ATS2020
Assessment of Transversal Skills

# ATS2020
# Learning and Assessment Model and the Transversal Skills Framework

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# ATS2020 - Assessment of Transversal Skills 2020

# D1.3: ATS2020 Learning and Assessment Model

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# ATS2020 Learning and Assessment Model and the Transversal Skills Framework


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# Contents

# 1. Introduction

Preparing students for living and working in the 21st century requires education systems to provide them with a core body of knowledge along with a set of key competences. The rapid growth of digital tools used by youth challenges national ministries of education. Student exposure to web 2.0 tools, devices, and environments brings new affordances, challenges, opportunities, and demands new skills for teaching and assessment *of*, *for* and *as* learning. Education must reform to accommodate, facilitate and develop 21st century learning, teaching, assessment and skills (Griffin et al., 2012).

In order to realise this new potential, education systems must support teachers to extend their pedagogy in order to coach young people to develop the knowledge, skills and values they need to live and work in a globalised economy and to contribute meaningfully and responsibly both locally and globally. The ATS2020 learning and assessment model constitutes a comprehensive model, exploiting modern approaches to develop such skills and innovative tools to assess them.

Emphasising student active engagement in their own learning and approaching summative assessment as formative assessment as long as it incorporates feedback used by the learner *(Taras, 2005),* the ATS2020 model introduces ePortfolios as a learning process and a product for the development and assessment of transversal skills. The learning model is based on a three-level developmental ePortfolio process -repository, workspace and showcase- (Abrami and Barrett, 2005) with an embedded continuous reflection cycle of "my learning" [1]. It is based on the argument that "Portfolio-type self-assessments or observations of key competencies grounded within authentic learning situations are suggested as methods that are better suited to supporting learners to develop key competencies and for validly assessing key competencies" *(Hipkins, Boyd & Joyce, 2005).*

## 1.1. Aims and Objectives of this Deliverable

This deliverable aims firstly to refine the initially proposed ATS2020 learning and assessment model and describe its basic elements. It then presents the theoretical background, the development process and the ATS2020 transversal skills framework. More specifically, to identify the competence areas and skills that the ATS2020 experimentation will focus; to define indicators (attainment goals) for each skill, taking into account existing work on transversal skills frameworks; to define each indicator through descriptive elements (attainment examples); and to provide a quantified representation to assess the learner's skills developed (proficiency levels).

The ATS2020 transversal skills framework, as the main output of this deliverable will be the base for the development of the ATS2020 learning designs (LDs), the scaffolding assessment tools (SAT) and the experimentation evaluation tools (EET).

## 1.2. Structure of the Report

This report is structured into three main sections:

- *The ATS2020 Learning and Assessment model,* gives an overview of the ATS2020 learning and assessment model as it was initially proposed and describes its basic elements, through WP1 extensive literature review.

[1] As introduced in *EUfolio: EU Classroom ePortfolios* a project funded by the European Commission under the framework of the Lifelong Learning Programme (KA1 - Implementation of the European strategic objectives in Education and Training) (2013-2015).

- *The ATS2020 Transversal Skills Framework,* describes the theoretical background on which the development model and process were grounded. The ATS2020 transversal skills framework is presented.
- *Tools and resources for the ATS2020 Learning and Assessment model,* describes how the framework can be translated into learning designs and assessment tools for the needs of the ATS2020 experimentation.

Finally, a number of appendices are included in the report to support the text references.

## 1.3. Key Terms

***Transversal skills***: Transversal skills refer to skills such as the ability to think critically, take initiative, solve problems and work collaboratively, skills relevant for individuals as citizens and in employment in today's varied and unpredictable career paths[2]. For the purposes of this paper the term "transversal skills" will be used, in the place of various synonyms used for the same core body of skills as transversal skills (such as 21st century skills, key competences, digital skills, 21st century skills, key skills, transferable skills).

***Skills***: As described in the European Qualifications Framework (EQF)[3], skills refer to the ability to apply knowledge and use know-how to complete tasks and solve problems. They can be described as *cognitive* (involving the use of logical, intuitive and creative thinking) or *practical* (involving manual dexterity and the use of methods, materials, tools and instruments).

***Competence***: Competence refers to a group of skills. In the EQF it refers to the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development[4]. In the ATS2020 project 5 competence areas are described.

***Digital competence***: Digital competence refers to a broad range of skills needed for and developed in a digital context. "Digital competence involves the confident and critical use of Information Society Technology (IST) for work, leisure, learning and communication. It is underpinned by basic skills in Information and Communication Technologies (ICT): the use of computers to retrieve, access, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet."[5]

***Attainment goals***: The learning goals to be attained in reference to the skills of the competence areas in the ATS2020 Transversal Skills Framework.

***Attainment examples***: Examples of learning that indicate the learning attained in reference to the attainment goals of the ATS2020 Transversal Skills Framework. The attainment examples are approached under the lens of ways of thinking (stands), ways of working (actions) and ways of living (ethics), so as to scaffold the learning designers to address the broader spectrum of learning.

***Proficiency levels***: Three progressive proficiency levels for each skill in the ATS2020 Transversal Skills Framework.

[2] ET2020 WG on Tranversal Skills (http://www.seecel.hr/et-2020-working-group-on-transversal-skills)
[3] The European Qualifications Framework for Lifelong Learning
[4] The European Qualifications Framework for Lifelong Learning
[5] DG CNECT, F4

## 2. The ATS2020 Learning and Assessment Model

Preparing students for living and working in the 21st century requires education systems to give citizens core knowledge along with a set of key competences. The rapid growth of digital tools use by the youth challenges national ministries of education. Student exposure to web 2.0 tools, devices, and environments brings new affordances, challenges, opportunities, and demands new skills for teaching and assessment *of*, *for* and *as* learning. Education must reform to accommodate, facilitate and develop 21st century learning, teaching, assessment and skills (Griffin et al., 2012).

**The *Assessment of Transversal Skills 2020 (ATS2020)* project proposes a comprehensive learning model to enhance student transversal, 21st century indispensable, skills, within the diverse EU national curricula, including provision of teachers with modern approaches and innovative tools for the assessment of these skills.**

The ATS2020 learning and assessment model extends and fleshes-up existing models combining process and product: a web of learning activities leading to learning outcomes; technological and scaffolding tools evaluated, extended and redesigned. Evidence of learning will be gathered using an ePortfolio three-level developmental process -repository, workspace and showcase- (Abrami and Barrett, 2005) with an embedded continuous reflection cycle of "my learning"[6]. Teachers and students are expected to collaborate and make evidence-based decisions while (re)designing instruction and learning.

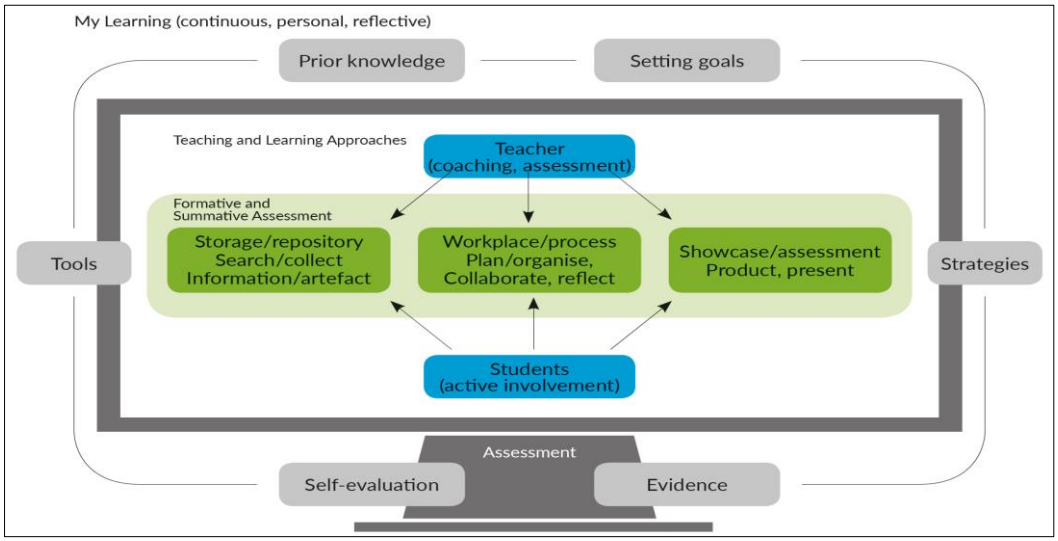


*Figure 1: ATS2020 Learning and Assessment Model*

The ATS2020 learning and assessment model has been derived from the work of *EUfolio - EU Classroom ePortfolios,* a project funded by the European Commission under the framework of the Lifelong Learning Programme (KA1 - Implementation of the European strategic objectives in Education and Training), during 2013-2015. The EUfolio project findings showed that ePortfolio approach as a comprehensive learning model provided an excellent vehicle for formative assessment, supporting student self-reflection and assessment, enabling peer assessment and enhancing teacher feedback with the potential to become more communicative. Furthermore, students had a more approachable opportunity to redraft work and thereby bridge gaps in their learning. Moreover, teachers appreciated that they were successful in achieving cognitive goals and developing 21st century skills even though there was little evidence supporting their

[6] As introduced in *EUfolio: EU Classroom ePortfolios* a project funded by the European Commission under the framework of the Lifelong Learning Programme (KA1 - Implementation of the European strategic objectives in Education and Training) (2013-2015).

beliefs. Most teachers stated that the formative assessment of their students' work was facilitated by the ePortfolio implementation, but they did not adequately describe how they assessed their students formatively. There were teachers who admitted that they needed guidance in order to evaluate and assess their students' ePortfolios with particular difficulty on assessing their students' 21st century skills (Economou and Avraamidou, 2015).

The above findings pointed to the need for further exploiting ePortfolios for developing and assessing transversal skills. Emphasis in the new learning and assessment model is given on the learners' active engagement of their own learning and on assessment *of*, *for* and *as* learning, providing a Transversal Skills Framework, based on which assessment tools were developed.

The proposed ATS2020 learning and assessment model was revisited and refined, based on extensive literature review in WP1; the basic elements of the model were identified and described.

## 3. Basic Elements of the ATS2020 Learning and Assessment Model

The ATS2020 learning model is based on and, at the same time, further promotes new innovative learning approaches enhanced by digital technologies. A strong theoretical background based on desktop research and literature review guided the project partners to the deconstruction of the proposed model into its basic elements. The learning model includes the following basic elements (Figure 2): transversal skills; ePortfolio; students' active participation in the designing of their learning (*My Learning Journal*), Assessment *of*, *for*, and *as* learning; digital technologies enhanced learning.


*Figure 2: Basic Elements of the ATS2020 Learning Model*

### 3.1. ePortfolio

In the ATS2020 model, ePortfolio is both a process and a product; it uses an ePortfolio three-level developmental process -*repository, workspace* and *showcase*- with an embedded continuous reflection cycle of *My Learning Journal*, for student planning of their own learning.

For the purposes of the project ATS2020, ePortfolio has been adopted as defined in the framework of the European project EUfolio (2014): "ePortfolio is student-owned dynamic digital workspaces wherein students can capture their learning and their ideas, access their collections of work, reflect on their learning, share it, set goals, seek feedback and showcase their learning and achievements".

The ePortfolio can provide students with the approach and the digital environment that will allow them to cultivate and develop transversal skills, to follow a process of self-reflection and self-assessment and cultivate skills of self-regulated learning. Additionally, the ePortfolio constitutes an innovative method of assessment of student learning and in particular assessment of transversal skills since it (re)presents each student course of learning and progress.

## 3.2. My Learning Journal

The *My Learning Journal*, as a tool of ATS2020, places students at the centre of learning by engaging them in a repeated process during which they design their own learning. During this process, students write down their prior knowledge about the topic they engage in; they set their learning goals; they develop strategies for achieving these goals; they set assessment criteria including the learning evidence that they need to collect. In the end, they reflect on the process that they have followed and assess their learning. This is a spiral continuous process. Students are expected to design and complete the *My Learning Journal* for each Learning Cycle, as well as for the whole school year. *My Learning Journal* for the school year should refer to the transversal skills students will focus on, as well as their whole experience in ATS2020. Each *My Learning Journal* is gradually developed and redesigned, as needed.

Just like other skills, transversal skills are developed by exercising them. Thus, for autonomous learning, students through *My Learning Journal* become self-regulated learners, take control of what they are learning, set and share learning goals with teachers and peers, evaluate their own work and the work of their peers and understand the feedback they receive.

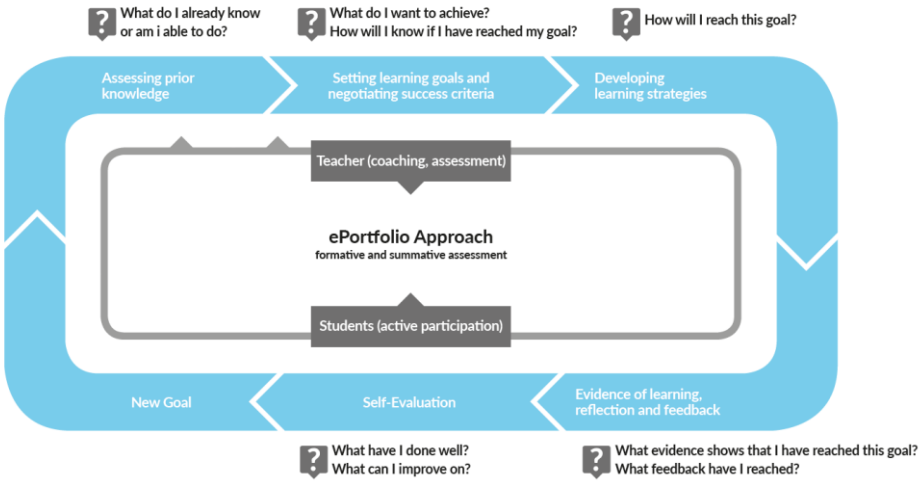


*Figure 3: Basic Elements of the ATS2020 Learning Model*

## 3.3. Assessment

Assessment is more and more seen as a tool for enhancing and informing learning, rather than just certifying it. To ensure effective formative assessment teachers need to share learning goals with students, enable them to self-monitor and self-regulate their learning, provide high quality constructive beyond informative feedback to students making multicriteria judgments and helping their students close their 'gap', involving them in the process of assessment. Assessment of transversal skills through an ePortfolio process approaches assessment *of*, *for* and *as* learning. Material on innovative approaches for assessment and formative assessment scaffolding tools are created, based on the *ATS2020 transversal skills framework*.

Assessment should be an important supportive tool for learning and at the same time a mechanism for individual empowerment. Assessment *of* learning involves approaches that assume the role of tools and provide a frame for the collection of evidence of learning, based on a specific and systematic process. Assessment *for* learning and *as* learning includes tools for learning, providing opportunities for students to develop new skills during their learning process.


*Figure 4: Assessment of, for and as learning*

Formative assessment in particular, has been prevalent in the educational discourse over the past decades, shifting the attention towards assessment practices that aid the learning and teaching process: "Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes" (Black & Wiliam, 1998). Feedback is an integral part of formative assessment that requires teachers to develop designing skills, so as to be specifically effective in designing and providing opportunities for their students to self-monitor and self-regulate their learning (Dixon, 2011). Formative assessment is always important for the progress of a learner, but especially so when the learning goals refer to transversal skills.

The ATS2020 model includes innovative scaffolding assessment tools *for*, *as* and *of* learning. Moreover, it suggests that ePortfolios provide an effective tool for developing and assessing transversal skills, aligned with Hipkins, Boyd and Joyce (2005) argument that "Portfolio-type self-assessments or observations of key competencies grounded within authentic learning situations are suggested as methods that are better suited to supporting learners to develop key competencies and for validly assessing key competencies".

Project deliverables *"D1.2-Report on research and literature on innovative assessment for learning approaches" and "D1.4-Technology and tools for the scaffolding of teachers, learners and researchers towards the assessment of the teaching and learning*" include a thorough review of literature on assessment.

## 3.4. Innovative Learning Approaches

### 3.4.1. Digital Technologies Enhanced Pedagogy

The rapid growth of digital technologies is increasingly influencing the way we live, learn and work. Children's use of digital technologies even more from younger ages, brings new affordances and opportunities, but also challenges. European Ministers of Education agree that Information and Communication Technologies (ICT) offer many unprecedented opportunities to make the learning journey more engaging and effective. ICT opens up new ways to involve learners and motivates them to continue to learn; to assess learning outcomes; to foster innovation and creativity.[7] At the same time, technology provides the opportunity to increase efficiency and equity in education. "Open technologies allow All individuals to learn, Anywhere, Anytime, through Any device, with the support of Anyone."[8]

[7] OPENING UP EDUCATION THROUGH TECHNOLOGIES: Towards a more systemic use for a smart, social and sustainable growth in Europe. Conference by EU Ministers of Education - Background Note. Oslo: December, 9-11 2012 (Organised by Cyprus and Norway, under the Cyprus Presidency of the Council of the European Union)

[8] COM/2013/0654: COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources.

In order to be able to exploit the full potential of digital technologies in education systems, new pedagogies and innovative learning and teaching practices are required. Learning design for technology-enhanced pedagogies is needed to avoid using technology as a mere substitute, but instead move from enhancement to transformation. Puentedura (2013) refers to his SAMR model at 4 steps in integrating technology into teaching and learning: Substitution, Augmentation, Modification and Redefinition [9]; this progressive approach will allow the use of technology for the creation of new learning activities previously inconceivable.

The ATS2020 project introduces a visualised learning design approach to enable the use of technologies to support the development and assessment of transversal skills.

#### *3.4.1.1. Learning Design Approach*

Learning Design is considered to be one of the most vital elements of successful teaching and learning, especially when teaching and learning involve innovative approaches and methodologies. The assessment of transversal skills, through an ePortfolio process, involves and requires new skills and tools to support the learning designs. Thus, one important aspect of the teachers' training was the introduction to Learning Design process, since teachers were expected to design their own educational scenarios or adapt existing ones that were developed at project level.

For that purpose, a Visualised Learning Design (VLD) approach is adapted for the needs of the project, based on the work of the UK Open University and the European project "Design Practice – PREATY"[10]. The project aimed to investigate how the Visualised Learning Design approach, as developed by the UK Open University supports teachers in the design of technology-enhanced activities (Avraamidou and Economou, 2011).

More on the Visualised Learning Design approach and its implementation in the ATS2020 project can be found on the project deliverables "D3.1-Professional Development Programme" and "D3.3-Learning Scenarios".

For the purposes of the ATS2020 project, the VLD approach was adapted to the needs of the ATS2020 learning model and its elements. It is expected that this approach helps the ATS2020 partners and trainers to guide and support the participating school teachers in the designing of learning scenarios that will lead to successful ATS2020 learning model goals, while at the same time will enhance communication among teachers and stimulate innovative pedagogical activities while designing.

## 3.5. Online Learning Environments

The online learning environments selected for ATS2020 are the open-source environments *Mahara* and the business solution *Office365 OneNote Class Notebook.* Based on the project deliverables of WP1 and WP2 (D1.4: ATS2020 Technology and Tools, D2.1: Specification for tools for a formative assessment process, D2.2: Describe tools and affordances for student-centred learning and assessment, D2.3: Customisation/development of tools, and D2.4: Support for key users, evaluation and further development of the tools) the two learning environments are adapted to meet the requirements of the learning model and a number of presentations, guides and training activities with supporting material are being designed and developed.

The Mahara environment provides a closed (private) secure environment, which allows users to create and save websites and documents, to upload and download files, to create learning groups providing them with material and lesson activities, to incorporate online tools, to participate in forum discussions, to provide and

[9] http://www.hippasus.com/rrpweblog/archives/2013/05/29/SAMREnhancementToTransformation.pdf
[10] http://www.design-practice.org, http://www.pi.ac.cy/preaty

receive feedback, to complete the *My Learning Journal*, and put together ePortfolios in order to showcase their assignments and artefacts.

The Microsoft Office 365 group of online tools and applications includes OneNote Class Notebook, OneDrive, SharePoint, Yammer, Lync as well as other embedded Web Apps and Office365 processing programs. A closed (private) secure environment is provided which allows users to create, save files, to organize their lessons in OneNote Class Notebook (materials, structure of activities, provision of feedback, utilisation of collaboration space), to fill-in *My Learning Journal*, and create their ePortfolios.

### 3.6. Innovation and Change Management

For a successful and sustained implementation of an innovation the teacher role is critical. As ATS2020 introduced innovative learning approaches within the school, and as teachers and school leaders as agents of change are considered to have a substantial role in the successful implementation of any innovation, it was considered essential to go through some literature review on this area (project deliverable "D1.5 Change Management and Implementation Model for Schools").

### 3.7. Transversal Skills

The rapid technological growth and digital transformation of our societies, have brought new affordances and at the same time new challenges in people's lives. While many opportunities arise from the use of digital technologies, citizens risk being unprepared for the future. In order to realise the potential of digital technologies, education systems must support students to develop the knowledge, skills and values for living and working in a digital environment.

*Transversal skills* refer to skills such as the ability to think critically, take initiative, problem solving and work collaboratively, skills which are relevant for individuals as citizens and in employment in today's varied and unpredictable career paths[11]. The ATS2020 project looks at transversal skills as a broad set of key skills developed through different disciplines that are critically important for success in school, further education, work and personal and social life; it focusses (as described in the next sections of this document) on transversal skills for *autonomous learning*, *collaboration and communication*, *information literacy*, and *creativity and innovation* in a *digital context*.

Various initiatives refer to such skills under different labels, including *21st century skills, key competences, digital skills, key skills, transferable skills, soft skills* and *life skills*, with many similarities or small differences. In this broad spectrum of (re)defining necessary skills needed for the 21st century, a number of frameworks are being developed internationally elaborating on the same core body of skills. ATS2020 project reviewed a wide range of such frameworks so as to examine whether a framework can be used, adapted or build on existing frameworks for the *ATS2020 Transversal Skills Framework*.

Deliverable "D1.1 - Research report on transversal skills frameworks" records this task, from which the next section gives an overview.

