

**ATS2020**

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Key Action 3: Support for policy reform

## ATS2020 - Assessment of Transversal Skills 2020

### D5.1: Research Methodology

#### WP5: Pilot Evaluation

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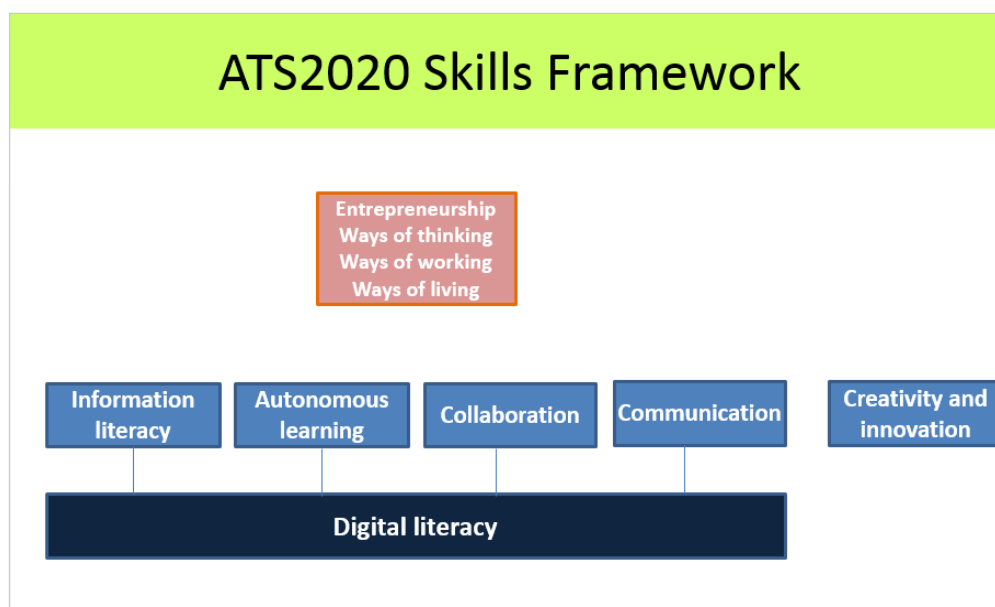
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## 1. Introduction

As outlined in the ATS 2020 research proposal, this document (Deliverable 5.1.) discusses the design of the research methodology for the pilot evaluation. This document is expected to inform the development of appropriate documents, such as questionnaires, interview protocols, observation rubrics, and artefacts coding tools, as discussed later on.

The current document has been prepared by the leaders of WP5 (Evaluation) i.e. The Education Research Institute (ERI)/Slovenia (P15) and the Center for Educational Research and Evaluation (CERE)/Cyprus (P3). The design of the evaluation methodology remains the responsibility of these two organisations that share responsibility for the development of the generic evaluation framework, as well as the data collection and analysis that will be further designed (Deliverable 5.2).

While preparing this document, the two institutions (ERI, CERE) faced various challenges related to the interconnections between the quantitative and qualitative aspects of evaluation within WP5, as well as the implicit (and explicit) interconnections between WP5 with the other WPs (especially, model framework/WP1, Technology and Tools/WP2, Teacher Professional Development/WP3, Implementation/WP4). However, intensive communication among partners (both online as well as face-to-face) has contributed to the establishment of consensus on essential components of the evaluation design. Hence, the methodological design has been based on the transversal skills framework (Fig. 1), as defined and discussed by the consortium during previous communication (online and face-to-face). As previously agreed, this framework drew from the ISTE Standards for Students (International Society for Technology in Education, n.d.), presented in Fig. 2. The four skills are, therefore, conceptualized in terms of this particular framework, as follows: Information and research literacy, Autonomous learning, Communication and collaboration (interpretation and argumentation construction), as well as Creative, Innovative thinking.



*Fig. 1:* ATS Skills Framework

<p><b>1. Creativity and innovation</b></p> <p>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.</p> <ol style="list-style-type: none"> <li>Apply existing knowledge to generate new ideas, products, or processes</li> <li>Create original works as a means of personal or group expression</li> <li>Use models and simulations to explore complex systems and issues</li> <li>Identify trends and forecast possibilities</li> </ol>	<p><b>3. Research and information fluency</b></p> <p>Students apply digital tools to gather, evaluate, and use information.</p> <ol style="list-style-type: none"> <li>Plan strategies to guide inquiry</li> <li>Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media</li> <li>Evaluate and select information sources and digital tools based on the appropriateness to specific tasks</li> <li>Process data and report results</li> </ol>
<p><b>2. Communication and collaboration</b></p> <p>Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.</p> <ol style="list-style-type: none"> <li>Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media</li> <li>Communicate information and ideas effectively to multiple audiences using a variety of media and formats</li> <li>Develop cultural understanding and global awareness by engaging with learners of other cultures</li> <li>Contribute to project teams to produce original works or solve problems</li> </ol>	<p><b>4. Critical thinking, problem solving, and decision making</b></p> <p>Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.</p> <ol style="list-style-type: none"> <li>Identify and define authentic problems and significant questions for investigation</li> <li>Plan and manage activities to develop a solution or complete a project</li> <li>Collect and analyze data to identify solutions and/or make informed decisions</li> <li>Use multiple processes and diverse perspectives to explore alternative solutions</li> </ol>

**Fig. 2:** ISTE Standards for Students

It is important to note that, despite efforts towards an agreed framework, this project allows flexibility among partners; partners are encouraged to adapt the evaluation concept to their culture-related setting and needs. During the implementation (pilot) phase, each partner will conduct qualitative and quantitative research following the agreed methodological framework, outlined in this document. Within this common frame, the partners will prepare reports of their research results, elaborating on the methods, the results and the conclusions. A more detailed account of the evaluation processes will be further developed by WP5 leaders and discussed/agreed within the consortium in future meetings. In addition, the tools and batteries will be designed, in accordance to the WPs, in consideration of the final intervention framework.

