04 GUIDELINES AND BEST PRACTICES FOR DISTANCE TEACHING IN TEACHER EDUCATION

BlueARROW

BLUE ARROW PROJECT CONSORTIUM

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Introduction

The present document intends to report the experience of Blue Arrow's approach in online learning, including Tangible User Interfaces (TUIs), a home kits that allows teachers in education to experience and learn autonomously.

This document is meant to be an easy manual for the educational stakeholders that intend to implement these activities. Thus, the potential targets could benefit from this report by the potential implementation of the best practices shown in the document, reapplying it in other contexts. It could be useful to underline that the main target of the BLUE ARROW project are the teacher educators that train new generation of kindergarten and primary school teachers. The potential target of this report are:

1) HEIs' staff for implementing this methodology in other contexts and with other age range;

2) MOOC providers;

3) Teacher educators;

4) Pre-service and in-service;

5) Researchers in the field.

Summarizing the expected impact will be:

- to understand educational issues, and to target solutions for the BLUE ARROW innovative methodologies;

- to analyse the pedagogical impact of the BLUE ARROW platform;

– to collect the perspective of teacher educators, teachers, caregivers, lecturers and professionals in the sector (the 'teaching community') that will be considered to make them innovators and aware practitioners;

- to define tailored solutions to teacher educators' needs and interests thus favouring their active participation;

- to propose the best practises and success stories, taking into account the presence of multiple stakeholders, as well as constraints, priorities, and challenges.

1. Background and DigiCompEdu

1.1 The Context

During the Covid-19 pandemic, the teaching sector exposed its fragilities and its adaptability. Furthermore, Europe is also facing a great challenge to provide sufficient and better-quality education and training to the teachers of tomorrow as the pandemic has come suddenly and has impacted on different levels. More than 100 million people who are directly related to the education sector globally have been severely affected (Gabriel, 2020) and many of them have been trying to turn their traditional face-to-face (f2f) education into digital one, without grasping the fact that the design of online education is more than turning on a computer and lector a lesson (traditionally designed) in front of a camera.

The new approaches for teaching during the COVID-19 lockdowns had a huge impact on the education in kindergartens and primary schools, in particular on students aged age 4-7 years old. This age range is when children need to learn by experience, drawing or manipulating things without writing and reading skills. The UN, on a worldwide scale, says that "the disruptions caused by COVID-19 to everyday life meant that as many as 40 million children worldwide have missed out on early childhood education in their critical pre-school year" (pag. 7, 2020). This is problematic because "they thus missed a stimulating and enriching environment, learning opportunities".

1.2 Didactic Practices During The Lockdown

Via the survey "Didactic practices during the lockdown", the Italian Erasmus+ National agency INDIRE was clear how the pandemic had impacted kindergarten and primary education. For pre-primary schools only 28,5% of teachers were able to deliver lessons online. It is important to underline however that the questionnaire was on a voluntary basis. In the case of pre-primary, the most time (4 hours a week for the 17,8%) were dedicated for activity of contact and socialization: this represents the main way the teachers used to maintain in contact with the children, lacking the possibilities and knowledge to reapply the f2f lesson into digital one. Teachers that participated in the survey reported a worsening of learning: 53,3% in pre-primary and 44,7% in primary, consider the quality of attention reduced and 43,7% of kindergarten teachers said that the motivation and engagements worsened with the distance learning experience. Declaratory learning, based on traditional didactical material, is easily exported in distance learning: MOOCs and videoconferences are perfect in this case. But in the case of children that are not able to read and write, the procedural

learning that refers to experience and laboratorial activities involving the senses is fundamental and is needed a rethinking when schools close and lessons are in front of a screen.

1.3 Teacher's Needs in Education

Teacher, educators are key players for ensuring the quality of teaching professions and the support of educational innovation (EC, 2013; OECD, 2013), yet they are often neglected by policies and are given little opportunities in terms of professional development (European Council, 2009). In response to a need of more digitally competent teachers the EU commission published an emergency call, with funding opportunity, asking to provide resources, solution to provide educators with a digital portfolio, Blue Arrow project is a result of it. It is crucial to improve the quality and relevance of higher education, by attuning teaching practices to current and emerging needs, and encouraging teachers' professional development. This context appears even more relevant after the COVID-19 pandemic, where teachers showed the need for new methods, tools and competences for being enabled to design and manage distance teaching.

Teachers should be trained with renewed pedagogies, new ways to teach, including strategies for distance learning suitable for kindergarten, primary schools and in the transition between these moments. It is important to underline that technology alone cannot guarantee good learning outcomes. More important than training teachers in ICT skills, is ensuring that they have the assessment and pedagogical skills to meet students at their level and to implement the accelerated curricula and differentiated learning strategies likely to emerge in the return to school, able to be addressed for distance learning or for f2f lesson, also when emergency takes over.

As has emerged during and after Covid-19 pandemic, many on the activities considered worsening education was not a properly designed online learning but emergency teaching in online mode.

Designing online learning can be a complex process, and there are several challenges that educators and instructional designers may encounter. Among them these are most significant:

1. **Maintaining engagement**: One of the biggest challenges of online learning is keeping students engaged and motivated. Without face-to-face interactions and the structure of a physical classroom, students may become easily distracted or disengaged.

2. **Adapting to different learning styles**: Online learning must be designed to accommodate a wide range of learning styles and preferences. This means incorporating various types of multimedia, interactive activities, and opportunities for collaboration.

3. **Ensuring accessibility**: Online learning must be accessible to all learners, including those with disabilities. This requires designers to consider issues such as screen reader compatibility, closed captioning, and other accommodations.

4. **Addressing technical issues**: Technical issues such as internet connectivity, platform compatibility, and software glitches can interfere with the learning experience. Designers must plan for these contingencies and provide technical support to learners.

5. **Providing effective feedback**: Feedback is critical to student learning, but providing effective feedback in an online environment can be challenging. Designers must create opportunities for feedback that are timely, meaningful, and actionable.

6. **Building a sense of community**: Without the social dynamics of a physical classroom, online learning can feel isolating. Designers must create opportunities for students to connect with each other, such as through discussion forums, group projects, and virtual office hours.

Overall, designing effective online learning requires careful planning, attention to detail, and a deep understanding of the needs and preferences of learners.

1.4   Blue Arrow Proposal

The BLUE ARROW projects aimed to create an innovative pedagogical approach for teacher in education (ITE and CPD) that involve the development of a MOOC and the implementation of these practices in higher education courses in teacher education programs for the new challenge of distance learning:

· Including new ways to teach applying digital creativity for teachers (pre-service and in-service) in primary and pre-primary,
· Proposing user-friendly tools and secure platforms which respect privacy and ethical standards,
· Developing new innovative educational methods for pre-primary and primary educators applying Tangible User Interfaces.

1.5   DigiCompEdu

Teachers in training are the main target group of Blue Arrow and the main focus of this project was to create resources and tools that they could use and reuse to enable them to be more technologically and digitally skilled.

Completely in line with this mission is the European Digital Competence Framework for Citizens (DigComp) that foreseen educators as "learning facilitators, or more plainly: teachers. As professionals dedicated to teaching, they need, in addition to the general digital competences for life and work, educator-specific digital competences to be able to effectively use digital technologies for teaching" (p. 15, 2017). DigCampEdu frame and describe these educator-specific digital competences, therefore it has been a point of reference for our work in the Blue Arrow project. The Figure 1 below represents a synthesis of the DigCompEdu framework

FIGURE 4: SYNTHESIS OF THE DIGCOMPEDU FRAMEWORK
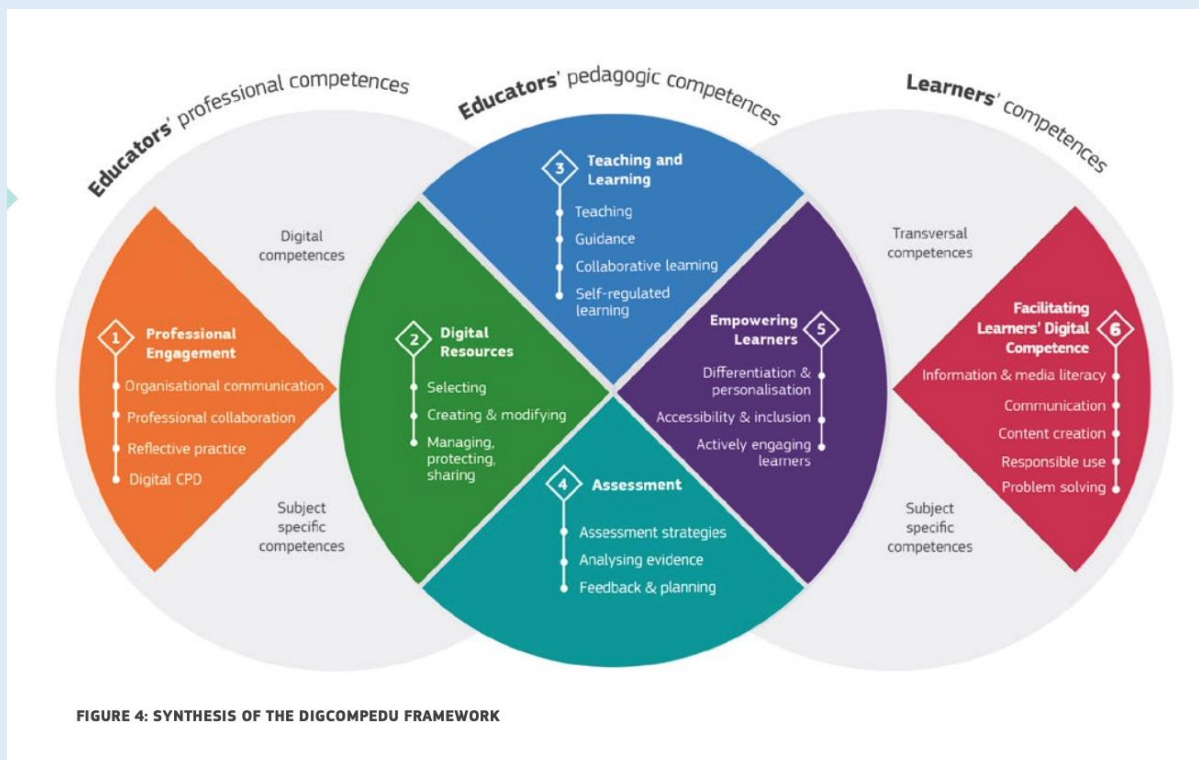
Figure 1- From DigComp 2017- Figure 4- Synthesis of the DigComEdu framework (p.19)

While the Figure 2 represents the DigCompEdu Areas and the respective competences and their connections
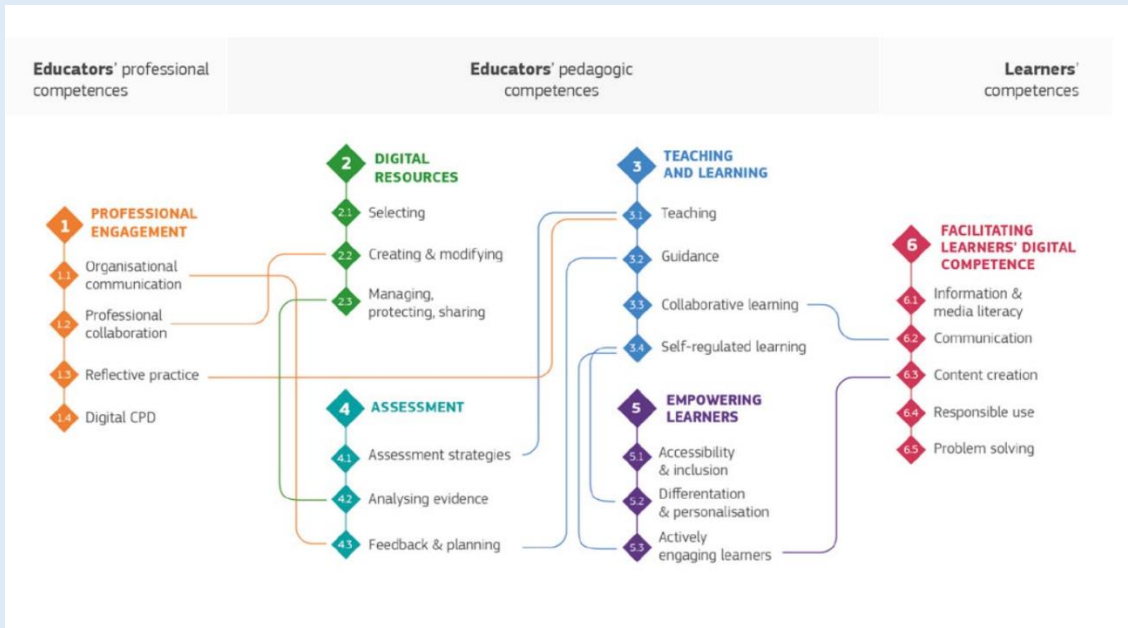
Figure 2- From DigComp 2017- Figure 3- DigComEducompetences and their connections (p.16)

For each of these competences has been used the Common European Framework of Reference for Languages (CEFR), ranging from A1(newcomer) to C2 (pioneer), see Figure 3, that enables users to define the level of progression and maturity of each of the competences detailed in the framework.
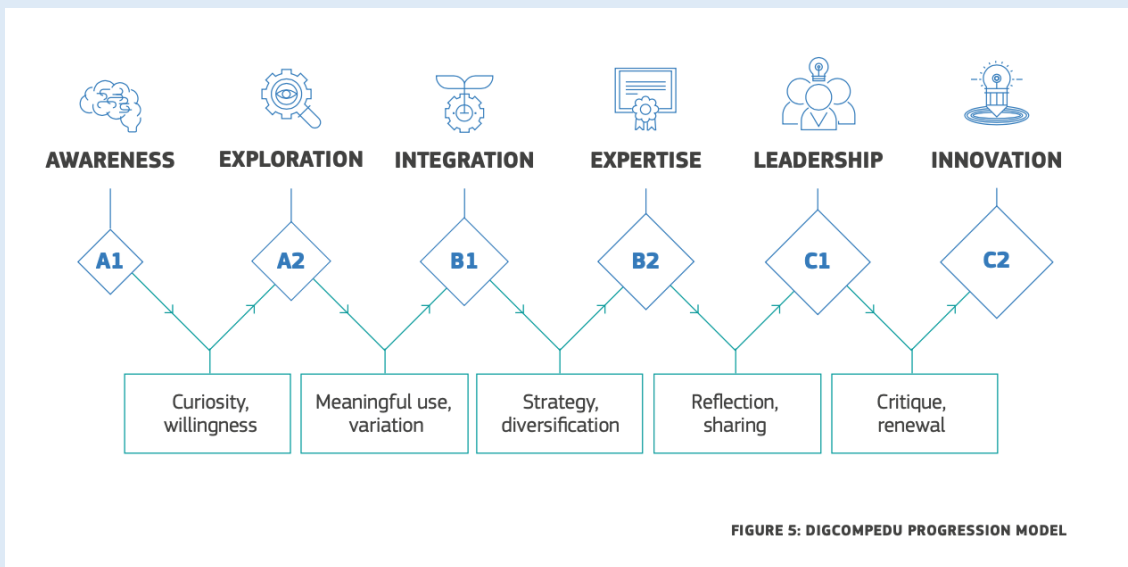
Figure 3- From DigComp 2017- Figure 5- DigComEducompetences progression model (p.29)

The DigCompEdu framework taches six areas belonging to the teacher's job, these are:

- · **Area 1- Professional Engagement**, this area focuses on the digital competencies that will enable the educators to boost teaching but also their professional interactions with parents, colleagues, students and other parties.
- · **Area 2- Digital Resources,** teachers are in need of using technology to identify, share and create educational resources, which implies their awareness of attribution, copyright and plagiarism rules, as well as protect content and data (i.e. students' grade and or exams).
- · **Area 3- Teaching and Learning,** technologies can enhance teaching and learning, together with a suitable approach and pedagogical strategy for the students, however this implies digital skills of the teachers in orchestrating and managing these technologies.
- · **Area 4- Assessment,** digital technologies need to be understood and applied by teachers to design assessment strategies, data and feedback.
- · **Area 5- Empowering Learners**, with the use of technologies will be possible to personalise learning and make it more engaging for users, embedding more inclusive affordances.
- · **Area 6- Facilitating Learners' Digital Competence**, teachers have the task of stimulating this transversal competence: the digital one, in their students.

1.6   DigcompEdu readapted in Blue Arrow project

As shown in the first intellectual output of the project (Fuertes-Alpiste et al., 2022) in order to include the digital creativity component, an adapted version of teachers' competence framework (the well-known DigcompEdu) was proposed by Barajas & Frossard (2018) in project DOCENT[1].Based on the structure of the DigCompEdu framework, the adapted version considers the professional and pedagogical competences of educators, as well as the development of students' competences. As shown in Figure below, it is divided into six areas and includes a total of 19 competences:

1. Area A refers to teachers' professional environment, i.e. their use of technologies to collaborate with the different members of the educational community, as well as for their professional development;
2. Area B focuses on the competences required to identify, select, create and share digital creative resources;

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3. Area C addresses digital creative pedagogies, i.e., the use of digital technologies in teaching and learning;
4. Area D relates to the use of digital strategies to assess and foster students' creativity;
5. Area E refers to the potential of digital technologies for promoting learner-centered strategies.
6. Area F focuses on the competences required to enhance students' digital creative competences.

Areas 2 to 5 constitute the pedagogical core of the model: they describe the competences required to promote creative, innovative, effective and inclusive learning strategies using digital tools.

The different areas of competence and their respective components are described below.
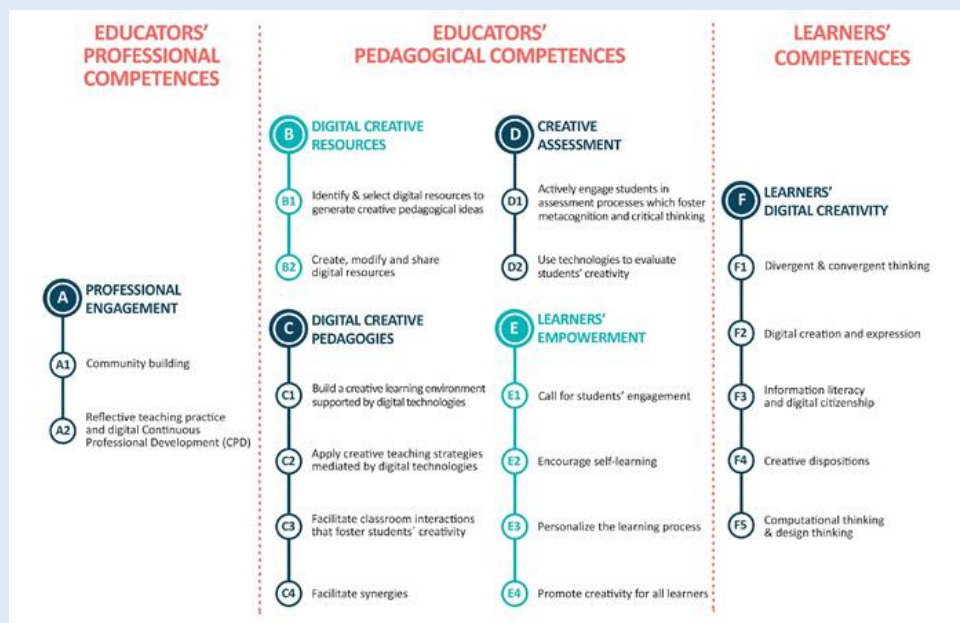
Figure 4- DoCENT Pedagogical Framework and its six areas.

This model has been adopted by the project BLUE ARROW for teacher education activities that will undertake the project, especially for the initial teachers training and the design of the TUI learning scenarios. On the next figures, we have adapted this creativity framework for TUI regarding competence Area C, D, E and F and are show in the next pages.

These competences are crucial for the teachers (pre-service and in-service) and for the teacher educators. The report aims to collect information about the perception about the teachers regarding the application of technology enhanced learning in their daily practices.

Area C: Digital creative pedagogies with TUI

Use digital technologies to support creative teaching & learning

C1. Build a creative learning environment supported by digital technologies

Create of a positive climate: establish a non-judgmental and ethical social climate, in which all students are supported and accepted; encourage open communication and trusting relationships; accept new ideas.

Promote exploration and invention: make a flexible use of space and time; make time and space for exploration processes where students freely interact, investigate, create, look for and try out solutions; use the classroom as a lab; promote risk-taking opportunities where students try before getting it right; use failure as a positive learning factor; accept ambiguity and uncertainty.

