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## ERACON 2019

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# **ERACON CONGRESS PRESENTATIONS**

## **EP7. COLLABORATIONS SERVING THE INTERNATIONALIZATION OF HEIS: UPE GOOD PRACTICES**

Andrea Redli, Bianka Molnar  
University of Physical Education, Hungary

### **ABSTRACT**

We would like to highlight the international partners (EU and Non-EU) of the University of Physical Education (UPE), Budapest through the Erasmus KA103 and KA107 projects. The financial support and the available funds that come from these two types of mobility programs could help realize exchanges that are key elements of our fruitful international cooperation projects. We would like to share how this traditional, innovation-focused institution is capable of developing the knowledge of internationalization through developing numerous partnerships in Europe and beyond. In our conception, there are three forms of the fund utilization and three different phases of the collaboration.

We would like to highlight the international partners (EU and Non-EU) of the University of Physical Education (UPE), Budapest, Hungary through the Erasmus KA103 and KA107 projects. The financial support and the available funds that come from these two types of mobility programs can help realize exchanges that are key elements of our fruitful international cooperation projects. We would like to share how this traditional, innovation-focused institution is capable of developing the knowledge of internationalization through increasing numerous partnerships in Europe and beyond. In our conception, there are three forms of the fund utilization and three different phases of the collaboration.

#### **1. create a new international partnership**

In the 1<sup>st</sup> phase the main focus is on the training programs for staff members (STT) parallel with teacher mobility programs (STA), for those who could build up the connection and support the communication. The leadership and the decision making level of UPE visit the partner university which gives a good opportunity to harmonize the conception of the cooperation.

During a first official „kick off meeting” the parties sit together and getting know each other in the academic and a little bit in a personal way. We can discover the hosting environments of the partner and highlight our strengths. The strategic approach of the collaboration is a key element and gives the ground of the co-work. After the first meeting or during the first consultation the delegation is capable of involving the relevant faculty members at both universities, who can take care about the partnership between the parties as a so called “anchor person”. Many times the former students, the alumni / alumna are the most adequate people to support the professional cooperation.

## **2. develop the existing cooperation**

In the 2<sup>nd</sup> phase it is the exchanging of teacher and faculty members (STA) and partly STT to improve the cooperation in professional level. When the cooperation is already existing, the parties need to stabilize the partnership together. In this stage the mobility exchange programs are focusing on the STA and the STT mobilities. The participants have the chance to improve their academic network, which help to develop the cooperation in the same time. Academic knowledge exchange is beginning through the exchange programs and the faculty members are able to prepare the next phase, when the students are joining to the projects.

## **3. combine the project opportunities**

UPE tends to utilize the higher educational project opportunities with a strategic approach and the strength of UPE, when we elaborate new international partnerships. In a longer term, the goal is to create a sustainable and mutually beneficial mobility system. Meanwhile, we involve different funds to enhance sustainability. The higher education partnerships are financed mostly by different kind of projects and funds in general, so it is important to maintain the sustainability. In the third phase the university is still keeping the previous mentioned types of exchange (STT, STA), and we integrate the students as a target group of mobility programs into the stable partnership with student mobility for studies (SMS) and student mobility for placement (SMP). When we are selecting students for the mobility program, we make sure the quality and the high interest from the participants. This is a key to deepen partnership and establish long commitment. To summarize the key element of the international partnership in UPE is the strong strategy making policy. The university is very responsible about making new partners, and the main goal is to serve both partner goals and strategy. The university is revising the international strategy and the mobility strategy often to ensure, they harmonize and serve the real need. Leadership commitment and publicity serves the process in the longer term. The goal of UPE is to create important and useful cooperation, which are beneficial both of the partners. The international office is responsible for the quality control: to revise the existing and evolving partnerships. If needed, they make small modification on the partnerships, goals and aims. In such cases if the partner does not serve the strategy, or not able to fulfil its function anymore, it is possible to end it. The international office is dealing with the communication with the partners. Mostly via e-mails or by other online way (Skype). For the university the importance of personal meetings is crucial. During the personal meetings there are possibility to correct and improve the cooperation and partnership. We can build up real personal relationships, which are essentials of all the international collaboration. As a totally sport scientific university UPE aims to search the best partners in this field and we are focusing on the quality of the cooperation.

# **EP10. AN ANALYSIS OF ERASMUS+ ICM 2014-2020: RESULTS AND IMPACT IN THE INSTITUTIONS. THE EXPERIENCE OF THE UNIVERSITY OF ALMERÍA, SPAIN**

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## **ABSTRACT**

The University of Almería, UAL, Spain, started its participation in Erasmus+ ICM in 2015 cooperating with 6 partner countries HEIs from the MENA region. Since then, the UAL has extended its cooperation network through Erasmus+ ICM to more than 50 HEIs in 20 countries, ranking currently the fourth Spanish University in mobilities and budget. During the execution of the projects a series of surveys were sent to partner HEIs to find out about the impact of the project at institutional level and the results of the EU surveys have been analysed. This paper reports about the main challenges and problems identified in the management of an ICM project, the results and impact in individuals and institutions, and tries to outline some recommendations and good practises based on what we have learned so far.

## **INTRODUCTION**

In 2014 the European Commission launched the first call for applications of the new Erasmus+ Programme, which included a strong international dimension oriented to increase the attractiveness of European higher education institutions and to give support to the EU's external action, allowing for the first-time mobility between Programme and Partner countries under the Key Action 107, KA107, International Credit Mobility, ICM. Since then, more than 64.000 mobilities of students and staff have been implemented between Programme and Partner countries.

For many partner countries HEIs, Erasmus+ ICM is a key tool to improve the quality of their Higher Education Systems and to provide their students and staff with key competences to interact in a globalized world, contributing to boost the economic and social development. For Programme Countries HEIs, it has proved to be also a powerful internationalization tool. The transition from Erasmus Mundus Action 2 to Erasmus+ ICM has not been easy and has involved many challenges for the organizations.

## **1. UAL NUMBERS AND PARTNERS COUNTRIES**

Since UAL started cooperation with partner countries through Erasmus+ KA107, the number of partner countries has increased from 11 in 2015 to 19 in 2018 and the number of partners HEIs has risen from 21 to 54 (see Tables 1 and 2).

Table 1. UAL E+ KA107 Project I

| UAL KA107 PROJECT |                      |               |                        |                     |
|-------------------|----------------------|---------------|------------------------|---------------------|
| PROJECT YEAR      | NUMBER OF MOBILITIES | FUNDING       | NUMBER OF PARTNER HEIs | NUMBER OF COUNTRIES |
| 2015              | 96                   | 486.792 EUR   | 21                     | 11                  |
| 2016              | 152                  | 598.140 EUR   | 31                     | 13                  |
| 2017              | 209                  | 766.070 EUR   | 51                     | 18                  |
| 2018              | 217                  | 836.310 EUR   | 54                     | 19                  |
| 2019 (APPLIED)    | 390                  | 1.316.632,00€ | 75                     | 26                  |

Source: Own elaboration

Table 2. UAL E+ KA107 Project II

| UAL KA107 PROJECT |                                                       |                          |            |                                |                                         |                     |               |                        |
|-------------------|-------------------------------------------------------|--------------------------|------------|--------------------------------|-----------------------------------------|---------------------|---------------|------------------------|
| REGION / YEAR     | IPA WESTERN BALKANS                                   | ENI SOUTH MEDITER RANEAN | ENI RUSSIA | ENI EASTERN PARTNERSHIP        | DCI                                     | DCI IRAN-IRAK-YEMEN | PI AMERICAS   | PI INDUSTRIALISED ASIA |
| 2015              | Bosnia-Herzegovina<br>Serbia<br>Albania<br>Montenegro |                          |            | Armenia<br>Moldavia            | Palestine<br>Jordan<br>Syria<br>Lebanon |                     |               | South Korea            |
| 2016              | Bosnia-Herzegovina<br>Serbia<br>Albania<br>Montenegro | Morocco                  | Russia     | Armenia<br>Moldavia            | Palestine<br>Jordan<br>Syria<br>Lebanon |                     |               | South Korea            |
| 2017              | Bosnia-Herzegovina<br>Serbia<br>Albania<br>Montenegro | Morocco<br>Tunissia      | Russia     | Armenia<br>Moldavia<br>Ukrania | Jordan<br>Syria<br>Lebanon              | Iran<br>Irak        | USA<br>Canada | South Korea            |
| 2018              | Bosnia-Herzegovina<br>Serbia<br>Albania<br>Montenegro | Morocco<br>Tunissia      | Russia     | Armenia<br>Moldavia<br>Ukrania | Jordan<br>Syria<br>Lebanon<br>Palestine | Iran<br>Irak        | Canada        | South Korea            |