## 2. Research Questions

The consortium has already reached an agreement on the articulation of the following research questions that will be addressed by all partners.

The first research question, which is outcome-oriented, is stated as: *‘To what extent did the ATS2020 learning model promote the development and the assessment of the transversal skills defined for the purposes of the project?’*. This explanatory question has three sub-questions, as follows:

- Did the students involved in the intervention (as applied in the ATS2020 pilot implementation) develop transversal skills to a greater extent than those not involved? (To what extent have pilot students’ skills been developed within different national contexts? How can variability be explained in view of the factors explored e.g. student-level, teacher-level, school-level factors etc.?).*
- Did the beliefs/attitudes on the development and assessment of transversal skills of the students involved in the intervention (as applied in the ATS2020 pilot implementation) change, compared to those of the students not involved? (To what extent have students’*

beliefs/attitudes on the development and assessment of students' transversal skills evolved within different national contexts (pilot/control)? How have they evolved across different attitude aspects/scales?)

3. *Did the beliefs/attitudes on the development and assessment of transversal skills of the teachers involved in the intervention (as applied in the ATS2020 pilot implementation) change, compared to those of the teachers not involved?* (To what extent have teachers' beliefs/attitudes on the development and assessment of students' transversal skills evolved within different national contexts (pilot/control)? How have they evolved across different attitude aspects/scales?)

The second research question appears as process-oriented and is stated as: '*How has the ATS2020 model on the development and assessment of the targeted transversal skills been implemented*'. This exploratory research question, again, has sub-questions as follows:

1. *How were the critical aspects of the model (e.g. teaching material/scenarios and designs, tools and technology) implemented in schools by those involved (teachers, students, schools)?* (Which aspects of the model were implemented as planned? Which aspects of the model had to be modified when applied?)
2. *What did the participants think of the implementation of the ATS2020 model?* (To what extent were participants satisfied with the implementation? Which difficulties did participants encounter in their attempt to enact the ATS2020 model? What did the participants perceive as the model's key strengths? What did participants suggest with regards to future implementation?)

Answers to the two research questions above will allow the consortium to address two critical aspects. First whether the intervention was a success. Conclusions will be drawn, not only on the outcome as a whole, but on individual aspects such as the development and assessment of students' skills, the development of students' and teachers' attitudes and beliefs etc. Second, whether the intervention resembles a model that could be transformed into an implementable policy. ATS2020 model features (e.g. the assessment, the professional development etc.) that were successful will be highlighted, as well as aspects that should be left out or require further investigation in the future. Besides, this project aspires to lead to the development of a policy framework that will allow for transversal skills to grow in various contexts.

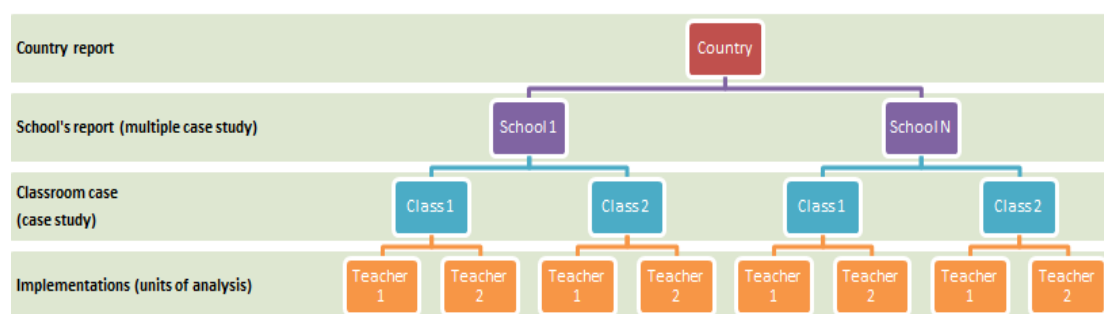
### 3. Methodological Considerations

This study adopts various theoretical underpinnings, required for addressing a quite ambitious research approach.

#### 3.1. Sampling

As already discussed in the project proposal, the ATS2020 model will follow a quasi-experimental and qualitative research design at various levels (Fig. 3), involving 250 schools, 1000 teachers and 10 000 students (10 piloting countries x 25 schools in each country x 2 classes x 2 teachers x 20 students per class).

To address the aims of the project and facilitate the development and the application of appropriate sampling procedures and research tools, the evaluation leaders have outlined sampling specifications and recommendations that are explicitly presented in Appendix 1.



**Fig.3:** Sampling Framework (ATS2020 project proposal)

### 3.2. Mixed-Methods

Due to the nature of the study and the complexities of the issues investigated, a mixed-methods design will be employed, in an effort to provide for a comprehensive evaluation framework.

Mixed-methods research methodology is widely recognised as an accessible approach to social inquiry, allowing the utilisation of data from different methodological standpoints (Creswell & Clark, 2011) towards the ‘better understanding of the multifaceted and complex character of social phenomena’ (Greene, 2008, p. 20). As Teddlie and Tashakkori (2009) argue, different methods are meant to inform and supplement each other.

According to the ATS2020 project proposal (p.24), during the evaluation process, three tasks will be addressed as follows: Quantitative status-quo study - Students’ transversal skills and teachers’ teaching practices (Task 1); Qualitative evaluation during the process of implementation (Task 2); Quantitative post-study (Task 3). In particular, as stated below, the first research question will involve Tasks 1 and 3, while the second research question will involve Task 2. As further explained below, the first research question (see Section 2 above) resembles an explanatory perspective, while the second is more exploratory in nature (Robson, 2011).

