Interdisciplinary Resilience through Science and Cultural Heritage Network

Co-funded by the
Erasmus+ Programme
of the European Union

The future has several names. For the weak, it is impossible; for the fainthearted, it is unknown; but for the valiant, it is ideal.

Victor Hugo

TABLE OF CONTENTS

1. THE PROJECT

1.1 Interdisciplinary Resilience through Culture and Heritage Network

Our project is a cooperation between educational institutions and business as well as regional development agents that can see a big opportunity to thrive and improve their skills and products in terms of new tools and digital competence in ICT and visualization techniques that open up new ways of collaboration in terms of open and distant Cultural Heritage Education through this strategic alliance of partners from 4 countries. "IRSCHEN" is not only the Acronym of the project but also the place where the project idea was born and where a very special site of archaeological importance called "Burgbichl" has been discovered recently by the Coordinators of the project, University of Innsbruck.

1.2 The Context of Irschen

The importance of digitization and creativity / cultural awareness is always present, but it is particularly emphasized in the current situation, at the time of the COVID-19 pandemic.

In order to anticipate this, we need to acquire new skills and competences that strengthen transversal skills and thus contribute to the resilience of the Higher Education sector and its key-actors. Our project is a cooperation between higher educational institutions and business/start-ups that can see a big opportunity in creating a win-win situation in order to thrive and improve their skills and products in terms of new tools and digital competences in ICT and visualization techniques that open up new ways of collaboration. Through this strategic alliance we can trigger a powerful change using the example of "IRSCHEN".

1.3 Vision

Through this interdisciplinary alliance, all partners can improve and promote technical skills, media literacy and awareness on our common cultural heritage while fostering our solidarity! The digital transformation of European Cultural Heritage (ECH) sites in the field of archeology will enable further social and educational added-value and will be made accessible to a broader audience.

Digitization can play an enormous role for culture and its dissemination, because the new technologies can help visualize the archaeological heritage in a revolutionary way engaging both the students and European citizens with real life applications corresponding to their interest and needs.

1.4 Target groups

Our target groups can be divided into 2 categories:
ACADEMIC & PROFESSIONAL STAFF in CULTURAL HERITAGE EDUCATION (archeology, history, ancient studies, regional development, monument preservation): Educational & scientific staff from partner universities that are in need of improving their digital competences and tackle skills gaps and learn about transdisciplinary approaches.
STUDENTS & LEARNERS: Students (18-35 years) of our partner universities from curricula in the fields of archeology, history, ancient studies, regional development, monument & preservation studies as well as interested citizens from our communties.

1.5 Objectives

To tackle skills gaps & mismatches, especially related to digital competences, through transdisciplinary approaches, and innovative pedagogies such as research-based learning;
 To develop, test and implement OER that are relevant for students of our targeted curricula with flexible and modular course design (online or blended) to support the setting up of open and distant learning while also being relevant for the labour market and for the wider society (people with fewer opportunities)
To increase attractiveness and reforming educational offers including real-world applications, inquiry-based and ICT-enriched learning, collaborative practices, including university-business cooperation; To foster civic engagement and life-long learning opportunities related to our archaeological heritage as an integral part of our European identity whilst delivering European Cultural Heritage Education in our partner countries and beyond, thus to promote a cross-border and scientifically based know-how transfer and understanding of active citizenship;
To foster transnational cooperation, know-how and interdisciplinary resilience through building a solidarity network between Academia & Business from "the Alps Adriatic Region" & "the Mediterranean".

1.6 Intellectual Outputs

Intellectual Outputs are esseciancial for the successful implementation of the project. There are three Intellectual Outputs (IOs) that need to be accomplished:
The IO1: Collection and Research of Cultural Heritage Data (analogue and digital in 3D, available in English and German) led by UIBK in cooperation with ZRC SAZU and municipality of Irschen
IO2: Toolkit for Digital Readiness including real life application provided by Solidarity Tracks.
IO3: Digitalization processes for innovative & inclusive education: Transforming finds from archeological sites into e-learning material (available in 5 languages: English, Italian, Greek, German, Slovenian) led by Ionian University in close collaboration with Solidarity Tracks..