Source: Own elaboration

## 2. WHY DOES UAL PARTICIPATE?

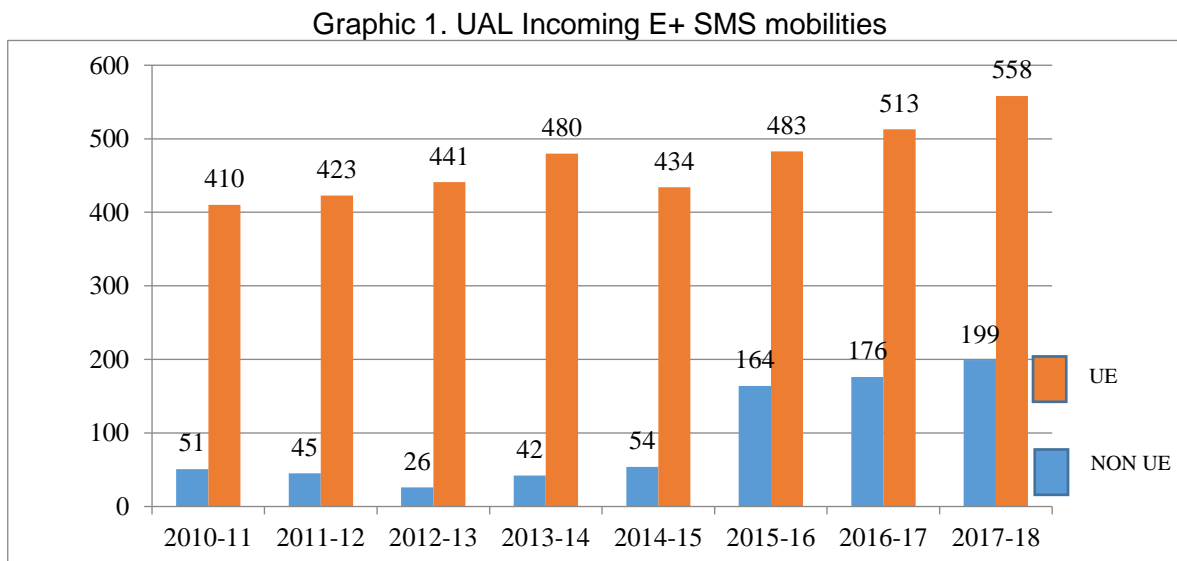
In order to find out which are the main benefits for the institutions that participate in Erasmus+ ICM, we have made a study on the impact of the programme for the University of Almería and for our partners during the last five years. There are several reasons for the UAL to participate in KA107. First of all, ICM gives us the possibility to attract highly talented students coming from non-EU countries. Secondly, it is an opportunity to enhance the existing Research and Academic cooperation between departments and institutions through staff and students' mobility. On the third place, new opportunities of research cooperation may result from Erasmus+ ICM grants.

Also, it helps us to create a stable network of partner HEIs for Research and Academic Collaboration. Once a stable network of reliable partners has been established, and you build up a relationship of trust, new opportunities for cooperation start to arise. For example, new proposal for Capacity Building projects. On top of this, it helps to increase the visibility of your institution.



### 3. MOST OUTSTANDING RESULTS AND BENEFITS FOR THE UNIVERSITY OF ALMERÍA

After analyzing the data of project 2016, we can conclude that the main result for the University of Almería, is that we have had an important increase in the number of incoming students mobilities for studies (SMS) since the programme started in 2015, rising from 522 students in 2014 to 757 in 2018. So, now our Campus is much more multicultural and international, with more than 50 nationalities in our classrooms (see Graphic 1).



Source: Own elaboration

Besides, UAL participation in KA107 has also resulted in:

- An increased number of KA2 CBHE projects as a result of Teaching Staff Mobility.
- An increased number of Doctoral Thesis under International Joint Supervision.
- An increased number of Master and Phd incoming students, which has a bigger impact on the university, because those often result in more Scientific production, joint publications and new research lines.
- New proposals for the creation of double degrees.

### 5. IMPACT ON PARTNER COUNTRIES HEIs

In order to find out what the impact for our partner country HEIs was, we distributed a questionnaire among them (31 in project 2016) to gather information for the Final Report. As questions were open, we have selected those that were more frequently given and repeated by our partners.

When asked about what the impact of the project on their institutions in relation with their institutional strategy was, most of them highlighted the following outcomes:

- a. Development of Academic and Research Networks.
- b. Knowledge Transfer among partners.
- c. Increase of internationalization through joint degrees and international partnerships.
- d. Development of new courses in English.
- e. Improvement of the International Offices.
- f. Strengthening of the institution visibility at international level.
- g. Increase of the of the institutions prestige.
- h. Harmonization with EU Higher Education Systems.

On the other hand, when they were asked to which extent their institution's international cooperation capacity had increased with this project, most of our partners agreed on the following answers:

- a. Establishing links with the EU HEIs study areas that might lead to joint research, joint publications, double degrees: 5 replies
- b. Developed considerable expertise in the management of mobility programs: 5 replies
- c. Increased cooperation with EU institutions and benefit from EU development in higher education: 4 replies
- d. Developing of academic and professional networks with the students and staff in teaching and research: 3 replies
- e. Increased number of partners as well as mobility numbers: 3 replies
- f. Challenged to certain policies and administrative rules to cope with internationalization (transfer of credits from ECTS to Credit hour, for example): 1 reply

## **6. HOW WAS THE SCHOLARSHIP HOLDERS EXPERIENCE? ANALYSIS OF EU SURVEY: 2016 PROJECT**

In order to know the opinion of the Erasmus+ KA107 scholarship holders about their mobility experience, the results of the 157 EU Surveys submitted for project 2016 were analyzed. Through the 'EU survey', the NAs try to find out about HEIs' compliance with ECHE principles, for instance, about the quality of the studies and participant's satisfaction, whether the mobile students have indicated that they have received academic recognition and whether the information before mobility was appropriate, both at the sending and the receiving institution.

In this analysis, we have put the focus on the selection process, learning agreement and recognition of studies, and support to grantees and their level of satisfaction, because these are some of the "*pressure points*" for the European Commission:

"Although HEIs located in Partner Countries are not eligible to receive an ECHE, if they wish to take part in Erasmus+ mobility between Programme and Partner Countries, they must sign an Inter-Institutional Agreement with their European partner which integrates ECHE principles (...).

In KA107 mobility emphasis should be given also for the first ECHE principle:

“Respect in full the principle of non-discrimination set out in the Programme and ensure equal access and opportunities to mobile participants from all backgrounds.” (ECHE Monitoring Guide for Erasmus+ National Agencies 2016).

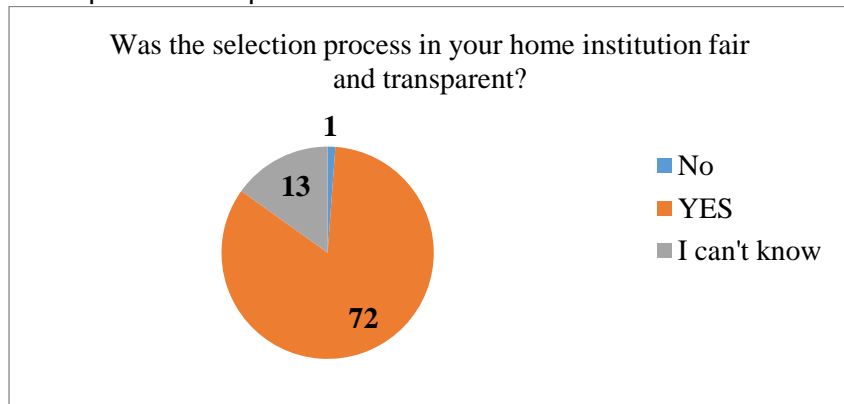
### 6.1. SELECTION PROCESS

Regarding the selection process, 72 students out of 86 that answered to this question said it was transparent, 13 were unable to judge, and one said it was not. Therefore, we still have to insist our partners on the importance of a fair and transparent selection process (see Graphic 2)).

### 6.2. LEARNING AGREEMENT

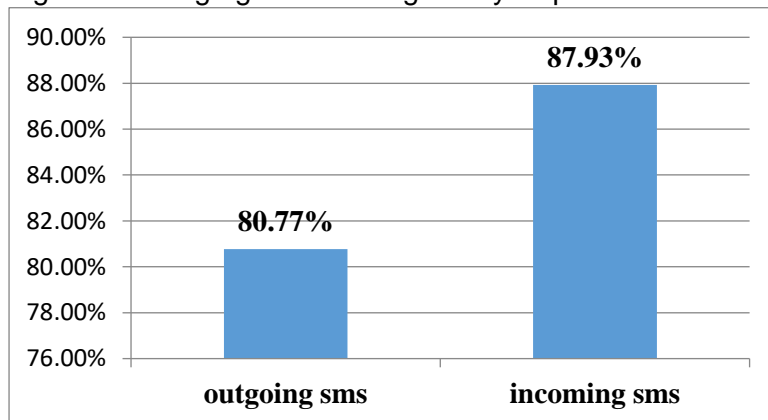
There is still a small percentage of cases in which the LA was not signed by all parties. In those cases in which the LA was signed after the start of the mobility period, it was the student who had not signed it. Most of the cases signed after the start of the mobility, it was the student who had not signed it (see Graphic 3).