## 4. Methodological Design

### 4.1. Explanatory Design-Orientation to the Outcomes

The ATS 2020 project experimentation is designed as an intervention that has a preparatory phase and the experimental phase. The preparatory phase is designed as CPD program for teachers centred on transversal skills, their integration into the subject centred curricula, the educational approach based on formative assessment, along with the use e-portfolios as tools for both teacher and student development.

The experimental phase is designed as a process lasting for the entire school year in which the experimental teachers implement the methodology they’ve learned in the preparatory phase in the real-life conditions of the experimental class in the participating schools.

The experimental design is primarily directed at answering the research question 1, more specifically to the sub questions 1 and 2 that are aimed at students. The gist of the experimental design is in the exploration, whether the proposed experimental approach will result in observable ‘improvement’ of student’s achievement in the area of transversal skills proposed in the ATS 2020 transversal skills model.

The success of the proposed educational approach among teachers will be measured in a more circumspect manner, not by measuring teacher’s skills (as with the students) but by the evaluation of teacher’s opinions and attitudes toward the AT2020’s approach, along with self-evaluation of the skills proposed.



#### 4.1.1. *Sampling*

The experimental design fits into the category of quasi-experimental designs. The decision for such a design comes out the limitations of experimenting in the real life environment of day-to-day school work. For the experimental design this means the following limitations:

- The randomised assignment of individuals to the experimental and control groups is not possible, as the school work is organised in classes and this cannot be changed for the purposes of the ATS2020 project (i.e. we cannot form arbitrary groups of students).
- The participating schools themselves will not be randomly selected, as the participation in the project will be voluntary. This means that only schools that are willing to participate.
- The experimental and control group setting will be created with existing classes. Typically those ‘natural’ classes already are different in terms of student’s achievements and social-economic setup. Therefore we already know, that baseline achievements of participating classes will not be similar as is ideal case in experimental design.
- An additional problem arises from the fact, that the central content of intervention, namely transversal skills, are not the content that will be newly introduced in the existing educational setting but are already a part of the curriculum, albeit typically defined in less detail as subject content. This is especially true, when the assessment is considered as in many cases the expected achievements in the area of transversal skills are not defined. For the experimental design this means, that existing practices similar to the intervention or its constituent parts will have to be taken into account.

These limitations will be offset by coupling the experimental design using experimental and control groups with the pre- and post-test design that will be applied in both groups. One round of testing will be applied before the intervention starts, at the beginning of the piloting school year, the other round will administered at the end of the piloting year. In this way the achievement, beliefs and attitudes of the individual students will be measured at two points in time and the change for every individual student will be determined. In that manner the baseline differences will be explored, but the primary benefit of the approach will be, that the size of the difference for each individual will serve as the basic data for the analysis of the effectiveness of the proposed approach.

The instruments aimed at teachers will also be administered as pre- and post- measurement.

Another important corrective for the limitation of the experimental design will of course be the application of qualitative methods.

The ATS2020 project is designed as a piloting implementation including a preparatory phase in which participating teachers are trained in the approach. This means that the participants will have to work in the collaboration with the consortium for a period of at least year and a half. The expectations for participants are not small and the project will give the participant teachers quite an additional workload in addition to their regular work in the schools. Also the schools themselves will have to be prepared to take the burden of providing the ground for the proposed experiment.

The proposed project requires participants that are willing to be involved and can be expected to show the level of commitment stemming from the project’s outlined properties.



The consortium not being in the position to provide financial incentives to the participants also means, that the rewards will be of the non-material kind (i.e. professional development, experimental work in some cases such involvement counts toward the promotion etc.). Although the latter incentives can be important, they cannot guarantee the commitment by all teachers.

Another consideration for the sampling procedures is a de facto autonomy of the teacher's profession in some of partner's states. Such autonomy means that the outside norms (i.e. curricula) set the objectives or educational outcomes, but how those outcomes are achieved in terms of methods, content and scheduling is entirely in the domain of teaching professionals.

For all those reasons random sampling of both schools and teachers involved in the project is impracticable and can actually produce devastating results (i. e. schools refusing to participate or leaving the project). In less severe cases it means that the participants don't show the full commitment to the project (i.e. fulfilling only the minimal requirements) thereby diminishing its impact. For that reason we propose to use a self-selected sample – both schools and teachers should be involved in a project on a voluntary basis.

The sample will consist of one full experimental class of the students and one control class of students. The teacher sample will consist of the piloting teachers and teachers that are teaching in the target grade.

Detailed guidelines for the sampling procedures intended for the partners are a separate document (Appendix). In this sections the general principles of schools sampling are outlined. The guidelines can be divided into requirements and recommendations, the latter are necessary to accommodate for the different national practices.

It is recommended that schools are invited to the project via a tender. From the pool of the schools that expressed interest for the project schools should be chosen that primarily correspond to the variation in the social composition of the participating educational system. This way is preferred to the choosing of schools by project partners, as it allows for a broader pooling of the schools.

In choosing the schools, the partners should observe the range of grades that are in the focus of the project. The distribution of grades should however not be even. About 2/3 of schools should contribute classes in the lower secondary school, preferably grades 7, 8 and 9 after the start of compulsory education.

The chosen schools should have at least two classes of the grade the project will be implemented and they should provide 4 teachers teaching in those classes willing to participate in the project. The teacher's agreement to collaborate in the project should be given before the school expresses the interest in the project. Teachers should collaborate on the voluntary basis.