## 4. Existing Frameworks Review

A number of frameworks have been developed in parallel around the world on transversal skills. For the purposes of the ATS2020 project, we conducted in-depth desk research and literature review to identify the most grounded frameworks, relevant to the ATS2020 learning and assessment model and its goals. We studied a large number of frameworks, so as to identify the most pertinent key skills that are critical to

[11] ET2020 WG on Tranversal Skills (http://www.seecel.hr/et-2020-working-group-on-transversal-skills)

meeting the needs of students in the 21st century, relevant to the ATS2020 goals and aims and not isolated from the educational context of the ATS2020 partner countries. This list was not exhaustive, as new work and research is continuously being developed on this area, and through the three-year life spam of the project it kept being updated. The outcomes of this work are discussed in "D1.1: Research report on transversal skills frameworks". The frameworks analysed are also listed here in Table 1, with a short overview.

*Table 1: List of Frameworks on "transversal skills" reviewed for the ATS2020 project*

| Framework | Description |
|---|---|
| enGauge 21st Century Skills: Digital Literacies for a Digital Age | The enGauge 21st Century Skills were developed by the North Central Regional Educational Laboratory (NCREL) and the Metiri group with the purpose of fostering 21st century competences in students, teachers, and administrators. The enGauge 21st Century Skills were developed through a process that included literature reviews, research on emerging characteristics of the Net-Generation, a review of current reports on workforce trends from business and industry, analysis of nationally recognised skill sets, input from educators, data from educator surveys, and reactions from constituent groups. In addition, data was gathered from educators at state-level conference sessions in 10 states, surveys, and focus groups in Chicago and Washington, D.C. Initial drafts of the enGauge 21st Century Skills were reviewed by experts in the field prior to inclusion in the enGauge list.<br>The following skill clusters, when considered within the context of rigorous academic standards, are intended to provide the public, business and industry, and educators with a common understanding of—and language for discussing—what is needed by students, citizens, and workers in the Digital Age: Digital-Age Literacy; Inventive Thinking; Effective Communication; High Productivity.<br>Each skill cluster is further broken down into representative skill sets, which offer guidance on recognizing student performance in developing the enGauge 21st Century Skills.<br>Further exploiting the enGauge framework, NCREL with Metiri Group developed a new Web-based framework which identifies Six Essential Conditions—systemwide factors critical to effective uses of technology for student learning.<br>*(NCREL and Metiri, 2002)* |
| The Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo) | In late 1997, the OECD initiated the DeSeCo Project with the aim of providing a sound conceptual framework to inform the identification of key competencies and strengthen international surveys measuring the competence level of young people and adults. This project, carried out under the leadership of the Swiss Federal Statistical Office in collaboration with the U.S. Department of Education, National Center for Education Statistics, and with support from Statistics Canada, brought together experts in a wide range of disciplines to work with stakeholders and policy analysts to produce a policy-relevant framework. Individual OECD countries were able to contribute their own views to inform the process. The project acknowledged diversity in values and priorities across countries and cultures, yet also identified universal challenges of the global economy and culture, as well as common values that inform the selection of the most important competencies.<br>DeSeCo aimed to develop, through an interdisciplinary, collaborative, and forward-looking approach, a frame of reference for assessments and indicators of competencies that would have resonance with the information needs of policy-makers. It is a vital contribution to advancing our understanding of what it means to be a competent individual and of how investments in key competencies can benefit both individuals and societies. Based on theoretical and conceptual approaches to competence and informed by political and practical considerations, the DeSeCo Project succeeded in developing a conceptual frame of reference for key competencies. DeSeCo's framework will serve as a guide to the OECD for the planning and implementation of a coherent, long-term strategy for assessments and indicators of key competencies among young people and adults. The DeSeCo framework could also find much wider application in the development of education and training programs for all stages of lifelong learning. |

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| | DeSeCo Project's conceptual framework for key competencies classifies such competencies in three broad categories: Using Tools Interactively; Interacting in Heterogeneous Group; Acting Autonomously. First, individuals need to be able to use a wide range of tools for interacting effectively with the environment: both physical ones such as information technology and socio-cultural ones such as the use of language. They need to understand such tools well enough to adapt them for their own purposes – to use tools interactively. Second, in an increasingly interdependent world, individuals need to be able to engage with others, and since they will encounter people from a range of backgrounds, it is important that they are able to interact in heterogeneous groups. Third, individuals need to be able to take responsibility for managing their own lives, situate their lives in the broader social context and act autonomously. These categories, each with a specific focus, are interrelated, and collectively form a basis for identifying and mapping key competencies. The need for individuals to think and act reflectively is central to this framework of competencies. Reflectiveness involves not just the ability to apply routinely a formula or method for confronting a situation, but also the ability to deal with change, learn from experience and think and act with a critical stance.<br>*(DeSeCo 2003)* |
| The Key Competences for Lifelong Learning – A European Framework<br>*(Note: A revised version has been published in 2018)* | The European reference framework is an outcome of the joint work of the European Commission and the Member States within the Education and Training 2010 Work Programme. This framework aims on one hand at identifying and defining the key competences that are necessary in the knowledge society; on the other hand, it aims at providing a European-level reference for supporting Member States' efforts towards ensuring the development of these key competences across all age groups. The Reference Framework sets out eight key competences:<br>- Communication in the mother tongue<br>- Communication in foreign languages<br>- Mathematical competence and basic competences in science and technology<br>- Digital competence<br>- Learning to learn<br>- Social and civic competences<br>- Sense of initiative and entrepreneurship<br>- Cultural awareness and expression.<br>Many of the competences overlap and interlock: aspects essential to one domain will support competence in another. Competence in the fundamental basic skills of language, literacy, numeracy and in information and communication technologies (ICT) is an essential foundation for learning and learning to learn supports all learning activities. There are a number of themes that are applied throughout the Reference Framework: critical thinking, creativity, initiative, problem-solving, risk assessment, decision-taking, and constructive management of feelings play a role in all eight key competences.<br>Each of the key competences has a short definition given before it is analysed in *Essential knowledge*, *Skills* and *Attitudes* related to this competence.<br>*(European Union 2006).* |
| P21's Framework for 21st Century Learning (P21) | The Partnership for 21st Century Skills (P21) developed in the US with the goal of positioning 21st century competences at the centre of K12 education under a vision for student success in the new global economy. P21 is an American organisation formed in 2001 with the sponsorship of the US government and several organizations from the private sector. P21's Framework for 21st Century Learning was developed with input from teachers, education experts, and business leaders to define and illustrate the skills and knowledge students need to succeed in work, life and citizenship, as well as the support systems necessary for 21st century learning outcomes.<br>P21 partnership has developed a unified, collective vision for learning known as the Framework for 21st Century Learning, to help practitioners integrate skills into the teaching of core academic subjects. According to P21, this Framework describes the skills, knowledge and expertise students must master to succeed in work and life; it |

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| | is a blend of content knowledge, specific skills, expertise and literacies. Every 21st century skills implementation requires the development of core academic subject knowledge and understanding among all students. Those who can think critically and communicate effectively must build on a base of core academic subject knowledge. Within the context of core knowledge instruction, students must also learn the essential skills for success in today's world, such as critical thinking, problem solving, communication and collaboration. When a school or district builds on this foundation, combining the entire Framework with the necessary support systems—standards, assessments, curriculum and instruction, professional development and learning environments—students are more engaged in the learning process and graduate better prepared to thrive in today's global economy.<br>The elements described as "21st century student outcomes" are the skills, knowledge and expertise students should master to succeed in work and life in the 21st century. These include: Core Subjects and 21st Century Themes; Learning and innovation skills; Information, Media and Technology Skills; Life and Career Skills.<br>The Partnership has identified five critical support systems to ensure student mastery of 21st century skills: 21st Century Standards; Assessments of 21st Century Skills; 21st Century Curriculum and Instruction; 21st Century Professional Development; 21st Century Learning Environments.<br>The *Assessment: A 21st Century Skills Implementation Guide*, was published in order to ensure that P21 support systems are aligned to produce 21st century outcomes for today's students.<br>*(Partnership for 21st Century Skills, 2007)* |
| ISTE standards for students (ISTE Standards·S) | The ISTE standards for students (ISTE Standards·S) were developed by the International Society for Technology in Education (ISTE). First published in 1998 (formerly NETS·S), they were the result of almost three years of development engaging a broad range of stakeholders. The standards defined what students needed to know and be able to do with technology. The second edition of the ISTE Standards·S focuses more on the skills and expertise and less on the technology tools themselves.<br>ISTE Standards·S identify several higher-order skills and digital citizenship as critical if we are to truly provide students the opportunity to learn effectively for a lifetime and live productively in our emerging global society and increasingly digital word. The ISTE Standards·S reflect the knowledge and skills that students need for work, life and citizenship in a digital age, global economy. The ISTE Standards·S are lofty learning goals, describing how students must leverage appropriate technologies to create, communicate, collaborate and innovate.<br>The technology standards for students are divided into six broad categories. A brief standard statement follows each category. The four performance indicators (a-d) for each standard provide specific outcomes to be measured: Creativity and Innovation; Communication and Collaboration; Research and Information Fluency; Critical Thinking, Problem Solving and Decision Making; Digital Citizenship; Technology Operations and Concepts.<br>Through the ISTE standards Refresh Project, the student profiles and scenarios were introduced. A general set of profiles describing ICT literate students at key developmental points in their precollege education (Grades PK-2, Grades 3-5, Grades 6-8 and Grades 9-12) were developed. The profiles highlight a few important types of learning activities students might engage in as the ISTE Standards·S are implemented. Furthermore, scenarios that accompany the profiles describe authentic activities that reflect not only the ISTE Standards·S but also relevant curriculum standards, underscoring the belief that technology use should not occur in isolation but as an integral part of learning across all skills and subject areas.<br>To ISTE, ISTE Standards are not a top-down construct. Teachers, technology coaches, other administrators and technology directors must work in concert to support the ISTE Standards·S. Student learning is at the centre of all educational efforts. Thus, ISTE Standards·T, ISTE Standards·C, and ISTE Standards·C were also published to support the ISTE Standards·S.<br>*(ISTE 2007)* |

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| UNESCO ICT competency standards for teachers (ICT-CST) | UNESCO ICT competency standards for teachers (ICT-CST) is a UNESCO initiative for identifying a common set of qualifications needed for the integration of ICT in teaching and learning. The framework was specifically designed to improve teachers' practice by providing guidelines for teacher education and training with a focus on ICT competences and on emergent views in pedagogy, curriculum, and school organisation. By crossing three approaches on human capacity development (technology literacy, knowledge deepening, and knowledge creation) with six components of the educational system (policy and vision, curriculum and assessment, pedagogy, ICT, organisation and administration, and teacher professional development) a curriculum framework is created for the UNESCO ICT Competency Standards for Teachers (ICT-CST) project (UNESCO 2008). The second phase of the ICT-CST project involves the establishment of a UNESCO mechanism to endorse training programs for compliance with the UNESCO standards.<br>The three approaches on human capacity development are employed along the six components of the educational system to develop the ICT-CST. The UNESCO ICT Competency Standards for Teachers Matrix presents this interrelation of the three approaches and the six components. Each of the cells of the matrix constitutes a module in the framework. Within each of these modules, there are specific curricular goals and teacher skills. A description of detailed teacher competencies, objectives, and methods for each module is provided.<br>*(UNESCO 2008)* |
| Innovative Teaching and Learning Research Project (ITL) and 21st Century Learning Design (21CLD) | Innovative Teaching and Learning (ITL) research on using the 21st Century Skill Rubrics along with the most effective models of professional development is an initiative sponsored by Microsoft Partners in Learning in collaboration with SRI International, namely the 21st Century Learning Design program (21CLD). Educators globally are working to design new models of learning that better prepare learners for life and work in the 21st Century. The purpose of the 21st Century Learning Design rubrics is to help educators identify and understand the opportunities that learning activities give students to build 21st century skills.<br>The 21st Century Skill Rubrics focus on the degree to which learning activities provide opportunities for students to develop 21st century skills and the degree to which student work exhibits these skills. Two types of rubrics were developed. Rubrics for coding learning activities describe the 21st century learning opportunities offered by each learning activity, while rubrics for coding student work describe the 21st century skills that students exhibit in the work they do. These rubrics deconstruct the broad concepts of "21st century learning opportunities" and "21st century skills" into component dimensions that direct attention to specific attributes of learning activities and student work. Learning activities are coded on five dimensions: collaboration, knowledge building, problem-solving and innovation, use of ICT for learning, and self-regulation. Student work is coded on four similar dimensions: knowledge building, problem-solving and innovation, use of ICT for learning, and skilled communication. Each dimension is accompanied by detailed definitions and a 4-point rubric to describe the varying depth with which the skill is called for (in learning activities) or exhibited (in student work). Figure 2 describes the dimensions in greater detail (SRI 2010).<br>For each dimension, definitions and rubrics are intended to distinguish clearly between learning activities that begin to provide basic opportunities for students to learn related skills and those that are structured so that students exercise the skill deeply.<br>For each dimension - Collaboration, Knowledge building, Problem-solving and innovation, Use of ICT for learning, Self-regulation, and Skilled Communication, the teacher is guided to determine how strongly the student work demonstrates the related skill. Each dimension has the same structure:<br>- An overview introduces key concepts for that dimension.<br>- "Big ideas" define important attributes of the student work for each dimension. |

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| | - A rubric uses the big ideas to help the teacher assign a number from 1 to 4, according to how strongly the student work demonstrates the given skill.<br>- A flowchart shows how to choose the best number in each case.<br>*(SRI International and Microsoft Partners in Learning, 2010)* |
| Assessment and Teaching of 21st Century Skills (ATC21S) and the KSAVE model | The ATC21S project define twenty first century skills as any skills that are essential for navigating the twenty-first century. These skills do not need to be new, but rather skills that are needed in the twenty first century, with essential new skills to emerge (Griffin et al., 2012). The project derived from the need, especially in developed economies, of major employers for skills demand jobs and deficiencies in these skills in new recruits in their workforces. Three major technology companies, Cisco, Intel and Microsoft, sponsored the ATC21S project, in joining forces with six national governments (Australia, Finland, Portugal, Singapore, England and USA), an academic partnership with the University of Melbourne, and an advisory panel (with representatives from OECD, IEA, UNESCO, the World Bank, the Inter-American Development Bank, the National Academy of Sciences and the International Test Commission). The multi-year project was launched in 2009 and aimed to define the skills required in operational terms, taking also into consideration teaching and learning needs from classroom practice.<br>ATC21S provides a list of twenty first century skills based on an analysis of twelve relevant frameworks. To structure the analysis of twenty first century skills frameworks, an overall conceptual diagramme was created, defining ten skills grouped into four categories: Ways of thinking; Ways of working; Tools for working; Living in the world. The KSAVE model was developed, where three categories were designed in order to approach each skill from different approaches: **K**nowledge, **S**kills, and **A**ttitudes, **V**alues, and **E**thics. The *Knowledge* category includes all references to specific knowledge or understanding requirements for each of the ten skills. The *Skills* category includes the abilities, skills, and processes that curriculum frameworks are designed to develop in students and which are a focus for learning. *Attitudes, Values, and Ethics* category refers to the behaviors and aptitudes that students exhibit in relation to each of the ten skills.<br>*(ATC21S, 2012)* |
| NAEP Technology and Engineering Literacy (TEL) Assessment | The Technology and Engineering Literacy Framework (TEL) was developed by WestEd for the 2014 National Assessment of Educational Progress (NAEP) at request of the National Assessment Governing Board of the US. The goal of this framework is to establish what students should know about and be able to do with technology. Students needed to demonstrate the wide range of knowledge and skills detailed in the three TEL assessment areas and they were asked to perform a variety of problem-solving tasks based on interactive scenarios reflecting realistic solutions. It included three content areas (Technology and Society, Design and Systems, Information and Communication Technology) and three practices (Understanding Technological Principles, Developing Solutions and Achieving Goals, Communicating and Collaborating).<br>Preliminary achievement level definitions (Basic, Proficient, and Advanced) have been developed for each of the three areas to be reported separately in the assessment and they will be used to guide item development and initial stages of standard setting for the 2014 NAEP Technology and Engineering Literacy Assessment.<br>As crucial to the assessment as the *practices* are the "contexts"—the situations and types of problems in which assessment tasks and items will be set. The practices expected of students are general, cross-cutting reasoning processes that students must use in order to show that they understand and can use their technological knowledge and skills. The contexts in which technology and engineering literacy tasks and items appear will include typical issues, problems, and goals that students might encounter in school or practical situations. Together, the assessment targets, practices, and contexts provide a structure for the generation of tasks and items.<br>*(NAEP, 2014).* |

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| DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe (2013).<br><br>DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model (2016).<br><br>*(Note: An updated version "DigComp 2.1: The Digital Competence Framework for Citizens" was published in 2017)* | "DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe" was published in 2013 by the European Commission Joint Research Centre (JRC). It presents a detailed framework for the development of digital competence of all citizens. The framework is the output of a wide stakeholder consultation. It consists of detailed descriptions of all competences that are necessary to be proficient in digital environments and describes them in terms of knowledge, skills, and attitudes. Three proficiency levels are suggested for each competence. The report also provides a self-assessment grid for mapping digital competence levels.<br><br>As described in the DIGCOMP report (2013), the shell of the DIGCOMP framework is structured in five dimensions:<br>- Dimension 1: competence areas that have been identified<br>- Dimension 2: competences that are pertinent to each area<br>- Dimension 3: proficiency levels that are foreseen for each competence<br>- Dimension 4: examples of the knowledge, skills and attitudes applicable to each competence (examples are not differentiated in proficiency levels)<br>- Dimension 5: Examples on the applicability of the competence to different purposes.<br><br>The DIGCOMP areas of digital competence are:<br>- Information<br>- Communication<br>- Content-creation<br>- Safety<br>- Problem-solving<br><br>For each of the above competence areas, a series of related competences has been identified. The first competence in each area is always the one that includes more technical aspects: in these specific competences, the knowledge, skills and attitudes have operational processes as a dominant component. However, technical and operational skills are also and embedded in each competence.<br><br>The self-assessment grid consists of 5 areas of digital competence and three proficiency levels, going from A (foundation level), to B (intermediate level) to C (advanced level).<br><br>*(JRC, 2013)* |
| Key Skills of Junior Cycle - Framework for Junior Cycle | A Framework developed by the Department of Education and Skills in Ireland for the needs of the Junior Cycle curriculum. Eight principles underpin the Framework for Junior Cycle:<br>- Quality<br>- Wellbeing<br>- Creativity and Innovation<br>- Choice and flexibility<br>- Engagement and participation<br>- Inclusive education<br>- Continuity and development<br>- Learning to learn<br><br>The learning at the core of junior cycle is described in twenty-four statements of learning. These statements describe what students should know, understand, value and be able to do at the end of junior cycle, having fully engaged with and participated in the junior cycle programme of their school. They are underpinned by eight principles and are central to planning for, the students' experience of, and the evaluation of the school's junior cycle programme. Schools will ensure that all statements of learning, along with eight key skills feature in the programmes offered to their junior cycle students. The detailed learning outcomes will be clearly set out in subject and short course specifications.<br><br>The eight key skills required for successful learning by students across the curriculum and for learning beyond school are analysed in 46 elements. The key skills are named and explained in language that students can access and understand. This will help them to take greater responsibility for their learning. The key skills will be embedded |

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| | in the learning outcomes of every junior cycle subject and short course. Thus, teachers will have a clear understanding of how they fit into a subject, short course or priority learning unit and how to build the skills into class planning.<br>*(Department of Education and Skills, Ireland, 2015)* |

As there are significant differences in the ways that skills are clustered in different frameworks, as well as in the nature and content of their descriptions, the ATS2020 team, worked towards a new organizational approach of the skills to focus on in its experimentation that would better much the educational context of the partner countries. The analysis of each area of skills decided, is described in the following section on the framework development methodology.

In Figure 5, Voogt and Roblin (2010), present a comparative analysis of the different frameworks they studied and the most mentioned competences in these frameworks.

| Mentioned in *all* frameworks | Mentioned in *most* frameworks (i.e., P21, EnGauge, ATCS and NETS/ISTE) | Mentioned in a *few* frameworks | Mentioned only in *one* framework |
|---|---|---|---|
| - Collaboration<br>- Communication<br>- ICT literacy<br>- Social and/or cultural skills; citizenship | - Creativity<br>- Critical thinking<br>- Problem solving<br>- Develop quality products / Productivity (except in ATCS) | - Learning to learn (ATCS, EU)<br>- Self-direction (P21, En Gauge, OECD)<br>- Planning (En Gauge, OECD)<br>- Flexibility and adaptability (P21, EnGauge)<br><br>Core Subjects:<br>- Mathematics; communication in mother tongue; science (EU, P21, ATCS);<br>- History and arts (P21 and ATCS) | - Risk taking (En Gauge)<br>- Manage and solve conflicts (OECD)<br>- Sense of initiative and entrepreneurship (EU)<br><br>- Interdisciplinary themes (P21)<br>- Core Subjects: economics; geography; government and civics (P21) |

*Figure 5: Similarities and differences between frameworks for 21st century skills (Voogt and Roblin, 2010)*

## 5. ATS2020 Transversal Skills Framework

The ATS2020 transversal skills framework was needed to be developed, with the aim to support the ATS2020 learning and assessment model and to guide the assessment of the transversal skills being developed. It was not developed with the aim to create a new framework reference of digital and transversal skills on its own; the framework is directly connected to the ATS2020 experimentation. The emphasis remains on the development and assessment of transversal skills and the framework will be experimented on, so as to provide an insight on how to develop and assess transversal skills under the indication of the specific targeted transversal skills identified for the needs of the ATS2020 model. Thus, the ATS2020 framework and its content can be adjusted depending on specific context and needs related to the transversal skills. This is very important as it should provide a clear methodology to follow for its further development or adaptation.