Graphic 2. Scholarship holders experience. Selection Process



Source: Own elaboration

Graphic 3. Percentage of learning agreements signed by all parties before the start of mobilities



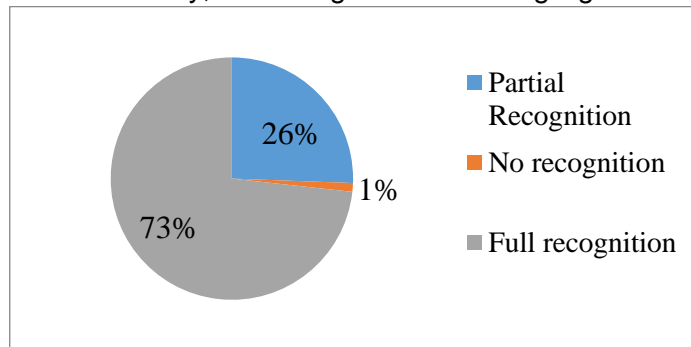
Source: Own elaboration

### 6. 3. RECOGNITION OF STUDIES

Regarding recognition of studies (see Graphic 4), there is a 26% of students that thought that they would obtain only partial recognition.

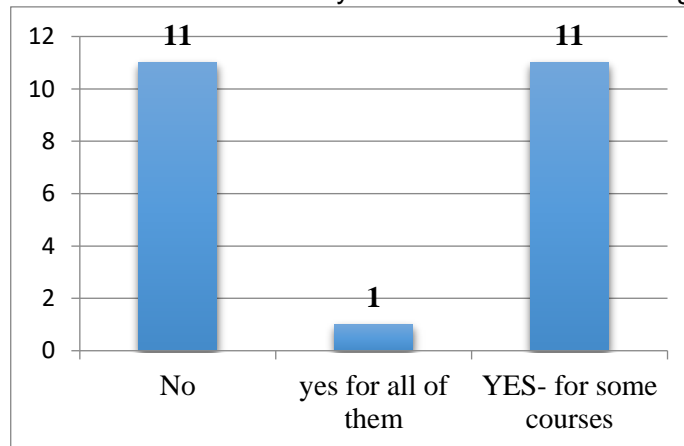
Almost the half of them knew that they had to take other courses at the sending institutions to complement the ones that had already been done (see Graphic 5). These students considered that they main obstacle for recognition would be that the content of the course will not be accepted by the sending institutions. To conclude, recognition is another issue that has to be further developed and improved, to achieve the full recognition in the future.

Graphic 4. Answer to question “Will you obtain the recognition of your mobility period by your home university, according to the Learning Agreement?”



Source: Own elaboration

Graphic 5. Answers to question “Will you have to take additional courses or exams at the sending institution for courses already evaluated at the receiving institution?”



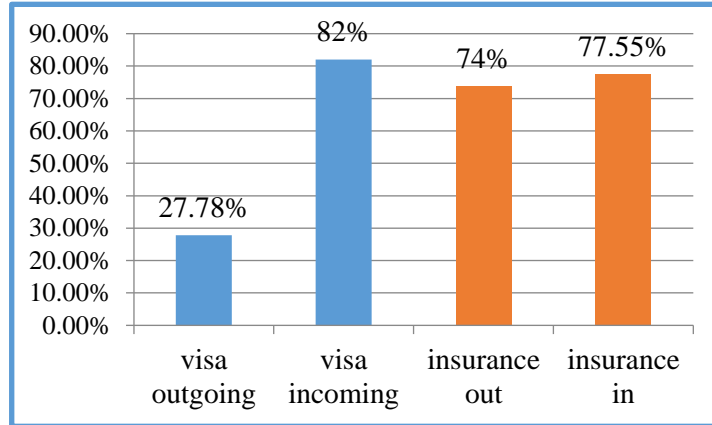
Source: Own elaboration

### 6.4. SUPPORT AND LEVEL OF SATISFACTION

The satisfaction rate regarding visa and insurance issues is high (see Graphic 6), with the exception of outgoing students who felt that they did not receive enough support for visa. The fact is that at UAL, many of our students do not need a visa and support in this matter is supposed to

be given by receiving institutions. However, we can say that during these years outgoing students have not encountered major issues related with this matter.

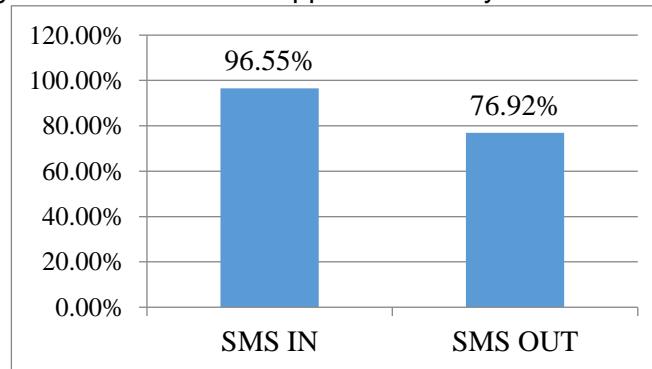
Graphic 6. Percentage of students that were very or rather satisfied with the assistance related to visa and insurance issues



Source: Own elaboration

Results about satisfaction regarding academic mentoring and administrative support offered by the University of Almería are reported in Graphic 7.

Graphic 7. Percentage of students that were very or rather satisfied with the academic mentoring and administrative support offered by the receiving institution



Source: Own elaboration

## **7. IMPLEMENTATION: MAIN PROBLEMS AND CHALLENGES**

### **7.1. PROGRAMME COUNTRY PERSPECTIVE**

As for the project implementation, we have identified some problems and challenges from the programme country perspective that we have been tackling with:

- a. Difficulty to allocate the outgoing scholarships: It has not been easy to send students from Almería to partner countries, because they are not familiar with the new destinations and their families are sometimes reluctant to send them outside Europe. Some of the solutions implemented have contributed to solve this problem: good promotional campaigns, fostering PhD mobility and changes in the direction of the mobility flows.
- b. Difficulties to implement mobilities coming from certain countries: For instance, the case of students coming from Gaza strip in Palestine, who cannot leave or go back to Gaza due to the siege.
- c. High turnover of staff at the IROs in some countries. This makes it difficult to establish an efficient cooperation, since new staff needs to be trained and received all the information from us again.
- d. Gathering some of the documents required by the Spanish NA: it is difficult to receive from partner countries institutions the Proof of recognition and proofs of a fair and transparent selection process that the EU requires.
- e. The time needed to open a Bank Account often delays the first payment. In order to solve this, an agreement has been signed with the Bank so that the first payment for incoming students and staff will be made upon arrival through a prepaid card.
- f. Incompatibility in Academic Calendars: In some cases, due to overlapping of Academic Calendars, some incoming students from Irak and Palestine had to leave before the final exams.
- g. Difficulties to establish common procedures for the selection of teaching and administrative staff: It is sometimes hard to find supervisors for STA mobility in host universities and, in other cases, some universities do not want our staff to contact directly with them when we open the call, what makes difficult for them to get a pre-invitation letter.

### **7.2. CHALLENGES AND DIFFICULTIES**

The experience of the UAL with KA107 is based on a strategy that involves dealing with many partners and many countries, which requires a heavy workload. For an efficient project management, it is essential to have a fluent communication with partners. As in KA107 partners are not integrated into a consortium, as it was in the Erasmus Mundus Action 2 Programme, communications must be adapted to each partner individually, and depending on their level of knowledge of the programme, the different cultural backgrounds and the different expectation they may have regarding the programme. Therefore, the effort is double than if it were a consortium. An additional task is the need of following up the implementation of the project mobilities during all the project life in order to take the necessary measures to correct deviations: amendments, reallocation of scholarships, changes in the direction of the mobility flows. Other aspects of the design of this programme that cause trouble and difficulties for the HEIs that are participating in it are:

- a. The lack of stability in projects (only 2 years period; 3 from last call).
- b. Yearly changes in the number of mobilities per country (not enough mobilities for all partners) makes difficult to give sustainability to the cooperation relationships.
- c. Application process involves heavy workload (one application per country).
- d. Difficulty in monitoring partner practices (selection process, recognition, calls, ...) which is, according to UE rules, programme HEI responsibility.
- e. Not enough training and information about KA107 in some partner countries, which make programme country HEIs to do continuous effort to train their partners.

## **8. RECOMMENDATIONS AND GOOD PRACTICES**

Based on all the above, we would like to share some good practices and give some recommendations that we hope could be useful for KA017 newcomers:

- a. It is very useful to organize an International Staff Week for KA103 and KA107. It is a way of concentrating most of the staff mobility in a week and it can be used as a Kick off Meeting to work all those aspects of the project management that must be improved. And, of course, it is a perfect occasion for networking and consolidating relationships.
- b. To develop Master and Doctorate mobility.
- c. To develop Staff mobility, since it helps to create strong links and enhance students' mobility. In this sense, STT and STA mobilities should be recognized at the sending institutions in the Staff professional career.
- d. To give some training and preparation to Staff about Erasmus+ and cooperation opportunities before their mobilities.
- e. To get your partners engaged from the application stage. A good application will need the contributions of all partners, and in that way you ensure a smooth beginning of the cooperation.
- f. To use KA2 to complement KA107 cooperation activities
- g. To provide training to partner universities (especially for those new HEIs in the Project): Guidelines for partners + templates, Guidelines for students, Guide on how to select process in compliance with ECHE, Workshops on different aspects of the project.
- h. To keep frequent communication with Embassies and Foreign Offices.
- i. To use testimonies of scholarship holders for dissemination and promotion.