1.7 IO1, IO2 & IO3

As far as IO1 is led by Innsbruck University in collaboration with Mobile 3D
Setting up the specific methodology for the research collection and its further digital processing in close collaboration with the start-up business MOBILE 3D
Excavations, digital Documentation of findings (incl. 3Dprocessing), Archiving, digital processing of finds, audiovisual material collection
Co-Creation and Peer-Review/ Partners are involved as well as students from different backgrounds to collect ideas for the interactive educational game
Choosing and evaluating the most significant finds, add scientific explanations/ historical context
Final report on the Collection and review by external experts from associated partners network and Quality Committee
Translation of the Collection (English, German)
Documentation of the whole process and monitoring of lessons learned/ recommendation for transferability by Ionian University

The IO2 concerns the TOOLKIT which was constructed by Solidarity Tracks and consists of 2 parts
1. Best practice examples for digital tools
2. Setting up and using innovative educational games in Cultural Heritage
Education
This was made possible by
by preparing a survey & guidelines to collect the best practices of digital learning
tools (systematize and analyze)
by monitoring the project partners in the collection of the best practices
Also the IO2 includes the following activities
-setting up of prototype for own virtual educational game based on IO1
materials with Mobile 3D
- fixing bugs detected in reviews/test by Mobile 3D

The IO3 is led by Ionian University and concerns
1.) Guidelines and Recommendations on how to transform finds from archeological sites into e-learning material (Lessons learned and Know-How transfer of the experiences gathered
in the consortium): target group is academic teaching staff.
2.) E-learning module on Late antiquity hilltop-settlements for students from curricula in the fields of archeology, history, ancient studies, regional development, monument preservation studies (available in 5 languages)
3.) E-learning module for academic/educational staff: How to transform finds from archeological sites into e-learning material (in English)

2. ACTIVITIES AND LESSONS LEARNED

2.1. Scientific Camp1 "Burgichl"

1The wall of the settlement

The 2021 archaeological camp took place from July 11th to August 1 and was organized by the University of Innsbruck. The students who participated were from the fields of archeology, history, ancient studies and regional development.

This program of archeological excavations is related to a fortified settlement at the top of the mountain "Burgbichl". According to the findings of the area, the professors - Archaeologists Dr. Barbara Kainrath and Dr. Gerald Grabherr, have concluded that this is a Roman settlement of the 4th - 6th century, when Christianity was deeply integrated into their daily lives. One of the most beautiful discoveries of the mountain, which proves the latter, is an early Christian burial chamber found on the south side of the arch. It is believed that the people of this time who were in search of protection and security, retreated to remote mountainous places and created settlements that have the character of a city. So this is the way "Burgbichl' settlement was formed .

There are four different excavation areas that they worked on as a team during the scientific camp, The four points of interest are:
 1) The Gate and its Wall
2) A Cistern (water tank)
3) Some buildings
4) The Church at the top

2.2. Documentation

2. The total station and the laptop

A very important aspect of the excavations is the documentation of the layers.
A new layer is starting when the density and

the color of the soil change as we go lower and lower then, we do not dig deeper until we reach the specific layer throughout the excavation site and documentation is done.

All the members of the team helped so that they managed to remove the roots, soften the soil and trim the edges of the site. As soon as they managed and reached the whole site in the 2nd layer, Dr. Gerald and Dr. Barbara came. and the procedure was the following:

For a start, they had to dust the stones so that the photos came out better. Numbered markers were then placed around and in the area and a drone was sent to photograph from above and looking down. The photo shoot must have taken about half an hour and more than a hundred photos were taken. But we did not end here. Then they set up a "special camera" where it helps to map the area. You call this machine "total station" and the way it does this is that a person holds a special stick that has something like a buoy on top (but in the end is a mirror) where he places it on the markers I mentioned above, and the machine sends a laser to the mirror where it in turn returns it accurately and thus reads the height and forms its topography in 3d format on a laptop that you find next door connected. Repeat the documentation process each time a layer of soil is removed (usually every week).

2.3. Findings and Feelings

Sometimes when the students were ready to start digging for the next layer since the documentation had finished the previous time they used metal detector to spot if something big was on the ground . There were times it spotted something big in the soil, for example a . fibulae like the photos show below.

It is really a very nice feeling to be the first to touch something in your hands after 1500 +/- years. Not to mention, the motivation given to each team of students to return to work happy and began to remove the remaining stones to dig deeper.