### 5.1. Literature Review

The extensive literature review gave the starting point for the ATS2020 Transversal Skills Framework to start forming. Al lot of work has been already done and the ATS2020 could build on it. It took a while, though, to study the frameworks collected for review, deconstruct each one in its elements and conclude in measurable transversal skills as the unit of analysis, and finally reconstruct a framework suitable for the needs of the ATS2020 project. Reasons for this complexity included:

- Existing work on frameworks for transversal skills is still in progress and it seems that a lot of research and experimentation is still needed in order to reach a common understanding on how to approach transversal skills and their assessment.
- Different terminology is used among the various frameworks for similar concepts, different content or even understanding is described for the same term, and clustering of skills is organised under various conceptual diagrams and structures.
- Competence areas are quite broad and there are skills that can have a place into more than one competence area or skills that can be placed in different areas or constitute a competence area on their own. For example, critical thinking or problem solving could be identified as a stand-alone area of competence or clustered under a number of other areas such as creativity and information literacy skills.
- In different frameworks the assessment of skills is addressed differently; in some cases, for example, standards and performance indicators are described, in some others content-related examples of what activities or tools can help to build proficiency are given, and in some others self-assessment criteria are listed.
- Some skills might not be relevant to a specific context, such as national, educational or even societal.
- The terms "digital literacy" and "ICT literacy" are not always clear in their content. Depending on the emphasis given, they could refer from "technical computer skills" to more complex skills within the digital context.

Thus, it was very important that a clear and explicit conceptual structure be described and agreed among the partnership. Moreover, the terminology used and the descriptions of each element had to reach a consensus and be consistent through the whole work and communication. Only then would all the stakeholders be able to contribute to the development of the ATS2020 framework, and use it effectively for the ATS2020 implementation and the development of the learning designs, the scaffolding assessment tools and the experimentation evaluation tools. It is noted here that in addition to the project partners, trainers (and even teachers and researchers at a later stage) were expected to contribute to the development of the framework and the development of the material based on it (LDs, SATs and EETs), and definitely to its use in the teaching and learning practices in the classroom as introduced by the ATS2020 learning and assessment model.

## 5.2. Work Plan

A working process was planned for the development of the ATS2020 transversal skills framework, as described below (not necessarily in a chronological order, as some tasks were done in parallel or were revisited):

1. Extensive desktop research and literature review to be accomplished.
2. All partners to share a basic understanding of the literature and studied frameworks and develop common understanding on various related concepts and terms (skills, competences, transversal skills, 21st century skills and so on).
    a. Training workshop for partners during the project kick-off meeting (2-3 April 2015) on transversal skills, discussion and exchange of first thoughts on how to approach the ATS2020 framework (Appendix 1). For that purpose, partners received before the kick off related material to review and be prepared to discuss during the workshop on transversal skills.
3. Partners to identify the relevant for their national context competence areas and skills.
    a. A template for partner country's priorities on Transversal skills was sent to partners right after the kick off meeting for their input (Appendix 2).
    b. A web meeting (6 May 2016) for first discussion on countries' transversal competence areas and skills priorities (Appendix 3).

4. Define the ATS2020 framework areas of competence and skills to focus on for the ATS2020 experimentation, based on the literature review and partners' priorities.
    a. Compilation of partners' input, cross-reference to existing frameworks and discussion on WP1 essential partners web meeting (4 June 2015) (Appendix 4).
    b. First draft of framework with competence areas and skills under focus and a first methodological approach for the ATS2020 further development, for discussion on WP1 essential partners web meeting (11 June 2015) (Appendix 5).
5. Finalise the descriptions of the skills to target under each competence area. First draft of extended framework analysis based on the proposed methodology.
    a. Presentation and discussion on Project Partners' second meeting, Slovenia, 2-3 July 2015 (Appendix 6).
    b. Online shared working documents for partners to provide feedback and input.
6. First version of the ATS2020 transversal skills framework.
    a. Presentation and discussion on the updated framework first draft during the Project Partners' fourth meeting in Ireland, 9-10 June 2016, based on partners' feedback and input (Appendix 7).
    b. Presentation and use of the framework during the Project Partners' third meeting, and Train the Trainers' workshop in Austria, 10-12 November 2015 (Appendix 8).
    c. Online shared working documents for trainers to provide feedback and input.
7. Second version of the ATS2020 transversal skills framework (after its use for developing the project LDs, SATs and EETs).
    a. Revisit and enrich framework after partners' and trainers' comments and feedback as well as the new CPI team's, while implementing the model for developing the LDs, SATs and EETs. These changes were related to the areas of Communication and Collaboration and Creativity and Innovation. Furthermore, the framework was enriched with additional attainment examples in all competence areas (Appendix 9).
    b. The second version of the framework was presented at the Project Partners' fifth meeting, Finland, 10-12 October 2016 and was shared online with all trainers (Appendix 10).
8. Third version of the ATS2020 transversal skills framework (after the completion of the experimentation).
    a. The framework was revisited for further updates after its employment in real classroom situations and the experimentation. No significant changes took place.
9. Dissemination of the ATS2020 transversal skills framework.
    a. The framework was disseminated at the project final conference on 2 February 2018.
    b. The framework is hosted on the ATS2020 online resources portal (ats2020.eu) and is referred to in the project deliverables and outcomes.

## 5.3. Methodology for the Design and Development of the ATS2020 Framework

### 5.3.1. The Journey

After a thorough review of the various frameworks on "transversal skills" worldwide it was evident that a clear and explicit approach for the ATS2020 framework development was needed. As the identification of the competence areas and skills was completed, it was necessary to agree on how to organise them and what level of analysis to reach. The different methodologies applied in the various frameworks studied in the literature review and the different backgrounds of the 17 project partners, supported List's (2016) argument "Regardless of whether we consider a levelled ontology independently plausible, it is undeniable that we use different levels of description to think and speak about the world" and necessitated the consideration of

defining an ontology or a taxonomy, in order to identify the concepts and categories in the transversal skills area (e.g. competence areas, skills, examples) and indicate their properties and the relations between them.

After the analysis of the partners' priorities on transversal skills, the following 5 areas of skills were decided to be addressed in the experimentation evaluation:

- information literacy
- collaboration and communication
- autonomous learning
- creativity and innovation
- digital literacy

In the beginning of the discussions *creativity and innovation* was suggested to be optional and not addressed in the experimentation evaluation; however, it was finally decided to be included, as it was an area that partners wanted to address. Furthermore, after long discussions it was decided that *digital literacy* will not be addressed as an independent competence area, but instead as an integral part of all the other areas, since all skills are developed and emerged through a digital context. Autonomous learning skills were also approached as skills that are necessary for all learning activities as students are expected to engage actively in their own learning through the *My Learning Journal*. Some other discussions also included the area of *entrepreneurship* as it addresses transversal skills important to the framework, such as problem solving, creativity and innovation. It was decided however, based on the work already done on *entrepreneurship* by the EU Joint Research Centre (2015), that *entrepreneurship* could refer to a whole new framework which is beyond the scope of the ATS2020 project, and that entrepreneurial skills would be embedded in the other ATS2020 framework areas. Moreover, it was noted that the five areas are overlapping, with skills in one area to support skills in another or skills of one area to develop along skills in another area. For example, *Information literacy* skills such as skills to *Process information and construct new knowledge*, are supported by *Creativity and innovation* skills such as *Create original works as a means of expression,* while *Define goals to achieve and develop a strategy to achieve them* under *Autonomous learning* develop along with *Contribute to project teams to produce original works or solve problems* skills under *Collaboration and Communication*.

Based on the above discussions, the approach of applying 4 "facets" to address these areas of skills was introduced. Facet 1 addresses the skills as analysed under each competence area. Facet 2 addresses the digital skills underlining all skills in each competence area. Facet 3 addresses skills under the lens of *ways of thinking*, *ways of working*, *ways of living* (in reference to the ATC21S framework and KSAVE model) with the aim to help the design of activities to achieve attainment goals that will contribute to (gnosis) *cognitive skills*, (praxis) *operational skills*, and (prognosis) *ethical and safety skills*. Even though the reference derives from ATC21S, the lens under which each skill is analysed does not necessarily correspond to the framework areas as they are, thus new names are introduced – gnosis, praxis, prognosis. A fourth facet was to be introduced at a later phase to identify skills that are emerging and developed during the ATS2020 model implementation and are part of entrepreneurship skills contributing to the entrepreneurship education (with references to the entrepreneurship JRC framework).

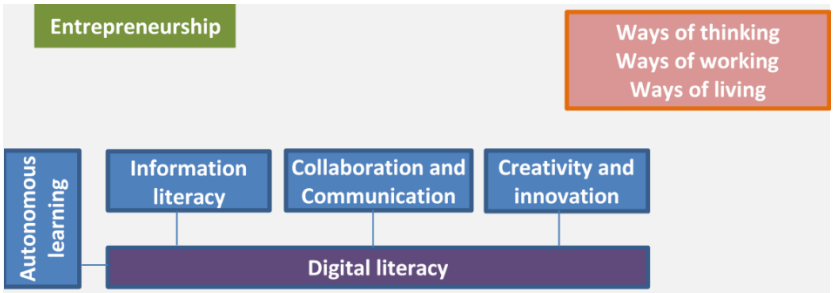


*Figure 6: The first methodological approach for the ATS2020 transversal skills framework*

An example to explain the 4 facets (Figure 7) was presented to the partners. In the *Information literacy* competence area, skills include *Search for information* (facet 1). Addressing this skill under facet 2 (*Digital literacy*) the skill *Use search engines on the internet* can be added. In addition, in facet 3, skills like *Be critical towards different tools and media* addresses *Ways of thinking*, skills like *Use search engines or databases that best answer to the research needs* addresses *Ways of working* and skills like *Ethical use of information* addresses *Ways of living*. Facet 4, will acknowledge emerging skills along the *Search for information* skill that are associated with entrepreneurship, such as *critical thinking*, *problem solving* and *decision making*.

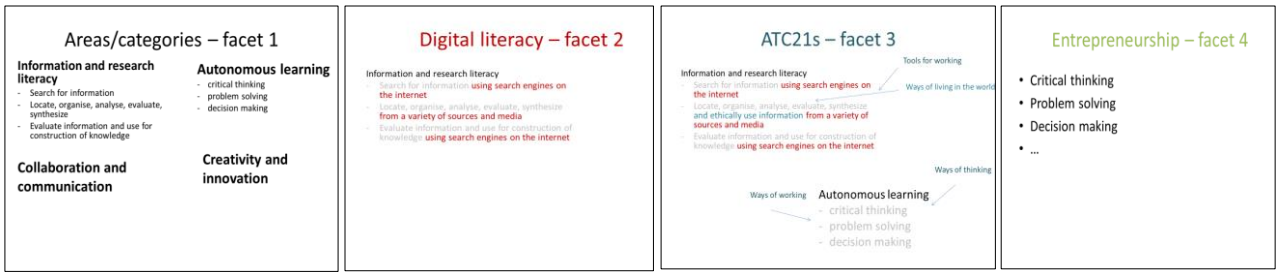



*Figure 7: An example of how to apply the first methodological approach for the ATS2020 transversal skills framework*

Another discussion during the development of a methodology to follow for the ATS2020 framework was to address challenges that have to do with learning standards and whether in the ATS2020 framework, skills assessment would be guided by indicators (Figure 8).

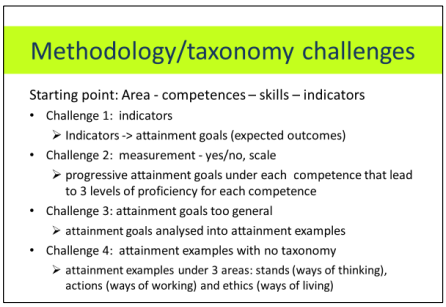



*Figure 8: Methodology challenges addressed*

These discussions led to the introduction of attainment goals for each skill in the place of indicators, to three proficiency levels for each skill and attainment examples for each attainment goals. The examples are approached under the lens of ways of thinking, ways of working and ways of living.

It is important to note that terminology changed through the progress of work and more systematic use of the same terms was pursued. For example, the use of the terms “skills” and “competences” together (e.g. “competences and skills”) or interchangeably (either “skills” or “competences”), caused some confusion.

### 5.3.2. The Methodology

The outcome of the journey to reach a methodology to guide and facilitate the development of the ATS2020 transversal skills framework was a *conceptual structure,* with the following elements:

- **competence areas** analysed into **skills**
- **attainment goals** set for each skill, with reference to digital competence area skills
- **attainment examples** given for each attainment goal, in three strands (stands, actions, ethics)
- three **proficiency levels** described for each skill

*Digital literacy* skills are cultivated through the use of digital technologies for the enhancement of the four competence areas. At the same time, the *Autonomous learning* skills are developed through the *My Learning*

*Journal,* guiding the learning process for the development of all. Furthermore, in all areas, skills reflect another dimension, supporting *ways of thinking* (stands), *ways of working* (actions) and *ways of living* (ethics).

Applying the above *conceptual structure* each area of competence was analysed into skills based on existing frameworks and in particular the Digital Competence Framework by the European Commission Joint Research Center (JRC, 2016), the ISTE Standards for Students (ISTE, 2007) and the ATC21S KSAVE Model (ATC21S, 2012). Each skill was then analysed into attainment goals, which refer to the student expected learning outcomes. There is in parallel refence to related digital skills that are needed to support the attainment goals, as learning is taking place in a digital context; for example, when the student is expected to *find relevant information*, digital skills such as *using different search engines to locate different types of information* are being described. As the attainment goals are still quite general, attainment examples (for each attainment goal) are given to help students, teachers, trainers and designers obtain a common understanding and through it identify the skills developed that will constitute the attainment of the learning goal and guide transversal skill assessment. The attainment examples are approached under the lens of *ways of thinking* (stands), *ways of working* (actions) and *ways of living* (ethics), so as to scaffold the learning designers to address the broader spectrum of learning. The attainment of the goals with the provided evidence supports the assessment of the skills which is reflected in three proficiency levels. The proficiency levels are approached in a progressive scale.

The example presented in Figure 9, shows the analysis of the attainment goal *Create new content in different formats* under the skill *Process Information and construct new knowledge* of the competence area of *Information Literacy,* to digital skills, attainment examples and proficiency levels.

| Skills | Attainment goals | Digital skills | Attainment examples | | | levels of "proficiency" 1 | levels of "proficiency" 2 | levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| 4. Process information and construct new knowledge<br>1. Plan strategies to guide inquiry<br>2. Evaluate and select information sources and tools based on the appropriateness to specific tasks<br>3. Locate, organise, analyse, evaluate, synthesize and ethically use information from a variety of sources and media<br>4. Process information and construct new knowledge | 4.1 Create new content in different formats | •Create and edit digital content<br>•Use software tools to create and edit text, presentations, videos and other formats | •See the potential of technologies and media for self-expression and knowledge creation<br>•Know which tool/application fits better the kind of content s/he wants to create<br>•Know that digital content can be produced in a variety of forms<br>•Understand how meaning is produced through multimedia (text, images, audio, video) | •Create knowledge representations (e.g. mind maps, diagrams) using digital media<br>•Create original works as a means of personal or group expression<br>•Use basic packages to create content in different forms (text, audio, numeric, images | • Judge constructive-ly and appreciate the work of others | Process information to create or edit content in a variety of formats, using different tools. | Process information to create or edit content in a variety of formats, using different tools. Construct their own (and new) knowledge. | Process information to create or edit content in a variety of formats, using different tools. Construct their own (and new) knowledge, in a creative and innovative way. Publish new content with respect to others. |

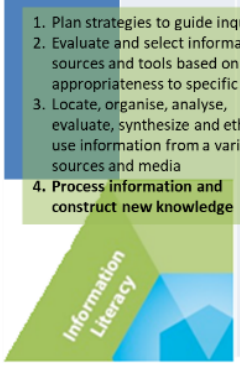



*Figure 9: An example of the analysis for the ATS2020 framework*

### 5.3.3. The Development Process

The methodology and *conceptual structure* introduced guided the development process of the framework. In order to identify the transversal skills related to the partner countries' priorities, the scene was introduced firstly by the exposure and study of the relevant literature review and existing framework.

#### *5.3.3.1. Literature Review*

The literature review was done through *D1.1: Research report on transversal skills frameworks* and all people involved (partners, trainers, researchers and teachers) were exposed to it through the report but also through presentations and workshops starting from the first project partner's meeting (as also described in

section 5.2 above). Existing frameworks were the base for the ATS2020 framework as the aim was not to create a new transversal skills framework; it was rather to adapt an existing one or more.

#### *5.3.3.2. Identification of Partner Countries' Priorities for Transversal Skills*

A working document (Appendix 2) was prepared and sent out to partners in order to identify their priorities of transversal skills based on both the literature review and their country context. The approach followed in most countries for this process, was to have meetings among the partners of the country and other stakeholders and discuss the needs of their educational systems and students. For example, the Cyprus team studied the frameworks presented in the workshop from the literature review and discussed during a face-to-face meeting which transversal skills (based on their professional experience) they considered important for the Cyprus implementation of the AST2020 learning and assessment model. The discussion took into consideration the following elements: the Cyprus education system needs and priorities; identification of a number of areas and skills that can be measurable and are of importance to focus under the existing educational system goals and curriculum; the ATS2020 learning and assessment model (3 levels of ePortfolio process and My Learning Cycle). The Cyprus team consisted of 3 teacher trainers, 1 researcher (with teacher background), 1 inspector and 1 counselor from secondary education (design and technology) and 1 inspector and 1 counselor from primary education.

#### *5.3.3.3. Compilation of Skills and Defining the Competence Areas to focus on*

The working documents were gathered from all partners and were compiled into one that was discussed. One of the challenges faced in this process was the diversity in the different countries' educational systems, specifically for the transversal skills approach within each country's curriculum. In some countries, as for example Ireland, the curriculum addresses transversal skills and defines goals and activities towards that direction (NCCA – Key Skills of Junior Cycle, 2012). On the other hand, in some other countries, for example Cyprus, there is but a very general reference of skills in the curriculum with no systemic inclusion of apart from scarce references in some subject units.

It was evident from this work, that skills that are closely related to the ATS2020 learning and assessment model included, skills that will be needed for the 3 levels of ePortfolio (e.g. Information literacy skills for level 1, collaboration and communication for level 2 and 3) and the My Learning Journal (e.g. Autonomous learning skills). At the same time digital literacy is an integral part of all areas of skills and thus an integral component to the ATS2020 model.

The areas of competences acknowledged by partners during this exercise, were grouped as follows:

- Digital competence, ICT and media literacy, ICT literacy, Digital citizenship
- Mathematics, Natural sciences, Technology competence
- Communication competence, Collaboration, Working with Others, Communicating
- Learning to learn competence, Learning to learn, Managing Myself, Autonomous learning
- Entrepreneurship and entrepreneurial spirit, Sense of initiative and entrepreneurship, Entrepreneurship
- Communication in the mother tongue, Communication in foreign languages
- Critical thinking
- Creativity, Creativity and innovation, Being Creative
- Staying Well
- Information and research literacy, Managing Information and Thinking

The discussions among project partners regarding the competence areas and skills to be identified through this process, referred to the following main points:

- One activity that almost all teachers give to their students is to look for information on the internet and turn in an assignment based on their research. However, it is not usually the case that during this activity, teachers aim in building skills that have to do with critical selection of sources, evaluation of

information, construction of knowledge and sharing outcomes. Thus, it is considered important for partners in ATS2020 to include the area of information and research literacy skills. At the same time information literacy skills are an essential part of the ePortfolio three-level approach of the ATS2020 learning model.

- A number of students are not competent enough to share their learning and communicate their work. They lack skills to argument and support their opinion. This could be quite deep and based on lack of knowledge and understanding of concepts (e.g. describing an electricity experiment without using electricity "words"). However, it could be based on lack of skills in using correct language, choosing effective media and understanding the audience. Thus, another important area for partners in ATS2020 is communication. Communication is often part of collaboration as it is necessary to be able to communicate effectively in order to collaborate effectively. Thus, communication and collaboration are to be addressed as one area of transversal skills. At the same time communication and collaboration skills are essential part of the ePortfolio 3 level approach that ATS2020 learning model uses.
- Usually students are quite guided in their learning process. A number of students if not given directions and clear steps to follow, might not be able to take initiatives for their learning. Thus, another area the partners considered is autonomous learning. *My Learning Journal* as introduced in the EUfolio project and adopted in the ATS2020 learning model aims towards that direction so as students build skills for autonomous learning.
- Creativity and innovation is an area that the ATS2020 team also considered important. Thus, another area to tackle through ATS2020 is creativity and innovation. However, in order to be able to monitor the development and assessment of these skills under the ATS2020 experimentation, partners agreed that skills need to be restricted in a defined spectrum. There was a suggestion that creativity and innovation is addressed by partners but will not be addressed as part of the ATS2020 experimentation evaluation.

It was also brought up that under each area there would be skills in common. For example, critical thinking is a skill needed in the area of information literacy and in the area of autonomous learning.

Most importantly, it was discussed that digital skills are needed in all areas with different dimensions. Digital tools and environments are part of the ATS2020 learning model and as such they require digital skills on behalf of the students. At the same time living in a world where digital technologies are part of everyday life, it is inevitable that communication skills, for example, incorporate digital communication skills. When referring to digital skills, it does not mean operational ICT skills alone but also skills within all the areas of transversal skills addressed in ATS2020.

Another important discussion was that through these suggested areas and skills larger ideas can be introduced such as "entrepreneurship" which some partners found quite interesting to approach as a "broader activity" during which the above areas of skills can be built.

#### *5.3.3.4. Analysing the Competence Areas into Skills*

A second review was done on the literature and 3 frameworks were identified as ones to be used as a base for the description of the elements of the ATS2020 transversal skills framework: *DigComp - Digital Competence Framework by the European Commission Joint Research Center (JRC, 2013, 2016)*, the *ISTE Standards for Students* (ISTE, 2007) and the *ATC21S KSAVE Model* (ATC21S, 2012). A comparative reference was used for ISTE and DigComp while the 4 areas of ATC21S (ways of thinking -stands, ways of working -actions, tools for working -digital skills, ways of living in the world -ethics), were to be used as an activity and attainment examples guide.

The competence areas were analysed into a set of skills based on the existing frameworks under four broad competence areas plus digital literacy. Digital literacy skills were used as a base line for all other areas (for example, when looking at information literacy skills, main sources and tools were to be digital).