C2. Apply creative teaching strategies mediated by digital technologies

Plan, implement and experiment with digital teaching strategies which may enhance students' creativity (e.g. inquiry-based learning, project-based learning, design-based learning, game-based learning, modelling-based learning); use multimodal approaches, including physical, digital and hybrid environments; keep record of the classroom activities (e.g. taking pictures, keeping a diary, creating a digital portfolio with students).

C3. Facilitate classroom interactions that foster students' creativity

Foster synergistic collaboration: encourage students to define, distribute and complete tasks towards a common objective; allow them for evaluating and negotiating each other's contributions and solutions through collective decision making; promote students-students, students-teacher and teacher-teacher collaboration.

Stimulate expression and dialogue: settle and manage digital teaching & learning environments (e.g., using social media) where all students can freely express their opinions, share their perspectives and exchange resources; manage group processes and effectively communicate to promote and mediate debates.

Encourage democratic practices in digital teaching & learning environments: promote students' fair-minded and equal participation, sense of group responsibility, respect for others and for other perspectives.

C4. Facilitate synergies

Create authentic learning opportunities by linking curricular concepts to real life situations: connect new knowledge to existing contexts and perspectives.

Bridge between certain subjects, themes and concepts: create cross-curricular learning opportunities where students can bridge different disciplines and see the relationships between them.

Relate different sources of information, media & tools: encourage students to build knowledge based on different perspectives; link and form associations between different sources of digital information.

Area D: Creative assessment

Use digital technologies and strategies to assess and foster students' creativity
Source, create and share digital creative tools and resources.

D1. Actively engage trainees in assessment processes which foster metacognition and critical thinking

Involve students in self-evaluation and peer-evaluation; focus on both the learning process and the outcome, so to encourage students to critically reflect on their learning path, competences, mistakes and progress; use a variety of assessment formats and approaches; use digital technologies to carry out formative and summative assessment (e.g., learning analytics).

D2. Use technologies to evaluate trainees' creativity

Apply criteria (e.g., fluency, flexibility, originality, elaboration) and tools (e.g., digital rubrics) for evaluating trainees' little-c (personal) creativity.

Area E: Empowering Learners using TUI

Use digital technologies to enhance inclusion, personalisation and learners' active engagement.

E1. Call for students' engagement

Select and use digital tools and strategies which call for learners' interest and motivation, as well as create an inspiring and stimulating learning environment; work from students' experiences.

E2. Encourage self-learning

Encourage learners to take an active role in learning, work on their own learning needs, organize tasks, self-regulate and solve problems autonomously through digital and physical fabrication; view them as creators, inventors and tinkerers; promote their sense of initiative and decision making; support them to become active, responsible members of the digital society.

E3. Personalize the learning process

Use digital technologies and strategies which address students' specific needs, as well as enable them to learn according to their own level, rhythm, pathway and objectives; transform explicit knowledge into tacit knowledge (i.e., help students to internalize new mindsets through meaningful, active learning experiences).

E4. Promote creativity for all learners

Ensure accessibility to learning resources and activities, for all learners, without regard to gender, physical, intellectual, social, emotional, linguistic, cultural, religious, or other characteristics; consider and respond to learners' expectations, abilities, physical or cognitive constraints to their use of digital technologies.

Area F: Learners' digital creativity with TUI
Foster students' digital creative competences

F1. Divergent & convergent thinking

Encourage students to identify and solve real-world problems using creative thinking skills, i.e., generate and apply original ideas and solutions by forming remote associations, conceptual combinations, and approaching problems from different angles; evaluate and select ideas using decision-making strategies, so to produce the best possible answers.

F2. Digital creation & expression

Adopt a "maker culture" which fosters students' creative expression of ideas, experiences and emotions in a range of media, through the creation of digital or tangible objects; allow for knowledge construction processes and expression based on students building, making, storytelling, prototyping, engineering and sharing objects that are relevant to a larger community.

F3. Information literacy & digital citizenship

Encourage students to articulate information needs, find information and resources in digital environments; organise, process, analyse and interpret information; compare and critically evaluate the credibility and reliability of information and its sources; participate safely, effectively, critically and responsibly in the digital world.

F4. Creative dispositions

Use digital technologies to promote students' openness to experience, responsible risk taking, tolerance of ambiguity, learning from failure, and viewing challenges as possibilities for learning.

F5. Computational thinking and design thinking

Stimulate students to solve problems and model systems, as well as understand mindsets and behaviors, by drawing on the concepts fundamental to computer science and design thinking.

In the next pages will follows the technological tools delivered by the BLUE ARROW project, their application and their results.

3. Blue Arrow Tangible Tool and the Authoring tool

Blue Arrow authoring tool is a Software developed for Windows devices. It has the main goal to allow teachers and educators to easily and intuitively create **augmented and multisensory stories**. The output is a learning experience ready to be used, involving both digital and tangible dimensions. The great strength is the opportunity for teachers to easily create an output based on specific educational and inclusive needs. The highly customized learning experience and the potential involvement of all senses work together to increase engagement and motivation enhancing the learning process.

The software is **open and free** for every user, available for download at the project website, together with a kit to create multisensory stories and their smart objects in a guided way. Moreover, a template file is available to design the story structure before implementing it using the Authoring tool. Also, on the website can be easily found tutorials about software installation procedure and the main features to create multisensory stories and to enhance any kind of object with NFC technology.

The Blue Arrow kit, all the video tutorials and the Multisensory story template are useful material for teachers to increase their familiarity with multisensory stories before using the authoring tool software to design and implement them.

Each story is based on the same structure:

-        **A cover:** an introductory scene to the story, displaying the title of the story, a background picture and a first audio file to introduce the final user to the learning experience.

-        **The scenes:** they can be intended as the chapter of the story or all the turning points. Each scene is composed of multimedia material (text, background picture and audio files) and it is linked to a smart object (a tangible object enhanced with NFC technology).

-        **The final scene:** the ending of the story.

The only way to proceed with the story moving from a scene to another is the **direct interaction** between the user and the digital interface through the smart objects: in each scene of the story, the narrator or the characters will ask the user to find a specific smart object and put it close to the RFID antenna.

The software is designed to be intuitive and simple to use for teachers. It presents an immediate interface and constant access to tips or video tutorials, helping the user to explore and use the software in the best and most effective way.

The authoring tool has been implemented using STELT (Smart Technologies to Enhance Learning and Teaching), a Smarted middleware used to effectively link the digital experience to real life objects, using NFC technology, to produce output such as the multisensory stories.

The software can be used in all Partners languages (Italian, Spanish, Albanian, Dutch) and English.

First, the user can choose to create a new story or open one from their library to continue editing it. Both choices lead the user to the editing section. In this section the main goal is to upload all the multimedia material of both the cover and the scenes, previously collected or created. So, each scene can be easily created putting together: a background picture, an audio file telling the story and asking for the user's direct interaction, a short text to be shown on the user's screen and customizable negative feedback. An important step is the choice of NFC codes: each scene must be linked to a three-digit code that the user can choose from a list. This code will be the same with which the user will tag the NFC sensor applied on the smart object chosen for the interaction with that scene.

Once the uploading procedure is completed and the user satisfied with their choices, the story can be saved and easily exported to an Android smartphone. A simple click on the "Export" button will transfer the multisensory story to the android smartphone connected to the windows device with a USB cable connection.

Now the story can be played on the smartphone that will be used also to read the NFC tags in smart objects, thanks to the integrated RFID antenna.

Each story is not immutable: Open library feature helps the user to edit the previously created multisensory stories or to continue their implementation in different times.

Multisensory stories implemented with Blue Arrow authoring tool represents a resource that can be easily shared. The users will find all their multisensory stories in a specific folder in their Windows device; the folder contains the app and the multimedia material, that can be and will be easily shared as OERs.

4. Blue Arrow hardware and the kits

The technology of which the "Blue Arrow" Project is based is based on a very simple idea: the Tangible User Interfaces, since their very first definition (Ishii & Ullmer, 1997), are conceived as tools that allow to "grasp" the digital and which cause actions within a virtual space, by means of a pairing mechanism between the object sensibly perceived by the user and the immaterial interface of the software. Pairing is usually carried out by means of specific technologies, such as Near Field Communication (NFC) or Radio Frequency Identification (RFID) (Di Fuccio et al., 2017), which are also very widespread in daily practice (e.g. through NFC technology, our smartphone is able to make contactless payments, like a credit card). They consist in the recognition, by an antenna that picks up electromagnetic waves, of a tag, a label, which can potentially be applied to any object or surface. The label is therefore marked with an ID code, in order to issue a unique and pre-set response through user-friendly software when it is recognized by the receiving device. From a hardware point of view, the "Blue Arrow" prototype requires a system capable of interacting with digital components thanks to physical objects. In the case of the "Blue Arrow" project, two solutions have been envisaged.

The first requires the presence of a PC connected via USB to an active tablet. The latter is equipped with an NFC antenna capable of recognizing physical objects with NFC tags. When the object is placed on the tablet, as shown in the image (see Fig. 5), the computer, via the antenna, recognizes whether the object positioned on the dashboard is the correct one and activates a virtual response consisting of audio and video, Directly on the screen.

Figure 5- Some tangible user interfaces and the active tablet that recognize the objects (in the picture Micky Mouse in on the top of the active table and its result is shown on the screen)

The second solution, on the other hand, is put into practice by means of a smartphone equipped with an NFC antenna. The tangible object in this case will be recognized directly by the smartphone (the antenna is usually located on the back of the device).

Also, in this case the smartphone screen will emit sound feedback (an mp3 file recorded during the design phase) and will release a corresponding image or video on the screen.

The physical objects of the stories can be adapted by the individual teacher, who can re-adapt commonly used items to develop the stories or select specific materials according to the DIY (Do It Yourself) approach.

In the "Blue Arrow" project, kits of exemplary objects have been prepared that teachers and parents can use to develop their stories. The kits are designed in a modular way; in fact, they can be found freely on the market, or they can be self-produced. Teachers can download some kits from the project website, print and cut them out. On the figures thus created it is possible to place the NFC tag, in order to make them usable, as in the story called "My friends, the shapes".

The first kit includes 8 logic blocks and a character who acts as Alice.

The second kit is developed for the story "Six elves in my heart" and aims to stimulate emotional expression and skills. In this case the kit consists of six elves and six scented jars. Also in this case, the puppets and scented jars can be purchased or created in a do-it-yourself way, since they are composed of substances that are easy to find in homes, such as cocoa, lemon and lavender.

The third kit refers to the story "Achilles the dot" and aims to develop personal and social skills through knowledge of the body and movements. The kit consists of Achilles, the point, to which are added the parts of the body, three olfactory stimuli (rose, orange and hazelnut) and a glass of water.

5. Focus group results

5.1 Focus group

One of the most used qualitative tools in the field of psychology disciplines is the focus group technique. This tool is a qualitative data collection technique that is based on the information that emerges from a group discussion on a theme or topic that the researcher wishes to investigate in depth.

Born in the field of social sciences, Malinowski, Lazarsfeld and Merton already used this type of qualitative interview, but clearly tracing the development of the method appears complex. It is conventionally believed that the first publication that sanctioned its origin is "The Focused Interview of 1941, where various sociologists, making use of an observation experience carried out at Columbia University, propose to measure the effects, in terms of persuasion of war propaganda.

The focus group can be defined as a carefully planned discussion to gain insight into a specific area of interest.

For a long time it was believed that the focus group could be used for the sole purpose of raising research questions, but today we can state that it can also be used to answer many questions (Corrao 2000, Morgan 1988). In fact, there is no need for the findings to be validated by further investigation because in most research the goal is detailed description and knowledge, not the main goal to create generalizations.

Focus groups are a qualitative research method whose objective is to explore in detail the aspects covered.

It is considered an applicable research technique when it is deemed appropriate to resort to evaluations, judgements, opinions expressed by professionals, experts or users/customers to receive their different points of view on a topic, a process, a result, a product.

The focus group combines elements of the individual interview and participant observation and becomes a specific technique characterized by the explicit use of group interaction as a tool for the production and collection of information regarding the orientation of the individuals involved on specific issues, structured in an outline that serves as an outline for discussion.

In the literature it is considered the technique of choice when it is necessary to receive feedback in specific circumstances (Bovina, 1998; Krueger, 1994; Morgan, 1988 and Stewarth Shamdasani, 1990), among which we indicate:

- market surveys to learn about the effects of products, projects, programmes, services, institutions or other topics of interest;
- generate research hypotheses;

- preliminary test the design of questionnaires and other quantitative research tools;
- add depth of analysis to the interpretation of quantitative results;
- confirm or test a working hypothesis;
- acquire complex information about motivations, attitudes, habits, experiences,
- knowledge, expectations of the target;
- test and analyze the effects of communication campaigns;
- evaluate the effectiveness of a tool;
- probe deeply into a topic.

The focus takes place like a group interview guided by a moderator who, following a more or less structured track, offers stimuli to the participants (Krueger, 1994). One of the characteristics that make the use of focus groups of considerable interest is precisely the interaction that is created between the participants.

5.2 Features of the group and main people involved in the focus group

Focus groups are to be considered as a method for collecting collective data produced through a group discussion that focuses on topics predetermined by the researcher on which the motivations, beliefs and perceptions of the interviewees are to be brought out.

From what has been said so far, the characteristics and figures participating in the focus group begin to emerge more clearly. This implies the presence of a moderator who uses the group to get information out of the group.

The focus group has specific characteristics that differentiate it from other types of groups both in terms of composition and goals. As regards the composition, it tends to differ from natural groups because it is a group built by researchers according to specific research objectives. And it has an instrumental function of deepening a specific research question that is being investigated or studying a phenomenon.

The number of subjects participating in a focus group is usually between six and ten participants, but the size can also vary between four and twelve (Krueger, 1994). According to Krueger (1994) the number of participants is evaluated in a contextual way, if on the one hand the «mini-focus groups» (four or five subjects) allow the participants greater familiarity and the possibility of exchanging experiences and points of view; the risk, and therefore the benefit, of larger groups is that they have a narrow range of ideas and opinions.

In the sampling plan, the selection of participants provides for the creation of a homogeneous group with respect to certain characteristics.

The choice regarding the degree of social homogeneity or heterogeneity of the group of participants can vary according to the research objectives: if the exploration is

focused and aims in depth, a homogeneous whole is preferable, if you want to reconstruct a range of positions it is more effective a diverse group.

This choice must be made in a preliminary manner since from the first contact the future participants will need to ask some discriminating questions.

In addition to the participants, the focus group involves four other main figures: the client, the researcher, the moderator and the observers, not all of whom are present during the focus.

The client. He is the one who commissions the research in order to solve a given question, and to whom the final results must be reported. It is advisable that the client actively participates in the realization of the first phase of the research, during the planning and when structuring the areas of investigation of the focus.

Researcher. On the other hand, he is the one who, on the basis of the research objectives to be investigated which are specified by the client, organizes and clearly identifies the areas to be investigated and prepares the data collection.

The moderator. An important role for the success of the methodology is covered by the moderator. The latter should possess both communication skills - he must make use of a simple and linear language in order to be understood by all the participants - and psychological skills in managing group dynamics - he must be able to manage the dominant personalities and stimulate the participation of all participants (Guglielmi, 1999). The moderator should therefore be considered the facilitator of communication within the group and assumes nominal leadership with the task of balancing the requests for sensitivity and empathy on the one hand and the need for objectivity and detachment that the participants require on the other.

The Observers. Sometimes observers who do not take part in the focus but observe and detail non-verbal aspects and the dynamics that arise during the focus group are also present in the focus next to the moderator.

5.3 Planning and phases of the focus group

The focus group technique can be divided into four main moments: the planning and definition of the intervention, the management of the group, the analysis of the information received, and the drafting of the final report.

Planning and definition of the intervention. During planning, the researcher must determine the expected objective by carrying out an analysis of the context and building working hypotheses. In the subsequent definition of the intervention, it is necessary to identify the reference public and outline the structure of the interview and the composition of the group with respect to the number and variables taken into consideration. Regarding the structure of the interview, the moderator follows a carefully planned track with a series of predetermined and sequential topics. The technique used is that of the "funnel" questions: we start from a general scheme to

arrive at a specific one, from the less structured ones to the more structured ones. The questions must be spontaneous and simple and must not suggest any potential answer.

According to Krueger (1994, pp. 54-55), we can have five types of questions:
- opening questions that allow the creation of the group;
- introductory questions that lead the participants to reflect on the subject of the discussion;
- transition questions that lead to the key to the topic of study;
- key questions that represent the heart of the topic and for this reason require more attention from the moderator;
- final questions that lead to the closure of the discussion and allow participants to reflect on previous comments.

5.3.1 Stages of management and duration.

The focus group is organized according to some stages. The welcoming or warm-up phase: the moderator introduces himself to the group and illustrates the reason why the people have been summoned, explains the objectives of the research and arranges the participants according to the setting.
In the following phase the moderator introduces the general theme of the discussion inviting the subjects to reflect on their past experiences. Stimuli are used to help them in this task and can be presented individually or to the group as a whole.
As regards the discussion phase, the moderator can request the "pure verbal" response method or use the written technique or the "leaf method".
The final phase of the focus group concludes with some open questions to allow participants to express their opinion and demonstrate their satisfaction/dissatisfaction in having participated in the discussion.
A focus has an average duration of about two hours but can be variable since it is linked to the participants and the interaction between them. Usually, it ranges from a minimum duration of one hour to a maximum of three. According to Colombo "the group has its own life span which must be foreseen and respected, it is necessary to give the members time to get used to thinking in groups, given that this becomes raw material and unit of analysis for research" (Colombo 1997).
Furthermore, it is never advisable to carry out just one focus but, in the literature, a minimum number of at least three focuses is suggested, even if this is closely linked to the complexity of the investigated topic. During the first focus, the validity of the elaborated interview, the clarity and the interest that the participants express (Bovina 1998) will be tested.

5.3.2 Recording and data analysis.

In order to be able to record data during the focus group, it is necessary to have the consent of the participants. Video and audio supports can be used to subsequently reconstruct and recover any useful information in the data analysis phase. The type of

data analysis, the detail and the form of the report depend on the research objectives and initial hypotheses.

Data analysis can follow two different types of approaches:

- strictly qualitative and ethnographic with a thematically ordered account supported by the group's verbalizations.
- "systematic": with a methodical coding of the transcription in which coding is foreseen through the analysis of the content (Morgan, 1993).

You may choose to use both methods as they are not mutually exclusive.

5.3.3 Final report.

The results, anonymously, can be presented and collected in a final report.

The report should be partly composed of the report of the contents that emerged, partly from quotations, partly from the interpretation of the data (Stewart-Shamdasani 1990). The data of interest are linked to the hypotheses and therefore should emerge from the interview trace. The "skimming" of the data must in any case take place ex post because, if it happened at the beginning, relevant information could be lost; a subsequent recording can possibly be carried out, but only after all the data have been considered.

The nature of data analysis, their level of detail and rigor depend on the purposes for which the data was collected. For exploratory research, a narrative description is often sufficient: "if the focus is preparatory to a rapid decision-making, the decision-makers can be part of the working group, perhaps as observers, discuss the results with the researchers and immediately draw the relationship" (Bovina 1998). It is necessary to forge the relationship on the starting hypotheses; in fact, in the social sciences, the initial choices are conditioning, and the results must inevitably be linked to the hypotheses. The core of the report must therefore be based on the "topical" topics covered in the interview guide. Obviously, since the initiative for the participants is free, it will be necessary to keep in mind, thanks to the participant observation, the significant interactions and dynamics in order to understand further significant elements (Morgan 1994, Templeton 1994).

5.4 Methodology

The evaluation events that are from E5 to E8 and involve all the Blue Arrow partners include a focus group with the educational stakeholders and educational professionals. The researchers hosting the evaluation/co-creation event show a couple of stories with the smartphone by using the tangible objects. In the case the event was performed in a blended mode the stories were showed via the mean of a video.

Figure 6.: A tangible story made with Blue Arrow.

In addition, the researchers could be supported by the Blue Arrow website and the templates for the story creation, and they present the project with their aims and their scopes.

After this stage there is a brief presentation of the authoring tool described in the previous chapter where the researchers show the potential of the system.

During all these steps the participants are left free to perform their personal observations without any suggestion, boosting a natural discussion.

Next, the research group starts the real focus group, starting with the questions described in the next paragraph. During the focus group the participants are recorded and then previously they signed an agreement for the voice-recordings.