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- European Commission (2016). ECHE Monitoring Guide for Erasmus+ National Agencies.  
 European Commission (2018). Erasmus+ Annual Report 2017.  
 European Commission (2019). Erasmus+ Programme Guide 2019.

## **EP11. SENIOR CITIZEN COGNITIVE TRAINING OPPORTUNITIES: A COMPARATIVE ANALYSIS**

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### **ABSTRACT**

Senior citizens in the EU are expected to increase from 29.6% in 2016 to 51.2% in 2070, which creates big challenges that Europe needs to address. Older adults fear losing their cognitive abilities as part of the ageing process. An important tool to keep cognition abilities as sharp as possible is cognitive training, since the brain resembles muscles and it can benefit from training the same way that physical training improves physical abilities. In the framework of the Erasmus+ Project "Tablet-Based Cognitive Gaming Platform for Seniors", an Android gaming platform will be developed to host a set of six games, aiming to engage seniors in enjoyable group activities exercising their cognitive skills related to memory, attention, reasoning & planning, processing speed and sequential processing.

### **INTRODUCTION**

Thanks to the advancements in medicine and technology, people tend to live longer. According to the European Commission's 2018 Ageing Report [1], the percentage of senior citizens in the EU will increase from 29.6% in 2016 to 51.2% in 2070. These demographics create considerable challenges that Europe need to address upon for the wellbeing of all its citizens. Ageing population is at greatest risk to develop a disability, not only a physical disability but also mental, and observations show that as people age, they lose certain cognitive abilities and they become more "fragile".

Cognition is a combination of processes, including paying attention, learning and reacting to objects in the environment, as well as using the language and memory. In the cases where cognition becomes impaired, the individual may have difficulty performing everyday tasks. Cognitive decline impacts the ability of the individual to stay up to expectations with social interactions and independent living. Situations where the cognitive decline reaches serious levels, are described by the term "dementia" and represent a key problem for public health. This is evident also in the Alzheimer Europe Statistics in 2018 [2]. France had the higher percentage of population facing Alzheimer (1,85%), Belgium followed relatively close with 1,77 %, Austria followed with a small difference (1,73%), then Bulgaria with 1,49%. The smallest percentage appears in Turkey in 2013 (0,44%), while Cyprus figures show 1,07%. These figures cause an urgent need to develop interventions and tools to support patients and their caregivers, develop



non-pharmaceutical interventions that will help older citizen to prevent or slow down the dementia symptoms and subsequently the percentages of Alzheimer disease. Taking such measures should be a priority for the well-being of senior citizens. The EU's Social Protection Committee is looking at ways of making adequate provision of long-term care sustainable in ageing societies, by investing in rehabilitation, age friendly environments and, most importantly, prevention.

Cognitive / Brain Training is the training one takes in order to improve his/her mental abilities and is important for senior citizens to prevent symptoms of or to deal with early symptoms of dementia. After a large ten years clinical trial [4] researchers found that a training called "Speed of Processing" lowered dementia risk in healthy older adults by up to 29% compared to people who did not receive any training [6]. The training was designed to improve the speed and accuracy of the person's visual attention. Another study revealed the role of healthy lifestyle programs, such as the use of comprehensive interventions which have been shown to be efficient for enhancing memory and other abilities in aged individuals whether they suffer from cognitive decline or not [5].

In our work we aim to support dementia prevention by creating a comprehensive cognitive skill training package, having at its core an Android tablet-based platform consisting of six (6) different games specifically designed for older people. These games will be supporting the training of certain cognitive skills: a) memory; b) attention; c) visual perception; d) reasoning and planning; e) processing speed; and sequential processing. To ensure high quality and effective results, our work started with a study to characterise the target audience, their learning needs and accessible learning objectives. The design and development of the games will happen at a later stage, while the selection of a tablet as the delivery device was made since statistics show that tablets are more accessible to older people. In addition to the games, an e-learning platform will be deployed, to host relevant learning objects aiming to support trainers and self-learners.

## **METHODOLOGY**

We have created a **survey questionnaire** for analysing seniors' levels of cognitive skills and learning needs, and the challenges they face in their daily lives. The questionnaire had been translated in all project partner languages (i.e., Bulgarian, Dutch, French, German, Greek, Turkish), populated online and disseminated to relevant communities in each country. The collected results were then analysed on a country basis and then consolidated in a common comparative report which facilitates the drawing of conclusions and the decision making within the project for the development of the games and the training material. In each country, different paths were followed for the data collection. For instance, in Turkey participants were selected randomly from public places, nursery houses, associations for retired people and they filled-in the questionnaire in paper format. Moreover, younger adults were mainly reached through social media accounts, e-mail groups and announcement in public places. All participants were given an appropriate consent form to sign before they filled-in the questionnaire. In the rest of the countries, data collection mainly happened through the online version of the survey, either by participants filling it in directly or by researchers that were interviewing the participants. In parallel with the survey, a desk research was conducted in each country, studying the situation about existing cognitive training and other opportunities for older people in improving their cognitive skills. In the following sections, we present first the results from the desk research and then the quantitative survey results.

## DISCUSSION OF FINDINGS

### A. FINDINGS OF DESK RESEARCH

#### Senior Care Services

In Cyprus and Turkey, seniors are taken care by their relatives upon retirement. In Cyprus, the majority of seniors will retire at their homes with the support of their family or they will enroll in a care center when they need certain degree of medical care. In Turkey, almost 100% of older adults are ageing at home. Fewer than 0,5% are ageing in care institutions so the family is the primary caregiver. Government gives emphasis on the support of seniors by taking different actions that would support the quality of their life, such as: i) The **Healthy ageing action plan** (2015), which aimed on Improving Home care services, diagnosis and treatment of older individuals; ii) the YADES (2016) programme which funds projects providing homecare services for 600 older adults; iii) Initiatives for *family centre care through financial subsidies, so as for family members to take care of their older relatives (2016)*. Those dedicating more than 8 hours per day are receiving a monthly wage. Incentives were also given for woman to enter the labour force as external caregivers [8].

In France, Belgium, Austria and Bulgaria, it appears that seniors, and not the family, have the sole responsibility of taking care of themselves. In France, seniors have the APA (aide personnalisée à l'autonomie) benefit so they have the option either to enroll a retirement and care home or to leave in their homes and to have a nursery support in their place when they need it. In Austria, there are different plans such as: the "Senior Home" which provides long term residential care, the "Supported Living Plan" for those who do not need nursing care, the "Assisted Living Plan" for those who need some assistant and the "Long Term Nursing Care" for those who need nursing. Moreover, there is the option of home care giver nursing.

In Belgium, there are the Homes for the elderly who are specially built housing for people over 60 and they are managed by a non-profit organization. In Bulgaria the case is different, as young Bulgarians are now either emigrating or moving to larger towns. As a result, many older people are now isolated, both in medical and in social terms. People who need medical care either go to a doctor or to a hospital since home nursing is something new for the country.

#### Training and other activities for seniors to improve cognitive skills

In Cyprus, only few organisations include specific cognitive training programmes for seniors in their services. An example is the **Memory Center** which was established in 2014 offering personalized cognitive training (memory, attention, speech critical thinking). They are offering orientation activities, learning new skills or relearning skills that the attendees forgot, using memory techniques. The training methodology is involving art, board games and interaction with family members. Moreover, seniors in Cyprus may also attend courses through the dedicated "Adult Education Centers" (art, gymnastics, languages, cooking, dancing, gardening, etc).

Another common thing for older people in Cyprus is that after retirement they take care of their grandchildren. Similar pattern we observe in Austria where seniors undertake the role to take care of grandchildren at kindergarten and primary school ages. In 2012, the Pensioners Association of Austria gave prizes to communities that promoted initiatives and projects for the elderly. The

capital of Vorarlberg has a dense network of facilities and numerous activities for seniors. Social centres, psychosocial counselling, assisted living and short-term care institutions make it possible to grow old with dignity in the city. Additionally, there are social networks for old people. Senior gymnastics, hiking groups, retirees' afternoons, nursing meetings and memory training are some of the ongoing activities.

Similarly, Brussels offers lots of opportunities for seniors, as it was the first city in Belgium to be named an Age-friendly City by the World Health Organization. Brussels invites senior citizens from around the world to come and discover the city's cultural treasures. The "Seniors Service of the City of Brussels" organizes various activities for seniors: events, workshops, conferences, excursions and meetings between generations.

In Austria, Turkey and Bulgaria seniors have the opportunity to re-enroll in a university after their retirement. More specifically, seniors in Vienna can choose between participation in a further education program or full-fledged study. Seniors are generally allowed to enter all bachelor's programs or to complete a master or doctorate program. For seniors, the university had set up a counseling center for older students with monthly counseling sessions. At the University of Vienna, Seniors must pay for their studies if they have already completed a full-fledged study and would like to begin a second degree. In Turkey, in 2015, the Acdeniz University launched the first academic program dedicated for older adults over 60 called "Renewal University", offering a wide selection of courses, free of charge and without strict grading as its goal is to enhance the life and creativity of its student and help them stay cognitively healthy.