Even though entrepreneurship is an area of skills of interest for most countries, it is such a broad area that it would be difficult to address in the scope of the ATS2020 experimentation. It seems that this area of skills can be the sum of skills mentioned in other areas (e.g. problem solving, critical thinking, autonomous learning). Thus, skills from other areas can be defined, that are also under entrepreneurship and address entrepreneurial behavior.

#### *5.3.3.5. Attainment goals and examples*

Following the *conceptual structure*, a number of attainment goals were set, in order to establish measurable student learning outcomes. The goals had explicit reference to digital literacy skills as well. As the attainment goals set were still quite broad and general, the development team, based on the *conceptual structure,* proceeded with the description of attainment examples under the 3 strands (ways of thinking, ways of working and ways of living). In parallel, the team described the three proficiency levels for each skill. This process led to the first version of the framework. This development phase continued with the involvement of more people (e.g. trainers) and the examples pool was being enriched. At the same time, while the examples were written the goals were also being refined. This process, along with the employment of the framework in the LDs, SATs and EETs, led to the second version of the framework.

#### *5.3.3.6. Employment of the Framework in the ATS2020 Model Implementation*

Trainers, and later on teachers, used the framework to develop the learning designs (LDs) for the ATS2020 learning model along with the scaffolding assessment tools (SATs). At the same time researchers developed the experimentation evaluation tools (EETs) for the student and pre-test. This phase constituted also the first validation process for the model. The framework was further used during the classroom implementations by teachers, trainers and researchers. To facilitate its use, the framework was presented in three views: (i) full view of each competence area with all the levels of analysis presented, i.e. skills, attainment goals, attainment examples, and proficiency levels, (ii) proficiency levels view of each competence area, i.e. skills, attainment goals and proficiency levels of analysis only, and (iii) attainment examples view of each competence area, i.e. skills, attainment goals and attainment examples only. After the experimentation, the framework was revisited and edited to its third version.

#### *5.3.3.7. Exploitation of the Framework*

The framework is expected to provide the flexibility to adapt its content (skills, attainment goals, attainment examples) to the context and needs of the implementation of the ATS2020 learning and assessment model. With the exploitation and scaling up of the ATS2020 model, it is expected to see more versions of the framework, validating its *conceptual structure* and *methodology*.

## 5.4. The ATS2020 Transversal Skills Framework

The ATS2020 Transversal Skills Framework includes five broad **competence areas** (four plus digital literacy were specified and selected for experimentation), with several specific **skills** in each competence area (Figure 6), based on existing frameworks in particular the Digital Competence Framework by the European Commission Joint Research Center (JRC, 2016), the ISTE Standards for Students (ISTE, 2007) and the ATC21S KSAVE Model (ATC21S, 2012). Skills are described at three **proficiency levels**; a number of **attainment goals** are set for each skill with explicit reference to digital skills; and **attainment examples** (for each attainment goal) help students, teachers, trainers and designers obtain a common understanding and through it guide transversal skill assessment -which is the objective of the whole project. The attainment examples are

approached under the lens of *ways of thinking* (stands), *ways of working* (actions) and *ways of living* (ethics), so as to scaffold the learning designers to address the broader spectrum of learning.

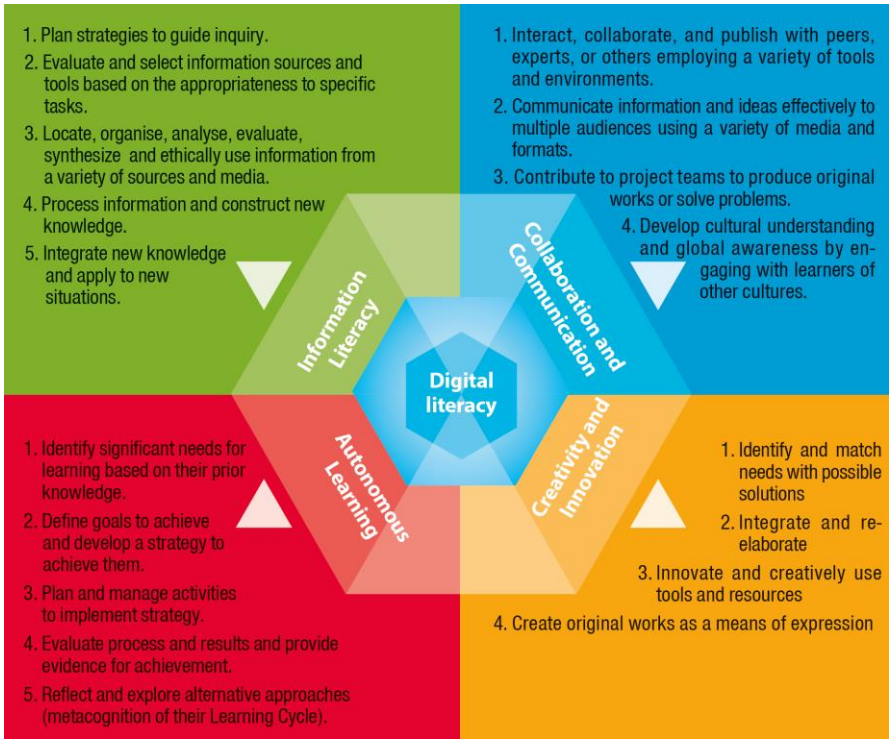



*Figure 10: ATS2020 competence areas of transversal skills*

In Appendix 11 the framework for each competence area is presented. The ATS2020 framework can also be found online at https://resources.ats2020.eu/resource-details/ADM/ats2020-framework.

## 6. Tools and Resources

The ATS2020 transversal skills framework was the base on which the learning designs, the scaffolding assessment tools and the experimentation evaluation tools were developed. In the visualised learning design approach used for the project, a macro level design template was introduced, where trainers and teachers identify the ATS2020 framework skills they will aim at during the learning cycle, so as to reach the curriculum expected learning outcomes (Figure 11). These are aligned with the tasks designed for the students to engage into and the learning outputs.

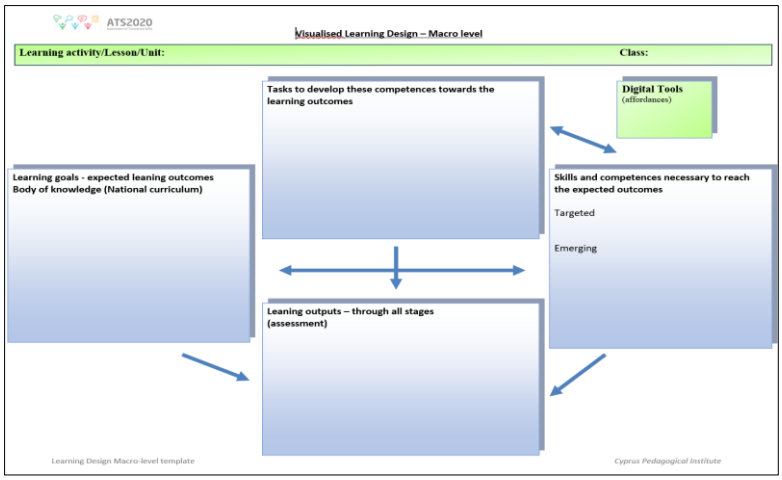
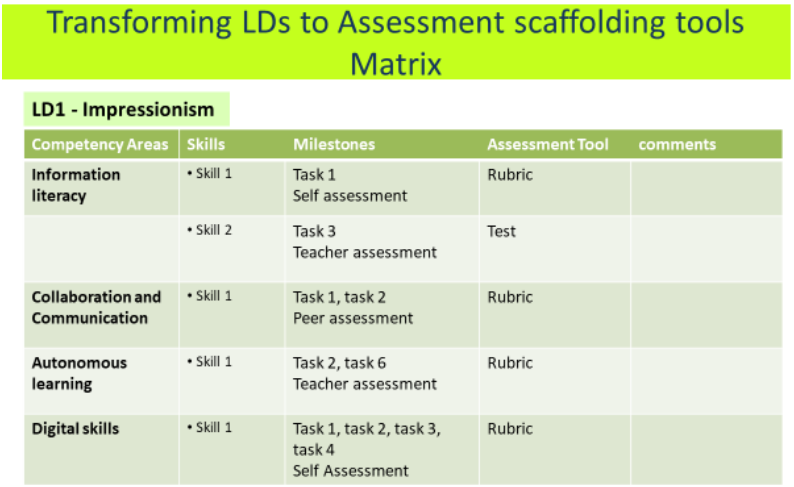



*Figure 11: Macro level template for the Visualised Learning Design approach*

## 6.1. Extending Learning Designs to Assessment Scaffolding Tools

Furthermore, the ATS2020 skills matrix was introduced. For each learning design (for example the Impressionism learning design, Figure 11), the competence areas to address are identified, along with the skills to be developed (taken from the ATS2020 framework). These are aligned with the attainment goals to reach and the attainment examples, while at different points of the learning process (milestones), assessment is taking place. Assessment tools (rubric, test, etc.) are planned to be used either by the students (for self- or peer-assessment) or the teachers for assessing transversal skills developed.



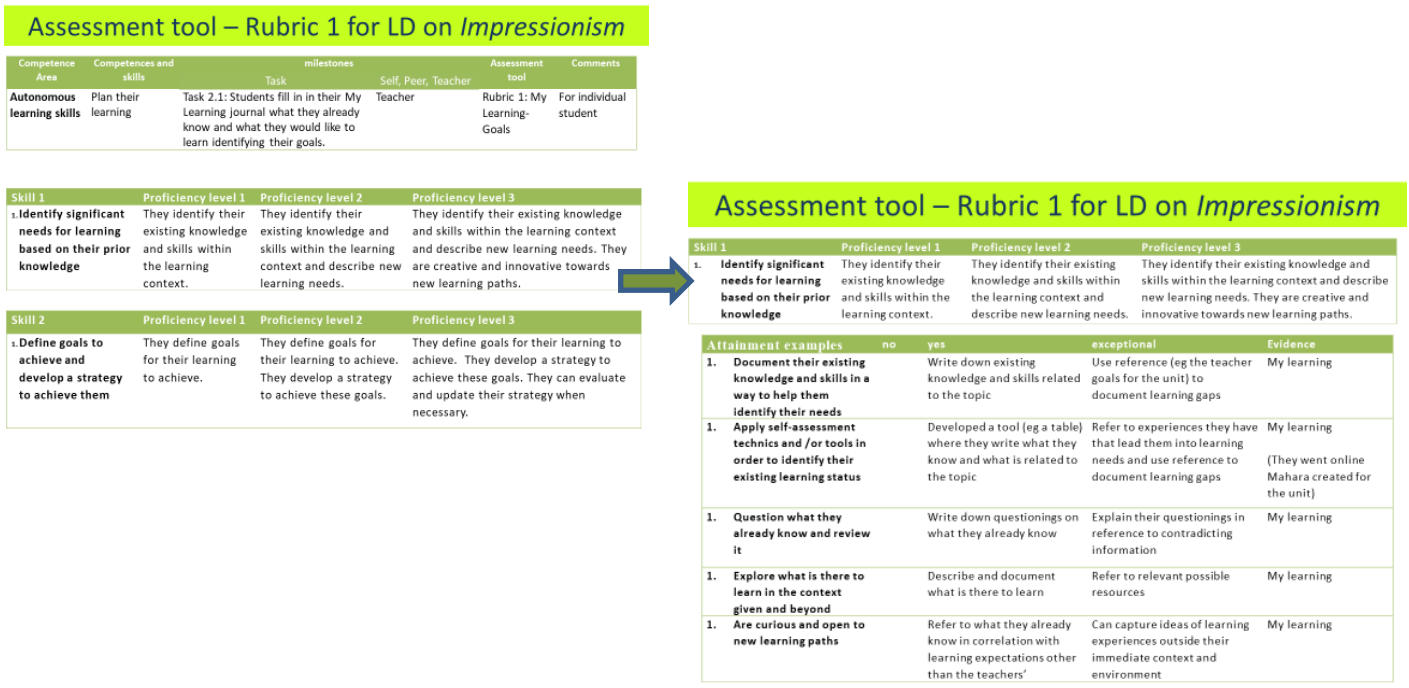
Transforming LDs to Assessment scaffolding tools Matrix

**LD1 - Impressionism**

| Competency Areas | Skills | Milestones | Assessment Tool | comments |
|---|---|---|---|---|
| **Information literacy** | • Skill 1 | Task 1<br>Self assessment | Rubric | |
| | • Skill 2 | Task 3<br>Teacher assessment | Test | |
| **Collaboration and Communication** | • Skill 1 | Task 1, task 2<br>Peer assessment | Rubric | |
| **Autonomous learning** | • Skill 1 | Task 2, task 6<br>Teacher assessment | Rubric | |
| **Digital skills** | • Skill 1 | Task 1, task 2, task 3, task 4<br>Self Assessment | Rubric | |

*Figure 12: Extending Learning Designs to assessment scaffolding tools matrix*

The development of assessment tools also follows the ATS2020 framework. As presented in Figure 13, the assessment of the student skill to plan his/her learning (under the Autonomous learning competence area) is developed with task 2.1. and will be assessed by the teacher using a rubric for each individual student. The rubric is then developed, so as through the attainment examples the teacher is enabled to identify the proficiency level of the student skill.



Assessment tool – Rubric 1 for LD on *Impressionism*

| Competence Area | Competences and skills | milestones: Task | Self, Peer, Teacher | Assessment tool | Comments |
|---|---|---|---|---|---|
| **Autonomous learning skills** | Plan their learning | Task 2.1: Students fill in in their My Learning journal what they already know and what they would like to learn identifying their goals. | Teacher | Rubric 1: My Learning-Goals | For individual student |

| Skill 1 | Proficiency level 1 | Proficiency level 2 | Proficiency level 3 |
|---|---|---|---|
| 1. **Identify significant needs for learning based on their prior knowledge** | They identify their existing knowledge and skills within the learning context. | They identify their existing knowledge and skills within the learning context and describe new learning needs. | They identify their existing knowledge and skills within the learning context and describe new learning needs. They are creative and innovative towards new learning paths. |

| Skill 2 | Proficiency level 1 | Proficiency level 2 | Proficiency level 3 |
|---|---|---|---|
| 1. **Define goals to achieve and develop a strategy to achieve them** | They define goals for their learning to achieve. | They define goals for their learning to achieve. They develop a strategy to achieve these goals. | They define goals for their learning to achieve. They develop a strategy to achieve these goals. They can evaluate and update their strategy when necessary. |

Assessment tool – Rubric 1 for LD on *Impressionism*

| Skill 1 | Proficiency level 1 | Proficiency level 2 | Proficiency level 3 |
|---|---|---|---|
| 1. **Identify significant needs for learning based on their prior knowledge** | They identify their existing knowledge and skills within the learning context. | They identify their existing knowledge and skills within the learning context and describe new learning needs. | They identify their existing knowledge and skills within the learning context and describe new learning needs. They are creative and innovative towards new learning paths. |

| Attainment examples | no | yes | exceptional | Evidence |
|---|---|---|---|---|
| 1. **Document their existing knowledge and skills in a way to help them identify their needs** | | Write down existing knowledge and skills related to the topic | Use reference (eg the teacher goals for the unit) to document learning gaps | My learning |
| 1. **Apply self-assessment technics and /or tools in order to identify their existing learning status** | | Developed a tool (eg a table) where they write what they know and what is related to the topic | Refer to experiences they have that lead them into learning needs and use reference to document learning gaps | My learning<br>(They went online Mahara created for the unit) |
| 1. **Question what they already know and review it** | | Write down questionings on what they already know | Explain their questionings in reference to contradicting information | My learning |
| 1. **Explore what is there to learn in the context given and beyond** | | Describe and document what is there to learn | Refer to relevant possible resources | My learning |
| 1. **Are curious and open to new learning paths** | | Refer to what they already know in correlation with learning expectations other than the teachers' | Can capture ideas of learning experiences outside their immediate context and environment | My learning |

*Figure 13: Development of an assessment tool*

Some considerations to be taken when designing or using an assessment tool include: whether the tools are global (like the example in Figure 13), that is independent of any context, or context-based, that is dependent of the context such as the task that the students are involved into (for example creativity skills for a video production); whether the tools are for the teacher to use or the student (peer- or self-assessment); whether the tools aim to assess individuals or group; and whether the tools are going to be used for formative or summative assessment (Figure 14).

| | |
|---|---|
| Teacher | Rubric, test |
| Student | Context specific context independent |
| Peer-assessment | Formative, summative |
| Self-assessment | Individual, group |

*Figure 14: Assessment tools characteristics*

## 6.2. Pool of Learning Designs and the Competences Matrix

The Visualised learning design process, helped teachers to explicitly refer to the transversal skills in their learning designs as well as align the learning goals with the activities, outputs and assessment. It also supported the communication of their ideas with their coach and other colleagues, facilitating giving and receiving feedback. The time needed for designing new scenarios was not always available for the teachers. Thus, the learning designs pool of examples was very helpful for teachers; they could fruitfully exercise their learning design skills for adapting these examples.

The learning designs provide ideas for different subject areas and can be used to help teachers prepare the learning cycles according to ATS2020 learning and assessment model. Teachers are encouraged to use them, adapt them or take them as a starting point for their ideas. The learning designs, as a resource, are expected to provide teachers an insight and an understanding of how their own learning designs and lessons could look like, to provide examples of the education process regarding what to teach, how to teach and how to assess in the framework of the project. The pool of learning designs helps the teachers to envision the teaching process with the incorporation of the ATS2020 methodology.

Teachers are also encouraged to keep their own matrix of LDs, based on the competence areas and skills that they tackle through the year. This is expected to facilitate the approach of skills development in a progressive approach building on previous skills within an area already worked with (Figure 15).

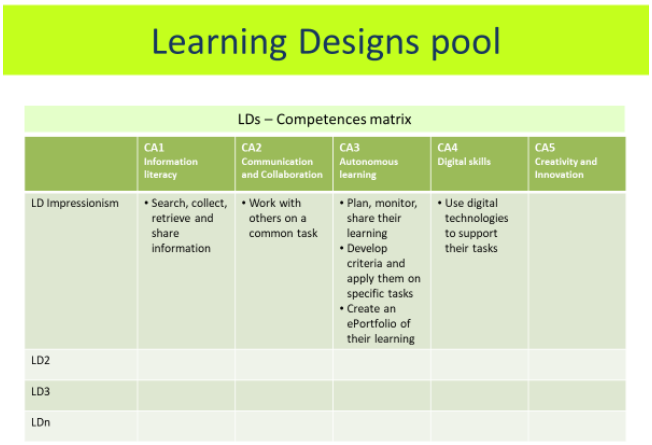



*Figure 15: Learning Designs competences matrix*

An online repository for the ATS2020 resources and tools (resources.ats2020.eu) hosts more than 80 fully developed and more than 100 macro level learning designs and more than 420 resources. For further information on the ATS2020 resources and tools you can refer to "D3.2: Training Material and Resources".

## 7. Teacher Training on the ATS2020 Learning and Assessment Model and the Transversal Skills Framework

As the ATS2020 learning and assessment model aims that students take an active role in their learning for transversal skills, it also entails for teachers to actively participate in the design and adaptation of their teaching. The assessment of transversal skills, through an ePortfolio process, involves and requires new skills and tools to support learning to take place. For that purpose, it was important that teachers were offered a high-quality training programme on the ATS2020 learning and assessment model and the transversal skills framework.

One important aspect of the ATS2020 teacher professional development programme was the introduction to Learning Design process, so as to guide teachers to explicitly include transversal skills in the learning goals and align learning activities with goals and assessment. ATS2020 teachers were expected to design their own educational scenarios or adapt existing ones that were developed at project level. The ATS2020 learning and assessment model and the transversal skills framework, were pivotal elements guiding the development of Learning designs and assessment tools.

The ATS2020 training programme is described in detail in deliverable "D3.1: Professional Development Programme".

## 8. Reflections on the ATS2020 Transversal Skills Framework

The process of developing the ATS2020 framework was a rich learning experience and enabled the development team to further understand how transversal skills can be developed and assessed. The analysis of each competence area into skills and setting goals to attain these skills, enabled the learning design for developing such skills within the curriculum. Moreover, the description of attainment examples and proficiency levels, facilitated the development of the assessment tools for these skills. The final ATS2020 Transversal Skills Framework as an output guided and supported the learning model implementation and triggered teachers' involvement in the design of more formative assessment scaffolding tools.

Developing, however, such a framework took a great effort and a strong team. The involvement of researchers, evaluation experts, curriculum developers, and teachers during the process proved to be indispensable. The development was a continuous process and the framework, as well as the process itself, allowed for flexibility and adaptations after its employment. The revision of the framework after its employment in real teaching and learning exercise is a necessary step as, the theoretical analysis and description of terms, is revised in real situations.

It is not expected that each school, research project, large-scale experimentation, and even national curriculum, should try and develop their own framework. Rather, they can adopt existing, tried frameworks, such as the ATS2020 one. It is important that the framework to be adopted, should be revised and adapted based on the context-specific needs. To revise the framework after its use in real classroom situations is a necessary and valuable part of the process of its improvement.

In the event of developing a new framework, from our experience what is important is: (i) to allocate at the beginning sufficient time and effort in a clear and rigid approach for describing the framework, including an ontology of the levels of analysis, from which the identification and descriptions of all elements will follow, and (ii) to include the revision of the framework after its use in actual school education as a necessary and valuable part of the process.