It is of outmost importance, that the all of the participating teachers and students are properly recorded for the purpose of the test and questionnaire administration. It is namely central to the project's evaluation, that the evaluation team is able to compare a pre end post-test evaluation result of both the test and the questionnaire result at the individual level of students and teachers. This requires clear procedures for tracking of the participants that is coordinated at the project level and carried out in the participating schools.

The main concern with the management of the sample data is the protection of the sensitive data of individuals, especially the underage students. Ideally for the evaluation procedures,

the participant's listing will include the full names and birth data (month and year of birth) of participants, as in that manner the possibility of misalignment of individuals pre- and post-data is minimised. We're however aware that countries have rules on the guarding of personal data (especially of minors) that might prohibit the schools to report this information to an outside party.

In such cases two approaches are proposed:

- Asking the parents for the permission to conduct a survey and use the personal data. This approach is preferred, but it might in some cases not be enough so satisfy the legal requirements.
- Anonymised listings – in that case the international consortium doesn't get the names, only codes of the participating students. The matching of names and codes is done within schools according to an protocol devised by the consortium. In this manner there is a certain possibility of a mismatch between codes and names.

#### **4.1.2. Research instruments**

For the quantitative part of the evaluation three separate instruments are foreseen:

- The student test composed out of items created for the measurement of the transversal skills in the students.
- The student questionnaire that is aimed at establishing the student's socio-economic background on the one hand and on the student's beliefs, attitudes and observations in with regards to the transversal skills and their role in school, at home and in other settings. Students will also self-evaluate their transversal skills.
- The teacher questionnaire that will focus on the teaches beliefs, attitudes, observation and educational practices regarding the transversal skills and their position and importance within the curriculum of the school. The questionnaire will also focus on the topic regarding the educational approach of assessment for learning.

##### **4.1.2.1. Student test**

The student test will be made out of four modules that will be combined into a number of booklets. Each student will work on one booklet in pre- and one in the post-test, the rule being, that the student should not get the same module twice. The modules will be comprised from the mixture of items with closed answers and open ended answers. This means that the scoring of items will be both automatic and human based.

The test will measure achievement in the areas of transversal skills set out in the ATS2020 model that are appropriate for the type of testing proposed. That means that areas of skills where test based evaluation instruments (other than self-evaluation tests) have not been developed in other contexts or in other research and the areas where the existing types of testing are not practicable in the mode foreseen for the ATS 2020 evaluation will not be evaluated. Within the framework of the project an overall evaluation involving all the sampled participants and using other approached as an test is not practicable.

Autonomous learning is an skill area, where the relevant instruments measuring the whole complexity of the skill area are not developed, even though the some discreet components can be measured via written tests (i.e. problem solving skills). On the other

hand test of creativity exist but are not practicable in an about hour long test that has to cover many areas.

The student test will therefore cover the areas of communication, collaboration and digital literacy. The test will be timed at 60 minutes.

#### 4.1.2.2. *Student questionnaire*

Student questionnaire will be focused on the following areas:

- Student's socio-economic background along with his academic and career ambitions.
- Student's beliefs and attitudes in regard of the transversal skills.
- Student's perceptions of the transversal skills in their present school environment.
- Student's self-evaluation of the ATS 2020 skills.

Student's questionnaires will consist of the closed-type items, typically with likert-type scales in the case of self-evaluation, belief and attitude measuring.

#### 4.1.2.3. *Teacher questionnaire*

The teacher questionnaire will focus on the following areas:

- Teacher's professional background and experience.
- Teacher's attitudes and beliefs in regards of the transversal skills
- Teacher's reporting on the role of transversal skills in the school environment they are working in.
- Teacher's professional development in the area of transversal skills.
- Teacher's self-evaluations with regard of transversal skills.
- A section on teacher's experience with the assessment for learning approach.

Student's questionnaires will consist of the closed-type items, typically with Likert-type scales in the case of self-evaluation, belief and attitude measuring.

#### 4.1.2.4. *Research instruments: production, authoring, translation and adaptation*

There are several major steps in the instrument production: the authoring of the instruments, the translation and adaptation procedure and that implementation of the instruments in the online platform.

The master instruments in English will be produced by ERI and put forward to a review by the project's partners. The partners' comments will be implemented to produce an English version master.

The instruments will be translated and adapted by the partners in the consortiums countries. The adaptation pertains to the localisation of specific terms both within the test items and the questionnaires (i.e. if a school leader is typically called 'headmaster' in a country she should be called like that in a questionnaire, if he is called a 'director' this term should be used; use of currency should be adapted to local currency used etc.) Terms and places to adapt will be marked in the master document.

Along with the master instruments, the partners will receive a manual that outlines the translation and adaptation process. Partners will carry out the translation and adaptation. They will also be asked to provide for a person different than translator to

proof-read the translations both in terms of linguistic correctness and appropriateness of the adaptations.

The Implementation to the online platform will be done in collaboration with the WP2 partners.

#### **4.1.3. Test administration**

The instruments will be administered via an online platform. The login details will be generated in provided to the consortium's partners responsible for the county pilot by the WP5 leader. The partners will have the responsibility to distribute the login details to the schools. The participating schools will have the responsibility to administer the evaluation testing according to the evaluation plan. Each school should appoint a teacher that will be responsible for the administration of the test and questionnaires.

##### **4.1.3.1. Scheduling of the evaluation procedures**

###### **4.1.3.1.1. Students**

The student test and questionnaires will be delivered as a pre- and post-test. The pre-test will be held before the piloting begins, typically this will be a few weeks after the beginning of a 2016/17 school year (mostly end of September). The test and questionnaires will take about 2h to complete. Both experimental and control class students will take the test. Schools might have to take the test in several sessions according to the availability of the computers needed to take the test. The test will be organised at school.