2.4. The Aguntum Museum and the Lavant Church

During the Scientific camp the professors scheduled visits to important historical sites located at Irschen. In one of these visits they went the Aguntum Museum which is located on the site of the archeological excavations of the only Roman city in Tyrol. Then they were directed to a mountain the same height as Burgbichl and there they found the Lavant church, as well as the small museum right next door. As a small bonus, they also saw some archeological sites where they supposedly belonged to the rich because of the way they were built.

They had a tour of the place where the archeological excavations of the Roman city were carried out (more specifically the "forum" or the market) where at the beginning of the 3rd century it suffered a serious fire. After the fire and according to the information given by the excavations, the forum must have been used mainly in the north wing. Also, in the north wing there must have been a "workshop" where various materials such as crystals and metals were processed. However, due to the fact that there were not enough data it cannot be stated with certainty if after the fire the forum still functioned as a market after the middle of the 3rd century.

They also visited the mountain where the Lavant church is located. Lavant is a municipality in the Lienz district of eastern Tyrol. Unfortunately, they were not able to enter the church but they were comforted by the excellent view of the landscape there. It was also as interesting as the Aguntum because the exterior of the church had reused pieces from the Roman Empire with symmetrical designs on them. After descending the mountain hill they entered the museum which had findings from the excavations of the area. There may have been a church on this hill but that does not mean that the ground does not have its own history. On the contrary, one could say after looking at the excavations as well as their number (but also their type) that an entire society once existed at this point..

2.5. Operation of the Excavations

Students also learned that due to the vulnerability of the archeological findings there are certain rules one must follow when he comes across historic findings. Therefore it of great importance to keep in mind that: During the excavation:
- In case of sensitive findings,
- it is necessary to consult the restoration laboratory (block recovery, transport protection, etc.)
- Findings recovered with moist soil (eg organic, iron) should be delivered immediately to the recovery laboratory.

Generally in discovering of findings
- We avoid damage from excavation tools!
- Avoid full surface exposure (special graces).
- We never reveal organic structures.
- The more fragile and complex the find, the less work needs to be done to dig it up.

First treatments
- Preservation of the substance of the findings from the first moment of projection (during the excavation) until the moment of maintenance and restoration
- Protection from direct sun exposure and uncontrolled drying

Packing: •
- Maintenance of soil climatic parameters •
- Protection against damage and machinery •
- Keep the bags open in case of ceramics, stone, etc.

- Organic finds, amber, wood, bones, horns, ivory, etc. We place them in a waterproof package and keep them in closed dry bags.
- Packaging materials: Plastic bags, PE (Polyethylene) bags with closed clips, PE film, PE foams, PE boxes and tins, plastic fleeces, microfiber without cellulose, cotton fabrics, white strips, acid-free paper, kitchen roll, plaster bandages. NO "green" paper towels, no toilet paper, newspaper or cloths metal protection material !!!

Storage conditions:
- Monitoring and maintenance of recovered finds during storage until actual maintenance and restoration.
- Prevention of mold, drying and other damage.

2) Before restoration
- Incoming items should be discussed in advance with the head of the rehabilitation department: Emergencies, funding, questions, documentation, post-rehabilitation process.
- The measurement number, tracking number or inventory number as well as the identity of the item must always be indicated on the tracking label!
- When the findings are delivered to the laboratory, a reliable list of findings (and in digital form) must always be attached.

3) During restoration
- If new questions arise during the restoration, such as the unexpected discovery and discovery of organic remains, the person in charge of the excavation is informed immediately so that further steps can be taken, e.g. for scientific research.

4) After restoration
- When designing or photographing metal objects, they can only be touched with gloves (protection for the object: sweating of the hands contains harmful salts and sulfur, as well as protection of the person: restored objects may be coated with harmful substances)
- Do not use plasticine or other similar masses (containing dirt and harmful fats) to secure objects during photographic documentation. Museum candle is the most suitable material for this purpose.
- Once documented, items should be repackaged with excellent acid-free and contaminant-free materials for long-term storage. Optimal storage and regular monitoring ensure the long-term preservation of the restored findings. You may need to return sensitive findings to the laboratory for professional packaging, e.g. especially in the case of iron findings: Sealing in nitrogen / vacuum with a special sheet

5) Exhibition
- If objects are to be exhibited after restoration, experts should be consulted during the planning of the exhibition to ensure optimal climatic conditions (e.g .without temperature fluctuations, optimal relative humidity, lighting) and pollutant-free materials. in the shop windows.
- Annual monitoring of findings at permanent external exhibitions such as Aguntum and Lavant.