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## Appendices

Appendix 1: Partners' Workshop on Transversal Skills (Project Partner Kick off meeting, Cyprus, 2-3 April 2015)

Appendix 2: Partners' Country Priorities for ATS2020 Transversal Skills - Input Template

Appendix 3: Partners' Web Meeting on Transversal Skills (Project Partner First Web Meeting, 6 May 2015)

Appendix 4: WP1 Essential Partners' Web Meeting on Transversal Skills (4 June 2015)

Appendix 5: WP1 Essential Partners' Web Meeting on Transversal Skills (11 June 2015)

Appendix 6: Partners' Workshop on Transversal Skills (Project Partner Second Meeting, Slovenia, 2-3 July 2015)

Appendix 7: Partners' Workshop on Transversal Skills (Project Partner Third Meeting, Austria, 10-11 November 2015)

Appendix 8: Partners' Discussion on Transversal Skills (Project Partner Fourth Meeting, Ireland, 9-10 June 2016)

Appendix 9: ATS2020 Transversal Skills Second Version Updated

Appendix 10: Partners' Discussion on Transversal Skills (Project Partner Fifth Meeting, Finland, 10-12 October 2016)

Appendix 11: ATS2020 Transversal Skills Framework

Appendix 11a: ATS2020 Transversal Skills Framework: Information Literacy Competence Area

Appendix 11b: ATS2020 Transversal Skills Framework: Autonomous Learning Competence Area

Appendix 11c: ATS2020 Transversal Skills Framework: Collaboration and Communication Competence Area

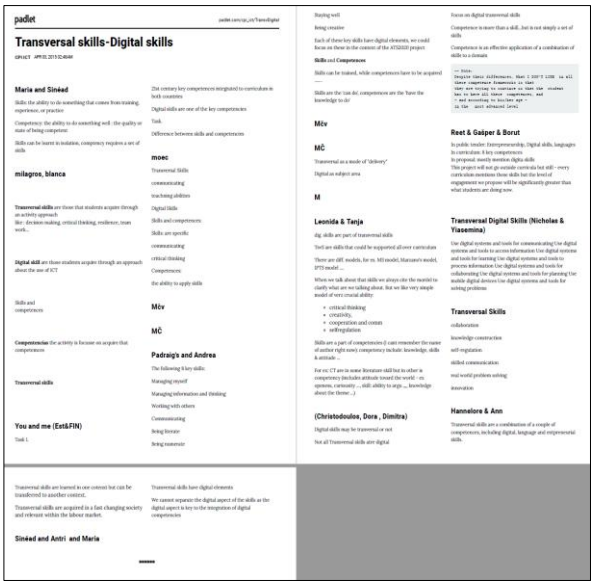
Appendix 11d: ATS2020 Transversal Skills Framework: Creativity and Innovation Competence Area

# Appendix 1: Partners' Workshop on Transversal Skills (Project Partner Kick off meeting, Cyprus, 2-3 April 2015)

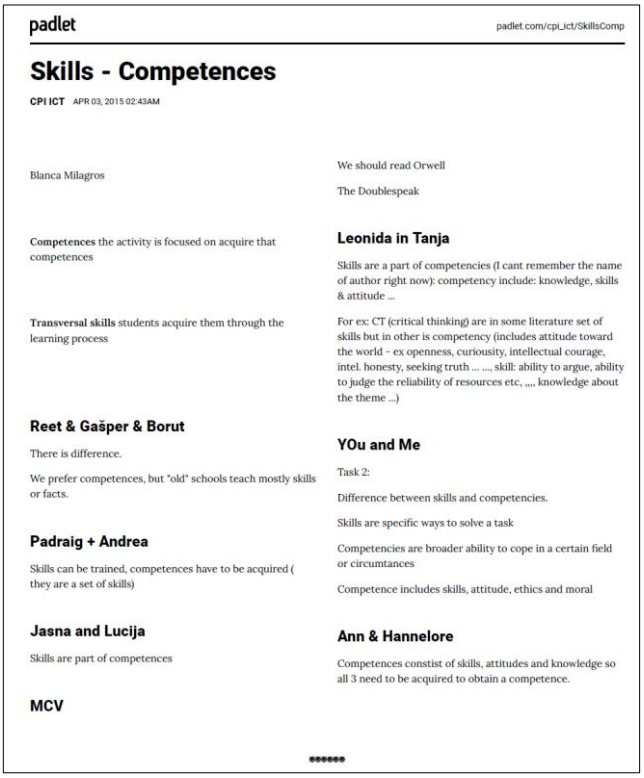
***Workshop Presentation***

## *Workshop Activities*

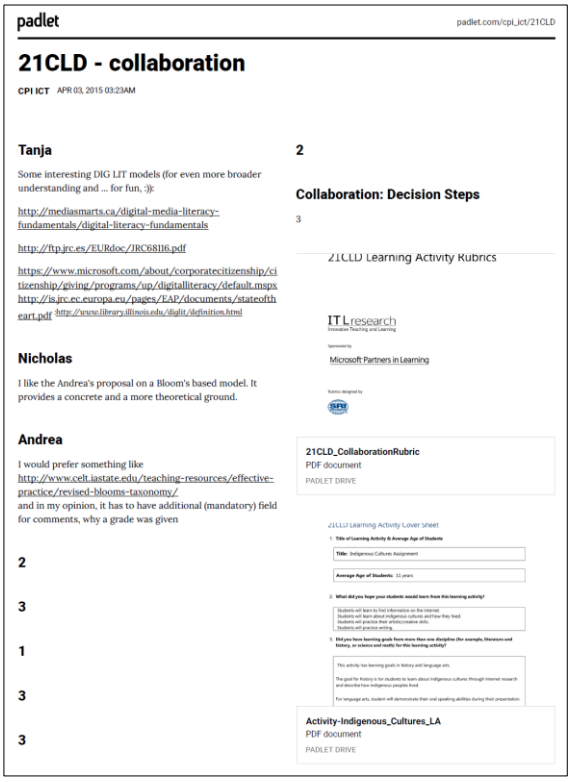

*Workshop activities guide on Padlet*




*Partners ideas on Transversal skills on Padlet (Output of Workshop Activity 1)*




*Partners ideas on Transversal skills on Padlet (Output of Workshop Activity 2)*




*Partners ideas on Transversal skills on Padlet (Output of Workshop Activity 3)*

# Appendix 2: Partners' Country Priorities for ATS2020 Transversal Skills - Input Template

**WP1**
**Partners' priorities for ATS2020 transversal skills**

***Step 1:***
Define in the following table (Table 1) which areas of transversal skills (4-5) is under focus in your country and you would like them to be included in the ATS2020 experimentation (e.g. collaboration, communication, digital citizenship, etc). You can refer to your country's framework if there is one (e.g. Ireland) or to any other framework (you can find the ones that we referred to during our workshop on the kick off meeting in Cyprus in Appendix 1).

*Table 1*

| Areas | Briefly define it |
|---|---|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |

***Step 2:***
Choose under each area the skills that are of your interest and fill them in table 2 below:

*Table 2*

| **Area 1:** | |
|---|---|
| **Skills** | **Briefly define it** |
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| ……. | |
| **Area 2:** | |
| **Skills** | **Briefly define it** |
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| ……. | |
| **Area 3:** | |
| **Skills** | **Briefly define it** |
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| ……. | |



| **Area 4:** | |
|---|---|
| **Skills** | **Briefly define it** |
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| ……. | |

***Step 3:***
Choose a couple of skills and describe in table 3 a task/activity that students could follow during which these skills are present and need to be applied/developed.

*Table 3*

| Skills | Description of task/activity |
|---|---|
| 1. | |
| 2. | |
| … | |

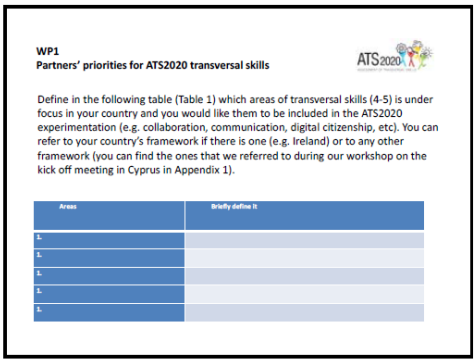
***Step 4 (optional):***
Start thinking how to assess these skills and what kind of evidence is needed. *(We will work more on this during our meeting in Slovenia.)*

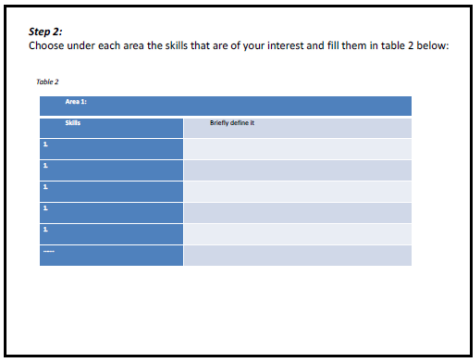
*Table 3(a)*

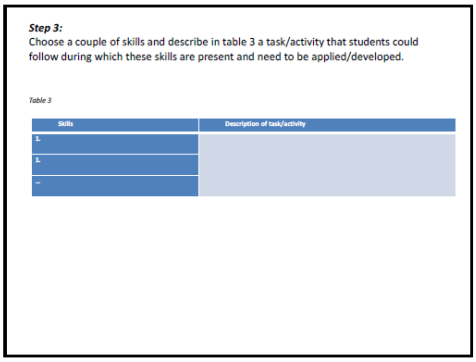
| Skills | Description of task/activity | Scoring |
|---|---|---|
| 1. | | |
| 2. | | |
| … | | |

# Appendix 3: Partners' Web Meeting on Transversal Skills (Project Partner First Web Meeting, 6 May 2015)

***Presentation on the Transversal Skills task***

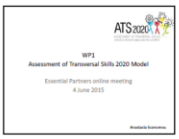



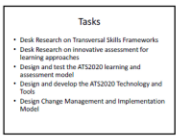



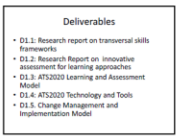
# Appendix 4: WP1 Essential Partners' Web Meeting on Transversal Skills (4 June 2015)

***Presentation on the Countries' reports on Transversal Skills priorities***

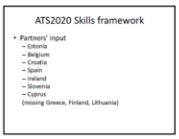


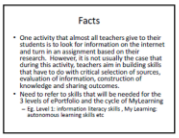


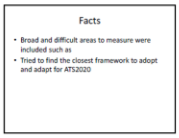


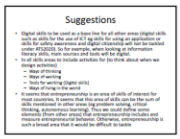


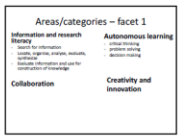


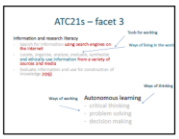



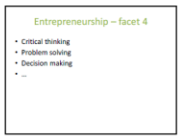




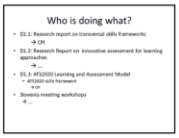



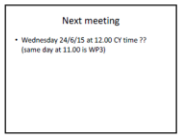




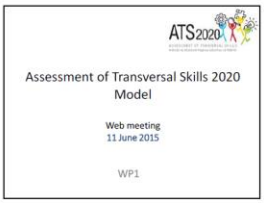


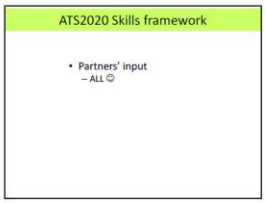


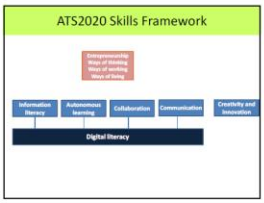



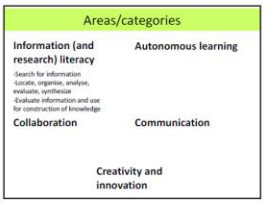
## Appendix 5: WP1 Essential Partners' Web Meeting on Transversal Skills (11 June 2015)

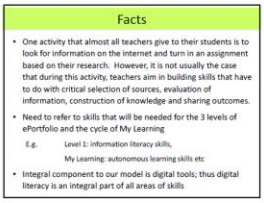
***Presentation on discussion for ATS2020 Transversal Skills framework first version and first thoughts on a methodological approach for its further development***

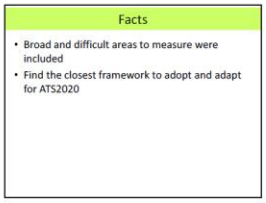


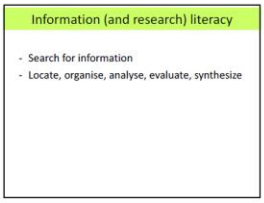



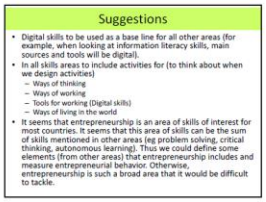



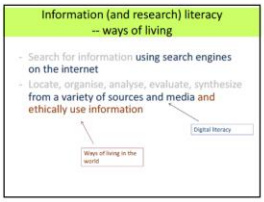



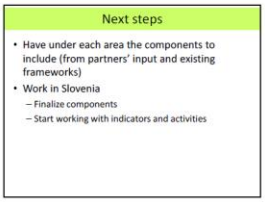





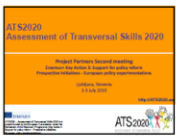



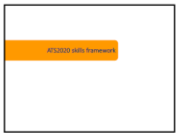



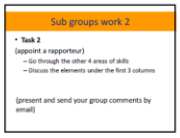
# Appendix 6: Partners' Workshop on Transversal Skills (Project Partner Second Meeting, Slovenia, 2-3 July 2015)

***Workshop Presentation***

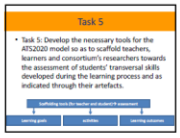


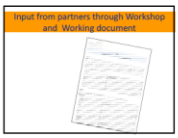



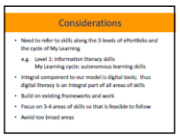


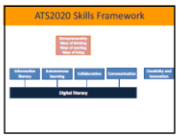


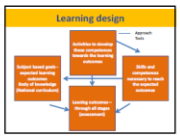




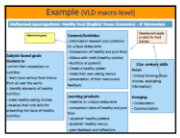



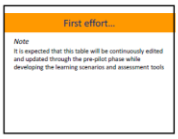



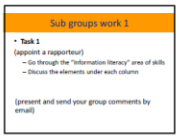



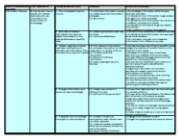


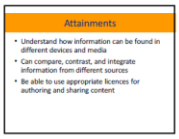


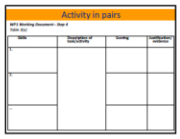







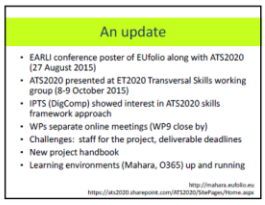



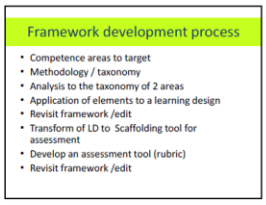


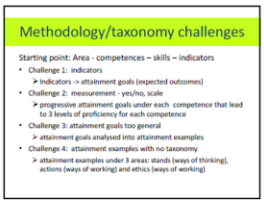



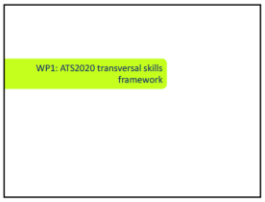
# Appendix 7: Partners' Workshop on Transversal Skills (Project Partner Third Meeting, Austria, 10-11 November 2015)

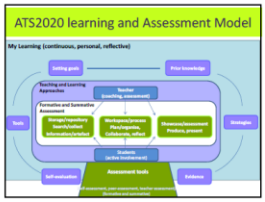
***Workshop Presentation***

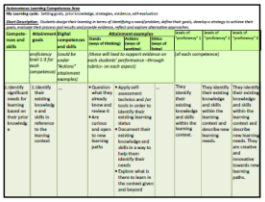



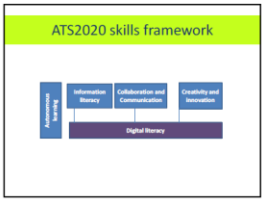



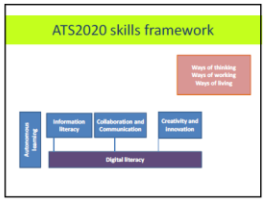



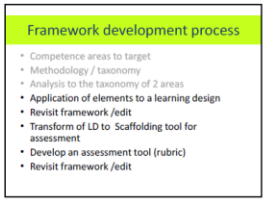



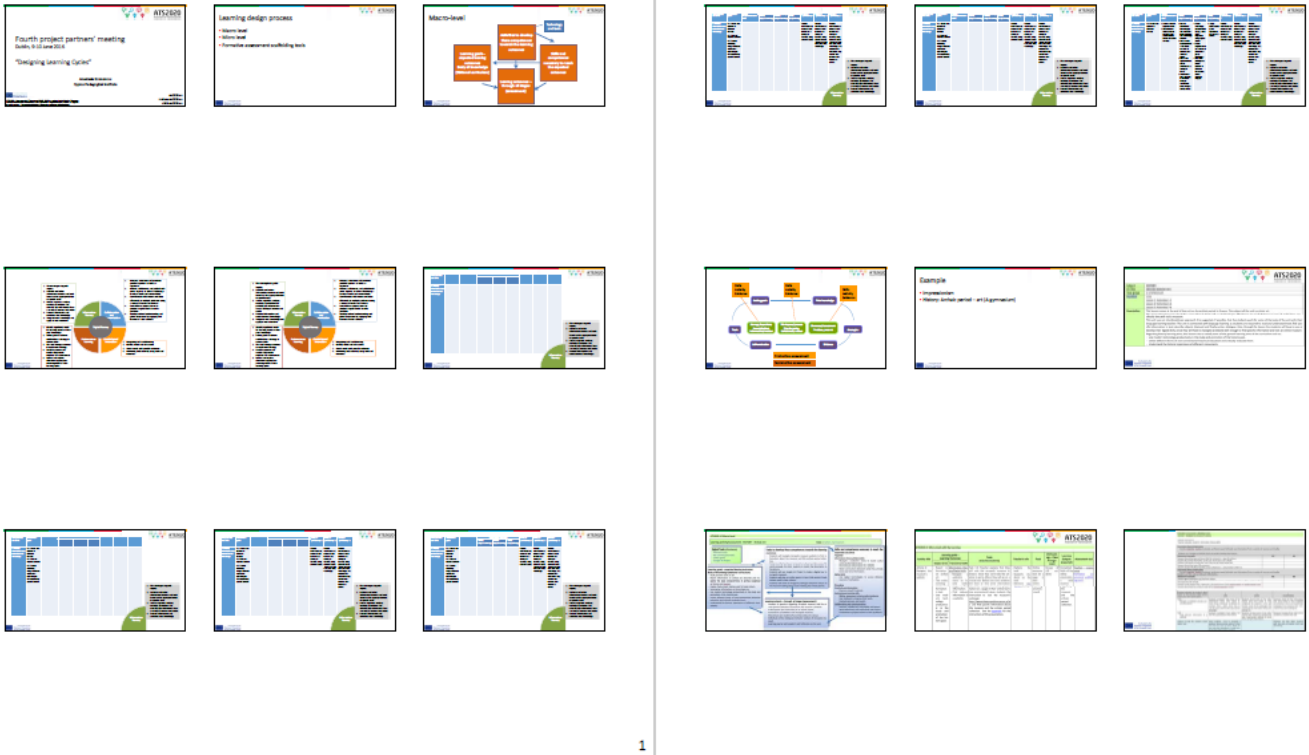


# Appendix 8: Partners' Discussion on Transversal Skills (Project Partner Fourth Meeting, Ireland, 9-10 June 2016)

***Presentation***

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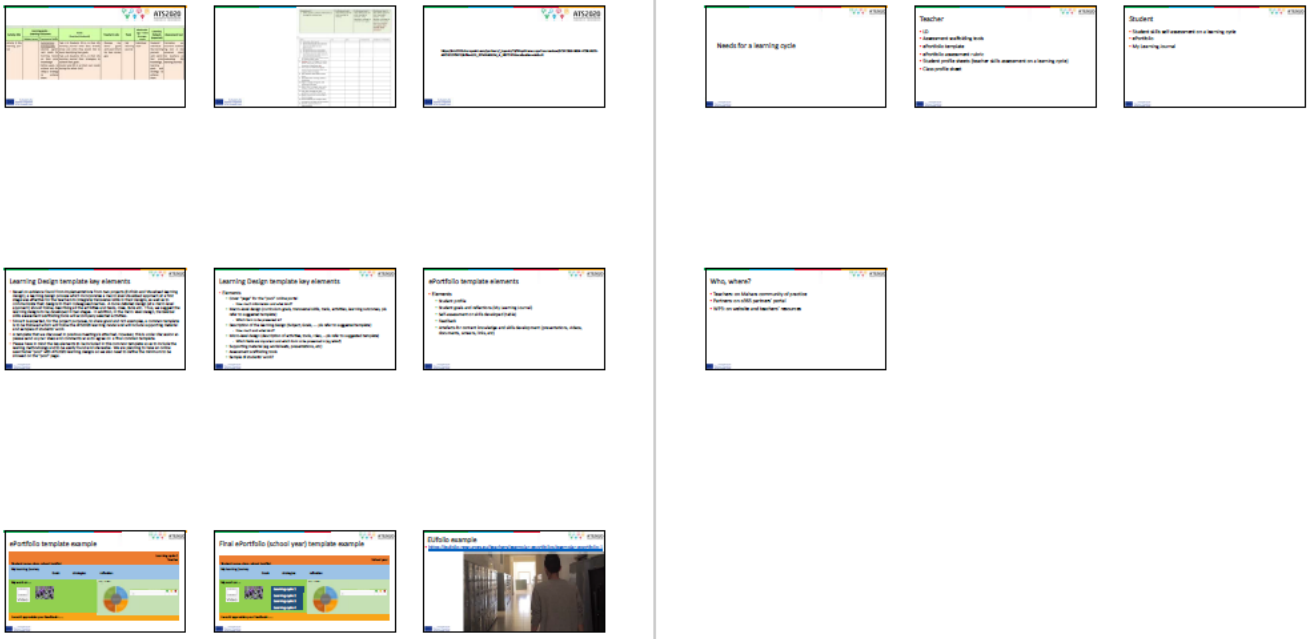
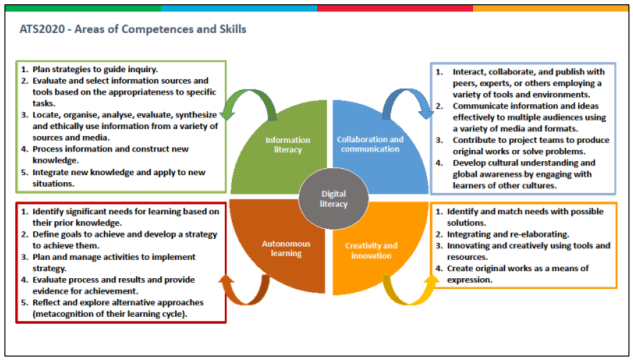
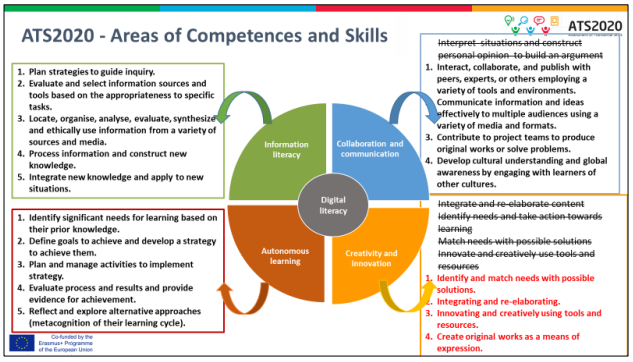