In Bulgaria, seniors could be educated for acquiring a level of school education at the expense of the state budget if they have not previously completed the same degree. Also, people (over 55+) can enrol a funded training courses for acquiring new profession or a higher level of professional qualification. In Cyprus it is not common or there are no initiatives for seniors to re-enter University after retirement although you might find some cases of seniors over 55 that are attending a University for a postgraduate degree.

What was common across all involved countries was the need for seniors to improve their digital skills: In France, private organisations propose relevant trainings especially dedicated to elderly. An example is the «Les Astroliens» organization who helps elderly people discover digital technology. The organisation pairs young students (18 -25 years old) with seniors. The classes can take place at the residence of the senior and are provided for free as the young teachers are volunteers. In Bulgaria, seniors can take a 3-day course on ICT skills, especially designed for people over 60 and it is offered as a group training. In Austria, there is the SeniorenColleg organization<sup>1</sup> that offers courses in addition to webinars for seniors. These courses include topics such as computer-related issues, use of smartphones and tablets. They are certified by the Federal Ministry of Labor, Social Affairs, Health and Consumer Protection as a Good Practice Model for Digital Senior Formation. In Cyprus a senior can take ICT courses at the Adult Education Centers but those are not specifically designed for seniors.

Overall, ICT skills seem to be an essential toolset for older people as well, as it creates opportunities for them not only for entertainment and socialisation but also for cognitive skills training.

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<sup>1</sup> <https://www.seniorencolleg.at/>

## Senior training using ICT

The study revealed various examples on how ICT is used in involved countries to support or prevent dementia symptoms. Some of the examples are seen as good practices by our team and are presented below.

- (Belgium) Seniors trainers in some rehabilitation care centers are using the Silver Fit Alois for Dementia [12], in order to train the cognitive skills of their seniors. They are taking the advantage of Kinect technology and are doing different activities. Seniors play with fun and challenging computer games that are customised especially to their needs. The games stimulate players to move, exercise their brains and enjoy of doing these activities with their friends.
- (Belgium) With SilverFit Mile [13] older people can enjoy a beautiful bike ride using a static bike. They can bike alone or with someone else. Users have the option to create their own route to bike. It projects a film so that the indoor experience resembles reality. Exercising has a very positive result in the physical health of seniors but also in their psychological status and cognitive abilities.
- (Cyprus) The Alzmindr application [9] is a smart mobile application for supporting seniors with dementia symptoms and allows carers to develop customized content for each user, such as reminders, activities using multimedia, photos, music, etc..
- (Cyprus) The STAGE project [11] allows seniors to enjoy entertainment through an online platform that offers access to cultural events and cultural content in their place, access on theatre plays, concerts, opera performances and museum exhibits in reasonable prices.

There are many other initiatives in involved countries that comprise mainly self-training applications. The emphasis is on turning older people more independent, making them ICT literate. Adopting a community-based approach, seems to help individuals by motivating them and making them enjoy more the activities, with results being directly observed by researchers. The self-training approach results are directly measurable since the software typically records and provides a progress report of the individual. Therefore, a mix intervention approach seems to be the correct way forward, addressing all skills more effectively, while keeping individuals motivated and engaged. Our study of the good practices across involved countries contributes to designing more appropriate interventions that will serve the real needs of our target users (people over 55 years).

## B. FINDINGS OF SURVEY

### Data collection and profile of participants

In total, 571 responses were collected as shown in Table 1, with the gender distribution presented in **Error! Reference source not found.** Participants were mainly in the following age ranges: Belgium 70-75 (38%) and 65-70 (23%); Bulgaria 55-60 (70%); Cyprus 55-60 (46,9%); France quite balanced with majority in 71-75 (27,8%); Turkey: 55-60 (28,6%) and 66-70 (25%); Austria 55-60 (39%).

Table 1. Data samples per country

| Countries    | Number of responders |
|--------------|----------------------|
| Belgium      | 96                   |
| Bulgaria     | 102                  |
| Cyprus       | 75                   |
| France       | 104                  |
| Turkey       | 84                   |
| Austria      | 110                  |
| <b>TOTAL</b> | <b>571</b>           |

Table 2. Gender distribution of participants

| Countries | Male %       | Female %     |
|-----------|--------------|--------------|
| Belgium   | <b>53%</b>   | 47%          |
| Bulgaria  | 33,7%        | <b>66,3%</b> |
| Cyprus    | 40,1%        | <b>59,9%</b> |
| France    | 36,1%        | <b>63,9%</b> |
| Turkey    | <b>53,6%</b> | 46,4%        |
| Austria   | 48%          | <b>52%</b>   |

## Health Related Challenges

Participants in Belgium reported health issues at a percentage of 49%, like hearing impairments, cardio-vascular problems, bones problems, etc. In Bulgaria, cardio-vascular and mobility challenges or visual challenges were mainly reported. In Cyprus, only 36.9% reported health issues such as cardiovascular diseases, visual problems or diabetes. In France, 40% of participants reported health issues like cardio-vascular diseases and hearing impairments. In Turkey 28.6% of participants reported diabetes and mobility challenges. Finally, in Austria 34% of participants reported hearing problems and 29% of them reported visual problems.

## Use of ICT technologies

In most of the involved countries, older people use mobile devices on a daily basis (smartphones or mobile phones), with tablets being very popular. Laptops are also very much used in Belgium and France, contrary to the other countries. Most of the participants across all involved countries never used e-readers.

In terms of ICT skills that participants consider useful to have, the majority across countries use or want to use emails or Skype for communicating with family and friends. The majority also want to use online browsing to read newspapers, with the exception of Turkey. Moreover, with the exception of Bulgaria, the majority of participants would like to be able to check their bank accounts online, submit their tax declarations or manage their electronic health record online. Less than half of the responders expressed interest in using social media, while editing photos or videos is not considered so important for participants. Smartphones have been reported as a very important tool across countries.

## **Cognitive Capacities**

In terms of memory capacity, the majority of participants in all countries but Belgium reported facing difficulties with their memory skills always or sometimes. More specifically, in Bulgaria they reported difficulties to remember personal belongings, important dates or to take their pills. In Cyprus, around 35% face difficulties in general with their memory skills with this percentage being 58% in Turkey and around 50% in Austria. In France, 60% of participants report that sometimes they face difficulties to remember things. It is noted, however, that the results are affected by the sample profile in each country.

In terms of attention capacities, participants in Belgium report facing problems sometime with the implementation of more than one task at the same time or with the focus on a task while having distractions (except for driving). In Bulgaria, Austria and Cyprus, participants face difficulties with maintaining attention while driving as well. In France, participants face less difficulties with staying focus, especially for long periods. On the contrary, in Turkey 45% of participants face difficulties to stay focus for a long period.

In terms of visual perception capacities, more than 60% of the respondents in Belgium report having a good ability to visualise images and to associate scenarios to accomplish a particular task. Same for Bulgaria, France and Turkey, however, respondents report challenges with interpreting maps, charts and diagrams. Almost half of the participants in Cyprus and Austria are experiencing visual perception challenges.

In terms of processing speed capacity, participants in Belgium do not experience problems with accurate calculation while shopping, neither with adaptation to a new environment. In Bulgaria, more than 60% face challenges with calculation. In Cyprus, one third of participants face difficulties related to speed processing. In France and Turkey, responders report having sometimes difficulties to calculate their shopping bill quickly and accurately. In Austria 46% face difficulties to calculate shopping bill quickly and accurately and 42% of the participants have difficulties to react quickly.

In terms of reasoning and planning capacity, around 70% in Belgium do not experience any problems in terms of forming ideas and organising something for a specific topic. In Bulgaria, around half of the respondents sometimes experienced problems on those topics, one third in Cyprus experience difficulties with organisation and planning. Difficulties to solve problems are reported in France, while no real problems on reasoning and planning are reported in Turkey or Austria.

Finally, in terms of sequential processing capacity, more than 60% of Belgium participants reported no challenges with putting things in order when thinking and no problem with planning things in a logical way. In Bulgaria, more than 50% of the respondents have difficulties to put

things in order and about one third of them face difficulties when they need to plan activities and events in a logical sequence. In Cyprus, around 23% of participants stated that they face difficulties related on sequential processing. This percentage is around one third in France and Austria and around 50% in Turkey.

### **Preferred learning methods**

Preferred methods Participants across countries prefer to learn through face-to-face classes, individually or in groups. Another preferred method of learning is from peers and with their family and friends (especially to learn how to use a smartphone or Internet). Around half of the respondents are eager to try learn online since they found it useful.

### **Leisure activities**

In their leisure time, participants like to play mind games like Sudoku and crosswords, spending time with friends or relatives, reading books, watching movies, travelling, playing sports, volunteering.

## **CONCLUSIONS AND FUTURE WORK**

As can be seen from this sample work, older people in involved countries face different obstacles that are related to their physical and mental health and need lots of support in order to deal or overcome those obstacles. The goal is to gain more quality of life. As a next step in our work, we will create certain cognitive skills learning objects that address the cognition dimensions reported in previous section. Based on the above results, different scenarios will be implemented in partner countries during focus groups which will involve also experts working with seniors. Finally, we will work on the training curriculum, which will include the training needs, objectives, action plan, initiatives, resources and assessment methods. The curriculum will be also translated in all partners' languages.