3. DIGITAL TRAINING

3.1.Research on Digital readiness & digital competence for using educational technology in teaching

Solidarity Tracks was responsible for the Digital Training activity and for the construction of the Good Practices toolkit. In order to do that a research was conducted. For the purposes of this research, several areas of interest to research were defined.

First of all, there was interest in finding if there is specific experience in teaching in general, using online courses and digital tools in educational process. However, the main focus of research was to assess the needs of respondents in terms of additional educational or training support in using digital technology for teaching and learning. The part of this process was also to identify the digital readiness of respondents to use educational technology for teaching and learning and to assess the areas and the levels of digital competence of respondents. Therefore, a survey was created with set of questions which aimed to collect the data from respondents which could help us to get answers on those research questions.

The survey was structured of the general (demographic) questions, the questions which aimed to measure the digital readiness through the dispositions, integrations, management, data practices, personalization and online interactions as a part of digital readiness as well as digital competence through its six areas (Area 1: Professional Engagement, Area 2: Digital Resources, Area 3: Teaching and Learning, Area 4: Assessment, Area 5: Empowering Learners, Area 6: Facilitating Learners' Digital Competence) and the levels starting from A1 – Newcomer up to C2 Pioneer. For the purposes of last, DigCompEdu framework was used.

Regarding Demographic characteristics

Out of 72 respondents on the survey, the most respondents (36,1%) work on Ionian University, while 20,8% work in University of Innsbruck and on Institute of Archaeology Slovenia, and 22,2% are Solidarity Tracks members.

Where do you work?
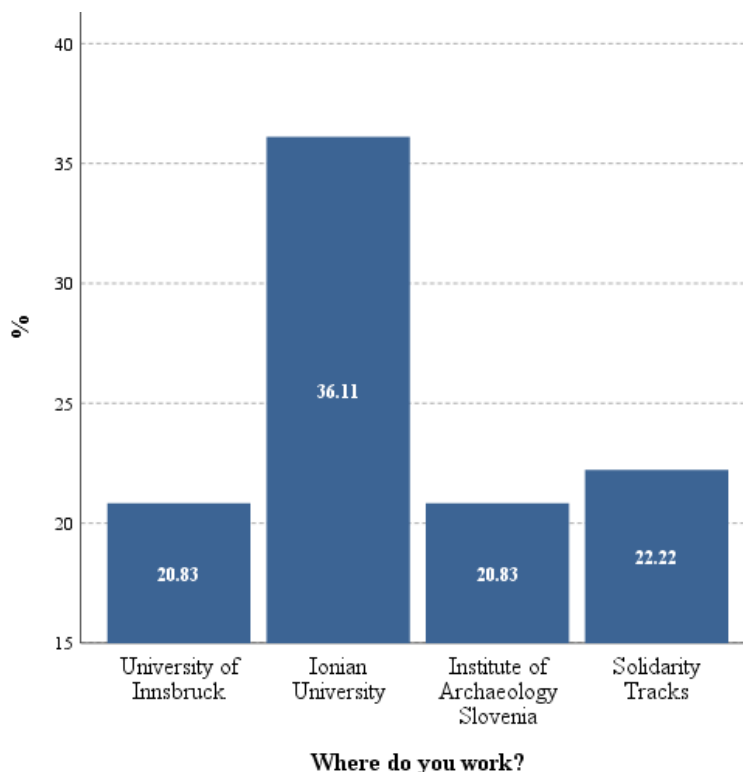
When it comes to the gender, more than a half of respondents are females (58,3%), 38,9% are males and two respondents or 2,8% preferred not to say their gender.

	Gender	
	n	%
Male	28	38.9%
Female	42	58.3%
Prefer not to say	2	2.8%
Total	72	100.0%

In average, the respondents are 43,6 years old with standard deviation of 11,2. There is huge variation of respondent's age and it vary from 23 to 66 years.

Descriptive Statistics

|	N	Minimum	Maximum	Mean	Std. Deviation
Age	72	23	66	43.60	11.176
Valid N (listwise)	72				

3.2 The Key Findings

In general, the results showed there is mild digital readiness among the respondents with average index of digital readiness of 3,8 (on scale range from 1 – 6), with standard deviation of 0,91. It means that respondents still do not feel well prepared for using digital tools and technologies in their teaching and learning process.