# Appendix 9: ATS2020 Transversal Skills Second Version Updated

## *Updated ATS2020 Framework*

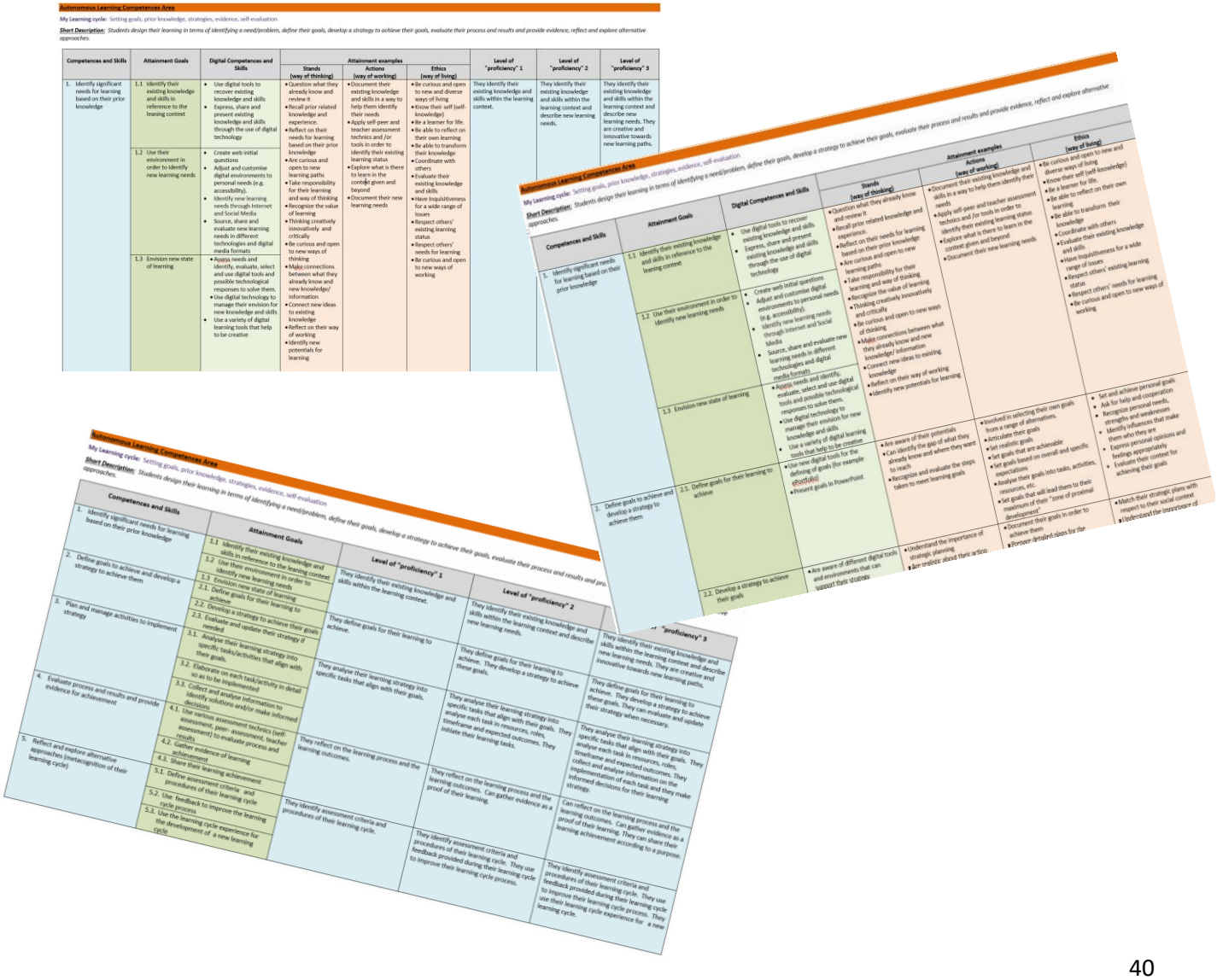



*First version of the ATS2020 framework*



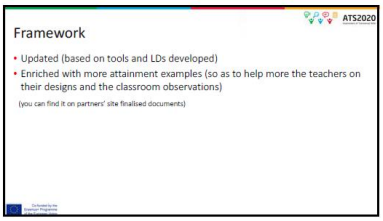

*Second updated version of the ATS2020 framework with the differences marked*

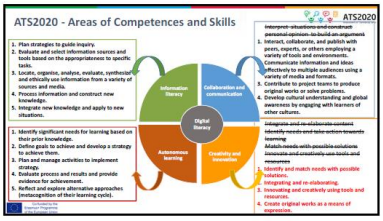
## *Enriched Attainment Examples*

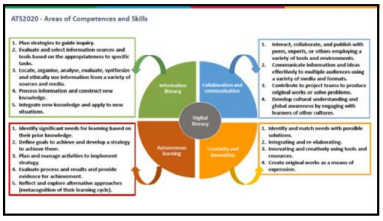


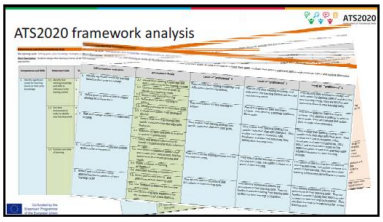
# Appendix 10: Partners' Discussion on Transversal Skills (Project Partner Fifth Meeting, Finland, 10-12 October 2016)

***Presentation***

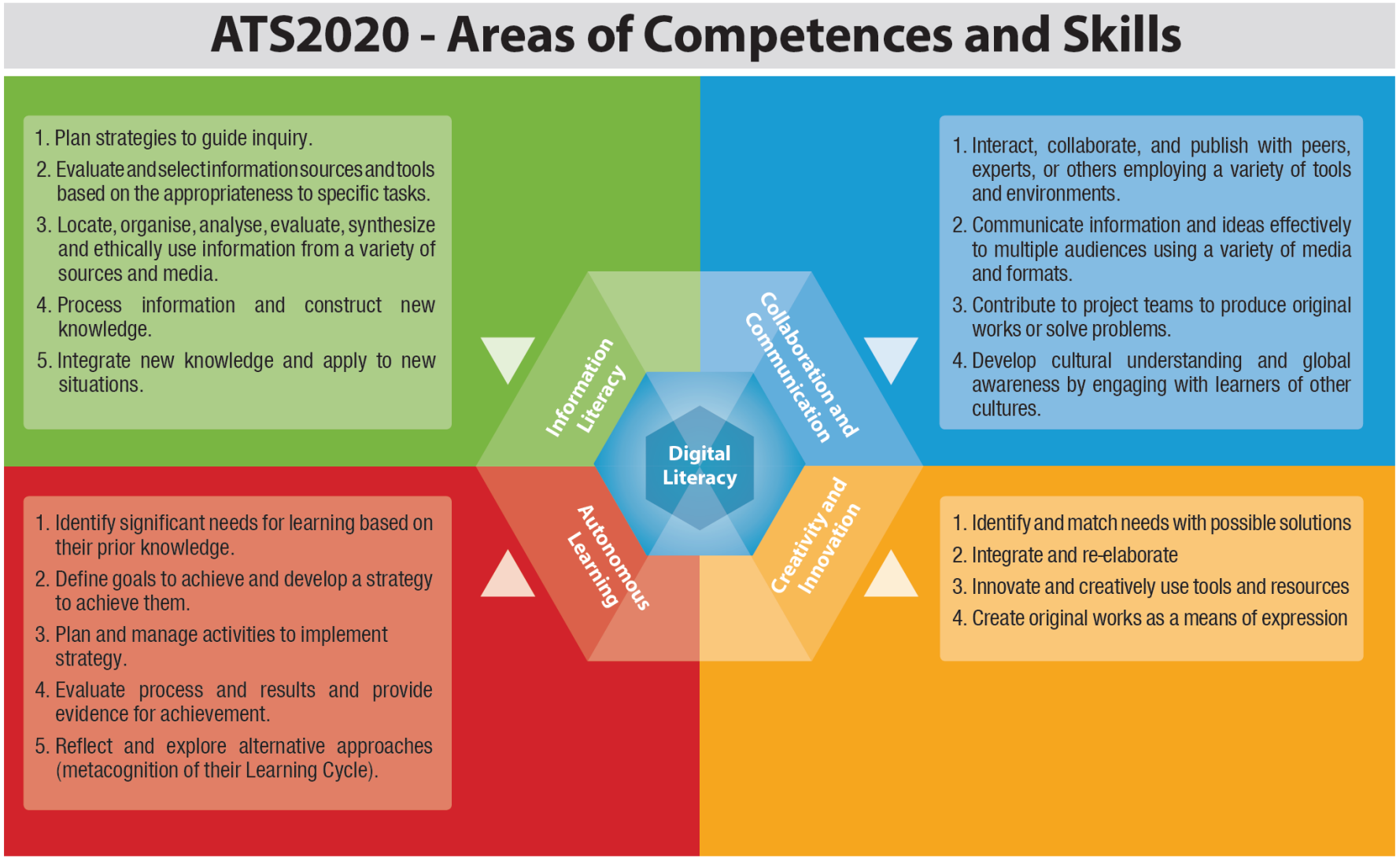



## Appendix 11: ATS2020 Transversal Skills Framework



# Appendix 11a: ATS2020 Transversal Skills Framework: Information Literacy Competence Area

## Information Literacy Competences Area

***Short Description:*** *Students plan how to search for, search, collect, evaluate and use information for construction of knowledge*

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| 1. Plan strategies to guide inquiry | 1.1. Identify significant needs/problems/questions to investigate in order to satisfy the learning goals | • Use digital tools to Identify significant needs/problems/questions<br>• Use information found in digital environments to identify significant needs/problems/questions to investigate<br>• Confer with others using digital tools to identify a research topic or other information need<br>• Identify new learning needs through Internet and Social Media | • Recognise the need for information<br>• Have a proactive attitude towards looking for information<br>• Be curious and prone to explore further and deeper<br>• Be motivated to seek information for different aspects in their lives<br>• Ask questions to probe more deeply<br>• Determine an appropriate scope of investigation | • Define and articulate the information need<br>• Adjust searches according to specific needs<br>• Write needs in the form of questions to be answered<br>• Formulate questions for research based on information gaps or on re-examination of existing, possibly conflicting, information<br>• Deal with complex research, by breaking complex questions into simple ones, limiting the scope of investigation<br>• Confer with others to identify a research topic or other information need | • Be curious and open in new and diverse ways of living<br>• Care about the needs and problems of others<br>• Identify needs and/or problems from their environment and/or society<br>• Be proactive about solving problems around them | Articulate information needs to satisfy the learning goals so as to start looking for it. | Articulate information needs to satisfy the learning goals and identify goals for their information inquiries so as to start looking for it. | Articulate information needs to satisfy the learning goals and identify goals for their information inquiries. They create information strategies for their inquiries so as to start looking for it and they have the capacity to update their strategies. |
| | 1.2. Define information inquiry goals related to the declared needs/problems/questions | • Use electronic search engines effectively to find relevant information that allows the formation of information inquiry goals<br>• Use electronic search engines to discover responses to similar needs/ problems/questions. | • Reflect on the use of different media and tools and resources | • Analyse the need/problem/questions into specific inquiry goals<br>• Identify keywords<br>• Have strategic information skills for goal oriented activities<br>• Define the nature of the information needed<br>• Define the extent of the information needed<br>• Define the reasons for searching for information<br>• Identify the media and information for a particular purpose and | • Recognise problems and look for solutions, media and information | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | | define the necessary content<br>• Identify key concepts and terms in order to formulate and focus questions<br>• Review the initial information need to clarify, revise, or refine the question | | | | |
| | 1.3. Create and update personal information strategies | • Adapt search strategies to a specific search engine, application or device<br>• Identify appropriate tools for finding information<br>• Present strategies through the use of digital technology<br>• Use computer programs (e.g., PowerPoint) to produce a detailed representation of planned strategies<br>• Use the internet to find and compare information so as to update information strategies | • Evaluate potential sources to look for media and information<br>• Recognise the need for media and information<br>• Acknowledge the availability of different resources and tools to support their inquiry | • Define or modify the information need to achieve a manageable focus<br>• Develop search strategies and search processes to find media and information<br>• Identify previous knowledge related to the inquiry goals<br>• Layout a work plan for the specified project<br>• Explore general information sources to increase familiarity with the topic<br>• Articulate and use criteria to make information decisions and choices<br>• Select and identify appropriate investigative methods e.g. laboratory experiment, simulation, fieldwork<br>• Investigate benefits and applicability of various investigative methods<br>• Develop a search plan appropriate to the investigative method<br>• Select appropriate controlled vocabulary or a classification specific to | • Recognise that a variety of media and information serve a variety of purposes<br>• Observe the way other people work to update personal information strategies | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | | the discipline or information access tools<br>• Construct and implement a search strategy using appropriate commands<br>• Implement the search using investigative methodology appropriate to the discipline | | | | |
| 2. Evaluate and select information sources and tools based on the appropriateness to specific tasks | 2.1. Select appropriate/relevant resources/tools that respond to the specific information inquiry | • Know whom to follow in online information sharing places (e.g. micro-blogging)<br>• Search for appropriate digital tools to perform the task<br>• Select and identify the most appropriate tools for finding information<br>• Evaluate digital tools based on criteria (e.g. usefulness, appropriateness, usability, easy to learn)<br>• Keep up to date with information sources, information technologies, information access tools and investigative methods. | • Understand how information is generated, managed and made available<br>• Understand how information can be found in different devices and media<br>• Be critical towards content, based on the source, media, time and other criteria that they pose<br>• Understand the reliability of different sources<br>• Understand how information is organised and disseminated, recognising the context of the topic in the discipline<br>• Differentiate between, and values, the variety of potential sources of information<br>• Understand that different sources will present different perspectives | • Cross check information sources<br>• Use and refer to multiple tools and resources<br>• Choose appropriate media and information sources<br>• Evaluate sources based on their relevance, accuracy, authority, currency, objectivity, coverage, usability in order to select them<br>• Identify the intended purpose and audience of potential resources e.g. popular vs scholarly, current vs historical<br>• Differentiate between primary and secondary sources, recognising how their use and importance vary with each discipline<br>• Construct and implement effective search strategies<br>• Obtain information using appropriate methods<br>• Investigate the scope, content, and organisation of information access tools<br>• Consult with librarians and other information professionals to help identify information access tools | • Value the positive aspects of technologies for information retrieval<br>• Be flexible so as to adapt to the demands of different contexts | Identify multiple resources that respond to the information inquiry needs. | Identify multiple resources and multiple tools that respond to the information inquiry needs. | Apply search technics that allow them to search for information on different tools and resources. |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | 2.2. Use resources/tools effectively (access and navigate) | • Know different search engines<br>• Understand that different search engines can provide different results<br>• Understand which search engines or databases best answer to their own information needs<br>• Use different search engines to locate different formats of information. (e.g. use YouTube to locate video)<br>• Adapt search strategies to a specific search engine, application or device<br>• Understand how search engines classify information<br>• Understands how feeds mechanism works<br>• Understands indexing principles<br>• Follow information presented in hyper-linked and non-linear form<br>• Use filters and agents<br>• Search for words that limit the number of hits<br>• Refine information searches and selects controlled vocabulary specific to the search tool<br>• Modify information searches according to how algorithms are built | • Realise that different needs require different solutions | • Compare, contrast, and integrate information from different sources<br>• Use various information access tools to retrieve information in a variety of formats<br>• Use appropriate services to retrieve information needed e.g. document delivery, professional associations, institutional research offices, community resources, experts and practitioners<br>• Use surveys, letters, interviews, and other forms of inquiry to retrieve primary information | • Take into account financial, legal and social issues when accessing resources and tools<br>• Maintain awareness of changes in information and communications technology | | | |
| 3. Locate, organise, analyse, evaluate, synthesize and ethically use information from a variety of sources and media | 3.1. Find relevant information | • Be able to search for information in digital environments<br>• Be able to locate different format types of information (text, video, pictures)<br>• Be able to use different search engines to locate different types of information<br>• Use alert/current awareness services | • Develop and maintain an open mind when encountering varied and sometimes conflicting perspectives<br>• Recognise that not all information found on the Internet is valuable and reliable | • Adjust searches according to specific needs<br>• Locate relevant information in the sources and material found<br>• Select information that responds to the inquiry needs and goals<br>• Identify keywords, synonyms and related terms for the information needed | • Filter information coming from a variety of sources<br>• Be critical about the information they find | Locate and retrieve information from a variety of resources and tools. | Locate and retrieve information from a variety of resources and tools. Critically evaluate information and organise it according to criteria that | Locate and retrieve information from a variety of resources and tools. Critically evaluate information and organise it according to criteria that |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | • Subscribe to relevant newsfeed and discussion groups<br>• Exclude irrelevant information using filters | | | | | they set such as relevance, reliability, content, e.tc. | they set such as relevance, reliability, content, etc Use information with respect to others (eg sensitive data) and copyright laws. |
| | 3.2. Analyse information and data presented in a variety of forms | • Select digital sources of information according to personal needs (e.g., webpage, video, audio)<br>• Classify information obtained through different digital sources and different formats based on specific criteria<br>• Source, share and analyse information that is found in different technologies and digital media formats<br>• Analyse digital information, judging its relevance and purpose | • Understand how different media can include hidden content<br>• Judge the validity of content found on the internet or the media<br>• Motivate themselves to find authoritative sources | • Identify the writer, the purpose, the language and the context of a text<br>• Analyse, examine, and extract relevant media and information<br>• Identify the best and most useful media and information<br>• Decode information in a variety of forms: written, statistical, graphs, charts, diagrams and tables<br>• Assess the quantity, quality, and relevance of the search results to determine whether alternative information access tools or investigative methods should be utilised<br>• Identify gaps in the information retrieved and determines if the search strategy should be revised | • Realise that hidden agendas may exist in information depending on the author and context<br>• Understand the intentions of different people when sharing information | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3.3. Critically evaluate information | • Search for author's credentials online.<br>• Use internet to compare information<br>• Compare the value and reliability of information depending on the source that it is found on (i.e., electronic encyclopaedia or blog)<br>• Assess digital tools and information based on their problem solving needs<br>• Apply assessment technics to evaluate digital technology information | • Be critical about the information they find<br>• Acknowledge that not all online information is reliable<br>• Understand the reliability of different sources<br>• Be aware that search engine mechanism and algorithms are not necessarily neutral in displaying the information<br>• Understand that information sources need to be cross-checked<br>• Recognise that media try to attract different audiences for different purposes<br>• Recognise and question prejudice, deception, or manipulation<br>• Recognise the cultural, physical, or other context within which the information was created and understand the impact of context on interpreting the information<br>• Recognise and understand own biases and cultural context | • Assess the relevance, usefulness, accuracy, authority, currency, timeliness, objectivity, coverage, usability of information<br>• Cross-check and assess the information validity and credibility<br>• Deal with information pushed at the user<br>• Compare, contrast, and integrate information from different sources<br>• Distinguish reliable information from unreliable sources<br>• Identify the writer, his/her position, expertise, and prejudice on the subject<br>• Compare information with their previous knowledge and experiences<br>• Distinguish editorial from commercial content / factual and fictional content of media and information<br>• Analyse the structure and logic of supporting arguments or methods<br>• Determine whether information satisfies the research or other information need and whether the information contradicts or verifies information used from other sources<br>• Analyse messages in a variety of forms by identifying the author, purpose and point of view, and evaluating the quality and credibility of the content | • Understand and question context, ownership, regulation, audiences, economic, legal, privacy and security issues of media and information<br>• Evaluate how people, places, issues, ideas and concepts are represented in media and information, with an appreciation of the importance of diversity in the media and information<br>• Recognise that media and information have social and political implications and that the media and information often have an agenda setting function<br>• Understand and evaluate the functions of media and information in society<br>• Develop awareness of the importance of assessing content with a sceptical stance and with a self-awareness of their own biases and worldview<br>• Understand that information and knowledge in any discipline is in part a social construction and is subject to change as a result of ongoing dialogue and research | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | 3.4. Store and retrieve information | • Use information management services, software and applications<br>• Know how to save files and content (e.g. texts, pictures, music, videos, and web pages)<br>• Know how to go back to the content they have saved<br>• Save, store or tag files, content and information and have their own storing strategy<br>• Retrieve and manage the information and content they have saved or stored<br>• Apply different methods and tools to organise files, content, and information<br>• Deploy a set of strategies for retrieving the content they or others have organised and stored<br>• Be aware about the importance of back-ups | • Realise benefits and shortfalls of different storage devices/services (online and local storage options)<br>• Be aware of consequences when storing content as private or as public<br>• Understand how information is stored on different devices/services<br>• Be aware about the importance of back-ups<br>• Realise benefits and shortfalls of different storage devices/services (online and local storage options)<br>• Acknowledge the importance of having an understandable and pragmatic storage system/scheme<br>• Be aware of consequences when storing content as private or as public | • Know different storage options and select the most appropriate<br>• Use different storage options<br>• Organise information and content<br>• Retrieve and access previously stored information and content<br>• Structure and classify information and content according to a classification scheme/method<br>• Use various classification schemes to store and manage resources and information<br>• Tag content<br>• Arrange/Save/ Store/Preserve/ Delete media and information<br>• Download/Upload and classify information and content<br>• Organise the content in a manner that supports the purposes and format of the product e.g. outlines, drafts, storyboards | • Be flexible<br>• Evaluate the practicality of their choices based on their environment | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | 3.5. Apply copyright law and licences | • Search for information to provide references when using information found on the web (e.g., photographs, videos etc.)<br>• Process digital information (i.e., paraphrase, adapt, use part of) based on copyright law and licences<br>• Use electronic material to create an e-portfolio taking into consideration copyright law and licenses | • Understand copyright and licence rules<br>• Understand the purpose of the copyright law<br>• Understand the financial, legal and social issues in relation to the use of information<br>• Know that some of the content they use can be covered by copyright<br>• Know there are different ways of licensing intellectual property production<br>• Have basic knowledge of the differences about copyright, copyleft and creative commons and can apply some licences to the content they create<br>• Articulate the purpose and distinguishing characteristics of copyright, fair use, open access, and the public domain<br>• Know how different types of licences apply to the information and resources they use and create | • Use references for information and content used<br>• Give credit to the original ideas of others through proper attribution and citation<br>• Use appropriate licences for authoring and sharing content<br>• Consider licences regulation principles of use and publication of information<br>• Find information on copyright and licence rules<br>• Compile references in the required bibliographic format<br>• Mention restrictions in reproducing or posting work done by others | • Respect the intellectual rights of the work and its creator<br>• Respect private and sensitive data<br>• Respect the original ideas of others<br>• Value the skills, time, and effort needed to produce knowledge<br>• Value the open educational resources approach | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| 4. Process information and construct new knowledge | 4.1. Create new content in different formats | • Create and edit digital content<br>• Use software tools to create and edit text, presentations, videos and other formats<br>• Select appropriate tools to create new content | • Know which tool/application fits better the kind of content they want to create<br>• Know that digital content can be produced in a variety of forms<br>• Understand how meaning is produced through multimedia (text, images, audio, video) | • Create knowledge representations (e.g. mind maps, diagrams) using digital media<br>• Create original works as a means of personal or group expression<br>• Use basic packages to create content in different forms (text, audio, numeric, images)<br>• Apply media and information in contextually-relevant settings to target audience<br>• Create new information after making a critical review and revision of assimilated information<br>• Show awareness of their target and intended audience<br>• Communicate clearly and in a style to support the purposes of the intended audience | • Judge constructively and appreciate the work of others | Process information to create or edit content in a variety of formats, using different tools. | Process information to create or edit content in a variety of formats, using different tools. Construct their own (and new) knowledge. | Process information to create or edit content in a variety of formats, using different tools. Construct their own (and new) knowledge, in a creative and innovative way. Publish new content with respect to others. |
| | 4.2. Edit and improve content | • Use digital tools that allow editing of existing content<br>• Combine information from different digital sources to create a completed view of a topic<br>• Use different technologies and digital media tools to improve content found on line<br>• Create and edit new content (from word processing to images and video)<br>• Select information from different digital tools to edit and improve the content of their e-portfolio | • Recognise trends and patterns to make conclusions from information sources<br>• Integrate and re-elaborate previous knowledge and content<br>• Produce creative expressions, media outputs and programming<br>• Use a range of ICT tools to effectively | • Group and organise the retrieved media and information<br>• Edit the content in order to enhance the final output<br>• Use the information they have located to edit data or to perform a task<br>• Select and synthesise media and information<br>• Combine information from multiple sources and with different characteristics, structure, forms and purposes to produce | • Respect intellectual property rights and licences<br>• Respect others when making adjustments and alterations | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | present information in various forms conforming to their purpose, recipient and content | representation of information<br>• Summarise information from multiple sources<br>• Summarise the main ideas that come out of the information and combine them to create new meanings<br>• Recognise interrelationships between concepts and draws conclusions based upon information gathered<br>• Extend initial synthesis at a higher level of abstraction to construct new hypotheses<br>• Incorporate principles of design and communication appropriate to the environment<br>• Present in an organised manner the information they have selected | | | | |
| | 4.3. Express creatively through different media and technologies | • Use a range of appropriate information technology applications in creating the product<br>• Create original videos and recordings using relevant software<br>• Find original ways of combining information coming from different media and technologies<br>• Communicate knowledge found on the web in ways that correspond to different age groups | • See the potential of technologies and media for self-expression and knowledge creation | • Engage with creative content<br>• Use a variety of media to express themselves creatively (e.g. text, images, audio, and movie)<br>• Take part in public conversation (e.g. through comment sections)<br>• Keep a blog or other version of online diary | • Incorporate feelings and stance in life through work with media and technology<br>• Incorporate parts of own personality and interests into work | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | 4.4. Responsibly publish content | • Be aware of digital safety and security issues when publishing content online<br>• Choose a communication medium and format that best supports the purposes of the product and the intended audience<br>• Participate in electronic discussions following accepted practices e.g. Netiquette<br>• Use BCC and CC to communicate information to various audiences<br>• Use different digital tools to publish content based on specific needs<br>• Share resources through online tools taking others' needs<br>• Responsibly engage with Web 2.0 user-generated content such as blogs, forums, video and photo sharing, social gaming, and other forms of social media | • Be critical about knowledge production and consumption with media and technologies<br>• Decide where and how their information is published according to purpose<br>• Make informed choices regarding their online actions in full awareness of issues related to privacy and the commodification of personal information<br>• Demonstrate an understanding of what constitutes plagiarism and correctly acknowledges the work and ideas of others<br>• Identify and articulate issues related to privacy and security in the print and electronic environments<br>• Identify and understand issues related to censorship and freedom of speech | • Demonstrate ethical use of information<br>• Protect personal data<br>• Communicate the learning product with acknowledgement of intellectual property<br>• Understand fair dealing in respect of the acquisition and dissemination of educational and research materials<br>• Obtain, store, and disseminate text, data, images, or sounds in a legal manner<br>• Demonstrate an understanding of intellectual property, copyright and fair use of copyrighted material | • Understand the responsibility of publishing content (e.g., reliable, not offensive, not harmful, etc.)<br>• Foresee consequences that published content may have on themselves or others<br>• See themselves as contributors to the information marketplace rather than only consumers of it<br>• Take social action by working individually and collaboratively to share knowledge and solve problems | | | |
| 5. Integrate new knowledge and apply to | 5.1. Make connections between what they already know | | • Identify whether there are differing values that underpin new information or | • Apply new knowledge and skills in new situations<br>• Compare new knowledge with previous | • Learn from their past actions and be open to change. | Integrate knowledge they already have and with new one. | Integrate knowledge they already have and with new one. Are | Integrate knowledge they already have and with new one. Are |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| new situations | and new information | | whether information has implications for personal values and beliefs<br>• Apply reasoning to determine whether to incorporate or reject viewpoints encountered<br>• Maintain an internally coherent set of values informed by knowledge and experience | knowledge to define its value and the contradictions and draw conclusions based on the information gathered<br>• Learn or internalise media and information as personal knowledge<br>• Evaluate knowledge for usefulness | • Transform information into knowledge | | able to question their ideas and other people's and adjust their thinking. | able to question their ideas and other people's and adjust their thinking. Review, restructure and reproduce new ideas. |
| | 5.2. Question ideas and assumptions, both their own and other people's | • Contribute to the public knowledge domain (e.g. wikis, public forums, reviews) | • Question, revisit, restructure, review, adjust, improve, and change ideas | • Pose questions asking for clarifications<br>• Refer to alternative solutions to problems<br>• Request explanations for other people's thinking | • Be critical about ideas and assumptions<br>• Acknowledge that ideas can be improved | | | |
| | 5.3. Adjust their thinking in light of new information | | • Be critical about knowledge production and consumption. | • Develop new action plans for achieving their goals<br>• Revise their strategies after collecting new information | • Respect other people's opinions and ideas | | | |