5.5 Focus group questions

During the focus group, as agreed during the Blue Arrow meeting the members of the team – researchers and technicians – hold the focus group animating it by triggering four topics:

1. Storytelling / Digital Storytelling
2. Competences / Digital Competences
3. Pedagogical Aspects / Reflection on the tool
4. Future application in teaching practice

The researchers held the discussion starting from these main topics with specific questions. These questions come after the presentation of the Blue Arrow project as

described in the previous section and showing the DigiCompEdu framework and then discussing its real implementation on daily teaching practices. The view of the focus group is oriented to gain information about the experience of this new pedagogical approach in e-learning, including Tangible User Interfaces for home kits that allows procedural and laboratory learning in an autonomous way for Teacher Education.

The expected impact of the focus group is:

- to understand educational issues, and to target solutions for the BLUE ARROW innovative methodologies.

- to analyse the pedagogical impact of the BLUE ARROW platform).

– to collect the perspective of teacher educators, teachers, caregivers, lecturers and professionals in the sector (the 'teaching community') that will be considered to make them innovators and aware practitioners.

- to define tailored solutions to teacher educators' needs and interests thus favouring their active participation.

- to propose the best practices and success stories, taking into account the presence of multiple stakeholders, as well as constraints, priorities, and challenges.

The questions are the following:

1. Storytelling / Digital Storytelling
- Do you think about the storytelling approach in your classroom? And about digital storytelling?
- How are you developing storytelling using this tool? Do you think is attractive for children? What are the children supposed to do at school with this tool?)
2. Digital Competencies
- In your opinion, which of those competences this tool would foster?
3. Pedagogical aspects / reflections
- Is it possible to build stories that are useful under a pedagogical point of view? In which subjects? Which are the most suitable areas for the application of this platform?
4. Reflection for the future
- How would you use the system in your daily teaching practice?

6. Lessons learnt from the Italian focus group (E5)

6.1 Participants

The E5 was conducted the 11th of November in Foggia and involved 20 participants (14 F, 6 M). The focus group was enlarged in respect of the typical number that falls between 6-10 users. Nevertheless, this represents a weakness of the study, it was a very important point in the Blue Arrow project, because it involved a bigger number of participants well disseminating the results of the project and its tools.

The group of participants are all teachers involved in pre-service teacher channels for special educational needs (in Italian called TFA – Tirocinio Formativo Attivo per il sostegno). In some cases, the pre-service teachers were unemployed (5 participants) the rest of participants had a job. Most of them works in the school sector:

- 6 Teachers
- 3 Educators
- 2 ABA experts
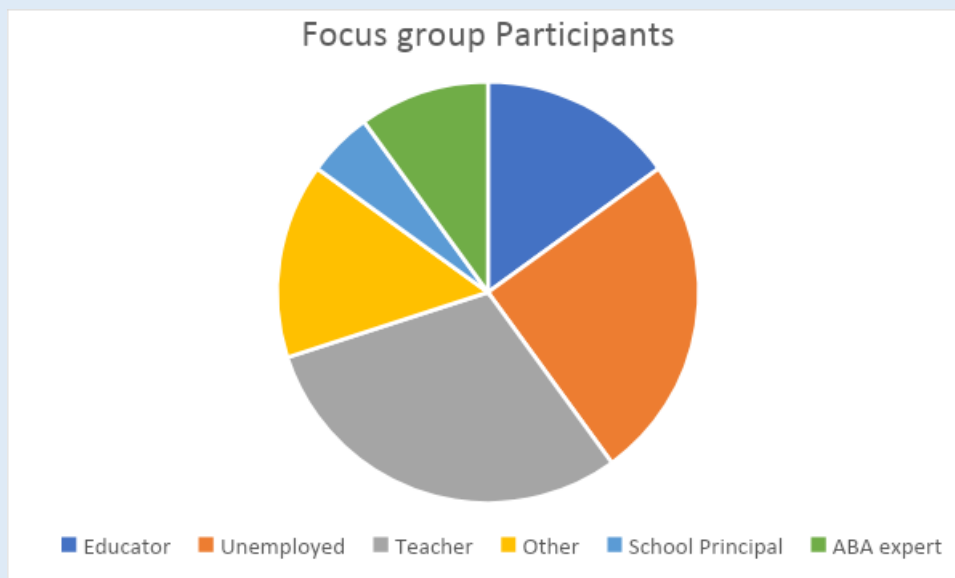
Figure 7: Pie-chart showing the jobs of the focus group participants.

6.2   Storytelling / Digital Storytelling

The discussion in the focus group was very intense and the teachers and educators involved in the discussion tried to catch the focus of the topic, however they appreciated talking in a broad sense based on the stimulus that emerged during the warm-up session. As explained in the participants section, the focus group involved 20 teachers and most of them are special teachers and most of them are secondary school teachers.

Regarding the storytelling, the perception is very positive and from the discussion brightly emerges that the storytelling is a good vehicle to motivate and captivate the pupils. Storytelling and digital storytelling allow to bring curricular information in an amazing way that could involve the learner in all the setting, including its home and for distance teaching/learning.

> *"The storytelling, in my experience, is especially useful to captivate the learner".*

At the same time, this element is seen by the discussion group as a potential limit. The storytelling and the need to create dedicated stories for specific children could "*disturb the class mood*" being something designed to a specific learner. The participants agree that it could be a real inclusive tool in the learning environment. The group considers digital storytelling a vehicle addressed for a reduction in the cognitive learning effort specific for the special needs of children with learning disabilities. This emerges with a significant strength, and it emerges in more than one sentence.

> *"Indeed it is inclusive, the children faces the technology"*

> *"obviously in this way you disturb the class mood"*

> *"the limit of this tools – so strongly digitalized – is to use it in a separated learning channel"*

A crucial point emerged regarding the interaction with the other teachers and in particular the relationship between the special needs teacher and the traditional teachers. The discussion group sees this a potential limit for a real implementation of the storytelling and digital storytelling, seeing it as a feature that it is fundamental. The main teacher in the class should have an agreement in the use of the system in partnership with the other teachers and, especially with the teachers devoted to the special education that has the role to seek specific learners with difficulties.

> *"The fundamental problematic is the acceptance of the class on behalf of the main teacher"*

In addition, another aspect discussed in the tail of this question is related to the role of these technologies in the life of children with special needs. Although it was not the focus of the original question, the focus group participants focused their attention to the value of the technologies in practical terms. The technologies proposed with the Blue Arrow project and the implementation of the Tangible User Interfaces are seen as very interesting but should be addressed not only for learning aims but also for a real improvement in the lives of the children. The teachers involved in the discussion considered the technologies very attractive, but they warn about the risk of the "Wow effect". In particular, the risk they see is regarding the selection of the objects addressed for their spectacular effect and not for a real need of the children involved in the learning process. The digital storytelling in this field should be designed in a way that is useful for the final users. Nevertheless, the participants in the focus group underlines that they would apply these tools if they have previously known. It is interesting that

the teachers make a little confusion between the Blue Arrow system and methodology with the technology used in the project. In practical terms, they substitute the name of the Blue Arrow project with the NFC tags. However this

"the special need children should be able to use these technologies in own life"

"the technologies in this program would not be selected for the "wow effect""

6.3   Competence / Digital Competences

The question regarding the digital competences and the skills that could be improved with the system shifted the attention on the level of the users. The focus of the discussion was on the possibility of the application of Blue Arrow in other grades of school. In particular, the discussion was related to the possibility of inclusion of these systems in the upper level (high school). The discussion moved on this because the group considered Blue Arrow a system that could be applied to the children with special needs and with low functioning that are included in high school classes. It is important at this stage to consider that in Italy there are no special schools and the students with learning disabilities are included in traditional classes. However, the risk that the group discussion underlines is related to being considered in a bad manner by the rest of the class. The other students could consider it in a negative way, estimating it as too addressed for kids.

However, the discussion was animated, and a part of the audience considered this tool as an opportunity to improve the digital competence since it is a more interactive way to be connected with the students. A competence that was discussed by the focus group is related to the lexical improvement, making a hypothesis about a game designed on the model of "Guess who?".

Another interesting aspect that emerged was the management of the technology and its education before the application of these competencies. The discussion focused on the need of a digital roadmap or a guide for the management in practical terms. The sense was that it is important to understand the final goal and teach how to use the technology. Finally, the discussion focused on the use of the digital tools by the teachers and the need to balance the relationship with the technology.

"The application of the NFCs is fantastic, but it is not valid for the upper level of school. Is it inclusive for the rest of the class?"

"The older students are limited by the technology."

"I do not agree with it, the kids could have a more interactive learning in this way."

"These technologies are more useful; these works better on the students with low functioning."

"We should understand what we would do with this technology: we should teach the technology."

"A similar thing could be used in the class also allowing the interaction. We could create a storytelling with the NFC or using anything, also using the interactive blackboard that fosters the collaboration between tools – I don't know – of a school topic, of an argument, of anything."

6.4   Pedagogical aspects / Reflections

Regarding the pedagogical aspects the teachers agreed that the Blue Arrow platform could empower a great number of different skills areas. Some teachers explicitly refers that all the competences could be involved using the stories applying the Tangible User Interfaces and working with the Blue Arrow Authoring Tool.

In the discussion emerged the need to improve knowledge about the systems similar to Blue Arrow in order to be more attractive for the children and providing new experiences.

Regarding the type of skills covered with Blue Arrow it referred to a broad number of different competences and topics. The interesting point is that it is related to hard skills as well as soft skills.

Follows a series of subjects clearly called during the focus group:

- Geography
- Geometry
- Food norms / Food science
- Language

In addition, the focus group participants referred different soft skills:

- Decision making
- Problem solving
- Teamwork
- Role playing
- Self-Esteem

Finally, also some pedagogical methodologies were called:

- Real case tasks
- Cooperative learning
- Classroom exercises
- Flipped Classroom

The group discussed the usefulness of the tool regarding the disability management and the interaction with non-verbal kids.

Another interesting point that was discussed is the inclusivity of the system (item that was previously discussed). The tool is considered well designed for the severe disabilities because the children with severe disabilities are more focused on the

dexterity, more than the language skills, so they are more likely to involve the other senses using Blue Arrow.

"If I have previously known the NFCs, I would apply it in my teaching practice."

"All the skills could be kept."

"It is useful for any curricular subject."

"I would know more technologies in order to engage them."

"Indeed, they use more likely, as I said, the technology because they are more addressed on the dexterity, more than using words. For instance, when it (the language skills) is compromised a finger or the sight, they need to improve the other senses that could be empowered with this technology."

6.5   Reflections for the future / Daily teaching practices

This question left the focus group participants and triggered an open discussion on the topics. The argument discussed during the fourth part of the conversation was really intense and a disagreement emerged between a group of teachers that consider BlueArrow as a good opportunity, a nice discovery for they work, considering it as a valid tool in particular in the special need education; another group that – although consider the BlueArrow tool as a interesting instrument for the teaching practices – underlined the potential effort it could bring for the special need teachers and educators and the risk of de-humanization of the system.

As previously said, in most cases the participants placed the attention on the technology behind the Blue Arrow platform (namely the Near Field Communication) and underlined their use. However, the main aspect that emerges is related to the surprise of these kinds of tools and the sense of discovery it brings. In addition, they consider it as a novelty in the teaching panorama, considering that it is the first time they see a similar technology.

During the discussion some participants wanted to highlight the risk of a hyper-autonomy of the children using these tools, with the final risk of losing a part in human relationship with the teacher. This view was agreed by a part of the group. They contested the automatic feedback, considering that the same exercises could be realized without the presence of a digital tool but could be managed by a human caregiver/educator/teacher. On the opposite side, in the discussion a group considered that the "operator" (considering an expert user as a teacher) should be behind the interaction with the digital tool, enhancing the relationship between human and computer. In addition, they considered that the interaction with a digital tool is attractive itself and it is more aligned with the digital languages they are used to in social media, using tablets, etc.

An argument that emerged was related to the lack of the collaboration with the parents that are a weak point in the learning process with the children of special needs. The idea emerged that using the smartphone as a vehicle of Blue Arrow, the teachers could be more motivated to use this tool with their children. In the same field, the presence of smartphones is a plus, as it is the semi-interactivity of the tool.

As said, another group considered the Blue Arrow system as very attractive but that could imply more effort for the teacher, because it is called to create, design and finally implement stories. It would be also critical in schools with poor resources as usually happens in the Italian schools. A critical aspect is the difficulty to manage children with severe disabilities that need to prevent or manage the crisis and the system could appear a tool that does not have an aim in this sense. The bigger fear remains the risk of a huge effort for the teacher.

This topic animated the discussion with the opposite opinion. On the other side, the debate focused on the type of subject, considering Blue Arrow a system that could be easily adaptable for specific topics.

"I did not think that it would be useful also for the school. It was a nice discovery."

"And perhaps, using these tools, are we losing a little bit of the human relationship with the educator?"

"would it not better that "Great" would be said by a real person?"

"Using in this way the smartphone, perhaps the parents could decide to use it."

"I see it also inclusive, I see it as a new, modern game!"

"How much this work in the school bureaucracy, could it be an additional effort for the teacher in order to get a satisfactory result for the student?"

"Who of us has experience, knows that the schools are not provided of paper books than the digital tools. So I may ask how it is possible to convince the school principals to buy these technologies."

"The technology is a support; it lows the discrimination and for sure helps the kids of all the ages"

"I do not agree with the co-building only in the class, the product should be brought at home and in class we create the aesthetic of the system."

6.6 The Italian focus group (E5) in a nutshell

The focus group considered the following points of strengths:

1. The teacher is an essential interface in the management of the system.
2. The system could be useful for a broad range of subjects (geography, geometry, mathematics, language) and for soft skills (decision making, problem-solving, communication).
3. The Blue Arrow tool is seen as useful in supporting learners' special educational needs because it is practical and involves dexterity and the senses.
4. It is seen as a discovery, an innovative tool that could motivate children and parents involving the traditional games and including innovations.

As well, the focus group arose some weak points:

1. Risk of teachers' overload.
2. Risk of a relation based on human-computer interaction.
3. Lack of resources in the schools for a real implementation.

7. Lessons learnt from the Spanish focus group (E6)

7.1- Participants

The E6 was conducted on 20th of February 2023 in Barcelona and involved 20 participants (14 female, 6 male). Participants were teacher educators of primary education. We also conducted an interview because one of the participants could not attend on the dat of the focus group. We wanted to have his opinion due to his expertise in digital storytelling with kids (pre-primary and primary education). The interview was conducted on the 7th of February of 2023 in Barcelona. We summarize next the main findings of the focus group and interview in the following sections.

In both cases, the focus groups and the interview, we started the session introducing the Blue Arrow project to the participants, explaining its rationale and theoretical background. We projected the tutorial fo the authoring tool so that they would know how the tool works. Afterwards, we tagged some NFC tags with the smartphone and the NFC tool in order to tag the TUI objects for the sample story and let the participants practice with objects and tags. We showed the participants a story created on the first co-creation workshop, using the story templates. The story is called "Ona i les seves emocions" ("Ona and her emotions" in English). Then, we showed the story templates so that attendants knew how the stories are designed first, before opening the authoring tool.

Once participants were aware of the affordances of the kit and the authoring tool, plus the NFC app and the tagged TUI objects, we proceeded with the focus group and the interview with the aim of gathering their thoughts on the Blue Arrow tool.

7.2 Storytelling /Digital Storytelling

Just a few of them had experience on using this methodology with kids, though some of them used it to set the scene of learning activities related to gamification. Another participant used tales to teach mathematical concepts. When asked if they found the blue arrow tool attractive for children, their opinions were divided.

In the interview, the interviewee said that his kids are very used to prepare scenes, define them and relate them with what they want to explain. He is confident it would be useful with bot pre-primary and primary education kids. He thinks the template is a good strategy to design stories and his kids are used to create storyboards, look for media in media databases, to record their voices, etc. His approach has a lot to do with

empowering kids through collaborative story creation, not only as consumers of already created stories.

7.3 Competence / Digital Competences

Participants said it would foster the transfer of digital competence to students (skill 6), also number 3 as it entails selecting and modifying media. Also, collaboration (3.3) as a story can be created in groups.

"Number 6, in full. Number 2, too. Number 3 also, because there are collaborative audiovisual projects where the children help each other a lot, they learn to guide their peers. They help each other much more than when we were kids, that we were more individualistic"

In the interview, the interviewee said it would foster the transfer of digital competence to students (skill 6), also number 2, 3 as it entails collaboration (3.3) as a story can be created in groups. And they are used to help each other. He acknowledged that skill 4 (assessment) can be tricky because they are used to peer assessment, but such a project can also foster such assessment. About self-regulated learning, he said that kids nowadays can have a lot of autonomy and we the educators must guide them. For example, they can say the themes of the stories, but he as a teacher must guide them to drive them where he wants them to go. So, skill 5 can also be promoted.

"Number 6, it's all. Read media information; With a story with tangibles we have to understand why the characters do things. If a girl leaves home because they want to marry her. What does that mean? It allows you to think about values and conflictive situations. Let them explain what they want but let them think.".

7.4   Pedagogical aspects/ reflections

When asked about the pedagogical aspects a participant suggested that this tool should be able to foster reflection or help students think about why they respond with a tangible or another one. For this, they suggested to include another field in the story template where the teacher can think about "if they are wrong, what can I do?", like a teacher's book.

"If the questions make you reflect before answering it would be better. The reflexive point It needs to be strengthened, why I am answering this."

The main criticism had to do with the simplicity of the feedback that the tool allows, not being constructive and too simplistic because it only allows a correct answer:

"It's fine as a qualitative resource, but with math I don't see it as much because of the "you were wrong" feedback issue. If it was done otherwise, it would be fine, but now for maths it does not".

"The difficulty is that it only allows you a correct answer and that you cannot customize the other answers, or yes or no and that's it."

Some participants then tried to give an answer on how this feedback would be improved. For instance, on giving prompts on the mistake: if you ask for the name of a geometric figure and the student gives a wrong answer (a triangle instead of a square) you could ask, look on how many sides does it have. Or the feedback message be another question being it simpler.

"To give constructive feedback you need to know the answer. And so, if you don't have information about what he answered, I can only say that he did it wrong and that he answered again. On the other hand, if he was asked for a triangle and put a square, I could tell him hey look at the number of sides, but because I know he has put a square on. We couldn't refine the level of response."

In the interview, the interviewee suggested that this tool could be used in several subjects as stories can be cross-curricular. He put an example for pre-primary kids where they created toy-characters to deal with children's rights and they created a stop motion with these. They could use these characters as tangibles and tag them to create a story with the templates and the authoring tool.

7.5   Reflections for the future

A participant expressed this tool could be interesting for teacher training so that they could apply it later with children. Another underlined that such a software can improve autonomy in students as it can be used individually, and it is self-assessed.

"It can be good in early childhood to move the evaluation and more autonomy for the student because the activity is self-evaluating, and the teacher does not have to give the solution. It is done by the same program. "

In the interview, when asked if he would use this tool for his teaching, he said he would be using it as he is starting an activity to deal with diversity of people of Raval's neighborhood (a low socioeconomic quarter in Barcelona's city center). Kids live this diversity in a natural way, and they could create stories to show others how cultures live together, their features, etc. They could tag objects related to each culture, create the tangibles, record voices, draw images and backgrounds.

"Raval (the neighnourhood) is the UN and allows an exchange of experiences, feelings. Children experience it normally, at school and in the neighborhood. That they can be the spokespersons for the virtues of diversity and intercultural coexistence. That's where it can go. Linking cultures to toys dolls that children are creating to explain things about that specific culture. And they will capture this with a drawn story and audio. I would use dolls as tangibles. And they would record the audios with their voices and the people they have met. and they would draw the background images.

They could tell a legend of some culture and link objects to written stories. (...). This would be an idea, then, who knows how it will end!"

7.6   The Spanish focus group (E6) in a nutshell

The focus group considered the following points of strengths:

1. The BLUE ARROW tool can be used in pre-primary education, primary education and teacher education, if the teacher is used to a more socio-constructive pedagogical approach, which has a lot to do with empowering kids through collaborative story creation, not only as consumers of already created stories.
2. Such a tool can foster several digital teaching competences (Digcompedu framework), mostly related to collaboration (3.3), transfer of digital skills to students (6) and selecting and creating digital resources (2)
3. It can be useful for self-directed learning and promoting student's autonomy, as it can also be used individually and it is self-assessed, reinforcing the role of the teacher as a guide.
4. The creation of stories using tangibles and NFC tags can promote collaborative learning in cross-curricular projects.
5. The template provided is a useful tool to guide the design process.