The post-test will be taken near the end of the school year, both by the experimental and the control group along with a slimmed down version of the student questionnaire.

###### **4.1.3.1.2. Teachers**

The piloting teachers will also work on a pre- and post-questionnaires, but the scheduling will be slightly different as with the students. The piloting teachers will fill in their pre-questionnaires prior to their training on the ATS 2020 model and the post-test will be taken after all the piloting activities in the school are finished.

A sample of teachers that are not participating in the pilot will be given the questionnaire that is identical to the pre-questionnaire toward the end of school year 2016/17.

The teachers will be given a deadline to complete the questionnaire but they will be free to as to where and when in a given framework they will work on the test.

##### **4.1.3.2. Requirements for testing**

The student testing will be done in a classrooms setting on (school) computers and should be supervised to prevent cheating. If necessary the testing can be done in several sessions. The requirements for the computers will be published in due time.

##### **4.1.3.3. Recording of participation**

Schools will be provided with the forms in which the participation and/or reasons for non-participation of both students and teachers will be recorded. The correct filling in of these forms is the responsibility of the person in school responsible for testing.

#### **4.1.4. Data analysis**

##### **4.1.4.1. Scoring/coding procedures**

As both the test and the questionnaires will be administered online and the majority of the items and almost all of the questions will be closed-type, there will be very little coding and a moderate amount of human based scoring.

All human based scoring will be done using a scoring manual that will include attainment levels descriptions for each item with some examples.

Each partner responsible for conducting the pilot in their respective country will nominate one country scoring leader. The country scoring leaders will have a scoring training with WP5 leaders that will also serve as review of the scoring manual version one.

The national scoring leaders will form a team of scorers in the country to score all of the students work.

We expect that open questions will arise in the scoring process. In the cases of indecision by the scorers, the problem should first be addressed by the national scoring leader and if he is unable to resolve the problem, the international scoring leader should be contacted with a query.

#### **4.1.5. Research and Ethical Considerations**

##### **4.1.5.1. Reliability procedures**

Interrater reliability procedures will be used to monitor the scoring process. By default, 20 percent of responses will be double-scored, the minimum interrater agreement should be 85 %. The amount of double-scored items can be increased if necessary, also remedial action will be taken if interrater reliability will fall below the threshold.

##### **4.1.5.2. Data cleaning**

Data gathered will be checked for inconsistencies that might arise for different reasons:

- Sample tracking errors (i.e. students recorded as participating but no data available)
- ‘Empty instruments’ (i.e. students participating but leaving the instruments empty for various reasons)
- Inconsistencies between sample data and answers in questionnaires.

The issues will be resolved with the help of consortium’s members and schools.

All data analyses and comparisons will be done on a country per county level. The main analysis that will serve as a proof of the success of the approach will be the comparison of the gain (the difference) in transversal skill between the students in the experimental and control group. Additional analyses will try to shed a light on different factors and their role in the student’s performance.

Similar analyses will be made with both the self-evaluation data of students and teachers.

The reporting will be done on the national level in full and also the schools will get the summary of their achievement.

##### **4.1.5.3. Data protection**

All personal data will be treated confidential and protected at all times. The WP 5 team will not report any of the results or the data of individual students or teachers. It will also protect the identity of schools and classes involved in the project.

All persons dealing with confidential data will have to sign a confidentiality agreement, unless their job contracts already involve such provisions.

Upon request, measures to anonymise the participants of the evaluation procedure will be undertaken.

#### 4.2. Exploratory design-Orientation to the Process

This section reflects on the qualitative and exploratory research approach, adopted in this study. In McMillan and Weyers's (2010) words, the value of qualitative research derives from the authentic and case-specific detail that it can encompass. The information obtained from such an approach is potentially richer and deeper than that described in numbers and statistics.

In compliance with the overall sampling scheme employed for the project (Fig. 3), this qualitative aspect will entail, overall, a large number of case studies, at the collective level, intended to address the implementation of the model in a range of different instructional contexts (different schools, classes, teachers, and students).

A growing interest in the implementation of innovations in schools (Bergman, 1981 in Grunberg and Summers, 1992) is related to the well-established *implementation perspective*, proposed by Fullan (1995). This places the focus on the actual implementation of an innovation in its intended context that is the actual field where it is intended for i.e., the school/class (Fullan, 1992). Such a perspective allows a thorough account of how the implementation unfolds, which could serve as a resource that can be drawn upon to supplement and inform any attempt to understand important aspects of how the innovation could actually play out. In other words, this approach allows opening the 'black box' of implementation, illuminating accounts of why certain features of the innovation seem to function effectively or not. This is consistent with Research Question 2.1. that aims to show what happens in schools during ATS2020 intervention, with the intent to put this innovation into perspective and provide insights into what might influence resulting practices.