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## **EP14. INTERNATIONAL ASSISTED COMMUNICATION FOR EDUCATION (I-ACE): GREEK CONTRIBUTION**

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### **ABSTRACT**

In this paper we describe the International Assisted Communication for Education (I-ACE), a 2-year EU funded project in the framework of Erasmus+ Strategic Partnerships, started in October 2016 and it involves 7 partners across Europe. I-ACE aims to promote the access of deaf students to education and citizenship. I-ACE project delivers an automatic bi-directional translation between sign language and written speech across 6 different languages (Portuguese, Slovenian, Greek, German, Cyprus and UK sign languages). The project is a communication bridge between conventional classroom and the deaf student and between deaf and non-deaf people.

### **INTRODUCTION**

Hearing impaired students experience problems when attending mainstream schools unless they receive proper help and support. They face extra challenges in nowadays education settings as language barriers to fluent communication between deaf and non-deaf students arise naturally. Different forms and channels of communication by the deaf community and the rest of the students and teachers often lead to loss of information.

In the Sessional Paper No.1 of 2005 [1], the Kenyan Ministry of Education, Science and Technology stated that the special education is important for human capital development as it prepares those who are most likely to be dependants to become self-reliant. However, of importance is the fact that the hearing impaired are subjected to the same curriculum that the hearing pupils in regular primary schools follow. This may be unfair because there are some aspects of that syllabus which they cannot cope up with due to their special needs [2].

Sign language has a grammatical structure of its own which does not follow the spoken or written language [3]. Specifically, in sign language they use sentences only word by word while filtering out some elements of the speech, such as the articles. The order of these also comes in a structure for example having subject then object, then verb, often having the time and location referenced at the beginning of a sentence. As a result, when the hearing impaired child's sign language is compared with the spoken language, the learner is penalized because of the difference in language structure which negatively affects the way learners write compositions or answer comprehension questions [4].

The International Assisted Communication for Education (I-ACE) project establishes an innovative infrastructure to promote fluid communication in the classroom between deaf and non-deaf people. I-ACE was funded under the framework of EU Erasmus + Strategic Partnership action started Nov 1, 2016 and completed Dec 31, 2018 with the coordination of the Instituto Politecnico Do Porto and the participation of the European Association of Career Guidance, Cyprus, the Technological Educational Institute of Crete, Greece, the University of Maribor, Slovenia, the University of York, UK and the University of Siegen, Germany. It also provides facilities to promote the inclusion of young deaf students in society and in international settings. This infrastructure includes a set of communication strategies and tools to assist the communication among deaf people. In particular it will allow the automatic bi-directional translation between sign language and written speech using a 3D avatar. In this way it fosters the access to education and a better quality of life by reducing the communicational gap and preventing early school leaving. This infrastructure is based on the main output of Virtual Sign, a successful research project funded by Fundação para a ciência e Tecnologia (FCT) in the field of Sign Language Translation [5].

The I-ACE project transfers innovative research results in the area of assistive technologies from the Virtual Sign (VS) [6] research project and complements its outputs. VS is a former research project, funded by the Portuguese government and coordinated by the applicant institution of I-ACE. During the VS project the bidirectional translation between Portuguese Sign Language and written Portuguese was investigated. It became clear at VS that the ability of technological solutions to empower deaf people with effective communication facilities could be improved to address the translation between different national sign languages. The I-ACE project uses the VS outputs and adapts the Sign Language Translator to five sign languages of six partners' nationalities, Portuguese, German, British, Cypriot/Greek and Slovenian. I-ACE project proposes an architecture to support real time translation between sign and written speech between different European sign languages. This bidirectional translation is available to assist the communication between the deaf and non-deaf communities using this VS tools.

The overall aim of the I-ACE project is to promote access of deaf students to education and citizenship. The specific objectives are: 1) Shorten the barriers faced by deaf students in education, 2) Promote active citizenship of the European deaf Community [7].

The paper is organized as follows: After a brief introduction concerning hearing impaired students and the I-ACE project, information about hearing impaired people in Greece is presented. Subsequently, this paper presents the methods used by the experts of TEI of Crete to set up the automatic bi-directional sign language translator for Greek sign language as well as the actions taken in Heraklion Crete, Greece, with the intention of identifying opportunities for using translator in real environments. Furthermore, a statistical analysis of the results from a questionnaire completed by deaf students and sign language teachers is presented, followed by conclusions.

## **HEARING IMPAIRED PEOPLE IN GREECE**

Greek Sign Language (GSL) has been recognized as the official language of deaf people since 2000. Despite the fact that in Greece there are about 25,000 deaf/hearing aid people and about 40,000 with residual hearing and also that deafness has been recognized as a disability by certified centers (KEPA), its dissemination is limited to the groups of people with common hearing problems. This results in a total lack of communication with the rest of the world. From infancy,

deaf people find it difficult to communicate with their parents, their siblings, and people in the family environment, this resulting in the isolation of the person with hearing problems. Eventually, the person should be incorporated in society, attend school or study and be rehabilitated professionally to avoid encountering enormous difficulties. Many people abandon their studies because there is no provision for them in the educational institutions. We could say that deaf and hearing impaired people live a mediocre quality of everyday life at all levels, from education to professional rehabilitation. Furthermore, they are socially excluded and the system needs total upgrading. Still, with the help of technology, such as that of mobile phones or some devices and programs on the computer, the communication process between the deaf and non-deaf can be improved to a great extent, in most cases [8].

The GSL is a natural visual language used by the members of the Greek deaf community with several thousands of native or non-native signers and it is not a representation of spoken language to another format, such as written language. Sign language (SL) is not universal as there are many SLs in the world: the American SL used in the US and Canada, the British SL, the Japanese SL etc. GSL follows a verbal as well as syntactic structure in order to express any abstract meaning. Furthermore, GSL has a set of strict grammatical and syntactical rules. In order to delimit these rules, GSL uses space and motion. Its vocabulary is rich, although there is no scientific research on its recording. GSL has no written form, but the theatrical plays on the deaf community are recorded on tape and stories are transmitted from generation to generation [9].

According to the office for the disabled people in Greece, there are 100.000 people with special needs in Greece. About 10.000 of them are deaf and hard of hearing. Unfortunately, the statistics show that the unemployment increasing rate of the disabled people in Greece are three to four times higher than the corresponding rate of the remaining population. Two main reasons can be identified for these special employment conditions: One, an inadequate estimate of the performance abilities of the deaf, and, secondly, the communicative problems between deaf and hearing colleagues [10].

GSL is a system constantly evolving and renewing, thus offering a world full of possibilities. It remains to be understood, accepted and respected. For this reason, we need an architecture able to withstand the complexity of sign languages, their interactions and how they evolve.

## **GREEK APPLICATION OF THE I-ACE PROJECT**

The aim of this project was to set up the automatic bi-directional sign language translator for GSL. For this reason, information for structural rules of GSL was gathered by interviews and meetings with deaf people and teachers of the deaf.

Two main Virtual Sign tools assist in the text-to-sign translation module: the Translator and the Configurator, both of them are components of the Virtual Sign Studio Online (VSSO) [6]. These tools are developed in Unity and built into Web Graphics Library (WebGL), so they can be used online through most popular internet browsers. VSSO translator works like an online application and is meant to be used daily at convenience. Users can write text in a white box, which then it be translated to any of the I-ACE partner's languages including so far: Portuguese, Slovenian, German, British, Greek/Cypriot sign languages. Our avatar does the required animations as gestures performing the translation of text to sign language. The translation is performed by our 3D avatar, checks the input words in our validated sign database, which returns the gesture information according to the specific country sign language grammar rules. Another utility of this tool is it can serve as connection from text to animation for other tools, digital games, plugins and

the other software by calling VSSO translator methods [5]. The system works by treating each word or phrase that would be spoken to a deaf person and breaking the signed equivalent into a series of “moments”. All words and phrases are stored to a database within the system. Each word and phrase are configured as a series of these “moments” starting at the initial moment and ending in the final moment. Each moment is an orientation of the fingers, hands, arms, body, head and facial expression in 3D space. The moments are based on the “Sign Language Hand Configurations” [7].

As a first step, for GSL, the experts of TEI of Crete, based on the dictionary of GSL, imported the selected hand configurations in the system and then they gave a meaning of each hand configuration. As a second step, 500 words were inserted to the program. It is obvious that a word in a sign language is consisted of more than one moments and each moment may use a different hand configuration. For this reason, the experts, for each word customized arms, hand configuration, body movement, head and facial expression of the avatar according to the GSL rules. Furthermore, after the creation of a sign, experts could reuse and import other similar gestures and edit accordingly to the new gesture being configured. Subsequently, the experts, through the procedure of validation, checked if the inserted words were correct. The signs had three states, validated in review and not validated. Once the words were validated, they became automatically available for the translator tool, which was updated in real time. After importing the Greek model, the avatar was considered “trained”. Therefore, he could translate Greek text to Greek Sign Language [11].