Respondents believe in some way that digital tools can improve teaching and learning process, but we didn't find that respondents believe that they know well how to use digital tools for monitoring student activity and performance in order to make informed choices and intervention to help students progress, to implement learning environment that allows for student customization of goals, pacing and learning path, they do not feel they are so ready to make and implement decisions related to selecting when and how to effectively combine online and in-person learning as a part of core instruction. And also, they believed that they are not well prepared to effectively facilitate their online interactions with and between the students.

We found that there are some differences in the level of digital readiness between the institutions, which means that institutions varies in the level of digital readiness. We found some significant correlations between the respondent experience and digital readiness . As the respondent has more experience in teaching using the digital tools, the more he/she has higher digital readiness (ρ=+0,28), Integration (ρ=+0,36), Management (ρ=+0,33), Data practices (ρ=+0,27) and Personalization (ρ=+0,26) as parts of digital readiness.

When it comes to the need of respondents to learn more about the way of using digital tools in education process, we found there is a moderate need. However, the need varies a lot between the respondents. The highest need, but still moderate need, is found in the planning and teaching process by learning objectives, writing or preparing the digital content for students, adapting the learning content and methods to online learning environment and administering online training courses with various platforms (M=6,3). From the other side, the lowest need, but also still moderate need, they expressed in creating and delivering AR (augmentative reality) content to the students (M=5,4), using games and gamification as a part of teaching strategy (M=5,6), creating and delivering VR (virtual reality) content to the students (M=5,7).
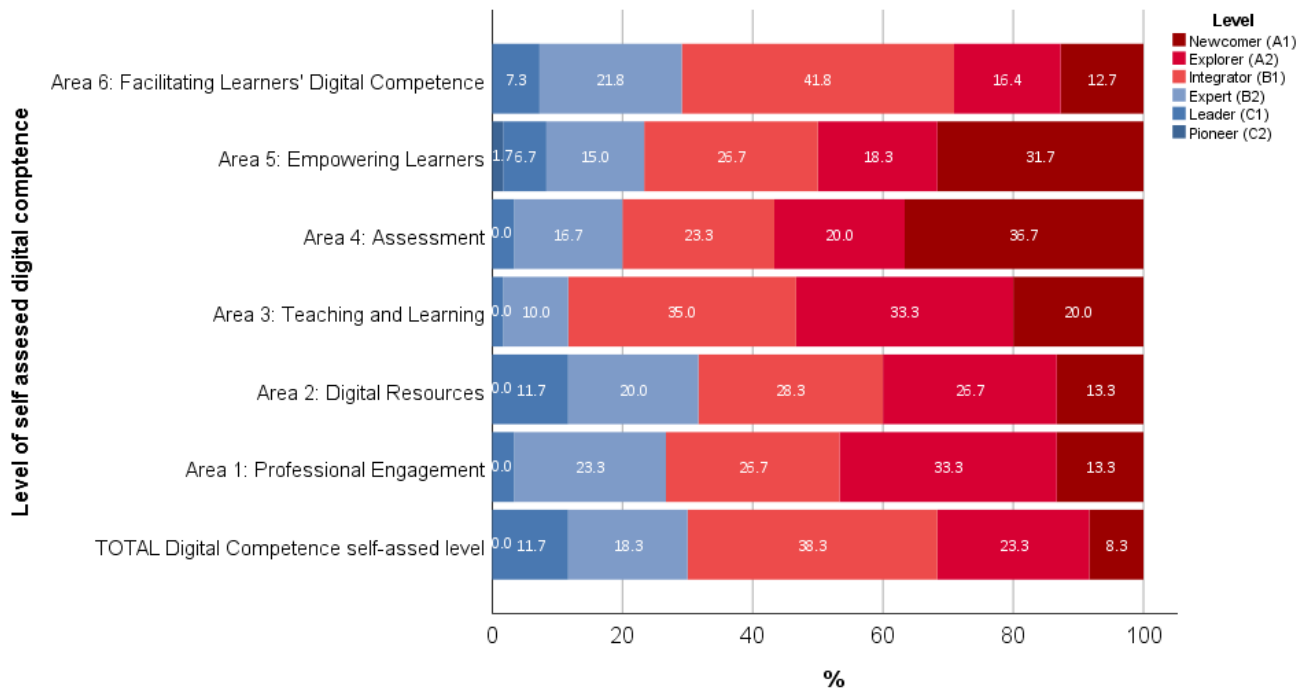
When it comes to self-assessed digital competence, there is no respondents with the general digital competence on a level of C2 – Pioneer. 11,7% of them of respondents are on the level of C1 – Leader, 18,3% on a level of B2 – Expert, 23,3% on a level of A2 – Explorer and 8,3% on a level of A1-Newcomer.