At the same time, the implementation of the innovation has no effect when the actors' views are not taken into account, since actions or inactions are determined by individuals' perceptions. Research Question 2.2 relates to students' and teachers' perceptions about the ATS2020 model and its implementation. In a people-oriented approach, the study takes an interest on the meanings of participants and understandings of implementation, based on actual school-specific concerns, rather than superficial knowledge and assumptions. Churchill et al. (1997) contend that teachers' perceptions constitute reality as far as their work lives are concerned. In this regard, focus needs to be placed on both the individual and collective pictures. The individual picture concerns the subjective meaning for teachers and students. The collective picture at the country level is also important because educational change is a socio-political context-specific process. Investigation of the relationships between new programs or policies and the thousands of subjective realities embedded in individual and organisational contexts is required (Hurst, 1983). According to Easterby-Smith et al. (1991), the starting point for phenomenology is that reality is socially constructed, rather than objectively determined. From a social constructionist viewpoint, focus is on meanings and the different constructions of experience. Through this reflexive perspective, direct experience of phenomena is central to understanding and interpreting behaviour (Peel, 2005), while hermeneutic phenomenology can transform the ways in which researchers and practitioners relate to each other (Perl, 1996). The phenomenological paradigm and associated qualitative methods have 'strengths in their ability to look at change processes over time, to understand people's meanings, to adjust to new ideas as they emerge, and to contribute to the evaluation of new theories' (Easterby-Smith et al., 1991, p. 32). In addition, phenomenology favours small samples investigated in depth, which



is the case of this study that employs an inquiry approach, based on personal narratives. The exploration of both teachers' and students' views constructs a 'reliable' picture of practices in the pilot schools (Zeldin and Topitzes, 2002 in Flanagan et al., 2007).

#### 4.2.1. Sampling

Since this study focuses on particular schools as real organizations or social settings, it can also be considered as fieldwork or case studies. As Bassey (2007) points, we need case studies:

of good practice and bad, of the competent and the mediocre, not simply of the story-telling or picture-drawing kind, but theory-seeking/theory-testing studies which try to tease out why a situation is good, bad or mediocre. (p. 154).

An opportunistic approach to sampling will be adopted in this project. As also outlined in Appendix 1, each partner will prepare and submit two (2) case studies at the school level. Each case study (at the school level) will build on case studies at the class level (at least two classes in each school); at least two teachers, as well as their students, involved in each class will also participate in the aforementioned case studies at the class level.

#### 4.2.2. Research instruments

Multiple data collection tools will be employed, enabling evidence-based claims about various aspects of the implementation of the model in classroom settings. Indicatively, these tools will include *classroom observations*, *teacher and student interviews* (group and/or individuals), as well as *student artefacts*.

A provisional description of themes and probes for the aforementioned data sources is provided here. As already pointed in the Introduction, the tools will be finalized after the key aspects of the ATS2020 model are clarified and agreed upon; the operationalization of these aspects is part of WP1 (e.g. *D1.4 Technology and tools for the scaffolding of teachers, learners and researchers towards the assessment of the teaching and learning*).

##### 4.2.2.1. In-class Observations

In-class observation is the first data source for the qualitative part of the evaluation framework. Direct observation is critical for assessing and monitoring communication skills (Kogan, Holmboe & Hauer, 2009; Russell, 2009) and skill-focused rubrics (Popham, 1999; Tierney & Simon, 2004). Despite demands for organisation and commitment, such an approach allows teaching to move away from routine to a systematic documentation of the learners' skills observed.

The observation tools will resemble checklists, rating scales and rubrics in accordance with the definitions of the transversal skills. It is important to note that rubrics have become increasingly popular for performance assessment, because they contain descriptions of performance criteria (Tierney & Simon, 2004). These criteria will be formulated, according to the definitions of the transversal skills and the quantitative tools that will be developed as part of WP1.

The observation guide will contain certain basic information, including the name of the school and identification of the classroom and the teacher. The context of the observation (e.g., language class, math class, recess) will also be recorded on the form, as well as the time that the observation will take place. Secondly, the guide will be concentrated on the teacher, the pupils and the ATS2020 model (three parts). The observer will investigate whether the teacher has specific attainment targets and corresponding activities and whether he/she has specified the transversal skills developed in the particular scenario. Other points to be addressed in the guide include teacher's behaviour, instruction strategies, classroom management, classroom climate, development of higher order thinking skills and questioning strategies. As far as the pupils are concerned, their involvement, attitudes demonstrated and indications of achievement targets will be investigated. Finally, with regards to the ATS2020 model, the development of the transversal skills will be further explored. Although the format of an observation form



depends primarily on the objectives of the investigation, it is considered important to allow space on the form to add codes or additional notes and comments.

#### 4.2.2.2. *Interview Protocols*

A randomly selected sub-sample of the students in the pilot classes (approximately 30%) and all pilot teachers will participate in individual interview sessions, after the enactment of the ATA2020 model, with the intent to elicit perceptions about key aspects.

The interviews will be semi-structured that they will rely on a fixed set of themes and core probes. However, researchers will also assume the flexibility to pose additional questions where they deem useful. Addressing a core set of themes will serve to ensure sufficient uniformity and substantial overlap across the case studies. At the same time, allowing freedom to enlarge the scope of this critical set of themes, as the need arises during the interviews, could allow delving deeper into the participants' perceptions on their experiences with the enactment of the model. During the interviews care needs to be taken to ensure a productive environment, where the interviewer will assume the role of a non-judgmental peer that poses probes in a neutral manner, so as to avoid influencing participants' reasoning or imposing a specific perspective.

#### 4.2.2.3. *Artefacts*

Artefacts of interest to researchers are those things that people develop, make and do (Goetz and LeCompte, 1984). The artefacts of interest to educational researchers are often written, but computer trails of behavior are becoming the objects of analysis as well. Examples of artefacts that may help to illuminate research questions include textbooks and other instructional materials, such as media materials; memos, letters, e-mail records, logs of meetings and activities; demographic information such as enrolment, attendance, and detailed information about subjects; and personal logs kept by subjects (Savenye & Robinson, 2004).