As well, the focus group and interview arose some weak points:

1. The provided feedback can be too straightforward and simplistic. It would need more options to make it more constructive.
2. The template should include a field to give indications on how to develop reflection for learning in each scene of the story. This could also improve the given feedback to students.

8. Best practices in using Blue Arrow

8.1 Quantitative studies on the Blue Arrow Authoring tool

Blue Arrow was applied in many courses enrolled in higher education institutions, in Italy, Spain and in Albania. One of the goals of the partnership is to evaluate the authoring tool developed in the Blue Arrow project and show in the previous chapters.

In order to evaluate the Blue Arrow Authoring Tool (IO3), we used the System Usability Scale (SUS) (Brooke, 1996). The system usability scale questionnaire uses a 5-point Likert scale composed of 10 questions that are:

1. I think that I would like to use this system frequently
2. I found the system unnecessarily complex
3. I thought the system was easy to use
4. I think that I would need the support of a technical person to be able to use this system
5. I found the various functions in this system were well integrated
6. I thought there was too much inconsistency in this system
7. I would imagine that most people would learn to use this system very quickly
8. I found the system very cumbersome to use
9. I felt very confident using the system
10. I needed to learn a lot of things before I could get going with the system

SUS yields a single number representing a composite measure of the overall usability of the system being studied. Note that scores for individual items are not meaningful on their own.

To calculate the SUS score, first sum the score contributions from each item. Each item's score contribution will range from 0 to 4. For items 1,3,5,7,and 9 the score contribution is the scale position minus 1. For items 2,4,6,8 and 10, the contribution is 5 minus the scale position. Multiply the sum of the scores by 2.5 to obtain the overall value of SU. SUS scores have a range of 0 to 100.

In the following table there are a grading format suggested in a study by Lewis and Sauro (2018).

The scheme allows to identify some ranges where place the usability of a tool- From 84.1 points the tool is considered with a usability graded as A+, from the 62.5 a tool is considered as enough usable by the users. In the study we considered the mean value, the standard deviation and the frequency of the values that falls in a specific grade.

SUS	Grade
84.1-100.0	A+
80.8-84.0	A
78.9-80.7	A-
77.2-78.8	B+
74.1-77.1	B
72.6-74.0	B-
71.1-72.5	C+
65.0-71.0	C
62.5-64.9	C-
51.7-62.6	D
25.1-51.6	E
0.0-25.0	F

Table 1. SUS Usability Scale Grades as proposed by Lewis and Sauro (2018).

The study involved 129 students of the course Learning Technologies (Tecnologie Diddattiche) in the cohort of students enrolled in Primary Education Degree in the University of Foggia in their first year of university. The questionnaires were administered in January/February 2023. The participants, during a lesson about the application of innovative technologies in education, were called to learn about the tangible user interfaces and to see the lessons created in the Blue Arrow MOOC (IO3) and the tutorials of the Blue Arrow Authoring Tool (IO4). After this preliminary lesson, the students were able to design and implement a OER that they uploaded on the Blue Arrow website repository. They were called to create new stories and only a prompt story was proposed "The Hot Dog" (Original name in Italian "Il cane salsiccia").

The laboratory was conceived in order to create little group of 3 students that was enabled to create their story and to implement with the authoring tool. They downloaded by their own all the materials from the Blue Arrow website and installed all the authoring tool on their personal computers. After the development of the stories at the end of the laboratory that was open for 3 hours, the students were called to reply to the SUS questionnaires.

The participants to this study are 129 (126 F and 3 M) with an average age of 26.3 and standard deviation of 7.85.
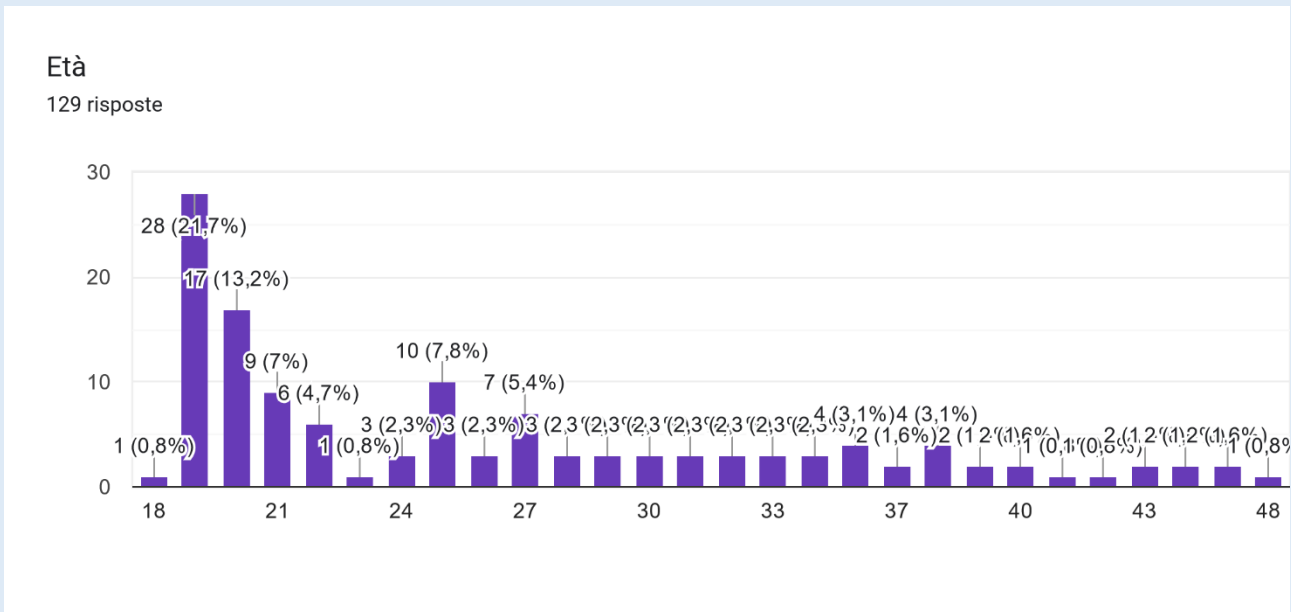
Figure. 8. Ages of the participants
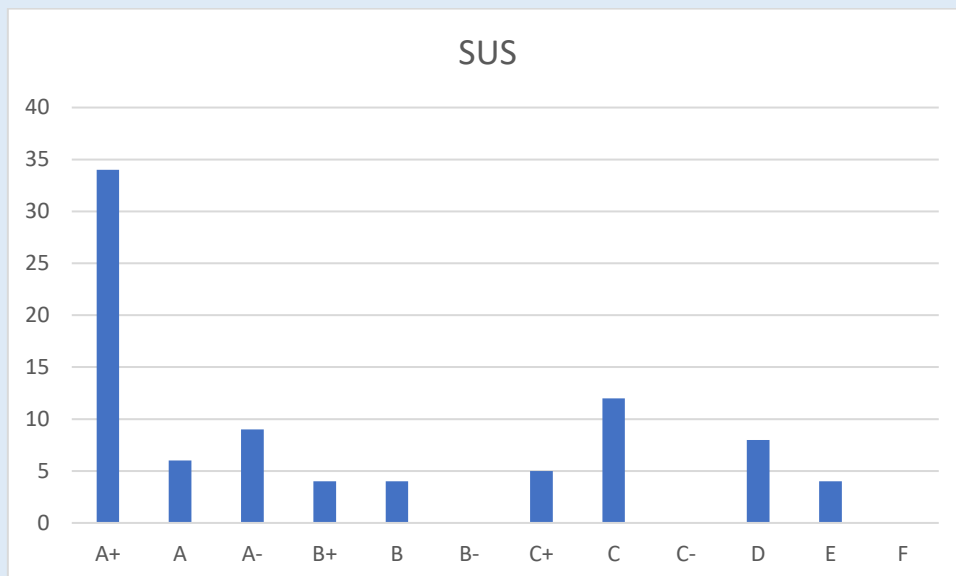
Figure 9. Distribution of the usability grades into the group

Results shows that the system has a good grade of usability with 36 that classified with the questionnaire the system with a global score A+. The mean value is 77.8 that falls in the grade B+ with a great variability having a standard deviation of 14.3 points.

If we put together the grade with the same letter (A+, A and A- are A; B+,B and B- becomes B; etc.) we have 62 participants that sees the system with the grade A, 14 with the grade B, 30 with the grade C, 12 with the grade D, 5 with the grade E and 1 with the grade F.

No evaluation of the preliminary digital skills was performed.

Very interesting the results regarding each question. To the question I think that I would like to use this system frequently, 52 replied with "I totally agree", 24 with "I agree". This question obtained the value of 4.47 with a standard deviation of 0.77.
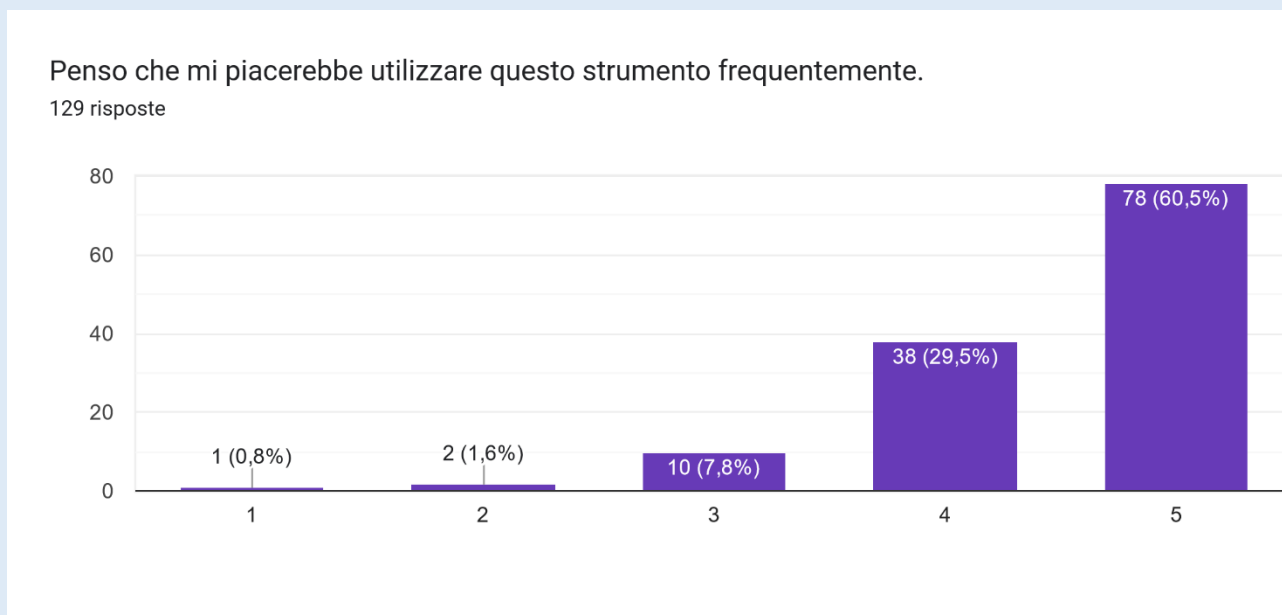
Figure 10: Answers to the question 1 "I think that I would like to use this system frequently."

At the same time another aspect emerges in the question 4 where is asked "*I think that I would need the support of a technical person to be able to use this system*" obtained 2.71 with a great variability (SD=1.28) as shown in the Figure 11.
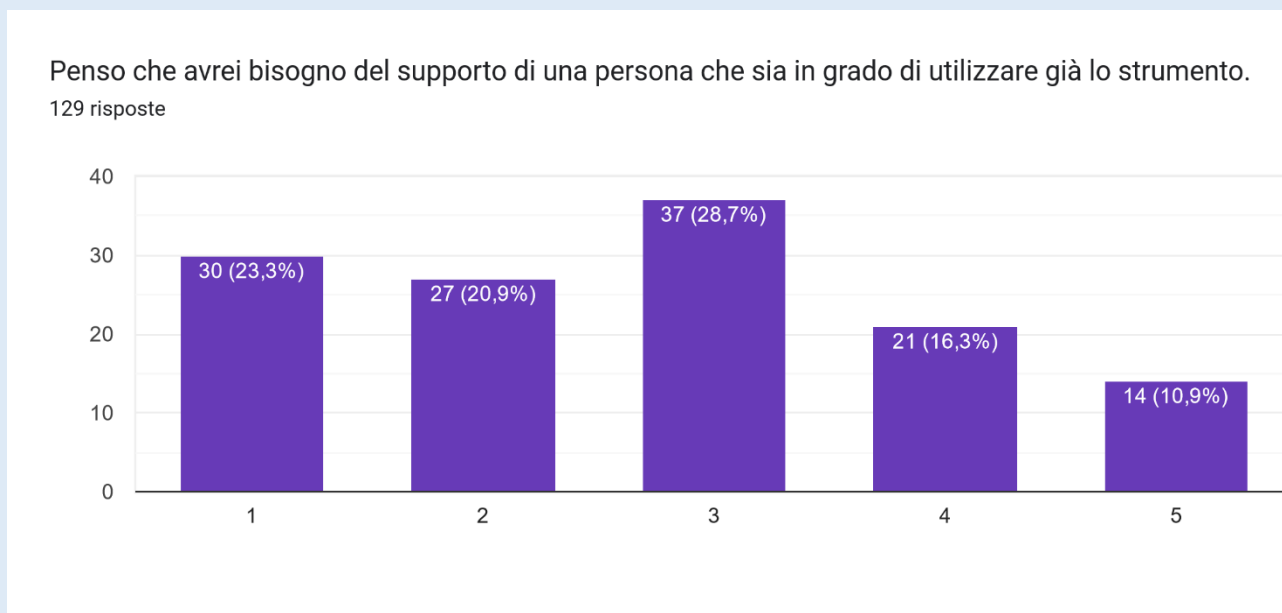
Figure 11: Answers to the question 4 ""I think that I would need the support of a technical person to be able to use this system"

Nevertheless, the participants believes that the Blue Arrow authoring tool could be easily learnt by other people replying to the question 7 with a very high mean (4.29) as shown in the next picture

Penso che la maggior parte delle persone potrebbero imparare ad utilizzare lo strumento facilmente.

129 risposte
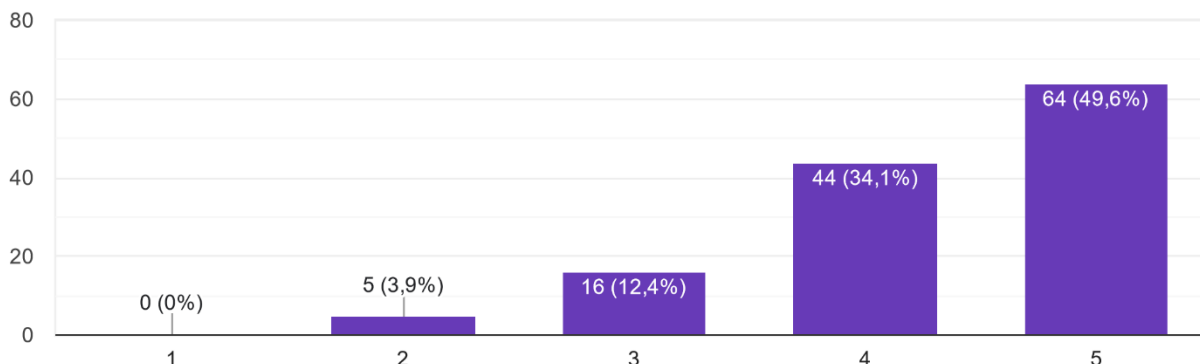
Figure 12: Answers to the question 7 "I would imagine that most people would learn to use this system very quickly

It follows the results:

1-.   I think that I would like to use this system frequently.
        Mean: 4.47; SD= 0.77
2.   I found the system unnecessarily complex
        Mean: 1.74; SD= 1.09
3.   I thought the system was easy to use
        Mean: 3.88; SD= 1.00
4.   I think that I would need the support of a technical person to be able to use this system
        Mean: 2.71; SD= 1.28
5.   I found the various functions in this system were well integrated
        Mean: 4.33; SD= 0.75
6.   I thought there was too much inconsistency in this system
        Mean: 1.57; SD= 1.04
7.   I would imagine that most people would learn to use this system very quickly
        Mean: 4.29; SD= 0.83
8.   I found the system very cumbersome to use
        Mean: 4.88; SD= 0.99
9.   I felt very confident using the system
        Mean: 4.15; SD= 0.93
10.   I needed to learn a lot of things before I could get going with the system
        Mean: 2.11; SD= 1.15

These results show as the Blue Arrow authoring tool would be considered a very useful tool for a first group of students represented by future teachers in primary schools and the usability is demonstrated also if the group have no experience with the innovative teaching tools.

Very interesting also, the results that came from the free comments in the questionnaire as:

"Beautiful activity, creative and really fun to do. Among other things, very useful for learning, I think I will use it a lot in the future."

"It seemed to me very interesting both from a creative point of view and from the point of view of the learning purposes, I think it should be used by all teachers to make learning school subjects pleasant and playful."

"Very useful laboratory and very interesting work done in class especially for a future as a teacher."

"I found the tool that was presented to us today really useful and innovative, a breath of fresh air. Surely at the end of the workshop I will use the story we invented with my children at nursery school."

"I think it is a very useful tool to use both in primary school and in kindergarten."

"I liked it as an experience because it was very practical and feasible, we identified ourselves with the thoughts of the children, in their way of seeing, perceiving and listening to things."

"I think it was very useful to give us the idea of how a multisensory story can be structured and I think I will gladly use this tool in the future, it would be perfect if they can be structured properly, controlling the position of text or images. I remain of the opinion that it is an effective and fun tool for children."

8.2 Design and evaluation of a multisensory storytelling in schools

The Blue Arrow program was used for a research project to implement a multisensory storytelling tool using tangible user interfaces (TUI) technology. This tool, once constructed, was employed within the school classrooms with the goal to evaluate its usability and effectiveness in terms of effects on learning and inclusiveness.

The sample was made up of two classes of the Instituto Omnicomprensivo Montero, in Montenero di Bisaccia (Italy). It is composed of 39 primary school students with a mean age of 8.4 years (SD = 0.87). Among them, 5 have special educational needs (SEN), of which 4 have a diagnosis of a specific learning disorder.

The decision to make use of multisensory narratives was methodologically based on the Situated Psychological Agent Framework (SPAF). This model aims to enhance pedagogical environments through the use of specific technologies such as the tangible user interfaces. In the traditional didactic narrative, there are three agents: the teacher, the pupil and the story. Through the Blue Arrow program an element was added: the multi-sensory one. In the light of the data available in literature, which supports the usefulness of multisensory, this element represents an important addition to traditional modes of storytelling.

Multisensory education has been extensively discussed in the literature, particularly for its ability to generate inclusive didactics. (Kamei-Hannan et all., 2022; Somma et al., 2021; Novakovic et al., 2019; Starcic et all., 2013). These data combine and add up to the studies that show the positive effects of storytelling as the development of: language comprehension, emotional well-being, empathy, sense of responsibility, sense of identity, imagination, creativity and literacy skills (Curenton et al., 2008; Haven, 2007; Griffin et al., 2004; Reese et al., 2010; Reese et al., 2010; Van Puyenbroeck & Maes, 2008).

The effective implementation of the tool was made possible by the middleware "Smart Technologies to Enhance Learning and Teaching" (STELT), a program that allows the construction of learning scenarios and their underlying logic. In this study, the Blue Arrow program was used to construct two parallel stories; the two stories were different in terms of narrative content but identical in terms of their structure. The stories constructed with the program were used as a vehicle to guide a curricular lesson that was alternative to traditional ones.

Before moving on to the construction of the stories, the content of the narratives was agreed with the teachers so that the difficulty of the stories would be appropriate to the pupils' abilities. Once the teachers' approval was obtained, it was possible to move on to the phase of researching and selecting all the necessary elements for the construction of the story scenes. For each scene the Blue Arrow program requires the editor to organise it according to certain specific elements:

- An image that acts as a visual support for the content of the scene.

- A text that acts as support for understanding the story.

- An audio content that acts as the narrative voice of the story.

- A second audio content that is used in case of error to recognise the object required by the story.

- A code, specific to each scene and transcribed on an NFC tag, associated to the objects, which will allow them to be recognised by the reader.

- An object, on which the previously coded tag will be applied. If this code responds to the requests of the story, it will allow the narration to continue.