## **ACTION IN GREECE**

I-ACE project aims to solve deaf communication problems in the society by removing technologic communication barriers and creating a data structure able to withstand the complexity of multiple sign languages granting accessibility and independency. For this reason, in addition to the development of the automatic bi-directional sign language translator for GSL, a number of actions were taken in Heraklion Crete, Greece.

The I-ACE project core activities were organized in three stages: a) preparatory, b) implementation, and c) closure. The preparatory stage included the creation of a focus group. The main aim of the focus group was to investigate the communication challenges faced by Greek deaf students, the solutions currently available, the key players acting in the field (governmental bodies, associations, public and private institutions) and Europe-wide initiatives addressing these issues. This investigation was carried out through desk research and online surveys. Furthermore, meetings were arranged with deaf people, representatives of Cretan deaf club and teachers from the special primary school for deaf children. Participants of the meetings were asked questions and discussed the problems they face in a predefined set of situations. They also investigated ideas and possible solutions to overcoming the barriers faced by deaf youngsters in education.

The implementation stage, where the automatic bi-directional sign language translator was adapted in GSL, was described in the previous section.

Finally, the closure stage took place. This stage included the pilot installation of the European sign language translator in the special primary school for deaf and hard hearing students in Heraklion of Crete and its duration was approximately 2 hours. This event was divided into three phases. In the beginning, a video of John, the I-ACE 3D avatar, was presented. In this video the rules of the Tic-Tac-Toe game were explained and information about the knockout competition where the students would be engaged afterwards was given. John explained the game in Greek

Sign Language and the students played Tic/Tac/Toe at our online application following John's indications. This phase took approximately 40 to 45 minutes. Subsequently, the students were introduced to the I-ACE translator and the configuration tool. After a brief introduction and a live demo on how to use it, the students were asked to login to the configurator (with the workshop credentials) and try it. At this hands-on session, students used the configurator to import words in GSL by themselves. This second phase of the pilot took approximately one hour. In the end of the event, students and teachers were asked to fill in a questionnaire to assess the functionality of John, the 3D avatar, as well as the quality of the translator. The duration of the assessment phase was about 30 minutes.

After the conclusion of the pilot experimental period, the research team of TEI of Crete participated in a workshop held in Porto, Portugal where representatives from the other partners participated as well. In this workshop, the pilot experience results, the outcomes of the project and the added value of the I-ACE software as effective assistive technology solutions to promote inclusive school and the inclusion of deaf students in society were discussed.

## STATISTICAL ANALYSIS

Six deaf students and four sign language teachers participated in the pilot installation event. According to the questionnaire, the average age of the participants was 19,4 years (two of the participants didn't write their age). Table 1 shows the results of the questionnaire.

Table 1: Questionnaire

|                                                |       |
|------------------------------------------------|-------|
| Deaf                                           | 6     |
| Sign language teachers                         | 4     |
| Age                                            | 19,40 |
| Usefulness                                     | 100%  |
| Understandability                              | 90%   |
| Speed                                          | 90%   |
| At home                                        | 100%  |
| At school                                      | 100%  |
| Willingness to participate in similar projects | 30%   |

The main results arising from the evaluation questionnaire showed that deaf and sign language teachers found the sign language translator significantly useful. The translation pace was quite good although one person found it very fast. The majority of the participants would like to have the European sign language translator available both at home (100%) and school (100%). The low percentage in willingness to participate in similar projects was anticipated due to the fact that 6 out of 10 participants were very young students.

Participants were also asked to suggest improvements about the tool. Table 2 summarizes the suggestions were made by the participants. The lack of expressive facial expression was identified as the main issue. Apart from the facial expression, it was clear that the other major issue was the vocabulary enrichment. Although all participants found the 3D avatar as a very useful educational tool, the lack of an extensive vocabulary limited its functionality. Another aspect

that was mentioned by the students was related to the size of the avatar when explaining how to play tic-tac-toe; they complained that the avatar image was very small. Also, the movements in some cases were not clear.

Besides the prementioned suggestions concerning translation, aesthetic changes were asked to be made in a future version such as colours and 3D model. The evaluation and the discussion with the participants regarding their experience with the 3D avatar gave us clear guidelines on the main aspects to improve in relation to the translator.

Table 2: Suggestions

|    |                                                               |
|----|---------------------------------------------------------------|
| 1  | facial expression                                             |
| 2  | facial expression                                             |
| 3  | more colours                                                  |
| 4  | body movement                                                 |
| 5  | facial expression                                             |
| 6  | facial expression, body movement                              |
| 7  | Slightly slower speed                                         |
| 8  | speed, facial expression, clearer movement                    |
| 9  | speed, facial expression, movement                            |
| 10 | speed, facial expression, better application, 3D presentation |

## CONCLUSIONS

This project addresses the lack of adaptability of schools and educational organizations in general to individuals with special needs. The main intention of the I-ACE consortium was to take the first steps for the inclusion of these individuals by developing a methodology to support the automatic translation of the educational contents of the different course units from the schools of the partner's countries into each national sign language.

The benefits of the I-ACE project are multiple and can affect students, teachers and everyone involved in the educational process. Using the European sign language translator, deaf and hard hearing students have the chance to acquire access to knowledge and information. Therefore, their involvement in the learning process is increased and their ability to understand and handle the incoming information is enhanced. Furthermore, teachers for deaf students can use the translator in the design and implementation of educational programs, in the evaluation process and in many other pedagogical duties.

I-ACE architecture has been also prepared to work with several distinct sign languages making it possible to have deaf people from different countries understanding each other. This is of great significance as it helps preserve their culture and makes users friendlier.

Statistical analysis of this research project showed that Greek deaf students and sign language teachers found the sign language translator significantly useful. Specifically, the majority of the participants found the translation pace quite good and the 3D avatar very useful educational tool. However, suggesting improvements about the tool, the participants mentioned the lack of the facial expression of the avatar and the poor vocabulary as the two main disadvantages.

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# **CAREER-EU CONFERENCE PRESENTATIONS**

## **CP3. SELF-EFFICACY IN DECISION-MAKING IN CAREER PLANNING OF LYCEUM STUDENTS IN CYPRUS**

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### **ABSTRACT**

The present study aims at investigating self-efficacy in career planning and career decision-making of third grade Lyceum students in Cyprus. The sample were 177 students of high schools (public schools of Paphos in Cyprus). The results showed that the intervention group compared to the control group of the 3rd grade of high school exhibited higher level of Career management, Career skills and Creativity at Work. Also, the intervention group compared to the control group of the 3rd grade of high school exhibited higher level of Speed of making the final decision, Consultation with others and aspiration for an ideal occupation. Finally, there was no other statistical difference between the two groups in relation to the information gathering and processing, desire to please others- dependence on others, internal locus of control, willingness to compromise and Flexibility at Work.

**Keywords:** self-efficacy, decision-making, career, Lyceum

### **INTRODUCTION**

Decision-making in career planning refers to the actions of an individual, which have to do with career decisions, approaches of these decisions, by choosing the best possible actions to implement those decisions (Facione & Facione, 2007). Vocational researchers and practitioners support that making career decisions does not only refer to the content of the decisions, but also to the decision-making process, that is, the way people approach their choices (Sidiropoulou-Dimakakou, 2010). In addition, decision management helps the individual's competitiveness in the labor market, in the active search of job opportunities and in the adaptation of the individual in the various changes and transitions of their career path (Bimrose & Hearne, 2012). However, the technological, social and economic changes of recent decades have led to the emergence of an unstable world of work, in which the question of what one wants to do as work is becoming increasingly difficult to answer (Gati, 2013). These changes in the world of work have led to an increase in the number of transitions from one job to another during one's life (Bright & Pryor, 2005).



For that reason, the traditional view that career decisions are made only once in one's lifetime, is now outdated and has been replaced by the view that taking career decisions is an ongoing iterative process (Savickas, 2011). Thus, although people used to face irreversible choices in their career path, today the young adults often have to go through several successive decisions and frequently reassess their previous career decisions or even to adapt their behavior and goals in order to effectively manage their career planning (Di Fabio et al., 2015). Consequently, the development of decision-making skills and the confidence in ourselves when exploring career choices emphasize on the concept of employability, since they help us to use the internal powers of our personality and cope with the constant changes in our career path (Rothwell & Arnold, 2005). In light of this, the strengthening of self-efficacy in making career decisions can enable young people to have positive feelings for themselves and the changes that occur in their lives, to acquire the ability to adapt to the new situations and find solutions acting as co-creators of their career decisions. Our views align with McIlveen's (2015) considerations, who claims that today, career counseling practice should place more emphasis on its preventive - educational role with the aim of supporting clients to act proactively in order to confront career decision making demands. We contend that this aim can be realized by helping clients acquire and develop a set of core lifelong career management skills where perceived self-efficacy in career holds significance importance.