# Appendix 11b: ATS2020 Transversal Skills Framework: Autonomous Learning Competence Area

## Autonomous Learning Competences Area

**My Learning cycle:** Setting goals, prior knowledge, strategies, evidence, self-evaluation

***Short Description:*** *Students design their learning in terms of identifying a need/problem, define their goals, develop a strategy to achieve their goals, evaluate their process and results and provide evidence, reflect and explore alternative approaches.*

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| 1. Identify significant needs for learning based on their prior knowledge | 1.1 Identify their existing knowledge and skills in reference to the leaning context | • Use digital tools to recover existing knowledge and skills<br>• Express, share and present existing knowledge and skills through the use of digital technology | • Question what they already know and review it<br>• Recall prior related knowledge and experience.<br>• Reflect on their needs for learning based on their prior knowledge<br>• Are curious and open to new learning paths<br>• Take responsibility for their learning and way of thinking<br>• Recognize the value of learning<br>• Thinking creatively innovatively and critically<br>• Be curious and open to new ways of thinking<br>• Make connections between what they already know and new knowledge/ information<br>• Connect new ideas to existing knowledge<br>• Reflect on their way of working<br>• Identify new potentials for learning | • Document their existing knowledge and skills in a way to help them identify their needs<br>• Apply self-peer and teacher assessment technics and /or tools in order to identify their existing learning status<br>• Explore what is there to learn in the context given and beyond<br>• Document their new learning needs | • Be curious and open to new and diverse ways of living<br>• Know their self (self-knowledge)<br>• Be a learner for life.<br>• Be able to reflect on their own learning<br>• Be able to transform their knowledge<br>• Coordinate with others<br>• Evaluate their existing knowledge and skills<br>• Have Inquisitiveness for a wide range of issues<br>• Respect others' existing learning status<br>• Respect others' needs for learning<br>• Be curious and open to new ways of working | They identify their existing knowledge and skills within the learning context. | They identify their existing knowledge and skills within the learning context and describe new learning needs. | They identify their existing knowledge and skills within the learning context and describe new learning needs. They are creative and innovative towards new learning paths. |
| | 1.2 Use their environment in order to identify new learning needs | • Create web initial questions<br>• Adjust and customise digital environments to personal needs (e.g. accessibility).<br>• Identify new learning needs through Internet and Social Media<br>• Source, share and evaluate new learning needs in different technologies and digital media formats | | | | | | |
| | 1.3 Envision new state of learning | • Assess needs and identify, evaluate, select and use digital tools and possible technological responses to solve them.<br>• Use digital technology to manage their envision | | | | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | for new knowledge and skills<br>• Use a variety of digital learning tools that help to be creative | | | | | | |
| 2. Define goals to achieve and develop a strategy to achieve them | 2.3. Define goals for their learning to achieve | • Use new digital tools for the defining of goals (for example ePortfolio)<br>• Present goals in PowerPoint | • Are aware of their potentials<br>• Can identify the gap of what they already know and where they want to reach<br>• Recognize and evaluate the steps taken to meet learning goals | • Involved in selecting their own goals from a range of alternatives.<br>• Articulate their goals<br>• Set realistic goals<br>• Set goals that are achievable<br>• Set goals based on overall and specific expectations<br>• Analyse their goals into tasks, activities, resources, etc.<br>• Set goals that will lead them to their maximum of their "zone of proximal development" | • Set and achieve personal goals<br>• Ask for help and cooperation<br>• Recognize personal needs, strengths and weaknesses<br>▪ Identify influences that make them who they are<br>▪ Express personal opinions and feelings appropriately<br>▪ Evaluate their context for achieving their goals | They define goals for their learning to achieve. | They define goals for their learning to achieve.<br>They develop a strategy to achieve these goals. | They define goals for their learning to achieve.<br>They develop a strategy to achieve these goals. They can evaluate and update their strategy when necessary. |
| | 2.4. Develop a strategy to achieve their goals | • Are aware of different digital tools and environments that can support their strategy<br>• Use ICT and digital media to access, manage and share strategy<br>• Use a range of tools to plan and manage strategy<br>• Present strategies through the use of digital technology<br>• Use computer programs (e.g., PowerPoint) to produce a detailed representation of planned strategies<br>• Use the internet to find and compare information so as to | • Understand the importance of strategic planning<br>• Are realistic about their action plans<br>• Recognize and evaluate the steps taken to develop a strategy | • Document their goals in order to achieve them<br>• Prepare detailed plans for the development of strategy<br>• Describe their strategy within a timeframe<br>• Align strategy with goals and expected outcomes<br>• Analyse their strategy into tasks, goals, expected outcomes, roles, resources, timeframe e.tc. | • Match their strategic plans with respect to their social context<br>• Understand the importance of developing personals strategies | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | update information strategies | | | | | | |
| | 2.5. Evaluate and update their strategy if needed | • Use digital tools to expand their strategy | • Understand that a strategy is their guidance to achieve their goals.<br>• Learn from past strategies and make changes if necessary<br>• Value the continuous monitoring of their strategy<br>• Have flexibility to readjust their strategy in the light of new needs | • Identify opportunities of improvement<br>• Adjust their strategy or elements of their strategy if needed<br>• Identify scaffolding tools to make their strategy explicit<br>• Revisit their goals and redefine them in the light of new information<br>• Evaluate their strategy in connection with goals, expected outcomes<br>• Redesign a strategy if needed | • Understand the importance of redesigning a strategy<br>• Flexibility in considering alternatives<br>• Remained open to other perspectives<br>• Understand the need for adaptation under the light of new knowledge/evidence | | | |
| 3. Plan and manage activities to implement strategy | 3.3. Analyse their learning strategy into specific tasks/activities that align with their goals. | • Use a range of strategies to find digital information and data<br>• Use different technologies to plan, manage and engage in their learning activities<br>• Stimulate creativity using digital technology | • Understand that there methodologies that can help the development and monitoring of their strategy implementation<br>• Evaluate activities progress towards achieving goals<br>• Assess their learning activities and suggest ways that are can be improved<br>• Constructed a cogent strategy using a logical process | • Use a range of strategies to find information, sources and data<br>• The tasks/activities can be observed and discussed<br>• Prioritise activities to achieve the goals set<br>• Adapt strategies to specific goals | • Be self-directed<br>• Receive and make use of feedback on their learning activities<br>• Be creative<br>• Respect others' abilities in implementing a strategy<br>• Understand the need for respecting timeframes | They analyse their learning strategy into specific tasks that align with their goals. | They analyse their learning strategy into specific tasks that align with their goals. They analyse each task in resources, roles, timeframe and expected outcomes. They initiate | They analyse their learning strategy into specific tasks that align with their goals. They analyse each task in resources, roles, timeframe and expected outcomes. They collect and analyse |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | 3.4. Elaborate on each task/activity in detail so as to be implemented | • Source, share and evaluate tasks/activities that are implemented in different technologies and digital media formats<br>• Web design<br>• Create an e-portfolio | • Compare and contrast tasks/activities<br>• Make connections between tasks/activities<br>• Make judgements about how effective a task/activity is<br>• Implement tasks/activities and take action<br>• Understand possible practical limitations during the planning of an activity<br>• Identify/examine possibilities of combining different resources | • Analyse each task/activity in resources, roles, timeframe and expected outcomes<br>• Prepare what is needed for the activities to be implemented<br>• Initiate the activities planned | • Respect given deadlines and organize time to meet them<br>• Take initiatives and express views | | their learning tasks. | information on the implementation of each task and they make informed decisions for their learning strategy. |
| | 3.5. Collect and analyse information to identify solutions and/or make informed decisions | • Collect information from various digital sources<br>• Source, share and evaluate information that are find in different technologies and digital media formats | • Understand the importance of detailed planning and monitoring<br>• Make connections between sources<br>• Adjust information in light of identify solution<br>• Evaluate the quality of the information and data and their sources | • Document the implementation of each task<br>• Use documentation to modify learning strategy if needed<br>• Compare and contrast information from different sources<br>• Analyse information and data presented in a variety of forms<br>• Prepare and organise information and data<br>• Make judgements about how valid and reliable an information is | • Take informed decisions<br>• Be organized<br>• Develop flexibility to work effectively in changing conditions<br>• Develop problem solving skills in different contexts | | | |
| 4. Evaluate process and results and provide evidence for achievement | 4.5. Use various assessment technics (self-assessment, peer-assessment, teacher assessment) | • Use digital tools to follow the process and results<br>• Use different technologies and digital media tools to give and receive feedback | • Compare and discuss samples of different students' achievements<br>• Evaluate the quality of task/activity<br>• Appreciate and critically interpret process and results | • Can review their progress themselves or in discussion with their peers<br>• Compare and contrast various assessments (self-assessment, peer-assessment, teacher | • Find ways of dealing with setbacks and difficulties<br>• Are open minded about peer-feedback peer-assessment and peer-criticism. | They reflect on the learning process and the learning outcomes. | They reflect on the learning process and the learning outcomes. Can gather evidence as a | Can reflect on the learning process and the learning outcomes. Can gather evidence as a proof of their |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | to evaluate process and results | • Apply assessment technics through digital technology | • Understand the value of assessment for improvement purposes | assessment) to evaluate process and results<br>• Develop specific criteria to evaluate process and results<br>• Develop and use assessment rubrics<br>• Use assessment results for adapting activities | • Develop good relationships and deal with conflict<br>• Respect difference<br>• Open-mindedness towards divergent world views<br>• Understand the opinions of other people | | proof of their learning. | learning. They can share their learning achievement according to a purpose. |
| | 4.6. Gather evidence of learning achievement | • Use digital storage and retrieval tools for managing evidence | • Use a variety of methods, tasks and strategies so that enough evidence is gathered to make sound judgements about learning | • Apply criteria for selection of evidence of learning<br>• Describe and adapt criteria for gathering evidence of learning<br>• Identify evidence that show that they have reached their goal.<br>• Use a variety of methods, tasks and strategies so that enough evidence is gathered to make sound judgements about learning<br>• Gather and present supporting evidence to argue their case<br>• Identify blocks or barriers to their learning and suggest ways of overcoming them | • Overcome obstacles | | | |
| | 4.7. Share their learning achievement | • Use digital tools to show and share their learning achievements<br>• Use digital technology to communicate | • Explore options and alternatives for sharing their learning achievement<br>• Gather, record and organize their learning achievement<br>• Understand the purpose of sharing results | • Describe the choice of learning achievements to share according to their audience<br>• Identify and describe the purpose to share specific learning achievements | • Make choices about how they best present their achievements to others, taking account of their audience<br>• Use different styles of communication suited to the situation | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | | • Share their learning achievement through performance and presentation such as visual art, music, drama, design and graphics<br>• Perform and present their learning achievement<br>• Discuss and debate their learning achievements<br>• Use relevant and reliable evidence to support their own claims or propositions<br>• Communicate using a variety of styles, including roleplay, drama, posters, and storytelling<br>• Identify different methods of sharing results | • Self-confidence in own abilities<br>• Communicate assessment results respecting individual differences<br>• Acknowledge ethics when sharing results | | | |
| 5. Reflect and explore alternative approaches (metacognition of their learning cycle) | 5.4. Define assessment criteria and procedures of their learning cycle | • Reflect on and review their own progress<br>• Identify blocks or barriers to their learning and suggest ways of overcoming them<br>• Manage digital reflection diaries to facilitate assessment procedures | • Are reflective<br>• Question, revisit, restructure, review, adjust, improve, change ideas<br>• Require new approaches to learning, teaching and assessment | • Keep reflection diaries on their learning cycle<br>• Reorganise their learning style | • Understand the value of the reflection<br>• Believe that with continuing effort they can succeed<br>• Synthesise and integrate evidence and ethical reasoning into a reflect and explore alternative approaches<br>• Identify faulty reasoning, assumptions and biases by thorough testing | They identify assessment criteria and procedures of their learning cycle. | They identify assessment criteria and procedures of their learning cycle. They use feedback provided during their learning cycle to improve their learning cycle process. | They identify assessment criteria and procedures of their learning cycle. They use feedback provided during their learning cycle to improve their learning cycle process. They use their learning cycle experience for a new |
| | 5.5. Use feedback to improve | • Create an ePortfolio | • Plan next steps in teaching and learning using feedback and assessment | • Validate feedback in terms of efficiency and effectiveness | • Require opportunities to be involved not only in the design of the | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | the learning cycle process | | • Generate feedback that encourages progress and give greater understanding and ownership of their learning | • Alter processes based on assessment feedback | learning but also in what they learn<br>• Validate feedback in terms of feelings and attitudes<br>• Willing to reconsider and revise views where necessary<br>• Are open to suggestions for improvement | | | learning cycle. |
| | 5.6. Use the learning cycle experience for the development of a new learning cycle | • Use digital storage and retrieval tools to present a new learning cycle | • Reflect on and evaluate their learning cycle experience for the development of a new learning cycle<br>• Learning cycle demonstrates real achievement in grasping what critical thinking is<br>• Use learning cycle to develop of a range of specific critical thinking skills or abilities | • Gather, record, organize, and evaluate the learning cycle experience<br>• Identify solutions/strategies in alternative contexts or scenarios<br>• Identify similarities in different tasks and explore strategies for working<br>• Implement acquired knowledge in unknown conditions | • Use ICT effectively and ethically in learning and in life<br>• Develop positive attitudes towards working in new projects<br>• Reflect on knowledge gained process used attitudes and feelings<br>• Understand the value of the learning cycle experience | | | |

# Appendix 11c: ATS2020 Transversal Skills Framework: Collaboration and Communication Competence Area

## Communication Collaboration Competences Area

***Short Description:***

*Students use the right tools (language, media) in order to explicitly share their learning and support their opinion.*

*Students use the right tools (language, media) in order to work collaboratively to support individual learning and contribute to the learning of others.*