After gathering all the necessary material for each story, it was possible to assemble all the elements for the construction of each scene and all the scenes for the construction of each narrative. Once the stories were obtained, it was possible to bring them into the classroom to evaluate the effects of the storytelling tool. To evaluate the effects of the tool, two different study conditions were developed.

In the first condition, that was the experimental condition, the students participated in a lesson during which they listened to a story using the TUI-based tool (Story1).

In this condition, the opening of the story was performed on an Android smartphone, which was mirrored in a personal computer and displayed in an interactive whiteboard available in classrooms. The smartphone acts as a tangible object recognition system, exploiting the NFC antenna inside the phone. The user interacts with the system by picking up the object he or she thinks is the right answer to the question asked by the system during the story. Placing the object on the back of the smartphone, it sends the object recognition to the application, allowing physical interaction with the story.

In the second condition, that was the control condition, the students participated in a traditional lesson, in which they listened to a story without the use of any type of technology (Story2).

To investigate the effect of the use of TUI on learning, in terms of acquired knowledge, each of the two classes (Class1 and Class2) was subjected to each of the two conditions.

Specifically, Class1 was subjected first to the experimental condition with Story1 and then to the control condition with Story2. Instead, Class2 was first subjected to the control condition with Story2 and then to the experimental condition with Story1.

The tools used for data collection during the experimental condition were: Observation grids compiled by the experimenter acting as observer; Questionnaire on the content of the story, to evaluate the knowledge acquired on the story just heard; System Usability Scale (SUS) to evaluate the usability of the tool based on TUI; Questionnaire to collect information on the acceptability, experience of use and

inclusiveness of the activity; and Structured interview addressed to teachers to collect their opinions and observations on the use of TUI in the classroom.

The tools used during the control condition were:

- Observation grids compiled by the experimenter acting as observer.
- Questionnaire on the content of the story, to evaluate the knowledge acquired on the story just heard.
- Questionnaire to collect pupils' opinion on the lesson.

One of the study's goals was to evaluate the effects of multisensory digital storytelling using tangible user interfaces on learning, in terms of knowledge acquired about a story, compared to traditional storytelling. The results did not show a statistically significant difference between the two conditions, indicating that TUI-based and traditional lessons have an equivalent effect on pupils' learning.

Regarding the other results on usability (SUS) and acceptability of the TUI-based tool, they showed a great appreciation by both teachers and students.

The latter also declared they had fun and got distracted very little during the lesson. The stimuli towards which the participants showed greater enthusiasm were the olfactory and the tactile ones, which are the sensory elements less stimulated during traditional teaching. Elements of the storytelling that were related to hearing and sight, more stimulated in traditional lessons, obtained lower scores, meaning lower appreciation.

These results about usability and acceptability should not be ignored, seeing that a teaching tool, albeit attractive, needs to have characteristics that make it easily usable by the user it is intended for.

The last element to consider concerns the elements that emerged from the questionnaire on inclusion, it should not be forgotten that one of the objectives of the study was to investigate the possible effect of the multisensory storytelling tool on inclusion, especially on the inclusion of subjects with SEN. The questions on inclusion highlighted how this type of activity fostered teamwork and collaboration among pupils.

Taking into consideration the results that emerged from this study, we may consider the two teaching methods investigated as equivalent in terms of learning potential, intended as the pupils' ability to acquire knowledge when listening to a story, this makes the multisensory digital storytelling built with the Blue Arrow program a valid alternative to traditional methods. The appreciation shown by the pupils towards this experience highlights how TUIs can be a support to the possibility of building knowledge in different ways following a Montessori approach based on the importance of the multisensory experience.

The real relevance of these results lies in considering them as the starting point for investigating new ways of teaching, using new tools and program, such as Blue Arrow, that give the possibility of transforming the way of teaching. This study, despite its limitations, showed how the storytelling tool built through Blue Arrow can be, at the same time, useful with respect to the teaching objective par excellence, which is to learn but, at the same time, it can also be well-liked by all pupils and become a means by which to encourage the creation of an inclusive environment for all.

8.3 BlueArrow as an escape room

The application made for this project has been called "Escape with Pulcinella", the goal is to empower the Italian language learning and the improvement of knowledge about Neapolitan culture's learning, applying the paradigm of Tangible User Interface (TUI) using a storytelling that motivates and involves the user by using the Blue Arrow authoring tool. The application proposes clues and riddles proposing a multisensory approach and involving the sense of smell, taste and touch mediated by the digital devices. The users' smartphone represents a sort of magic wand that it is used to browse the room – designed as a learning environment – aimed at completion of the story.

The participants are 22 to 32 years old, 8 females and 2 males. Regarding nationalities, 2 are of Croatian nationality, 8 are of Italian nationality, for a total of 10 participants. Scoring System usability scale (SUS) was used to assess if the instrument was effective. The mean and standard deviation was calculated and according to the mean score this instrument is satisfactory.

The Escape Room also incorporates a narrative structure that draws on the methodology of storytelling - the art of recounting tales. The underlying story is straightforward and follows a linear path. The narrators, represented by virtual avatars, will guide the students in a manner that is at times explicit and at times enigmatic, as they search for various objects and attempt to solve riddles in order to progress. There will be three narrators: an external voice-over that will provide initial context, followed by Pulcinella and the Munaciello, who will engage in dialogue during the escape. As with any escape room, the objective will be to solve all the riddles. The story commences within the university, but as soon as players touch the carillon, they will be transported to different locations across various time periods, accompanied by Pulcinella, and their goal will be to retrieve the pieces of the carillon that have been broken by the Munaciello, in order to return to the present.

For the escape room it was created an app called "Escape with Pulcinella" that guides the the narration. Steps were followed:

- Creating a script;
- Finding all the objects for the puzzles;
- Creating the graphic part for the puzzles and print;
- Creating the graphic part for the application,
- Audio recording;
- Tagging of objects with NFC sensors;
- Implementation on "I'm in Tales" of the smart objects by associating a digital meaning to each of them;
- Testing;

Sensory stimuli are employed in the riddle to facilitate and enhance the gaming experience by creating a learning-friendly environment. Moreover, the employment of

tangible user interfaces (TUIs) underscores their potential as inclusive instruments from a multisensory standpoint (see Figure 13).

Figure 13: A user that smells a smelling jar

It is important to note that the experimentation was carried out with participants who engaged in the experimental situation one at a time. Unlike typical escape rooms, no time limit was assigned due to the investigative motivations that underlie this research. "Escape with pulcinella" was installed on mobile phone and upon pressing the "play" button, graphics and audio are displayed, with the first narrator (the off-screen voice) commencing by informing the participant of the game's context, the story, and the other narrators. Furthermore, the first narrator will indicate the smart object that the player must locate to progress with the story. For each scene, only one correct object is available that permits the participant to progress and unlock the story, and this is the task assigned to the participant scene by scene. When the participant has located all the correct objects, the story concludes, and the escape terminates. The participant returns the mobile phone, and there is an exchange of feedback with the researcher, followed by the completion of a questionnaire. The utilized rooms are then rearranged to welcome the next participation. The most important thing about TUI's are multisensory approach, that has allowed sense's stimulation like touch, smell in every scene situation.

The participants, are from 22 to 32 years old of which 8 are females, 2 males. Regarding nationalities, 2 are of Croatian, 8 are of Italian, for a total of 10 participants.

The participants were informed of the experimental procedure solely at the moment of the experimentation. Users were not required to acquire any specific techniques or undergo any prior training prior to the day of experimentation. Adequate information concerning the experiment and the tool was provided to facilitate smooth progression. Following the experiment, a brief debriefing was conducted in which information was exchanged between the researcher conducting the study and the participants. Subsequently, Italian participants were presented with a questionnaire regarding the acceptability of the tool, specifically the System Usability Scale (SUS), which was translated and subsequently retranslated into English to ensure the validity of the tool. The questionnaire also included open-ended questions regarding the utility of the tool for learning about Neapolitan culture, its strengths and weaknesses, the aspects that

were most involved, and the time required for gameplay. Erasmus participants were required to complete a specific questionnaire regarding Neapolitan culture prior to the experiment, encompassing topics that were encountered during the escape room.

The standardized System Usability Scale (SUS) (Brooke, 1996) was administered to each participant, and the scores were subsequently classified into a grade or class. The mean and standard deviation were then calculated, and based on the mean score, the tool was found to be satisfactory, usable, and efficient, albeit with some imperfections. It is worth noting that the SUS sets a usability limit of 68, which is considered an average score. The scores are distributed around a mean of M=79.25 and SD=14.816, there by signifying that the tool is acceptable with an almost excellent user experience.

Figure 14: SUS Scores

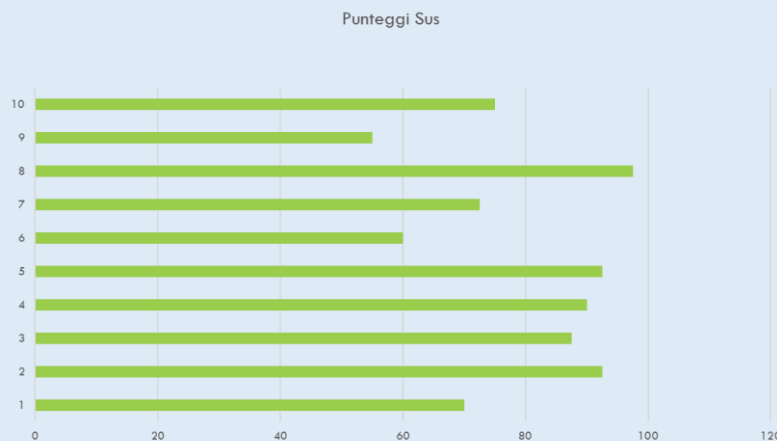Upon examining individual cases, 50% of the participants found the tool to be acceptable, satisfactory, and easy to use, falling under the "A+ grade SUS" category. Conversely, 30% of the participants encountered some difficulties in using the tool, finding it to have average usability. Additionally, 20% of the participants reiterated the non-usability and acceptability of the tool, finding it difficult to use.

8.4 Initial Teacher Training Application

8.4.1 In Spain

BLUE ARROW project was presented to one cohort of future teachers and one cohort of future education specialists in two undergraduate courses of the Faculty of Education of the University of Barcelona. As with respect to future teachers a number of 32 participated divided into 9 groups. And with respect to future education specialists there were 24 divided into 6 groups.

Both cohorts were working in teams of three to four students, as was decided in the classroom, following a project work approach that is common at the University of Barcelona. The students were introduced to the pedagogical approach of learning with tangibles, and to the TUI and tools created by the project. Once they understood the use of the tools, they were asked to design scenarios considered of pedagogical value for their future students. Following the BLUE ARROW methodology. Each group was free to choose the specific area and content of the scenario, so they could show their creativity in looking at scenarios that are useful and original, something that was achieved in many cases. In Table below we can observe that some of the designed scenarios are devoted to kindergarten education while other are devoted to primary education, both to the initial levels and to the last level. This implies that the BLUE ARROW approach and tool works well at all levels of kindergarten and primary education. The fact that the story can be actually voice over implemented allows for little children to interact with the Tablet and follow the story before they learn to read, something that was very much appreciated by the future teachers and specialists.

All groups presented their designed scenario, although some of them were not fully finished. The number of scenes varies, from four to nine, but in all cases the preservice teachers catch the essence of the designs. As we can see the scenarios are very varied in terms of areas and levels, and all are created based on storytelling approaches. Interesting is the fact that the tangibles are also understood as "hybrid tangibles", combining representations of tangibles (2D) with real 3D objects. Below is a list of some of the scenarios produced:

Group	Title	Theme	target	Discipline	Description of content	Skills involved	Resources	Num. Scenes
1	Marc and math	Math education	primary, first level	maths	A child is not good in math, so it practice different digital scenes with math oriented situations	numerical calculus,	digital pen	9
2	The trip of the dolphin Serafin	diversity	Early Childhood Education.	interdisciplinary	a dolphin travels in the ocean and finds other species to make friend	social interactions,	dolls, balls, magnifying glass, etc	5
3	Tazita's journey	exploration of home environment	infant and primary education, first level	environmental exploration	This is the story of "Tazita", an animated object that has the mission to find his little brother "Redondito", who has lost by the house	game-based learning	watch, cups in different shapes, keys, etc	9

4	Letters!	knowing the alphabet	Early Childhood and primary education, first level	languages	A child and a teacher identifying letters through dialogs	reading literacy, communication,	Cardboard with pictures of letters	6
5	Ona and her emotions	emotional education	Early Childhood Education.	interdisciplinary	A little girl, Ona, identify different emotions by gestures	identifying emotions	Cardboard with a picture of the letter	6
6	Interacting with my friends	sex education	primary education, last level	interdisciplinary	a set of typical scenes young students experience, and how to interact each other	personal communication, decision-making,	pictures, coloured cards, condoms, etc	8
7	Chloe the Fairy	language, names of objects	Early Childhood Education.	identification of objects	preparing the ride for fairies to become one	match objects with names	luggage, books, keys, backpack, basket, rabbit wand	6
8	How much do you know about sustainable menstruation?	sex education, biology	last cycle of primary education	biology, interdisciplinary sustainable development	young girls learn about menstruation and different methods to deal with	personal care	cloth pads, tampons, menstrual panty, menstrual cup,	6
9	The tale of Blanquet, a special beard	names of objects, colors, shapes	Early Childhood Education.	environment knowledge	Through a day life of a little beard, children identify colors, shapes, names	identification of colors and shapes	different bears made of plasticine	8
10	THE WORLD AND THE ADVENTURES OF TOMÁS THE FOX	names of objects, colors, shapes in nature	Early Childhood Education.	environment knowledge	through FOX, the child in the game identify different objects	find objects and people	mountain, forest, birds, made of pictures, and teddy fox	6
11	Noah's nerves	localisation of day-to-day objects, and animals with different mood	Early Childhood Education.	environment knowledge	In a pond animals with different mood exchange	identification of expressions and animals	teddy frog, other animals with different expressions, cup	6
12	ready go to school with Biel	Good manners	Early Childhood Education.	Habits and routines in Early Childhood Education.	Biel follow up the day-to-day routines to be ready to go to school	routines and good manners	cup, milk, chocolate, shoes, toothpaste, etc	5

Table 2. OERs developed in the Spanish Multiplier Event.

8.4.2 In Italy

The BLUE ARROW Platform just described was illustrated to trainees at the the pre-service teacher training for special education (called in Italian Tirocinio Formativo Attivo - TFA - Support specialization course (VI cycle)), in June 2022, and used in specific dissemination events. The students were therefore invited to co-design new multisensory scenarios for the use of the TUI kit, creating interactive narratives that could be replicated in the classroom involving subjects with disabilities, especially in the case of sensory deficits. The co-creation experiment, in addition to stimulating knowledge of the proposed innovative teaching methodologies, intends to test the flexibility and adaptability of the intervention protocol, collecting, in the meantime, useful material for future experiments. 290 trainee teachers (F = 227, M = 63), belonging to secondary level, took part in the co-creation experiment, divided into two classes (which we will indicate with A and B, Tab. 1). The students were asked to devise some original narrative scenarios based on the template described, determining a disciplinary sector, a specific reference target and the materials used. The students, after an introduction on TUI issues and after having seen some developed stories in practice, had the task of creating a multi-sensory story oriented towards inclusive paths that could involve the involvement of users with specific disabilities. The participants, divided into 31 working groups, produced as many co-designed scenarios: of these, 10 develop themes in the humanities area (cultural, historical-geographical, literary

sciences), 8 in environmental education, 2 in music education, 2 in nutrition education, 1 in geometry; 3 scenarios instruct on the preparation of culinary recipes; 5 scenarios present an interactive fairy tale with ethical-moral implications. Some examples of co-designed scenarios are summarized in the table below:

Tab. 1- Co-created scenarios in the framework of the pre-service teacher training for special needs education (TFA Sostegno, Università di Foggia, A.A. 2021-22)

Group	Title	Topic	Description	Hard e soft skills to be developed	Specific Manuals	Special needs
1A	La Divina Commedia	Italian literature and culture	The user briefly retraces the entire plot of the "Divine Comedy" by manipulating action figures and objects that represent the characters and places of Dante's work	Cultural skills, problem solving	Dante's action figure, match (olfactory experience), Charon coin, cone, ampoule with floral fragrance (olfactory experience)	Not specified
3B	The clean mermaid	Environmental education	Clean, the siren protagonist, guides the user on a journey of exploration of the seas, leading to an overall reflection on water pollution	Environmental skills, awareness of ecological issues, problem solving	Clean's action figure, net/plastic cup, rubber jellyfish, pack of cigarettes, boat	Not specified
4A	Recognize the right key	Musical education	The user is guided through an interactive musical performance path	Musical skills, eye-motor skills, executive functions	Musical keyboard, tablet for music composition, smartwatch for vibration perception	Not specified
4B	The mysteries of the castle	Historical-artistic disciplines	The building history of Castel del Monte is retraced, with precise historical and architectural references	Artistic-manipulative skills, creativity, cultural skills	Terracotta figurine, three-dimensional octagonal figure, crown, photographs, clay footprints, rubber falcon	Subject with bilateral hearing loss
5B	Let's make a pizza!	Cooking	The user takes part in the execution of a culinary recipe centered on the preparation of a pizza	Specific cooking skills, memorization, executive functions, numeracy	Food scale with beep, pizza ingredients, teaspoon, bowl with lid	Subject with severe visual impairment

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7A	Recognize the geometric figure	Geometry	The activity involves the user in the creation of a triangle, by means of tangible objects such as a wooden board, a rope and some nails	Technical-mathematical skills, problem solving	Wooden board, nails, rope, interactive mouse for visually impaired (TActile MOuse), 3D printer	Visually impaired subject
12B	The plate of health	Food education	The activity intends to convey the concept of healthy eating, through the composition of a meal based on vegetables and other nutrients	Decision-making, food knowledge	Vegetables, chicken drumstick in rubber, glasses with juice	Not specified
14A	Tanabata	Literature, cultural anthropology	The user is catapulted into an interactive narration against a fairy-tale background, inspired by Japanese folklore	Cultural relativism, creativity, problem solving	Silky fabric, bamboo basket, doll, floral fragrance (olfactory exp.), mask, rubber dove, braid, poppy seeds, fruity fragrance (olfactory exp.), sensory bottle, silhouettes of stars	Subject with visual impairment

Table 3. OERs created during the Italian Multiplier Event

8.5 Study on the impact of hybrid environments for multi-sensory learning and storytelling in the area of visual disability

This best practice produced research developed in connection with the "University of Roma3", University of Naples and Sant'Alessio Institute for the Blind in Rome. It aimed to test the impact of hybrid environments for multisensory learning and storytelling for subjects with visual impairment.

Within the project thesis was tested, the prototype realized, on two pilot studies conducted in parallel on different samples:

1)   The first study was conducted on the fourth IV of the Comprehensive Institute of Naples S. Giovanni Bosco.

2)   The second study is on a single case study of a six-year-old "S" with a severe rare disease, CTNNB1 syndrome, discovered only in 2012.

The research was possible thank to the prototype developed in the framework of the BLUE ARROW project, since the authoring tool was the main driver for the story's implementation.

The WHO defines "disability" as any restriction or deficiency of the ability to carry out an activity in the way and within the limits considered normal for a human being. To date, according to data provided by the WHO in the world there are 217 million visually impaired, considering the total blind there are about 253 million subjects with visual disabilities. A visual impairment is due to the loss of visual acuity and the main causes are structural defects, defects of refraction, visual defect at the cortical level. We focused on the low vision with which we mean a reduced bilateral and irreversible visual ability that limits the autonomy of the subject. The data report that childhood low vision in developed countries makes up 5% of the total pathologies, it is due to congenital, perinatal or genetic causes, while in developing countries 15% with infectious or nutritional causes. Research in developmental psychology shows that visual impairment from birth leads to a transient delay in reaching developmental stages compared to a person without a disability. The most significant delays occur in the psychological, sensorimotor spheres, in the area of verbal language and in spatial orientation. Acting on a system with disabilities means considering a network work, where there is a synergy between several systems. In reference to the ecological theory of human development of Urie Bronferbrenner, the study of the subject must consider the latter not as an individual but as a subject inserted in systems that affect it and vice versa.