Research has focused on the artefacts, students (and teachers) develop in a given learning environment because analyzing these aspects provides evidence on the effectiveness of the innovation under study and, therefore, supports designers' endeavours to improve instructional effectiveness and, sheds light on the nature of learning (Bell, 2000; Wisnudel-Spitulnik et al. 1997). Bell (2000) suggests that looking closely at the activities students perform, linking those to the artefacts students create, analysing the artefacts to determine whether the activities achieved their intended objectives is a way to evaluate educational innovation and provide insights to other researchers and educational designers. This results in the development of powerful instructional materials.

In this study, and within the spectrum of the assessment of the ATS2020 model for teaching and assessing the targeted transversal skills, students' and teachers' artefacts -developed through the implementation of the model- will be further analysed to (a) determine whether the intervention is effective with regards to its goals and (b) identify strengths and limitations.

#### 4.2.3. *Data Analysis*

The data collected from all data sources will be coded and analysed by each partner country with an aim to identify emergent issues and probes to support the development of the reporting of two case studies.

##### 4.2.3.1. *In-class Observations*

Coding of the observation data will be based on coding guidelines which will be used in both data reduction and data retrieval. Codes that represent certain events or actions can be used as part of the observation instrument and will be summarized on a table.

##### 4.2.3.2. *Interviews*

A descriptive analysis approach will involve inductive coding techniques (Seidman, 1998), attaching codes to chunks of data, grouping data into categories based on their commonalities (clustering) and then noting patterns and themes. The analysis of data -e.g. transcriptions of

recorded interviews- will employ category generation and saturation. To proceed with data interpretation and a synthesis of meanings, responses will be categorized into emerging thematic groups.

The interview data will be transcribed and analysed drawing on content analysis (Weber, 1990). In particular, the responses offered by the interviewees during the interviews will be processed for each separate theme, which will be representing the key aspects of the ATS2020 model. The responses will be organized into categories intended to capture and portray the variation in the data. It is expected that this process will lead to an account of students and teachers' perceptions about the key aspects of the model and its implementation.

#### 4.2.3.3. *Artefacts*

Van Gog et al (2008) suggest that many unobtrusive methods for collecting information about human behaviors fall roughly into the categories of document and artifact analysis. Concurrently these methods of analysis usually overlap with other methods; for instance, verbal or nonverbal behavior streams produced during video observations or content analysis.

According to the literature, artefact analysis should involve the following four activities: locating artefacts, identifying the material, analyzing it, and evaluating it. It needs to be stressed that the more informed the researcher is about the subjects and setting, the more useful artefacts may be identified and the more easily access may be gained to those artefacts.

For analysing the artefacts the principles of artefact analysis, proposed by LeCompte and Preissle (1993) and Goetz and LeCompte (1984) will be used. Specifically, the analysis will rely on pre-determined features/criteria that will directly reflect the assumptions posed by the ATS2020 model for teaching and assessing the targeted transversal skills. Hence, for each type of artefact (student or teacher) specific coding rubrics will be developed.

#### 4.2.4. *Research and Ethical Considerations-Limitations*

Reliability refers to the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions (Hammersley, 2013). The involvement of different groups of participants (e.g. teachers, students) in data collection can certainly enhance reliability through eliciting diverse accounts. In retrospective, it would be worth considering the collection of data at different stages to establish whether, for instance, teachers hold the same views throughout the implementation of this project. To further improve the validity, the strategy of multi-side case studies will be employed, by choosing different schools for in-depth study.

Because of the uniqueness of the case study schools in terms of the educational structures and decision-making processes as well as the school culture, the findings can certainly not be generalisable to other contexts. Generalisations can also not possible due to the small size of the sample (Pickering and Coleman, 2004) and the characteristics of the respondents (teachers, students), who are not necessarily representative of the whole population. Thus, one cannot assume that the experiences described by the participants in the selected schools can translate across other contexts. However, the aim here is to obtain deeper understanding of the true picture of implementation, as experienced by a number of individuals rather than generalise these specific findings to all schools. Therefore, emerging issues pertaining to the conditions under which the project practices (development of transversal skills) may be initiated, implemented and sustained in schools could appear of relevance to other settings, as well.

Researchers have easy access to teachers and because of their familiarity with the context, they will be able to better conceptualise teachers' accounts and proceed to sound interpretation of their reactions. However, approaching educational reality often reflects the researchers' background; the kind of knowledge we produce ultimately depends on our assumptions about the world and our particular model of reality. Therefore, to avoid personal bias and to detach the researchers as much as possible from an imposition of their own perceptions on teachers, several techniques will be employed. First, researchers will acknowledge their own position.

Similarly, to Peel (2005) while reflecting on similar experiences through an autobiographical stance, intervention practices will be viewed as a means to an end. Yet, teachers' individual constructions on the value, impact and use of project practices would not necessarily coincide with the researchers' views. Second, researchers will be careful during the interviews with colleagues, not to express views of their own. This strategy will allow the alternative voices of students and teachers to be presented from their own perspective, as others' authentic personal realities. Finally, to avoid 'inappropriate' data interpretation, critical subjectivity, not allowing the researchers to be overwhelmed with own views and resisting the temptation to look for data that confirmed their own positions will be employed.

Before data collection, 'informed consent' (Glesne & Peshkin, 1992) from teachers to provide interviews will be established. Teachers will be further reminded that participation to data collection is voluntary, and that their anonymity would be maintained. While conducting the interviews, the teachers will be asked to express their views openly and honestly; it will also be ensured that interview questions will be shaped in such a way, so as to elicit teachers' and students' perceptions on the ATS2020 project without threatening participants.

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## APPENDIX 1

## SAMPLING PROCEDURES/CONSTRAINTS FOR THE PILOT TESTING OF THE ATS2020 MODEL IN SCHOOL SETTINGS

The table below provides a synopsis for the specifications and constraints that need to be satisfied by the partners in making selections about (a) schools, (b) classes, (c) teachers and (d) the specific pilot classes that will be the focus of the case studies.