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Levels of "proficiency" 1 | Levels of "proficiency" 2 | Levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| 1. Interact, collaborate, and publish with peers, experts, or others | 5.1. Develop good relationships and appreciate the value of cooperating to reach both collective and personal goals | • Understand the characteristics of different digital tools and know how to use them to achieve project purposes<br>• Use several digital collaboration tools and means to collaborate with others in the production and sharing of resources, knowledge and content<br>• Use the collaborative features of software packages and web-based collaborative services (e.g track changes, comments on a document or resource, tags, contribution to wikis)<br>• Use several digital collaboration tools and means to collaborate with others in the production and sharing of resources, knowledge and content<br>• Adapt applications to collective and personal needs and preferences | • Know that collaborative processes facilitate content creation<br>• Understand the dynamics of collaborative work and of giving and receiving feedback<br>• Value other people's viewpoints and be willing to share ideas and contribute to collective work<br>• Understand the importance of sharing opinions in constructing new knowledge<br>• Understand the importance of filtering information and critically evaluating content<br>• Have an informed opinion about sharing practices, benefits, risks and limits | • Exchange views and collaborate with peers smoothly<br>• Use a wide range of tools for online communication and collaboration<br>• Use digital technology to participate in collaborative learning and communication spaces<br>• Use collaborative tools in such a way so that everyone within a group is allowed to contribute to a project<br>• Use collaborative features of software packages and web-based collaborative services (e.g track changes, comments on a document or resource, tags, contribution to wikis)<br>• Adapt applications to collective and personal needs and preferences | • Be willing to collaborate with others towards common goals<br>• Respect the rights and feelings of others when using digital media<br>• Be inclusive by allowing everyone in a group to contribute to a project<br>• Be aware of copyright issues<br>• Consider ethical principles of use and publication of information and act accordingly | Understand the dynamics of collaboration towards goal achievement and develop good relationships with peers, experts, or others. | Collaborate well enough to achieve shared goals. | Interact, collaborate and achieve collective and personal goals. |
| | 5.2. Co-operate | • Work with others through emails, voip, social media, blogs, instant messaging<br>• Share files and content with others through simple technological means (e.g. | • Understand that collaborative work requires flexibility and willingness in order to achieve a common goal | • Agree on collective goals and work with others in physical and online space towards achieving them<br>• Take on different roles within groups | • Be willing to share and collaborate with others<br>• Be flexible and willing to make compromises to achieve a common goal | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Levels of "proficiency" 1 | Levels of "proficiency" 2 | Levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | sending attachments to emails, uploading pictures on the internet)<br>• Actively share information, content and resources with others through online communities, networks and collaboration platforms | • Have an understanding of the different roles needed in completing a collaborative project<br>• Value democratic processes when collaborating | • Contribute to decisions as part of a group<br>• Take a proactive attitude in the sharing of resources, content and knowledge<br>• Share content found on the internet (e.g. how to share a video within a social networking site) | • Show appreciation for the contribution of other team members<br>• Respect other people's privacy when interacting in the digital space | | | |
| | 5.3. Learn with others | • Manage the different types of communication received (e.g. sort out emails, decide whom to follow on social sites)<br>• Share files and content with others through simple technological means (e.g. sending attachments to emails, uploading pictures on the internet)<br>• Actively share information, content and resources with others through online communities, networks and collaboration platforms | • Understand that peers can support each other's learning by utilizing their strengths and weaknesses<br>• Understand the importance of sharing content in digital space in order to facilitate the learning process | • Work in pairs and larger groups to help each other in the learning process<br>• Help other students to understand and solve problems<br>• Use digital collaboration tools to collaborate with others<br>• Evaluate the contribution of others to common projects<br>• Provide and receive feedback | • Recognize that many different people can support own learning and know how to get that support<br>• Be willing to provide and receive help in achieving learning goals<br>• Be willing to identify strengths and weaknesses among team members and assign tasks accordingly to achieve learning goals | | | |
| 2. Communicate information and ideas effectively to multiple audiences using a variety of media and formats | 5.4. Communicate, express opinions, write, make oral presentations and perform | • Use web-based tools to communicate content and information<br>• Share content found on the internet (e.g. how to share a video within a social networking site)<br>• Use appropriate licences for authoring and sharing content<br>• Participate in social networking sites and online communities to pass on or share knowledge, content and information.<br>• Use social media to promote results of work | • Be aware of different digital formats (including multimedia) and know how to use them to create content for multiple audiences<br>• Be aware of the potential to communicate information<br>• Be aware of how meaning can be encoded and decoded<br>• Understand active protection of personal data | • Use the cc and bcc function when communicating online<br>• Communicate to multiple audiences through different digital communication means<br>• Be actively engaged in online communication in order to prepare content.<br>• Tailor the format and ways of communication to specific audiences<br>• Identify which webpages are attractive and easy to navigate | • Be critical about the content shared<br>• Protect privacy when sharing<br>• Understand that own digital footprint can be seen by others<br>• Take safety and security measures | Listen, discuss, and debate information and ideas. | Express ideas through performance and presentation. | Communicate, express opinions, write, make oral presentations and perform using appropriate language. |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Levels of "proficiency" 1 | Levels of "proficiency" 2 | Levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | • Understand online risks and threats, know about safety and security measures | • Protect own devices | | | | |
| | 5.5. Listen and express oneself | • Use web-based tools to communicate content and information | • Be willing to listen to other people's views as well as to express oneself confidently | • Ask well thought-out questions and listen to the answer<br>• Listen actively<br>• Express feeling and thoughts clearly in an appropriate tone | • Be willing to express feelings and thoughts in a clear and appropriate way<br>• Agree or disagree respectfully<br>• Use different styles of communication according to context and audience | | | |
| | 5.6. Perform and present | • Use web-based tools to communicate content and information<br>• Participate in social networking sites and online communities to pass on or share knowledge, content and information | • Understand the need to make choices about how best to present ideas to others, taking account of the audience in question | • Express ideas and emotions through performance and presentation such as visual art, music, drama, design and graphics<br>• Express ideas and emotions by using a variety of digital media and formats<br>• Select the most appropriate communication means according to the purpose | • Understand the importance of adapting one's presentation to the needs of the specific audience they are addressing each time | | | |
| | 5.7. Discuss and debate | • Use a chat or a discussion forum to communicate<br>• Use web-based tools to communicate content and information<br>• Actively share information, content and resources with others through online communities, networks and collaboration platforms | • Understand the importance of exchanging views with peers and others towards forming an informed opinion<br>• Understand the importance of engaging in dialogue and presenting one's views clearly according to the audience's needs | • Participate confidently in class discussion<br>• Engage in discussions and debates in online and physical space in a constructive manner<br>• Present own point of view clearly and provide arguments to support own opinion<br>• Show respect and empathy to others when | • Engage in discussions and debates in online and physical space in a constructive manner<br>• Be willing to provide arguments and counterarguments to support own views and enrich discussions<br>• Understand the importance of showing respect and empathy to | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Levels of "proficiency" 1 | Levels of "proficiency" 2 | Levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | | they are expressing their thoughts and feelings | others when they are expressing their thoughts and feelings<br>• Respect the rights and feelings of others when using digital media<br>• Know about ethical issues in the online space (e.g. cyberbullying) and act accordingly<br>• Be aware of copyright issues | | | |
| | 5.8. Use language | • Use edit functions to modify content<br>• Produce digital content in different platforms and environments<br>• Actively share information, content and resources with others through online communities, networks and collaboration platforms | • Understand the importance of using well-constructed sentences and appropriate language in making their point clear as well as in communicating their feelings and ideas effectively | • Understand and use a wide vocabulary<br>• Speak and write in well-constructed sentences<br>• Edit, correct and improve own written work<br>• Use a range of writing forms to express own ideas<br>• Make suggestions and comments in a polite and collaborative manner when engaging in online collaboration | • Understand the importance of using well-constructed language in getting one's ideas and views across<br>• Be willing to use appropriate language and other media in an informed way in order to get own ideas across | | | |
| 3. Contribute to project teams to produce original works or solve problems | 5.9. Gather, record, organize, and evaluate information and data | • Know how messages and emails are stored and displayed<br>• Filter the communication received (for instance, sorting out emails, deciding whom to follow on micro-blogging social sites, etc.)<br>• Apply different methods and tools to organise information, content, and files<br>• Know different storage options<br>• Download and upload content<br>• Know different storage media | • Know that collaborative practices facilitate content creation<br>• Understand the dynamics of collaborative work as well as the dynamics of giving and receiving feedback<br>• Be willing to share and collaborate with others in online and physical space | • Use a range of strategies to find information and data<br>• Filter and monitor the information I received<br>• Evaluate the quality of information and data as well as their sources<br>• Make judgements about how valid and reliable information found is<br>• Prepare and organize information and data | • Organize information according to the needs of the team<br>• Recognize existing knowledge as well as the wide range of information available<br>• Know about ethical issues in the online space (e.g. cyberbullying) and act accordingly | Gather, record, organize and evaluate information and data within a project team in order to produce original works or solve problems. | Critically evaluate options, alternatives and different approaches in order to produce original works or solve problems. | Implement ideas and take action based on critical evaluation of options and alternatives. |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Levels of "proficiency" 1 | Levels of "proficiency" 2 | Levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | | • Deploy a set of strategies for retrieving the content organised and stored | | | | |
| | 5.10. Explore options and alternatives | | • Be willing to put together along with peers an action plan for implementing a project<br>• Be willing to identify gaps in implementation along with team members and take corrective action<br>• Be willing to present ideas to the project team in a clear and intelligible manner | • Think through a problem step-by-step<br>• Reflect on progress and modify plan if needed<br>• Try different approaches when working on a task and evaluate what works best<br>• Seek out different viewpoints and perspectives and consider them carefully<br>• Imagine different scenarios and predict different outcomes<br>• Identify needs and discuss with team members for working out a solution | • Understand the importance of designing a strategy for reaching a goal<br>• Research information and different options on the web before taking a decision<br>• Participate in forum discussions for researching options and alternatives<br>• Critically evaluate possible solutions and digital tools | | | |
| | 5.11. Implement ideas and take action | • Use digital tools to implement ideas and take action | • Understand the importance of adopting a proactive attitude for putting together an action plan along with peers | • Test out ideas<br>• Evaluate different ideas and actions<br>• See things through to completion | • Take a proactive attitude in putting an action plan together for reaching a goal<br>• See things through to completion<br>• Match needs with possible solutions<br>• Understand when own competence needs to be improved or updated and find ways to fill those gaps | | | |
| 4. Develop cultural understanding and global awareness | 5.12. Respect difference | • Actively participate in online spaces<br>• Select the most appropriate communication means according to the purpose | • Appreciate other people's similarities and differences as a valuable part of life<br>• Understand that different cultures have different | • Listen actively and respectfully when people from different and cultures express their views and feelings | • Show respect to people of different cultures<br>• Show openness to learning from different people | Be aware of the world's problems and believe in ability to make a difference. | Respect people from different cultures and make connections | Collaborate with learners from other cultures to make the |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Levels of "proficiency" 1 | Levels of "proficiency" 2 | Levels of "proficiency" 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| by engaging with learners of other cultures | | | communication and interaction practices<br>• Respect cultural difference as well as viewpoints expressed by people from different backgrounds | • Appreciate the work and effort of people from different cultures and be willing to incorporate it in shared work<br>• Collaborate effectively with people from different cultures in physical and online space<br>• Look to enrich his/her own experience by interacting with people from different cultures and backgrounds | • Be willing to collaborate with people from different cultures towards a shared goal<br>• Understand that the experience and perceptions of people from different cultures can enrich one's knowledge and lead towards informed choices and decisions | | with people working to make a positive difference. | world a better place. |
| | 5.13. Contribute to making the world a better place | • Actively participate in online spaces<br>• Get actively engaged in online participation | • Believe in one's ability to make a difference<br>• Think critically about the world and its problems and propose solutions<br>• Be aware of the potential of technologies and media for citizen participation and democratic action | • Get involved in the community—including family, school, local, global, virtual – towards creating a better world<br>• Make connections with others who are working to make a positive difference<br>• Use digital means in order to effect change in the community and support democratic values | • Understand that the experience and perceptions of people from different backgrounds and cultures can shed light on global issues affecting today's world<br>• Be willing to listen to the views and perceptions of people from different cultures in order to make informed decisions about global and local issues<br>• Take action in physical and online space for responding to global challenges as an active citizen | | | |

# Appendix 11d: ATS2020 Transversal Skills Framework: Creativity and Innovation Competence Area

## Creativity and Innovation Competences Area

***Short Description:*** *Students identify and match needs with possible solutions, integrate and re-elaborate existing resources, innovating and creatively using tools and resources and create original works as a means of expression.*

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
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| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| 1. Identify and match needs with possible solutions | 1.1 Assess own needs in terms of knowledge, resources, tools and competence development | • Use information found in digital environments to identify needs<br>• Identify own needs through Internet and Social Media<br>• Adjust Internet searches according to specific needs<br>• Find relevant communities, networks, and social media that correspond to their interests and needs<br>• Adapt digital tools to personal needs<br>• Explore the web, the market, or their online network when searching for solutions | • Seek for resources, tools and competence development<br>• Think through a non-routine problem step-by-step and set strategy in problem solving<br>• Reflect and identify own needs | • Define the problem<br>• Set the specifications and requirements<br>• Investigate the parameters of the problem to guide their approach<br>• Look for sources of information and digital tools to find help for problem-solving<br>• Find the relevant knowledge for the solution<br>• Use knowledge, reasoning and skills in devising strategies | • Appreciate the added value of resources<br>• Acquire self-assessment of own needs<br>• Evaluate their strengths and suggest ways to improve them<br>• Accept their weaknesses and find ways to empower them<br>• Develop intrinsic motivation | Use existing knowledge, make decisions and take actions when solving a routine task, but asking for help when facing a new or ill-defined problem. | Solve a non-familiar or ill-defined task by exploring different possibilities (tools, technologies) and making a decision about which is the most effective. | Make informed decisions when choosing a method, tool, device, application, software or service for a non-familiar task.<br><br>Understand how new methods or tools work and operate. Plan, monitor and critically evaluate which method or tool will serve |
| | 1.2 Critically evaluate possible solutions | • Use digital tools to evaluate possible solutions<br>• Use digital tools and resources which help in the decision making process | • Novel and adaptive thinking (finding new solutions and responses to unexpected circumstances)<br>• Make informed decisions about whether and how to pursue relevant goals<br>• Be critical about possible solutions | • Make a decision to select the appropriate solution<br>• Choose the most appropriate solution<br>• Rely to tangible criteria in order to evaluate possible solutions<br>• Explore alternative solutions that are offered<br>• Revise the possible solutions | • Maintain an open mind to alternative interpretations-solutions<br>• Critical/analytical thinking in evaluating possible solutions<br>• Put aside personal prejudices and biases in the process of evaluating<br>• Comfort in disagreeing with others and trying solutions | | | |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
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| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | • Imagine different scenarios and predict different outcomes | | • Step away from an effort and return later with a fresh perspective<br>• Redefine problems effectively and think insightfully | | | their needs the best. |
| | 1.3 Implement ideas and take action | • Use digital models and simulations to implement the ideas<br>• Use digital tools and resources to help making the action plan | • Evaluate different ideas and actions<br>• Think about the way and the stages the ideas are implemented | • Develop, implement and communicate new ideas to others effectively<br>• Make an action plan<br>• Monitor progress effectively throughout the implementation of the plan<br>• Test out ideas<br>• See things through to completion<br>• Test the solution and iterate on improvements<br>• Interpret and construct dynamic models and simulations of real world processes | • Emphasize on the process and not on<br>• the product<br>• Effectively confront the obstacles that arise during the implementation of ideas<br>• Be patient<br>• Take the time to appreciate the journey and understand how things work<br>• Take risks and learn from their mistakes and failures | | | |
| 2. Integrate and re-elaborate | 2.1 Modify and refine existing resources | • Search for information in digital environments<br>• Create and edit digital content<br>• Use software tools to edit text, presentations, videos and other formats<br>• Use digital tools to recover existing knowledge and skills<br>• Be aware of digital safety and security issues when editing and publishing content online | • Use a wide range of idea creation techniques<br>• Know about different resources and databases that can be remixed and re-used<br>• Seek out different viewpoints and perspectives and consider them carefully<br>• Take inspiration from others<br>• Balance between breadth and depth of knowledge<br>• Consider the dynamics in the | • Modify content in simple, basic ways<br>• Distinguish the specific elements of the resources that need/want to be modified or refined<br>• Identify the advantages and disadvantages of the existing resources and try to eliminate the disadvantages | • Judge and appreciate the work of others<br>• Recognise the value of creativity<br>• Consider licences regulation principles of use and publication of information<br>• Understand copyright and licence rules<br>• Behave independently and assumes responsibility for own behaviour and choice<br>• Develop self-confidence, self-esteem and self-efficacy<br>• Understand and question context, ownership, regulation, audiences, economic, legal, privacy and security issues of media and information | Make basic changes to the content that others have produced. | Edit, refine and modify the content they or others have produced. | Critically elaborate and mash-up existing items of content. |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
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| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | | existing environment and experiment with the surroundings | | • Develop awareness of the importance of assessing content with a sceptical stance and with a self-awareness of their own biases and worldview | | | |
| | 2.2 Critically elaborate and mash-up existing resources | • Contribute to the public knowledge domain (e.g. wikis, public forums, reviews)<br>• Explore the possibilities of mixing different technologies and digital media to help them reflect and synthesize | • Think about the way the existing resources can be synthesized<br>• Come up with new original ideas<br>• Combine knowledge from previously disparate fields<br>• Understand the reliability of different resources<br>• Be critical towards content, based on the source, media, time and other criteria that they pose | • Remix different existing content<br>• Create new by mixing and matching old<br>• Cross check information sources<br>• Evaluate resources based on their relevance, accuracy, authority, currency, objectivity, coverage, usability in order to select them<br>• Compare, contrast and integrate information from different sources<br>• Distinguish and evaluate the disparate elements of each resource and combine them in a productive and meaningful way<br>• Combine bits of relevant information in novel ways<br>• Compare new information to old information in novel ways | | | | |
| 3. Innovate and creatively use tools and resources | 3.1 Be aware of tools and resources that can be used for creative purposes | • Search for appropriate digital tools to support creativity and innovation<br>• Evaluate digital tools based on criteria relating to creativity and innovation | • See the potential of technologies and media for being creative | • Discover, edit and use tools and resources creatively and innovatively | • Lifelong learning-stay updated on the latest technology trends and new tools and resources | Know that tools and resources can be used for creative purposes and | Use tools and resources for creative outputs and for solving problems (i.e. | Solve conceptual problems, contribute to the knowledge |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
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| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | 3.2 Express themselves creatively with the use of tools and resources | • Apply digital tools to gather, evaluate, and use information<br>• Use a variety of media to express themselves creatively (text, images, audio, and video) | • Think about which tool or resource suits better with their style and can express more effectively themselves | • Exploit technological potentials in order to express themselves effectively<br>• Use tools and resources to learn, think and express themselves | • Judge and appreciate the work of others<br>• Consider licences regulation principles of use and publication of information<br>• Understand copyright and licence rules<br>• Use ICT effectively and ethically in learning and life | make some creative use of them. | visualizing a problem). | creation and take part in innovative actions, by taking advantage of tools and resources. |
| | 3.3 Create knowledge and solve conceptual problems in innovative ways | • Use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions<br>• Use ICT to present and share new knowledge and solutions of a problem<br>• Use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge | • Identify the essential elements in a problem as well as the interaction between these elements and use electronic tools to facilitate analysi<br>• Have in mind the traditional problem solving process and think about a new and innovative one | • Select appropriate tools to create new content<br>• Explore the possibilities of mixing different technologies and digital media to help them reflect, problem solve and present ideas<br>• Use visualization tools to represent data in ways never before possible<br>• Solve a theoretical problem, of individual or collective interest, through or with the support of tools and resources<br>• Make hypothesis<br>• Design coherent solutions<br>• Conceptualize possible solutions to problems or explanations that are novel<br>• Recognize consequences for solutions to problems | • Appreciate the adding value of tools and resources in solving problems and creating knowledge in innovative way<br>• Be pro-active in looking for solutions<br>• Recognise the potential use of knowledge, skills and understanding in solving conceptual problems | | | |
| 4. Create original works as a means of expression | 4.1. Create new and original content, ideas and products | • Use software tools and multimedia to create new content in different formats (text, presentations, videos)<br>• Create an eportfolio | • Get inspiration by going out into the world to seek experiences that spark the imagination | • Create original works as a means of personal or group expression<br>• Create models, visualizations, simulations and representations | • Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas<br>• Understand that creativity and innovation is a long-term, cyclical process of | Produce new content, ideas and products in a creative way. | Produce new, original content, ideas and products in a creative and | Produce and extend new, original content, ideas and products in a creative and |

| Competences and Skills | Attainment Goals | Digital Competences and Skills | Attainment Examples | | | Level of "proficiency" 1 | Level of "proficiency" 2 | Level of "proficiency" 3 |
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| | | | Stands (way of thinking) | Actions (way of working) | Ethics (way of living) | | | |
| | | • Create digital media objects which demonstrate creativity and imagination to present the outcome<br>• Use a variety of digital tools and resources to create collections of artefacts | • See the potential of technologies and media for self-expression and content creation<br>• Think out of the box and look beyond the obviously<br>• Apply entrepreneurship way of thinking in creativity and innovation | • Develop, test and refine prototypes as part of a cyclical design process<br>• Present and evaluate creative process and final product, using domain-appropriate criteria<br>• Incorporate feelings, life stances and parts of own personality and interests into work<br>• Communicate complex ideas clearly and effectively<br>• Use a deliberate design process for generating ideas, testing theories and creating innovative artefacts<br>• Be involved in negotiation with the teacher, encouraging reflection<br>• Reflect on production process and determine elements that worked well and those that might be modified in the future<br>• Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur<br>• Incorporate alternate, divergent or contradictory perspectives or ideas<br>• Provide a critique of the curriculum | small successes and frequent mistakes<br>• Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions<br>• Be open in new radical concepts<br>• Be imaginative, open-minded, flexible and adaptable<br>• Apply intellectual skills in everyday contexts and promote creative ideas<br>• Step away from an effort and return later with a fresh perspective<br>• Take risks<br>• Overcome personal fears to try something new<br>• Understand the contribution of creativity and innovation in their daily life | | expressive way.<br><br>Criticize in a relatively satisfactory level the quality of their final content, ideas and products based on criteria. | expressive way, presenting an innovative outcome.<br><br>Effectively criticize the quality of their final content, ideas and products based on clear and tangible criteria, proving the development of their critical thinking skill. |