In literature, studies made by Bara et al. (2018) identify in a study conducted, that children with visual impairment when reading books by an educator, were much more involved and active when they had books in 2D better if 3D than books without illustrations. Blind or visually impaired children must participate in the narrative experience by using their own bodies, manipulating, smelling and enjoying the objects

available (Kamei-Hannan et al, 2022). It has been identified that learning through multisensory stimulation is better than only one sensory channel (Jordan and Baker, 2011), and multisensory activity is one of the activities that stimulates all the senses in the child, such as taste, smell, hearing, has a positive impact on children (Patch,2022). The multisensory environment is therefore an activity that offers practical materials to stimulate the senses, stimuli that affect the development of children. (Pagliano, 2013). The involvement of the senses in storytelling ensures greater attention, understanding, exploration, and learning in the child, especially if it has visual impairments. Digital storytelling is a dynamic combination of storytelling and technology, a method that combines the art of storytelling with digital media, including text, images, recorded audio narration, music and video. These digital elements are then merged into a computer software. It goes to tell an interactive story lasting about ten minutes that revolves around a specific theme or topic, it is going to organize digital content in a structure that has a basic narrative element to follow. The result is a story constructed through multimedia elements. With Tangible User Interface, a term introduced by Hiroshi Ishii and Brygg Ullmer, reference is made to the human-machine interfaces that give the user the opportunity to interact with a computer system by manipulating objects called "tangible". The main fields of application of TUIs are school, extracurricular, disability. The use of the prototype involves the upgrade of these skills:

• Memorization

• Learning about history

• Involvement

• Attention

• Storytelling

• Through a multisensory stimulation.

The device consists of a pc and a Magicboard, TUI platform with educational purpose. Besides the Magicboard and the pc you can also use a simple mobile phone containing an NFC antenna. The user is required to interact, on the pc, with a digital story through physical objects to be placed on the Magicboard or mobile phone. The moment the subject places the wrong object, negative feedback is output by the system, or in the case of a positive object, the story proceeds forward. Each object has an NFC tag that is recognized by the MagicBoard or mobile phone. **Seven stories were created with the Blue Arrow authoring tool** but selected according to certain criteria, two, Dragolandia and Magiclandia used in the pilot studies. All seven stories have been implemented through the Blue Arrow authoring tool.

The central body of the thesis was dedicated to the experimentation of the prototype within two pilot studies. The first conducted on class IV of the Istituto comprensivo San Giovanni Bosco (NA) the participants were thirteen children aged 8 and 9 years. The trial involved two meetings a week apart. The children were divided into two groups,

the TUI group experimented with the prototype interacting with it, and Group A only listened to the reported story without interacting with the Tangible User Interface, each child had the opportunity to experience the activity individually. Subsequently, questionnaires were administered to investigate a better understanding, learning, memorization and motivation as well as the usability of the instrument after the use or not of the prototype. The objectives of this study were:

• Improving understanding and learning through stories

• Increased motivation and acceptance by subjects

• Usability Analysis of Tangible User Interfaces (TUI)

The analysis of the results was made through the Wilcoxon-Mann-Whitney non-parametric statistical test, which did not reveal significant differences between the TUI group and the listening-only group. As for the analysis related to the System Usability Scale (SUS) is highlighted through the creation of a histogram that the scores are distributed between 40 and 60 with a couple of peaks, Moreover, such scores are distributed evenly as can be observed both from the average (the total average is 60.2) and from the standard deviation (total standard deviation is 13). Thus, for some subjects interacting with the prototype was easy and intuitive even if a major limitation of the study is a low sample size.

The second pilot study focused on testing the prototype on S. a six-year-old girl, visually impaired with a rare disease, the syndrome «CTNNB1» discovered only in 2012, to date there are 18 cases diagnosed in Italy. It is a neurological development disorder caused by mutation or deletion of the CTNNB1 gene, characterized by neuro-motor delay, impaired vision (squint, hypermetropia), impaired speech, trunk hypotonia, etc. The objectives of the pilot study on this individual case are to investigate the effectiveness of the use of tuis in enhancing levels of understanding, attention and involvement of S. Check the acceptance of S in relation to the activity and finally investigate the point of view of parents. The trial lasted one month, with four weekly meetings. S. had the opportunity to play with the prototype in autonomy even outside the meetings established with the experimenter. An observation grid has been compiled that investigates six areas: motility; perception-attention and cognitive skills, nonverbal communication, social interaction, discrimination-generalization-planning-problem solving, other observed behaviors. In addition, a questionnaire was administered to parents of S before and after the trial. The results of the observations show that the objectives have been largely met. The interaction with the device and the tuis allowed an increase in levels of attention and involvement. Object manipulation has improved the understanding and experience of the story. There was a good appreciation of the proposed activity confirmed by repeated behaviors and actions at each meeting such as: clapping, show joy at the sight of the game and objects, hops, embraces the experimenter and the guide to the game table to play together, through the PECS (Picture Exchange Communication System), present on his tablet indicates the desire to

play with the prototype. In the answers to the questionnaire given, parents declare that they will use the tool in the future to improve the understanding of texts and consider the tool to support people with disabilities.

9. Micro credentials

Micro-credentials are a type of short learning opportunities acknowledged with an award such as a digital badge or a certification. They can be provided by a HEIs or/and a VET organization and by MOOCs providers as well.

There are many definitions available of 'micro- credential', however in this document we will adopt the one belonging from the European Commission, as, in the authors opinion, is among the most complete:

"A micro-credential is a *proof of the learning outcomes* that a learner has acquired following a *short learning experience*. These *learning outcomes* have been *assessed against transparent standards*. The proof is contained in a certified document that lists the name of the holder, the achieved learning outcomes, the assessment method, the awarding body and, where applicable, the qualifications framework level and the credits gained. **Micro-credentials are owned by the learner**, can be shared, are *portable* and may be combined into larger credentials or qualifications. They are underpinned by *quality assurance* following agreed standards" (European Commission, 2020).

In the last years micro-credentials phenomenon have raised and gain more and more attention, however the biggest change, at policy level, can be registered in June 2022 with the adoption of the Council Recommendation on a *European Approach to Micro-credentials for Lifelong Learning and Employability*. With this EU Council Recommendation the EU member states are invited to "develop measures to create a micro-credential ecosystem by the end of 2023" (Council of the European Union, 2022).

As reported in OECD (2023), and represented in Figure3, the offering of micro-credentials available in the six of the main MOOC providers has expensively increased in the last four years (2018-2022).
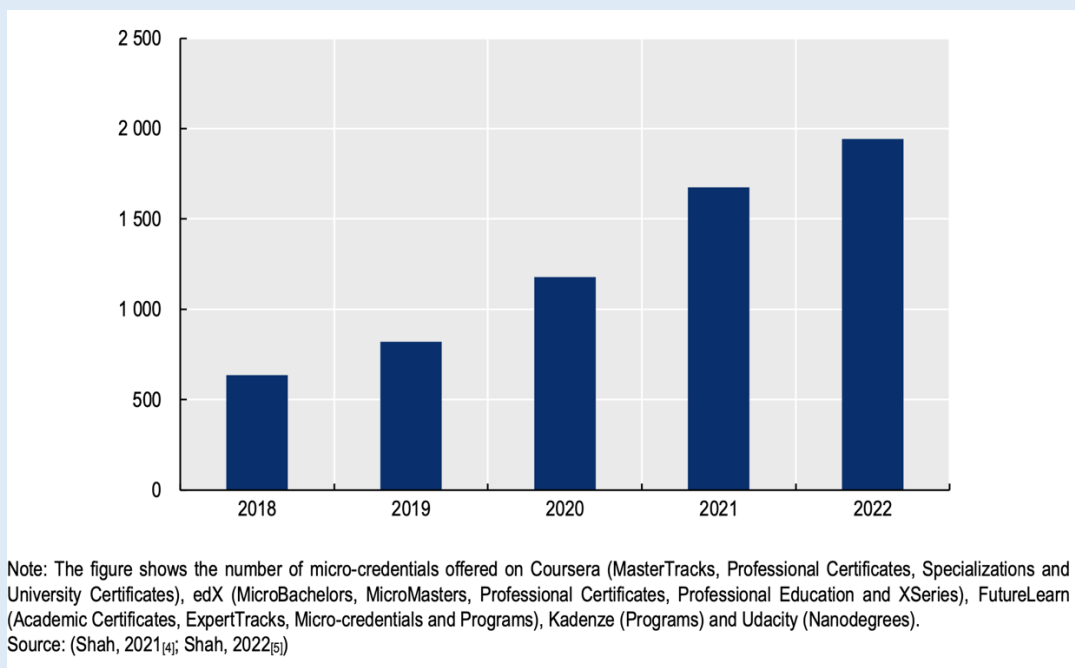
Note: The figure shows the number of micro-credentials offered on Coursera (MasterTracks, Professional Certificates, Specializations and University Certificates), edX (MicroBachelors, MicroMasters, Professional Certificates, Professional Education and XSeries), FutureLearn (Academic Certificates, ExpertTracks, Micro-credentials and Programs), Kadenze (Programs) and Udacity (Nanodegrees).
Source: (Shah, 2021[4]; Shah, 2022[5])

Figure 15- The number of micro-credentials offered on six major learning platforms (2018-2022), Source OECD, 2023

Furthermore, "many EU member states are moving forward with piloting micro-credential programmes and discussing adapting national legislations and quality assurance systems. Similarly, in the Asia-Pacific region, the UNESCO Asia and Pacific Regional Bureau of Education is researching national use cases of micro-credentials to assist policymakers to have an overview of approaches taken in the region (INQAAHE, 2023). The Council of Ministers of Education, Canada, also established a working group dedicated to micro-credentials to share directions taken in each province and territory and explore possible collective actions to be taken at the pan-Canadian level" (OECD, 2023, p.3).

Micro-credentials have a format that can enable professionals, like teachers to update their knowledge, skills and competences, keeping up-skilling and re-skilling in for a continuous education and professionalization. They can be earned on a self-paced schedule, allowing teachers to fit them into their busy schedules. Additionally, micro-credentials may be less expensive than traditional professional development programs, which can be a significant benefit.

Another key component of digital micro-credentials is that they are owned by the learner who can collect them in an online portfolio like Europass. A micro-credential can also be stackable to a bigger programme, like a degree but this is only possible is a HEI recognizes its value and volume. To enable a faster recognition, it is suggested to select micro-credentials that make use of the Bologna tool, i.e., ECTS, diploma supplement and reference to the EQF level (Antonaci et al., 2021).

10. Conclusions

The document reports the experience of the new pedagogical approach of Blue Arrow in the e-learning, including Tangible User Interfaces for home kits that allows a procedural and laboratory learning in an autonomous way for Teacher Education.

For this reason, it was necessary to provide an easy manual for the stakeholders that intends to implement these activities. Thus, the potential targets could applied who could reapply the pedagogical strategy of implementing tangible and laboratorial activities with TUIs for teacher education (4-7 years old).

This document summed up key finding from the implementation activities (A4), by providing practical examples, tales from the field and success stories.

As seen, the Blue Arrow project produced an important result in the update of the DigiCompEdu framework applied in the field of Teacher Education applying innovative tools that merges physical and digital worlds. The pedagogical framework was the main element that conduced to the development of the authoring tool as an easy-to-use system aimed at the development of OERs.

The number of OERs in the project website is even ingrowing because the project is continuously applied in HEIs and schools.

The element that brought this success is the design of the authoring tool as an easy instrument for teachers. The teacher educators and pre-service teachers were involved in the development and in the evaluation of the system, producing a continuous update of the tool in line with the expectations of the teachers.

Blue Arrow worked closely with the teachers and the future teachers with the final aim to build a system with a consistent impact in the teaching practice. The project was born on the consequences of the COVID-19 crisis, however during the implementation the idea was to re-address the project to be useful in distance learning and in class. The methodology was performed with this final goal.

The evaluation of the tool was a success, the system is considered easy-to-use with high score in the System Usability Scale and was considered an interesting instrument for the teaching practices: teachers (in a broad sense covering from pre-service to retired teachers) considered a good tool for pre-primary education and primary education. Blue Arrow it is considered useful for self-directed learning and promoting students' autonomy, reinforcing the role of the teacher as a guide.

In the report was shown some interesting best practices and in particular, Blue Arrow was re-used as a system for the development of educational escape rooms with a gamification approach. In addition the project arose the interest of other HEIs that wants to apply the results of Blue Arrow project. In this report, we shown the first results of a pilot study on visual impairment, because the project seems particularly addressed to this kind of disabilities since it impacts on a multisensory approach.

However the project has also some shortcomings. Some teachers consider it as a potential increase in the effort to be spent for the teaching activities and in some cases it is seen as a system that could be too free and that gives the user too free to apply their results.

The preservice and in-service teacher were included in all the project activities. This work brought an extensive co-creation approach and produced an important number of OERs (more than originally planned in the proposal).

At the moment the number of published OERs is 218 (last check 27/04/2023). The Number could increase in the next months because BLUE ARROW will continue to be used by the Universities involved and by partners that increased their interest in the project (University of Naples, Online University Pegaso, University of Bari, ASP Istituto Ciechi Sant'Alessio, Garage94 srl, ISTC-CNR, Fondazione IDS Città della Scienza, Creatic ES, University of Salerno, Serious Game Factory).

As reported the number of OERs delivered and uploaded on the website are 218.

In this pot we have a division into languages:

- 24 in English
- 12 in Albanian,
- 18 in Spanish/Catalan
- 156 in Italian

BLUE ARROW represents a first significant result in the field of innovative distance teaching learning system that needs to be enlarged and allows that more researchers could make new hypothesis and study the effectiveness of the systems. The project results of Blue Arrow allows a sustainability and a continuous increase of interest in the project.

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11. Annex 1: E5 Italian Event – 11th November 2022

Focus group: Multiplier Event

Storytelling / Digital Storytelling

1. How do you think about the storytelling approach in your classroom? And about digital storytelling?
1. How are you developing storytelling using this tool? Do you think is attracting for the children? What the children are supposed to do at school with this tool?)

Domanda: storytelling. Cosa pensate dello storytelling? E cosa pensate del digital storytelling? Li conoscete almeno in parte? Sono strumenti attrattivi e se possono essere inseriti in classe e se li avete inseriti in classe.

User6: Non conoscevo gli strumenti che sono stati visti e presentati, a livello didattico, sono convinto che con **una buona programmazione** anche in aula è possibile farne un uso abbastanza buono, per diversi casi che potrebbero, potremmo trovare davanti nella nostra professione. È chiaro che l'attività didattica va programmata con precisione, anche quando l'allievo viene lasciata solo ad interagire. Se l'attività didattica viene ben programmata si evitano errori o rischi a cui potrebbe andare incontro. Per me la classe può essere vista come una sorta di **laboratorio**. Diciamo da valutare, da esaminare, da adattare alle singole situazioni. Diciamo che è stato interessante, come le dicevo prima, a livello informatico conoscere queste tecnologie in ambito didattico. Ne farò uno spunto di riflessione.

User1: Io non so se è storytelling durante la fase di osservazione cerco, noi facciamo prima una osservazione sui ragazzi, ci rendiamo conto delle strategie da implementeare. Per cui lo **storytelling, nella mia esperienza, è proprio accattivare il ragazzo**, ovviamente non sto parlando di quelli con basso funzionamento, ma i ragazzi con i quali che hanno un medio alto funzionamento. Quindi utilizzo già delle soluzioni che sono presenti su piattaforme, ho utilizzato big nomi che usa argomenti di **storia** e **italiano**. Sono attrattivi per il ragazzo perché c'è uno sportivo che parla di Machiavelli, piuttosto che un giocatore di calcio che parla di storia. Quindi ho anche utilizzato gente più famosa di me per **accattivare**, rendere partecipare, accattivare **l'attenzione** dei nostri alunni sia una priorità. Quindi ciascuno di noi deve cercare le strategie migliori. Le scuole però non sono ancora attrezzata per aiutarci in questo. Noi dobbiamo portarci il materiale da casa, le scuole forniscono il meno possibile, quindi abbiamo tutti controllato l'NFC se ce l'abbiamo noi, perché abbiamo capito che dobbiamo fare da noi. Quindi vi ringrazio, bellissimo, **ma dobbiamo lavorare noi**. Rubo dal collega, la progettazione si fa prima e non in classe perché li dobbiamo sostenere, non solo il ragazzo ma tutta la classe.

Non è detto che il ragazzo conosca necessariamente il rosso, la fata turchina. Chiaramente c'è tutto un lavoro fatto prima non è che si arriva in classe, ci si mette con il ragazzo e si fa questa storia. Bisogna accertarsi prima, può essere pure che il cognitivo del ragazzo non ci arrivi e non si possa utilizzare e non si favorisca l'inclusione con questa attività e magari bisogna cambiare.

User8: Diciamo che la riflessione fondamentale che stavamo facendo in altre situazione riguarda proprio questo, Sì progettiamo, sì interveniamo sull'alunno che ha disabilità o verbale non verbale, quella che sia. La problematica fondamentale è **l'accettazione da parte della classe del docente curriculare**, da utilizzare all'interno della classe di queste nuove tecnologie. Perché non si parla più di integrazione ma di inclusione, ma si lascia questi ragazzi all'interno del contesto classe per favorire la partecipazione attiva. Il problema sta per me a monte, non c'è una cultura realmente inclusiva che permetta di accettare l'utilizzo in condivisione con gli altri alunni normodotati di queste nuove tecnologie perché molto spesso, culturalmente, la vecchia guardia di docenti curriculari, la vede come una **perdita di tempo**. Come un qualcosa che si scosta dal libro di testo, dalla spiegazione frontale, e quindi come diceva il collega tutti gli sforzi, possono **mandare in frustrazione** non solo l'insegnante di sostegno o l'educatore ma anche il ragazzo stesso che si trova a fare determinate cose in maniera diversa dal resto dalla classe, c'è un'inclusione non reale e non fattiva, sia a livello di socializzazione, di apprendimento e didattico.

User10: Io la vivo quotidianamente. Quando trovi il **docente curriculare illuminato**, ti permette di fare queste cose. Nella maggior parte di casi, i programmi sono lunghi, le vacanze sono tante, tendono a legarsi al libro di testa e alla classica lezione frontale. Bisogna trovare chi accetta questa cosa. E come diceva il collega tutto il lavoro che c'è dietro.
Quanto si può utilizzare con i curriculari o con quelli che hanno la differenziata, con chi ha una forma di disabilità grave e comunque lo lasci in classe per il discorso dell'inclusione. Purtroppo l'UDA va bene quando hai la differenziata o io ho ad esempio un ragazzo curriculare, obiettivi minimi quello che sia, ma quando invece c'è una disabilità molto grave e comunque il ragazzo resta in classe e vuoi cercarlo di aiutarlo proponendo questi strumenti innovativi, inevitabilmente vai a cozzare con quella che è la programmazione di classe e inevitabilmente **vai a disturbare come se fosse quella che è il clima di classe**. Perché comunque questi presuppongono come strumenti un'interazione, per cui il ragazzo disabile deve sentire il feedback positivo, negativo, come abbiamo visto. Comporta la creazione di uno spazio idoneo per svolgere questo tipo di attività, perché non c'è. **Le aule sono classi pollaio**. Ne abbiamo parlato per tre anni. La nostra riflessione era soprattutto questa. Ottime come tecnologie, ottimi spunti da utilizzare assolutamente, però quanto possono utilizzati in un'ottica di inclusione nell'ambito della classe, quanto sono attività da far fare in modo differenziato come

tempi e spazi, in questo caso non perdiamo l'ottica dell'inclusione. Era questa la riflessione. Scusate.

User12: Mi riallaccio al discorso della collega. Sono assolutamente d'accordo con lei, tutto molto affascinante. Io sinceramente non conoscevo la tecnologia dell'NFC lo apprendo oggi, mi affascina. Però poi la riflessione è questa: Uno strumento così fortemente digitalizzato, necessita obbligatoriamente di uno spazio fisico per, come dire, poi spiegare, preparare, per interagire con il ragazzo, quindi forse il limite di tutto questo, è un'opinione per carità, **il limite di questo strumento così fortemente digitalizzato è quello di approntarlo e utilizzarlo per una differenziata.** Come diceva giustamente la collega, nell'ambito di un contesto classe con docente poco illuminato, perché ce ne sono, non è una critica ma ce ne sono, perché hanno un retaggio della vecchia scuola tradizionale non essendo nativi digitali non hanno neanche la conoscenza di queste tecnologie. Poi questi strumenti, questa è la riflessione, quanto poi questo strumento digitale all'interno del contesto classe e non con una differenziata, per esempio con obiettivi minimi può essere utilizzato. Questo è tutto qua.