<b>Schools</b>	
<i>Number of schools that will participate in each country</i>	<i>The project will involve 25 schools per participating country (total of 250 at the collective level).</i>
Constraints to be satisfied in selecting the participating schools	<ul style="list-style-type: none"> <li>- Partners should choose 25 schools at the national level. Where possible, it would be helpful to have:               <ul style="list-style-type: none"> <li>○ a minimum of 5 upper primary (10–12 year-olds) and</li> <li>○ a minimum of 5 lower secondary (13-15 year-olds).</li> </ul> </li> <li>- Participating schools should, preferably, have more than two classes at the grade of interest. Selecting schools with more than two classes on the same grade level will offer greater flexibility and support optimum sampling choices.               <ul style="list-style-type: none"> <li>○ Only two classes per school will be included in the project for evaluation purposes.</li> </ul> </li> </ul>
<b>Classes</b>	
<i>Number of classes that will participate in each country</i>	<i>Two intact classes in each participating school will take part in the project (total of 50 classes in each participating country, 500 on the project level). In each case, one class will serve as the pilot group, whereas the other will serve as the control group. The ATS2020 model will be only enacted in the pilot class, whereas the other will serve as the comparison class (for the experimental design)</i>
Constraints to be satisfied in selecting the participating classes	<ul style="list-style-type: none"> <li>- The two classes in each participating school will need to have               <ul style="list-style-type: none"> <li>○ as similar composition of students as possible.</li> <li>○ at least 15 students each.</li> </ul> </li> </ul>
<b>Teachers</b>	
<i>Number of teachers who will participate in each country</i>	<i>There will be a total of four teachers participating in each school (total of 100 teachers in each country). The selection of the teachers is closely connected to the corresponding selection of the two subjects (e.g. Mathematics and Physics) that will</i>



	<i>serve as the context for the pilot implementation of the ATS2020 model in each school.</i>
Constraints to be satisfied in selecting the participating teachers	<ul style="list-style-type: none"> <li>- The teachers for the two subjects selected for the pilot implementation in the particular school should be different individuals for the pilot and control class               <ul style="list-style-type: none"> <li>o Two of the participating teachers will teach the two subjects in the pilot class.</li> <li>o The other two teachers will be the teachers who teach these same subjects in the control class.</li> <li>o An example: Mathematics, Class A-Teacher X; Class B-Teacher Y and Physics, Class A-Teacher Z; Class B-Teacher K</li> </ul> </li> </ul>
<b>Case Studies</b>	
<i>Number of case studies that will be conducted in each country</i>	<i>Each partner will need to conduct two (2) case studies in two different pilot classes. The focus should be set at the class level.</i>
Constraints to be satisfied in selecting the pilot classes to serve as case studies.	<ul style="list-style-type: none"> <li>- Each of the two case studies should be focusing on a different educational level, i.e., one case study should be situated in an upper primary school (10–12 year-olds) and the other on a lower secondary school (13-15 year-olds). This comment doesn't concern countries where the pilot will be implemented only in secondary education. Provided that the teachers/schools involved in the case study will participate in more extensive data collection, it is important to select teachers/school who can commit themselves to productive participation in these procedures.</li> </ul>

### **Caveats that need to be taken into consideration and dealt with**

- The success of the project is contingent upon the effective collaboration between the local research groups and the participating schools (the teachers who will participate but also the administration of the schools). Each partner needs to bear this in mind and take appropriate actions to ensure and sustain an effective and productive collaboration.
- It is important to ensure broad coverage of subject matters, grade levels, and characteristics of the participating schools and teachers, both within the individual countries and at the collective level. Also, it is important to ensure broad coverage in the case studies as well.
  - o Suggestion: The outcome of the selection process that will be carried out in each country [both, for (a) the schools/classes/teachers and (b) the pilot classes that will be the focus of the case studies] will need to be approved by WP5 leaders (Education Research Institute, Slovenia; Center for Educational Research and Evaluation, Cyprus).



- Each partner will be asked to submit specific information, ahead of time, through a specially designed template (sampling framework) by February 28<sup>th</sup>, 2016.
- The enactment of the ATS model will take place during the next school year. In some cases, it might not be possible to ensure that the teachers who have agreed to participate in the project will be serving in that same school in the next year.
  - Suggestion: Partners should be encouraged to ensure a larger pool of schools/teachers to accommodate any unexpected deviations from the work plan. We would recommend ensuring a pool of 27-28 schools which provides a 10 % buffer.
- Each school is expected to integrate the ATS2020 model in two different subjects (e.g. Mathematics and Physics) but there is currently no restriction as to which subjects could be used for this purpose. It might be that the pilot implementations across countries could end up targeting a large number of disparate subjects. Lack of substantial overlapping across enactments could pose a methodological limitation
  - Suggestion: The coordinator will centrally specify certain core subjects that all partners should address (partners will be given a choice) in at least one school. In delineating this set it is important to get inputs from the partners so as to arrive at a consensus that takes into accounts local constraints and the partners' preferences. Example: Each partner should have at least one of the schools addressing e.g. Mathematics. In addition, partners will be free to choose subjects on an optional basis for the rest of the implementations. This approach will establish a certain level of homogeneity in subject areas addressed, also allowing for diversity across partner implementations.
- There is no restriction about the duration of the implementation of the ATS2020 model in the pilot classes. It might be that the pilot implementations across countries could vary substantially in this respect, which could pose a methodological limitation.
  - Suggestion: Specify maximum/minimum duration so as to ensure homogeneity, at least to a certain extent.