In a general, we can conclude that high percentages of respondents or 69,9% are on the level of digital competence up to B1 – integrator, which cannot be sufficient level for digital competence that can ensure effective way of using digital tools for the purposes of learning and teaching. Therefore, there is a need to provide to the respondents adequate professional support and training in this field.

At the end, we found there is high positive and statistically significant correlation between digital readiness and digital competence (r=+0,65, p=0,00), which means that as the respondents' digital readiness is increasing, the total digital competence increase too.

3.3 Short term staff Digital Training

The Short term staff digital readiness training took place in Lefkada during 9-10 of September. Two teachers and two PhD students from University of Innsbruck and two teachers from Ionian University participated in it. The training was interesting enough and quite helpful for understanding not only the importance of digital tools and how to use them but also for the goals and aims of the rest of the participants. First of all we were encouraged to share our fears and hopes therefore we bonded.

Also we discussed about the advantages and disadvantages of digital training which was quite significant for realizing the positive impact of digital training and how to improve our attitude towards it. We presented the good practices of digital training or digital tools and we started leaning some other useful digital tools like, video editing, logo puzzle, jitsi, skribl.io. Moreover there was talk about more digital tools like mooc, massive open online course, Moodle - a Learning Platform or course management system and Trello – Trello a collaboration tool that organizes your projects into boards.

3.4 Best Practices Toolkit

All good practices brought by the Project Coordinator and the Partners were mostly for digital training and assessing digital skills for teaching cultural heritage. Mobile application for Museums, the visualization of contents in Augmented Reality within museums 3D reconstructions to perform immersive and engaging visits of ancient buildings and sites were some of the main objectives by Mobile 3D. Additionally, other tools aims were to use innovative technology for teaching in schools and museums, to use online courses to explore the educational potential of digital cultural heritage and also to prepare their

course material in Greek as freely accessible digital educational content in the form of PowerPoint lectures by the Ionian University.

Good practices demonstrated by University of Innsbruck aim to enhance awareness of the need for training in digital skills for the creative industries and to design a set of Guidelines for Digital Competences for Creative Industries. Strengthen cultural institutions and test, promote and implement high quality digital learning material both for teaching at university and school level as well as for reaching out to a broader audience.

Other good Practices by Solidarity Tracks aim to support young crafters and to integrate them into professional life or to support them with On line training, support and coaching, and building their capacity for the use of modern learning methods related to non-formal education of young people and social entrepreneurship based on virtual technology.

Concerning good practices which were presented by   ZRC SAZU, they aim at 3d reconstruction of archaeological sites especially those who are located at the top of the hills and also virtual museum visit.

3.5 Meeting the needs arising from the findings of the research

According to the good practice digital tools and the key findings which resulted from the survey It seems there is a moderate need to learn more about the way of using digital tools in education process which need however varies a lot between the respondents. The highest need seems to be found in the planning and teaching process and writing or preparing the digital content for students, adapting the learning content and methods to online learning environment and administrating on line training courses on various platforms. On the hand, there is also a moderate need in creating and delivering AR content to the students. using games and gamification as part of teaching strategy creating and delivering VR content to the students.

Trello - Trello is a collaboration tool that organizes your projects into boards. and will assist the teachers by offering them in one glance what have they being working on, who has been working on what, and where something is in a process. Moreover Moodle - is a Learning Platform or course management system (CMS) - a free Open Source software package which is designed to help educators create effective online trainings, therefore It can be an important tool which could aid the fulfillment of the first need.

Concerning the other need to use games and make gamification a part of teaching strategy there are a lot of tools suitable for this use. Such as ActionBound - an app for playing digitally interactive scavenger hunts to lead the learner on a path of discovery. Online puzzle maker – also could help the teacher to create puzzles for for the learners to get accustomed to new notions or ideas..Moreover Kahoot - Kahoot! is a game-based learning platform which uses multiple choice quizzes that can be accessed via a web browser or the Kahoot application to help the learning process.