User17: Allora riflettevo proprio su questo punto, Voglio mettere il focus piuttosto che sul ragazzo ma sul resto della classe. Con queste tecnologie bellissime che io non conoscevo, quali spazi ha il resto della classe. **Un'altra perplessità** era, rispetto al discorso della ragazza. **Effettivamente è inclusivo**, il ragazzo si trova difronte davanti alla tecnologia, ma il rapporto con gli altri e con l'insegnante, ho la sensazione che poi **venga a mancare l'interazione**.

User19: A proposito di questa tecnologia: la scuola sicuramente serve a tante cose fra cui dare nozioni, dare un metodo. Un metodo. Io penso che queste tecnologie debbano dare un metodo. Cioè nel senso che quando l'alunno finisce il suo percorso scolastico dovrà essere in grado non di ricordare la poesia o quando è nato Garibaldi, dovrà essere **in grado di utilizzare queste tecnologie nella sua vita.** Cioè un NFC, se è abile deve poter in grado di prendere un aereo senza chiedere aiuto a nessuno. È un **metodo che va insegnato** sperando che questo metodo abbia un riscontro all'esterno del contesto classe e possa avere un riscontro nel contesto sociale. Quindi penso che gli **oggetti non vadano scelti per l'effetto wow**, ma sulla loro fattibilità di essere utilizzati sia per la cultura che al proprio inserimento nella comunità.

[Show the DigiCompEDU on the screen] Digital Competencies
      1. In your opinion, which of those competences this tool would foster?
Una domanda supplettiva: quali possono essere le competenze con sistemi di questo genere. Quali sono le competenze stimolabili, per voi?

User5: L'utilizzo dell'NFC è assolutamente fantastico però se non è valido per i gradi superiori. Quanto può essere inclusivo con gli altri della classe?

User20: Ma i ragazzi più grandi sono limitati dalla tecnologia.

User4: Non sono d'accordo **i ragazzi possono avere una didattica più interattiva in questa maniera**, ad esempio pensa ad un gioco sul modello di "indovina chi". Puoi sviluppare **un gioco interattivo** che gli risponde digitalmente sul lessico ad esempio.

Per me rischiano di mandarci a quel paese se gli facciamo vedere un qualcosa del genere a ragazzi di secondaria di secondo grado.

Queste tecnologie vanno molto meglio**, funzionano meglio sul ragazzo a basso funzionamento**. Perché anche se sono alla secondaria di secondo grado.

User5: mi volevo ricollegare a quella domanda che per me è il punto nodale della questione. Abbiamo parlato del metodo noi siamo prima di tutto degli educatori, cioè l'educazione alla tecnologia che hai nostri ragazzi con sostegno e non è sfuggita completamente di mano, prima di capire che cosa dobbiamo andare a fare con queste nuove tecnologie **dobbiamo educare alla tecnologia**. Ma non la sanno utilizzare, tutte le devianze che vediamo sui social, bisogna dare un **limite all'utilizzo della tecnologia** non si può fare tutto con la tecnologia altrimenti la deriva è sicura.

User9: Mi viene in mente, che ho sentito parlando con un amico un po' di tempo fa. Noi che siamo boomer, io lo sono penso di sì, parecchio navigata, noi stiamo vivendo la transazione non siamo nati nel mondo digitale. Quindi sappiamo come fare le cose senza tecnologia. Abbiamo **un altro tipo di approccio all'uso del digitale** perché sappiamo cosa significa, fare le cose senza tutto il ben di Dio di cui disponiamo adesso. I ragazzi che sono nati nel mondo digitale non hanno questo filtro, cioè sono : **non hanno una guida dell'utilizzo del mondo digitale**. Questo è drammatico! Per certi versi, altri, guardandolo da un altro punto di vista. Questo penso sia attinente. User6: io non voglio fare troppo la boomer, il mondo digitale è un mondo fantastico, ci sono delle potenzialità pazzesche. Io che ho fatto ricerca nella vita mi sono dovuta caricare fotocopie, dispense, libri, quando sono arrivata al Pdf ho dovuto ringraziare il cielo ,di non dovermi portare tutto il materiale indietro. Quindi, insomma, nessuno può negare l'importanza del mezzo digitale e le potenzialità che ha, però appunto noi che siamo vecchi tra virgolette, abbiamo la possibilità di mantenere questo rapporto, di **bilanciare, il rapporto con la tecnologia**, dovremmo educare prima noi stessi e poi cercarlo di proiettarlo questo mondo completamente diverso, per questo mondo che si va configurando e che a me fa una paura tremenda, mi sento veramente incapace di gestire il nuovo mondo digitale.

User3: Secondo me va fatto distinzione tra la tecnologia utilizza all'interno del contesto classe e i social media. Cioè tutto ciò che spaventa oggi, i ragazzi utilizzano nel peggiore dei modi, va messo un attimo da parte con quello che può incrementare la didattica a scuola. Poi in merito a non mi ricordo chi, ha parlato di relazione con il docente, educatore, con gli studenti. **Una cosa del genere può essere utilizzata nel contesto classe anche interagendo. Si ha la creazione di uno storytelling con gli NFC o con qualsiasi altra cosa, anche con l'utilizzo della LIM che favorisce una cooperazione tra gli strumenti non so di un modulo scolastico, di un argomento, di una qualsiasi cosa.**

Pedagogical aspects / reflections
1. Is it feasible to build stories that are useful under a pedagogical point of view? In which subjects? Which are most suitable areas for the application of this platform?

Quali competenze possono essere sviluppate? Sia a basso che ad alto funzionamento? Quali sono le competenze e le aree tematiche che possono essere sviluppate?

User9: Io non conosco l'NFC ma ho ottime esperienze con lo storytelling con la LIM. La LIM **si adatta a qualunque materia curriculare**. Quindi io, per esempio, abbiamo trovato gli Stati. I ragazzi (era una verifica orale) dovevano dire le capitali di tutti gli stati del mondo e indicarli sulla LIM. Se avessi conosciuto questa tecnologia avrei utilizzata con una ragazza con una neuro paresi cerebrale, ho avuto ottimo risultati con la coperta Montessori. **Se avessi conosciuto gli NFC gli avrei applicati**, aveva ottimi risultati con il tablet spostando i toni gravi. Può essere utile per casi gravi utilizzandolo individualmente. Per la classe può essere motivante soprattutto nei casi di **compiti di realtà**, ho fatto organizzare, è stata inclusa tutta la classe, dei viaggi a Lourdes che presentavano su Instagram, mettendo i costi, ecc. Ho delle ottime esperienze, **vorrei conoscere più tecnologie per arrivare a loro**

User11: Dipendenemente dal progetto si può fare **Decision making**, scegliere una cosa rispetto all'altra. **Problem solving**, qual è la siutazione che ti aiuta ad uscire da un problema, tipo con l'escape room. Secondo me è molto inclusivo, Io ci ho già privato, l'ho vista ed era una prima classe. Hai ragione ad avere un dubbio sulla classe di secondaria perché hanno una mentalità diversa di inclusione, tendono a vedere sé stessi fuori dalla scuola come adulti, individui a sé, già sono più su attività diverse. Io in quinto usavo Prezi, perché si muoveva sulla lezione frontale. Poi quando sei lì, a capire e ad osservare e quello che devi fare e crei sulla base di quello che trovi davanti. A uno piace la musica, te ne esci di là.

User7: Come fai a coinvolgere tutti gli altri?
User11: L'esempio delle fasce climatiche, in **geometria**, la competenza è saper distinguere e muoversi su una mappa, riconoscere i continenti, l'NFC ti sarebbe utile in quel caso, non è obbligatorio ma ti dà solo l'elemento di interattività, rispetto a qeullo che facciamo già adesso. Le potenzialità sono tantissime, assurde. Ci credo anche io per

quanto sia più giovane, anche io ho paura, perché non mi sento pronta ad affrontare un tipo di tecnologia che ha bisogno di così tanta ricerca alla base e di progettazione. Sicurametne non me ne posso uscire dall'oggi al domani, nel fare una attività con l'NFC o un gioco di classe o fare un percorso ad ostacoli in cui guardo la motricità fine e il decision making così, così fare l'"Indovina Chi" con i post it. Con gli NFC dietro hai, dico la stupidaggine del verso (dell'animale), il video dell'HACCP ti può dire una parola che è riconducibile del vide. In realtà si può fare anche con gli altri nella dimensione lessicale. Sono tantissime le versioni che possiamo fare. **Ci mancano i soldi, le risorse, ci mancano un contesto classe che può essere inclusivo**. Sono tuti limiti e barriere che noi insegnanti di sostegno abbiamo a prescindere in qualunque cosa che vogliamo fare diverso dalla lezione frontale noiosa. Noi dobbiamo darci da fare. Noi abbiamo super programmi.

Riguardo le competenze, sicuramente come i videogiochi che aumento le competenze di attenzione e decisionale. Le lingue, io l'ho utilizzato lo storytelling per la lingua italiana. Si poteva linkare sul termine non conosciuto e si apriva tutta la pronuncia e tutto. **Spirito di gruppo, role playing e autostima**. Poi soprattutto è uno strumento più visto come gioco, non ci sono barriere nei confronti dell'apprendimento per la mia esperienza.

User16: Mi interrogavo su quali competenze volevamo raggiungere, parlando con la collega, abbiamo detto che generealmente osservando gli studenti andiamo ad individuare quali competenze vogliamo raggiungere, e poi per **il discorso che progettiamo a casa**, poi facciamo progettazione che volga a raggiungere quelle competenze ed era un obiettivo risultato, osserviamo, vediamo quali competenze vogliamo migliorare, svilupapre o sollecitare epoi andiamo a costruire il percorso a seconda del singolo ragazzo. Al contrario a nostro parere. **Tutte le competenze possono essere raggiunte**.

User8: Le competenze da raggiungere sono sul singolo alunno in maniera personalizzata. Quali sono quelle che non possono essere raggiunte? Tutte le competenze vengono toccate
In realtà può avere esito sull'autonomia, sul cooperative learning nel cercare qualcosa autonomamente qualcosa che sia sul mondo di internet o in generale.
Un obiettivo potrebbe anche essere l'autostima.

User5: Allora, sì. Vorrei aggiungere appunto con la collega. Anch'io ho esperienza e ho notato che l'utilizzo delle tecnologie sono indispensabili. Possiamo dire con **disabilità gravi**, perché mi è capitato infatti di avere come disabilità e sicuramente con la tecnologia **sono riuscita a sviluppare qualcosa con loro che non avrei sicuramente senza uscita sicuramente senza. Infatti loro utilizzano facilmente appunto la tecnologia proprio perché sono più improntati alla manualità, all'uso più che alla parola, per esempio quando è compromessa, un dito, oppure la vista e quindi sviluppano altri sensi**

che possono essere incentivati proprio con questa tecnologia. Quindi l'utilizzo dei tablet, l'utilizzo del telefono, sono un aiuto fondamentale.

2. Reflection for the future
   - How would you use the system in your daily teaching practice?

User14: Diciamo che tutti i dispositivi che adesso ho in casa, la maggior parte sono tutti con l'NFC, senza neanche saperlo. L'ho scoperto da poco. Perché utilizzando il telefono per accedere al modem, e il mio cellulare si è attivato da solo. Quindi già avevo capito che tutti i dispositivi arrivano NFC, invece per quanto riguarda l'ambito dell'educazione, io conosco un progetto molto simile che LEAR 3.0 che noi utilizziamo soprattutto con i bambini per quanto riguarda le PECS, quindi proprio alla comunicazione. Quindi un po' io ne sono a conoscenza, e però **non pensavo che si poteva utilizzare anche nel mondo proprio della scuola. Quindi è stata una bella scoperta.**

Researcher: Bene, ci sono altre riflessioni?

User2: Io sono rimasta piacevolmente sorpresa perché l'ho conosciuto li ho conosciuti solo nel penso nel 2017 con un post finance per i pagamenti con il cellulare.

Non so se l'aspirapolvere a casa mi parte con qualcosa, ma penso sia bluetooth. Non so se è NFC. Io li utilizzavo, senza sapere, senza sapere cosa fosse. È molto interessante

Researcher: A livello Education?

User2: Education No, la prima volta sto cercando di prendere il più possibile

Researcher: Ci sono altre riflessioni in questo senso? Prego?

User3: è tutto bellissimo. Ovviamente inutile commentare questo. Perché le potenzialità? Poi io, onestamente, non ho esperienza di sostegno. Non ho esperienza di sostegno. Ne ho anche poca di supplenze a scuola. Onestamente però vedo le potenzialità che hanno questi strumenti. È da qualche tempo. Mi configuro anche con realtà di ragazzi con DSA, povertà educativa. Quindi insomma un po' mi affascina il mondo. Se però quando abbiamo iniziato a fare lezione, una domanda subito mi è venuta in mente. **E non è che forse utilizzando questi strumenti perdiamo un po' la relazione umana con l'educatore**? Non è una critica, ma è una riflessione per gli altri e soprattutto magari non nello storytelling, perché quello è già una cosa più interattiva, coinvolgente, quello è un mondo fantastico e siamo d'accordo, però magari quando il ragazzo mette l'oggetto sulla tavoletta lo deve riconoscere "ah bravo". **Non è meglio che "ah bravo" glielo dica una persona?** È un altro tipo di rapporto. Senza nulla togliere alla validità dello strumento, però forse una mediazione, comunque con un altro essere umano si dovrebbe prevedere. Non so mi è venuto in mente questo.

User 4: Rispondo in base in base alla mia esperienza. Io ho lavorato tanti anni con i bambini, autistici. Dipende da ragazzo a ragazzo, da bambin a bambino, è chiaro che ci sono vicino e comunque c'è sempre qualcuno, almeno nella mia esperienza. Quindi se al **bambino piace tanto lavorare con queste tecnologie** ed è anche molto soddisfatto

quando il computer stesso o il tablet risponde "ah bravo" il bambino stesso è contento. Poi magari c'è **l'operatore dietro che potenzia**.

Sono esperienze che io non ho.

È chiaro che magari tu dici, si perde la relazione perché, per esempio, per quanto riguarda le PECS come mia esperienza, io ho lavorato con un bambino non verbale, però, purtroppo, come nella maggior parte dei casi lavoravamo, noi operatori, **non** c'era la **collaborazione da parte dei genitori**. Quindi alla fine, il bambino le PECS, le utilizzano solo con noi, però questo almeno per me, uno spunto perché non avevo mai visto questo utilizzo delle PECS con il cellulare, con il microfono dietro perché poi il bambino è molto tecnologico. Cioè sa usare il cellulare meglio di me, no. **Fatto in questa maniera con il cellulare, i genitori si convincano a farlo.**

User6: Io non lo conoscevo, lo vedo molto utile, non solo per i bambini ma anche per i ragazzi un po' più grandi. **Lo vedo anche inclusivo, lo vedo come un gioco nuovo, moderno.** Appunto, seminterattivo, chiamiamolo così. Avendo una bambina, normodotata, sono certa che anche a lei piacerebbe giocare con questo tipo di gioco, di strumenti. Per questo lo vedo assolutamente inclusivo. Il poter giocare, insieme, agli stessi livelli, perché no? Tutto qui.

User7: In passato lo dicevamo ironicamente, partiamo dalla Penna PIC. Abitati a strumentazioni scolastiche economiche facevamo il paragone con questo. Ci interrogavamo del riportare nel contesto classe, una costruzione-progettazione sotto il punto di vista non dello studente, ma del docente. **Quanto questo lavoro nella burocrazia scolastica, va a pesare per il docente al fine di ottenere un risultato soddisfacente per lo studente.** Cioè ok, massimo potenziale dello strumento però a danno del docente di sostegno ancora per una volta. Quindi ci chiedevamo se viene relegato un professionista che se ne occupa, cioè un progettatore, cioè colui che va a svolgere questa funzione o è il docente a farsi carico di questa funzione.

User8: Sì, buongiorno a tutti, io invece ci interrogavamo del tipo di applicazione che è chiaro che è molto interessante, almeno io non conoscevo questo tipo di interattività. Quale portata potrebbe avere anche nella **scuola secondaria di secondo grado**. Ci chiedevamo se negli studi precedenti le scuole si siano mostrate interessate a queste modalità. Chi di noi ha esperienza, sanno che **le scuole non sono neanche dotate di libri cartacei piuttosto che del digitale**, quindi mi chiedo come sia possibile convincere i nostri dirigenti all'acquisto di queste tecnologie. Dobbiamo capire come possiamo agire in questo senso.

User4: Io volevo un attimo riprendere il discorso (darò del tu). Il docente di sostegno si deve prendere carico di una attività che non è ovviamente le solite schedine che noi possiamo proporre che sono visualmente più interattive, più eye catching. Il progettare una cosa più fisica sicuramente attrae qualunque tipo di gravità del disabile. Dall'altra parte noi sappiamo soprattutto nell'era di adesso, **alfabetizzazione tecnologica è un motivo di discriminazione**, quindi noi stiamo parlando e ci approcciamo al gruppo

classe ma a delle situazioni in cui la tecnologia salva la gravità, o perché a casa, chi è più grave viene buttato sulla tecnologia e rimane nel "buono" e non crea troppo disturbo. Poi ci sono situazioni in cui l'alunno grave va al centro e fa qualcosa di effettivamente utile, però la maggior parte delle volte, in famiglia non si sa gestire una situazione nella stessa famiglia quindi molto spesso mi è capitato di vedere un alunno buttato lì al tablet dalla mattina alla sera, a vedere il video di peppa pig o altre cose. Perché non usare noi, farci carico di usa degli strumenti che possono essere utili a prescindere dall'uso che si fa a casa perché non possiamo noi, noi siamo insegnanti non siamo genitori, ricordiamoci ciò. Dall'altra parte noi possiamo **interfacciarci** alla community e dire questa cosa a **scuola sta funzionando**, ci passo metà della giornata con tuo figlio, ti sto suggerendo come fare, ci sono un sacco di video tutorial su come utilizzarlo a casa, soprattutto **per i ragazzi non verbali** questa è la via di uscita, la luce in fondo al tunnel. Brutto chiamarla così, mi rendo conto, scusate. Mi attacco un attimo a delle parole molto forti, però molte volte a casa è difficile gestire un non gestire verbale, io ho paura sinceramente. Io sto da due anni sul sostegno, il non verbale è il tirocinio che amerei di più, è la sfida più grande. **La tecnologia è un aiuto, abbassa la discriminazione e sicuramente aiuta i ragazzini di tutte le età**. Perché fuori dalla scuola i ragazzini sono soli con tutta questa tecnologia, non sanno che farsene e hanno uno span di attenzione che è una chiusura di occhi poi fondamentalmente e quindi un NFC sicuramente attira dal gioco. Incentiva anche a vedere immagini, a conoscere, a sapere, a **incuriorisi** perché fondamentalmente è il problema dei ragazzi di oggi. **Non hanno curiosità**.

User7: La domanda è: se la creazione del prodotto è un **lavoro supplettivo per il docente di sostegno**. Se il prodotto finito mi comporta sei mesi di lavoro, il ragazzino ha due settimane per entrare in attenzione, posso farlo io docente e quindi accavallarmi tanto lavoro per tenerlo sempre buono. Per questo chiedevo se ci fosse comunqnue una persona che possa sostenere fuori. **Io non condivido della co-costruziione unicamente in classe, il prodotto deve essere portato da casa e in classe si fa la facciata della costruzione**. Però tolto ciò non si può improvvisare in classe da zero soprattutto nella condizione di gravità, perché nel down devi gestire la crisi e non fare questo. Però se i tempi di attenzione dei ragazzi sono bassi e brevi, rispetto alla produzione del prodotto, come entro io in contatto con questo servizio senza entrare in frustrazione io.

Io utilizzavo dei gruppi. Però mi rendo conto che la **mole di lavoro** dietro a questo che si deve realizzare è molto importante.

User4: **Dipende dalla materia che devi fare**. Mi rendo conto che non è facile progettare qualcosa del genere. Io con il mio alunno stiamo facendo **geografia**, le fasce climatiche, siamo in prima classe di una scuola alberghiera. Fasce climatiche io mi sono messa nella mia didattica un po' a metà, **interattiva ma legata alla tradizionalità**. Ho fatto una mappa per ogni continente, ho messo i tropici, l'equatore, ho messo le fasce climatiche e gli animali. In Antartide ci metto i pinguini, nel deserto ci metto il cammello, in Alaska gli orsi, perché In base alla fascia climatica trovi gli animali e ti ricordi che tempo fa. Ed è una cosa può essere utilizzata anche con gli NFC. Mettere gli NFC nei poster che ho fatto

in A3, fatto carino con CANVA (che vi consiglio), usare degli animali fisici dipende dalla gravità, perché uno che c'ha 16 anni, **avere gli animaletti di plastica è un po' troppo da bambini**, evitiamo di escluderlo socialmente perché è un prodotto per bambini, però utilizzare il cellulare, che animale ci sono, che versi fa l'animale.

Lo facciamo già!

Lo facciamo già ma con l'NFC ci dà **l'entry dell'interattività**. Noi (docenti di sostegno) lo facciamo già, l'NFC è più tecnologico per creare interattività per le cose che già facciamo.

12. Annex 2: E6 Spanish Event. 21st February 2023

Storytelling / Digital Storytelling

1. How do you think about the storytelling approach in your classroom? And about digital storytelling?
2. How are you developing storytelling using this tool? Do you think is attracting for the children? What the children are supposed to do at school with this tool?)

1- Researcher: Vosaltres feu servir l'storytelling, narracions, explicar històries?

Participant 1: No gaire

Participant 2: tant d'aventura per ambientar una escena o situació d'aprenentatge. Algunes vegades amb narracions digitals que creo jo, i a vegades les creen ells. Fan històries amb presentació de diapositives on explicar històries, per triar opcions (recorreguts de lectura).

Pedagogical aspects / reflections

1. Is it feasible to build stories that are useful under a pedagogical point of view? In which subjects? Which are most suitable areas for the application of this platform?

2- Researcher: Ara que us hem explicat com funciona aquesta eina del blue arrow, Què us sembla aquesta eina de blue arrow per l'storytelling amb un sentit pedagògic? Seria factible construir històries i en quines assignatures?

Participant 3: està bé coma recurs qualitatiu, però amb matemàtiques no ho veig tant pel tema del feedback de "t'has equivocat"x3. Si es fes d'una altra manera estaria bé, però ara per mates no.

Participant 4: A Infantil per identificar sí. Per fer sèries. Em falta que permeti posar en relació dues coses. no sé si es pot fer. Per exemple; busca la peça que es tal, i després, busca la peça que sigui de color groc.

Participant 5: es pot fer però no en una escena.

Participant 2: la dificultat està en que només et permet una resposta correcta i que no pots personalitzar les altres respostes, o sí o no i ja està

Participant 6: el feedback és molt simple

Participant 5: quin FB es podria fer que estigués bé?

Participant 2: per donar un feedback constructiu necessites conèixer la resposta. I per tant, si no tens informació sobre què ha contestat només puc dir que ho ha fet

malament i que torni a contestar. En canvi si se li demanava per un triangle i m'ha posat un quadrat li podria dir ei mira el nombre de costats, però perquè sé que m'ha posat un quadrat. No hem pogut refinar el nivell de la resposta.

Participant 3: cau en l'assaig en l'error. Ara em diu que no i n'agafo un altre i vaig provant.

Participant 6: Potser seria millor que el FB fos una altra pregunta. No està malament però estaria millor.

Participant 2: clar, el plantejament és una narrativa lineal per desbloquejar la següent pantalla.

Participant 1: O podria fer la pregunta d'una altra manera en la mateixa escena, però això no es pot fer.

Participant 5: No.

Participant 3: si dius quina emoció té l'Ona, potser no la saben. Però potser pots fer una pregunta més fàcil.

Participant 6: Jo faig mates, i poso contes perquè identifiquin passes per resoldre un problema.

2. Reflection for the future
   - How would you use the system in your daily teaching practice?

3- Researcher: Tot i aquestes limitacions, creieu que ho podríeu fer servir en els vostres contextos educatius amb tangibles? tindria algun sentit?

Participant 6: Ara no ho veig amb els meus estudiants perquè és una inversió de temps. L'ús de mòbil no crec que sigui un plus. Ara, sí que té sentit formar-los perquè després ho puguin fer amb els seus alumnes.

Participant 3: Jo crec que sí, sobretot per educació primària. El tangible dona joc, sobretot pels més petits. Els grans també.

Participant 1: pot estar bé en infantil per desplaçar l'avaluació i més autonomia per l'alumne perquè l'activitat és autoavaluativa, i la mestra no ha de donar la solució. Ho fa el mateix programa.

Participant 3: a vegades el "t'has equivocat" també pot estar bé. Tot és trobar-li el moment, el sentit pedagògic.

Participant 1: fa anys els feia fer un conte matemàtic als alumnes en vídeo.

Participant 3: els faig agafar un doc en paper imprès on redacten coses per ells importants i hi enganxen codis QR on enllaça alguna imatge o qüestió

Participant 4: Hi ha dibuixos animats a la TV on deixen un moment perquè els nens responguin.

[Show the DigiCompEDU on the screen] Digital Competencies

1. In your opinion, which of those competences this tool would foster?

4- Researcher: Coneixeu el marc de CD, Digcompedu? és aquest que us projecto. Penseu que una activitat d'aquesta mena, pot afavorir el desenvolupament de competència digital docent?

Participant 1: la última, la 6, pensant en estudiants de magisteri, si els fessim fer servir aquesta eina aniria bé.

Participant 3: el tema de seleccionar, modificar contingut digital també, de manera transversal. També el compromís professional. Hem de reciclar-nos per també. De fet, quasi totes funcionen.

Participant 4: La 3.3, lo col·laboratiu no ho promou molt.

Participant 5: Pots fer una història conjunta.

Participant 1: crear-la sí, però l'aplicatiu...

Participant 5: pots fer que es participi conjuntament a l'hora d'interactuar amb tangibles.

Participant 6: Sí, potser sí, buscar el consens.

Participant 3: Sí, permet buscar el debat.

Researcher: La 6, la 3 no tant. La 2? Alguna altra?

Participant 7: La transferència, segur que passa.

Participant 3: de fet, es demanen als alumnes aquestes competències digitals. Tinc gent de pràctiques a qui se'l hi demana.

Participant 1: Si les preguntes fan rumiar abans de contestar estaria bé. Li falta potenciar el punt reflexiu, el perquè responc això.

Researcher: Potser a la fitxa sí que hauria de tenir un camp de com gestionar la reflexió.

Participant 7: Sí, un prompt dins de la fitxa.

Participant 1: exacte. Dir "si s'equivoquen què fer?". Com un manual del professor.

Researcher: És un aportació molt bona

Researcher: moltes gràcies per la vostra col·laboració.

11. Annex 3. E6 Spanish event. 7th of February 2023 (interview)

[In Catalan language]
MF-Researcher
MP-Interviewee

1- Aquesta eina que has vist, de crear històries amb tangibles, creus que podria encaixar amb el que fas tu? I seria atractiu pels nanos?

MP: Sí, i pels nanos adolescents. Estan molt avesats a preparar escenes a definir-les, a vincular coses que volen explicar sobre diferents temàtiques. Segur que les podria provar amb nanos.

MF: I amb els petits?
MP: Sí, sempre ho he treballat amb nanos de 2n a 6è de primària, on creen ells les històries. Ells decideixen sobre el que volen parlar, i jo els acompanyo perquè tingui un sentit el que expliquen, i si són temàtiques sensibles, que no expliquin coses barroerament. Ho portem fent de fa molt de temps.

MF: Aquesta eina no permet fer curtmetratges, sinó escenes seqüencials.
MP: La idea no deixa de ser la mateixa. Nosaltres els fem fer guions tècnics, els fem buscar sons a bancs de recursos, es graven veus, etc. Ells són els autors.

MF: els tangibles els coneixes?
MP: No, però tots els infants tenen telèfons a l'abast, siguin propis o no, i per tant, hi ha la possibilitat. Poden explicar històries com a creadors.

2- MF: Saps que hi ha el marc Digcompedu?
MP: No, el de la Generalitat (el govern regional).
MF: Aquest és el de la UE. Té 6 competències generals
MP: Sí, són les mateixes.

MF: Són les competències digitals que han de tenir els docents. Quines d'aquestes penses que creant històries amb tangibles amb els nanos es podrien desenvolupar?

MP: La 6, de ple. La 2 també. La 3 també, perquè són projectes audiovisuals col·laboratius on els nanos s'ajuden molt entre ells, aprenen a orientar els seus companys. S'ajuden molt més que quan nosaltres érem petits, que érem més individualistes.

MF: Tu veus que els nanos creïn històries col·laboratives.

MP: Sí, en grup, on tothom aporta idees vàlides. És molt bonic fer-ho amb nanos de diferents edats, on els més grans ajudin els més petits. Per tant, la 3.3. La 2 sencera perquè quan fan una història han de ser selectius, què expliquen o no, els has de fer comprendre els canvis de pla audiovisual, tant amb petits com amb adolescents.

MF: Tenim la 2 , la 3, alguna més. La 4 d'avaluació?

MP: És el que més els costa. Sempre et diran el que més els motiva, però com avaluar-se... sempre et diran què els ha aportat, motivat. Són capaços de veure elements positius. Si s'avaluen uns als altres és millor que l'avaluació del docent cap a ells. És més positiu entre iguals. Permet detectar més necessitats.

MF: Aprenentatge autoregulat?

MP: És clar. Avui els alumnes tenen molta autonomia. Van més per davant ells que els docents! Per això som nosaltres els que l'hem de controlar. Com que cadascú explica el que vol i com ho vol, sí que hi ha espai d'autonomia, tot i que jo guïi la història. Em passa amb moltes activitats; jo els deixo proposar i jo guio. Comencen amb propostes molt grans i jo aprofito aquesta iniciativa i curiositat que tenen per reconduir-ho. I si fem coses amb impacte positiu, millor. Així , el nen és protagonista de les seves decisions. Estàs afavorint l'autonomia.

MF: De fet la 5 parla d'això.

MP: Tot el que fem ho decideixen els alumnes. jo buscaria la manera de com incorporar els tangibles per introduir-los-hi. També explicar el funcionament de les tags. Segur que després els haig de frenar el torrent d'idees que tindran per muntar històries.

MF: accessibilitat, inclusió, implicació activa.

MP: Sí, tot. L'element és que si són protagonistes i creadors, no jo, això es compleix. Amb els tangibles podrien fer descobrir coses. Havíem fet coses amb QR. Podríem fer-ho am tangibles.

MF: El bloc 6 d e facilitar la competència digital a estudiants.

MP: Tot. És que deia abans. Voleu fer una història de bullying, d'homosexualitat, o salut mental. Però jo les haig de dir com ho voleu fer això. I no caure en estereotips. De fet, els nanos ja estan molt acostumats a situacions poc normals. I són responsables com a comunicadors. L'educador ha d'ensenyar a pensar sense donar una solució. L'han de trobar ells. Per tant, la 6, és tota. Llegir la informació dels mitjans; amb una història amb tangibles hem d'entendre el perquè fan les coses els personatges. Si una noia se'n va de casa perquè la volen casar. Això què vol dir? Permet pensar valors i situacions conflictives. Que expliquin el que vulguin, però que pensin. Ells fan històries que sovint acaben de manera molt barroera.

3- MF: és possible construir històries que siguin útils des d'un punt de vista pedagògic amb tangibles? Quines àrees creus que serien susceptibles per fer servir històries amb tangibles?

MP: Poden ser totes en funció de com ho enfoquis. La llengua i la història, de forma transversal. Jo estic en un entorn no formal i ho tracto de forma transversal. Crec que des de l'educació formal té potencial, però estaria molt més "encorsetat" pel currículum i que incorpori un projecte amb totes les àrees i que permeti aprendre. Però què millor que explicar històries audiovisuals, on es documentin, vinculin aquesta informació a una història, a diferents matèries curriculars com la biologia o la llengua (anglesa, castellana, etc.), i això és d'un potencial brutal. Però a l'escola això es fa poc perquè es perd el control del grup, i el mestre com el que ho sap tot.

MF: I segons el teu punt de vista, com ho veus amb nanos d'infantil?
MP: Veus aquells ninots d'allí? Són creats per nanos d'infantil per treballar els drets dels infants. de 3 a 6 anys també poden ser creadors. Però més guiatge necessitaran. Però els primers stopmotions que vaig fer eren amb nenes de 3 i 4 anys sobre temes quotidians seus, a vegades de problemàtiques social i emocions tristes. El pare que ha perdut la feina, que fa fred a casa, amb dibuix on el pare està trist, i sa germana, la mare i ell surten contents. Editat amb el KdenLive.

4- MF: per acabar i pensant en el futur, quan t'he explicat les coses de com funciona el sistema de les etiquetes nfc, com ho faries servir amb les teves activitats?
MP: Ara estem iniciant un projecte de parlar de l'origen de la gent del barri de Raval, que té més de 100 nacionalitats. Parlar de les cultures del barri. poder creuar aquestes cultures, Ara tenim dels del Marroc, Bolívia, Pakistan, Filipines, Bangladesh, catalans... per ells viure junts és la normalitat, per altres no. El Raval és la ONU i permet fer un intercanvi d'experiències, de sentiments. Els nens ho viuen amb normalitat, a escola i al barri. Que ells puguin ser els portaveus de les virtuts de la diversitat i la convivència intercultural, doncs per aquí pot anar. Vincular les cultures a uns ninot que estan fent els nens per explicar coses d'aquella cultura concreta. I això ho plasmaran amb un conte dibuixat i amb àudio. Faria servir els ninots com a tangibles. I gravarien els àudios amb les seves veus i de la gent que han conegut. i dibuixarien les imatges de fons. Podrien explicar alguna llegenda d'alguna cultura i vincular-hi objectes amb la història escrita. Si hi havia un personatge que feia tal cosa en una època, què està buscant el personatge X per aconseguir el seu repte. Aquesta seria una idea, que després qui sap com acabarà! (riu). La idea és que els nens prenguin a construir un relat i explicar-lo, compartir-lo. Aquest és el repte a aconseguir.
Amb adolescents pot fer-se servir per encarrilar a persones perquè expressin el que els està passant. I si s'escau, treballar-ho mb el seu tutor, família, etcètera i fer un acompanyament. Fent històries, projecten el que els passa, des d'una perspectiva personal, individual, no en grup.
Tenen mil usos i cal veure on estan els límits.
MF: Dono per acabada l'entrevista. Moltes gràcies.
MP: ciao ciao!

12. Annex 4. E7 Albanian event. 3rd of February 2023 (focus group)

[In Albanian language]

Storytelling / Digital Storytelling

2. How do you think about the storytelling approach in your classroom? And about digital storytelling?

2. How are you developing storytelling using this tool? Do you think is attracting for the children? What the children are supposed to do at school with this tool?)

Pyetja

Cfare mendoni per rrefimin e tregimi?Cfare mendoni per rrefimin digital te tregimit?

Jane instrument atraktive.Si mendoni mund ti aplikojm ne klasa apo i keni aplikuar tashme?

User 1:Eshte një menyre shume inovative dhe shume e bukur ne trajtimin e nje teme si rrefimi apo mesimdhenia.Me duket shume interesante dhe ka nje perdorim dhe nje llogjik te thjesht,per me teper duket se mund te implementohet goxha thjesht neper klasa.

User 3: Ne kendeshtrimin tim storytelling eshte nje menyre aktivizimi per femijet, sigurisht nuk po flas per ata me funksionalitet te ulet, por po flas per femijet qe kane nje funksionalitet te mesem dhe te larte. Keshtu qe perdor aplikacione qe jane prezente ne piataforme, duke perdorur emra te medhenj qe tregojne argumente per historine e italise. Jane terheqese per femijen sepse eshte nje sportist qe flet per Makiavelin, ne vend te nje futbollisti qe flet per histori. Keshtu qe kam perdorur keto forma per te terhequr vemendjen e nxenesve dhe te zgjuar interesin e tyre. Gjithsekush nga ne kerkon dhe eshte ne kerkim te vazhdueshem per strategjine me te mire, por shkollat tona nuk jane ende gati per te na ndihmuar ne kete aspekt. Ne duhet te sjelim materiale nga shtepia, ndersa shkollat na furnizojne aq sa munden, keshtu qe kemi kontrolluar qe te gjithe ne NFC nese e kishim ne, sepse e kemi kuptuar qe duhet ta bere nga ne. Keshtu qe ju falenderoj por ,por duhet te punojme ne.

User 5: Rrefimi digital duket shume i bukur por ne qe kemi njefaremoshe dhe nuk jemi praktik ne perdorimin e teknologjis kemi vertet probleme ne perdorimin e saj.

User 4: une nuk kam pasur njohuri per NFC dhe sot qe po e degjoj po me terheq. Por ne njejten kohe edhe reflektoj qe nje instrument i tille kaq mire i digjitalizuar ka nevoje per kohe per menyren e veprimit, per tu pergatitur per te bashkevepruar me femijen. Pyetja qe me lind ne keto raste eshte se kur kemi mesues te dobet ne aspektin e njohurive te diteve te sotme, sidomos digjitalizmit,(sepse ka mesues me pak njohuri dh ekjo nuk pernem nje kritike por ky esht enje fakt, atefere keto mjete sa mund te jene produktive per tu perdorur nga keta mesues, apo ne shkolla.

User 2: Kjo teknolgji eshte goxha inovative dhe duke vene re se shumica e gjera po shkojn drejt teknologjis edhe sistemi shkollor duhet te ndjeki hapat e kohes.

Show the DigiCompEDU on the screen] Digital Competencies

1. In your opinion, which of those competences this tool would foster?

Cilat mund te jene avantazhe dhe kopetencat e perdorimit te nje sistemi te tille sipas jush?

User xx: Eshte e sigurt se tek femijet do te terheqi me shume vemndje pasi implementon nje form loje ne mesimdhenie apo ne rrefimin e nj tregimi edukativ.

User xi: Per mendimin tim ky sistem sa eshte i mire eshte edhe i keq pasi duke vene re si psh rrjete sociale,lojrat kompjuterike,perdorimi i telefonit eshte kthyer ne nje varesi per brezin e rri sistemi arsimor fillor duhet te qendroj larg ketyre sistemeve duke mos influencuar ne varesin nga teknologjia tek femijet.

User yy: NFC eshte shume e vlefshme dhe fantastike per perdorimin e saj, por nuk eshte e vlefshme per ata student apo nxenes qe jane me rezultate te larta duke qene qe eshte i thjesht.Duhet te jete gjithe perfshires ne te gjitha kategorit e nxenesve dhe studenteve.

User yx: Avantazhi i nje sistemi te tille eshte i dukshem.I thjesht ne perdorim dhe inovativ.
Me ane te nje sistemi te tille ora e mesimit behet me terheqse dhe sigurisht me efikase.

Pedagogical aspects / reflections
1. Is it feasible to build stories that are useful under a pedagogical point of view? In which subjects? Which are most suitable areas for the application of this platform?

A eshte e mundur te nderoni histori qe mund te sherbejn nga nje veshtrim pedagogjik ?
Ne cilat fush eshte me i lehte aplikimi i tyre?

User xi: Potencialet ne kete dimension jane te shumta,por ne te njejten kohe ndjej pak pasiguri ose frike sepse nuk ndjehem mjaftueshem gati per te pasur nje teknologji te tille e cila ka kaq shume kerkim ne baze dhe projektim

User yy: Perdorimi i kesaj mund te jete i shumte si ne matematik per zgjidhjen e nje ekuacioni me rrjedhe logjike si ne gjuhesi per gabimet e shqiptimeve.Per mendimin tim kjo teknologji me pershtatje e duhura si nje interface pak me praktik do te kete nje perhapje te madhe ne fusha te ndryshme.

User xy: Aplikim me i thjesht eshte ne kopshtet per femije me aftesi te kufizuara por edhe ne kopshtet normale duke qene se eshte nje sistem si loje dhe shume dinamik per rrefie tregimesh dhe promovime krijimtarie.

User xii : Ky instrument eshte shume i vlefshem dhe per femijet me te rritur pasi krijon tek ata konceptin e nje loje moderne.Besoj do te jete shume efikas

User cv : Nga veshtrimi pedagogjik femijet duhet te vezhgohen ne menyre qe te korrigjohen gabimet e tyre perndryshe nuk eshte e lehte ti mesosh.Me kete metode jane femijet dhe loja pra nuk eshte nje mesues qe tju shpjegoj pse po gabojn.

User yx: Eshte nje menyre e mire dhe efikase per te larguar mesuesit nga ajo forma klasike e mesimdhenies se merzitshme.Do te jeme e gatshme ta eksperimenton kete metode ne te ardhmen

User YV: Nga kendveshtrimi pedagogjik eshte shume i vlefshem po problemi eshte tek shkollat,kopshtet ..... per mjete e nevojshme didaktike digitale ne menyre qe ky sistem te mund te implementohet.Pra duhet te shtohen dhe resurset ne menyre qe kjo te jete efikase.