## **INDIVIDUAL DIFFERENCES IN DECISION-MAKING: DECISION-MAKING PROFILES OR STYLES**

People do not make decisions in the same way. The styles or the decision-making strategies refer to how individuals think and act in the selection process. These styles reveal both the academic field and the emotional aspect of the behavior and show us the method used by an individual so that his decision will have the best possible outcome (Sidiropoulou-Dimakakou, Argyropoulou & Drosos, 2010). For instance, some individuals rely on others or try to please significant others; other individuals may have a more independent approach to career decision making, with an internal locus of control, as well as an active engagement in collecting information (Harren, 1979). It is important for career counselors to become familiar with their clients' typical decision-making behavior so they can tailor the counseling process to the unique way each of their clients makes career decisions. Indeed, studies have shown that individuals with different approaches to career decision making tend to respond best to counseling that is tailored to their particular style (Amit & Gati, 2013). On the basis of the claim that this is an oversimplification, Gati and his colleagues (Gati, Gadassi, & Mashiah-Cohen, 2012) proposed an alternative approach the career decision making profiles, which is used to characterize the ways individuals make career decisions. Using profile rather than style to describe the ways individuals make career decisions indicates a more complex, multidimensional construct with several characteristics and acknowledges the influence of both personality and situational factors on different decision-making tasks.

On the basis of a systematic analysis of previous research that focused on styles and subsequent empirical tests career decision making profiles were identified as making up clients' career decision-making profiles: information gathering (minimal vs. comprehensive), information processing (holistic vs. analytic), locus of procrastination (high vs. low), speed of making the final decision (slow vs. fast), consultation with others (rare vs. frequent), dependence on others (high vs. low), desire to please others (high vs. low), aspiration for an ideal occupation (low vs. high), willingness to compromise (low vs. high), and using intuition (little vs. much) (Gati & Levin, 2014). Career decision making profiles can contribute to the counseling process such as help the client

for making more adaptive career decision (Gadassi, Gati, & Dayan, 2012) and confront fewer career decision-making difficulties (Tian et al., 2013).

In this context, strengthening the career decision-making profile of young people during their studies in the secondary education school will enable them to explore potential opportunities and personal capabilities and to manage the complex factors involved in taking career decisions (Sidiropoulou-Dimakakou, Argyropoulou & Drossos, 2010). Thus, deciding on a career is a very demanding activity for students leaving school and are in the process of transition to the labor market, which are to perform with responsibility.

## **PERCEIVED SELF-EFFICACY IN CAREER PLANNING**

The concept of self-efficacy was introduced in psychology by A. Bandura (1997) and its importance is considered crucial to the science of career counseling in the last 25 years (Betz, 2000). Given the importance of the cognitive expectations and especially self-efficacy beliefs in the choice of an alternative behavior and the successful outcome of various conditions, the importance of interpreting and predicting the individual's behavior was quickly perceived during the career development processes (Kaliris & Sidiropoulou-Dimakakou, 2012).

*Perceived self-efficacy in career planning* refers to the beliefs people form in terms of their ability to implement the appropriate actions required to effectively decide about various career issues (Sidiropoulou-Dimakakou, Mylonas, & Argyropoulou, 2015a). Perceived self-efficacy in career planning is a new variable, which can be applied in career counseling in order to understand the person's thinking and action framework in exploring careers opportunities and/or to enhance the capacity of the individual through which the cognitive, social and behavioral skills are organized into a single course of action to achieve the career goals. A relatively high degree of self-efficacy in career planning may strengthen the ability through which cognitive, social and behavioral skills are organized into a single course of action for the achievement of career objectives. Moreover, employees equipped with high self-efficacy levels are more likely to perform occupational roles innovatively, whereas those with low self-efficacy levels are prone to processing occupational duties conventionally and with little personal embellishment (Sidiropoulou-Dimakakou, Argyropoulou & Mylonas, 2015b). All in all, it is concluded that both the decision-making characteristics and the perceived self-efficacy in career planning are considered important and necessary skills for an effective career management and response in a labor market that is distinguished by complexity and high volatility.

## **AIM OF THE STUDY AND RESEARCH QUESTIONS**

Our aim was to explore the decision-making and self-efficacy in career planning in Cypriot students of the 1<sup>st</sup> and 3<sup>rd</sup> grade of Lyceum. More specifically, the aim is to investigate whether the intervention group of 3<sup>rd</sup> grade of high school improved in the area of Career Decision-Making Profile and Perceived self -efficacy in career planning due to the intervention that was implemented in of high school. There is a lack of studies examining the impact of self-efficacy in career planning in the development of career decision making profiles. This is a gap in bibliography we intended to fill with this study. In particular, the following research questions were addressed:

1. Which are the differences between the control group and the intervention group in relation to the Career Decision-Making Profile (1st grade)?

2. Which are the differences between the control group and the intervention group in relation to the Perceived self – efficacy in career planning (1st grade)?
3. Which are the differences between the control group and the intervention group in relation to the Career Decision-Making Profile (3rd grade)?
4. Which are the differences between the control group and the intervention group in relation to the Perceived self – efficacy in career planning (3rd grade)?

## **METHOD**

### **RESEARCH DESIGN**

The research method chosen was quantitative. The purpose of quantitative research is to find relationships between different actors. Quantitative research refers to the systematic investigation of phenomena with statistical methods, mathematical models and numerical data. A typical sample of observations is usually used and generalization is sought in a wider population. Data collection is done through structured protocols, such as questionnaires, scales, and proofs of achievement. The researcher selected 177 students of the 1st grade of the high school. Students were split into two groups, the control group with 50 students and the intervention group with 127 students. In the 1<sup>st</sup> grade all students were measured in relation to their Career Decision-Making Profile and their Perceived self-efficacy in career planning. Afterwards in the group of the 127 students the researcher implemented a training process regarding the Career Decision-Making Profile and the Perceived self-efficacy in career planning. After, this intervention the two groups were examined again with the same research tools in the 3<sup>rd</sup> grade of the high school.

### **PARTICIPANTS**

177 students of the 1<sup>st</sup> grade of the high school (public schools of Paphos in Cyprus) were gathered (100 female students and 77 male students). Furthermore, 130 of the students were 15 years old and 47 were 16 years old.

### **MEASURES**

*Perceived self-efficacy in career.* Perceived Self-efficacy in Career Scale (PSECS; Sidiropoulou-Dimakakou et al., 2012) was used to explore career self-efficacy beliefs. The 21-item scale has reached adequate psychometric properties in studies with adults ( $N = 126$ ) and Lyceum students ( $N = 276$ ). Four dimensions were supported by exploratory and confirmatory factor analyses (Sidiropoulou-Dimakakou et al., 2015): *Career management* represents individual's ability to cope effectively with practical and emotional issues in career (e.g. "I believe I am able to achieve most of the career goals that I have set for myself despite the current social and economic difficulties"); *Career skills* relates to the utilization of organizational skills and performance when working under harsh conditions (e.g. "In general, I can think of alternative ways to better organize my work and become more efficient"); *Flexibility at work* refers to a person's ability to adapt to transitions and changes that may occur in the workplace (e.g. "Even when duties in my job change, I am able to perform efficiently"); *Creativity at work* represents active interest in career through creativity and ingenuity (e.g. "Thanks to my resourcefulness, I know how to deal with unexpected situations in my work"). Items are scored on a 5-point Likert-type scale (1 = no confidence at all, 5 = complete confidence). Alpha estimates in this sample were high for the total scale ( $\alpha = .91$ ) as well as for the sub-scales (.80, .75, .75, .80).

*Career Decision-Making Profile Questionnaire.* For the measurement of specific characteristics in career decision-making the Career Decision-Making Profile Questionnaire was used adapted to the Greek language (Sidiropoulou-Dimakakou, Argyropoulou & Drossos, 2010). The CDMP includes 36 questions and the adaptation to the Greek language works best using seven factors. The participant evaluates the degree to which each question describes their opinion better using a 7-point Likert scale (1 = totally disagree to 7 = totally agree).

Specifically, the first factor, *Speed of making the final decision*, evaluates the time it takes for the individuals to make a final decision when the necessary information is available. The second factor, *Information gathering and processing*, evaluates the extent to which the individuals are very careful when collecting information, analyzing their components and processes it according to these components. The third factor, *Desire to please others- dependence on others* evaluates the extent to which the individuals seek to satisfy their significant others (e.g., parents, partner, friends) and wish to avoid full responsibility for deciding by themselves, waiting for the decision of others. The fourth factor, *Consultation with others*, evaluates the extent to which the individuals, as they pass through the different stages of the decision-making process, seek the advice of others. The fifth factor, *Internal locus of control*, evaluates the extent to which the individuals believe that they control their future career and feel that the decisions they take affect their future career opportunities. The sixth factor, *Aspiration for an ideal occupation*, evaluates the extent to which the individuals are trying to find a job that is perfect for them. Finally, the seventh factor, *Willingness to compromise*, evaluates the extent to which the individuals are willing to show flexibility when facing difficulties and obstacles to the realization of their choices and switch to other alternatives.

The results of the reliability analysis were very satisfactory for every subscale of the questionnaire. More precisely the results were the following: Speed of making the final decision (.69), Information gathering and processing (.66), Desire to please others- dependence on others (.76), Consultation with others (.69), Internal locus of control (.63), Aspiration for an ideal occupation (.61) and Willingness to compromise (.64).

*Demographics.* A questionnaire was employed to gather data on students' gender, age, school grades, and the parents' educational level.

## **PROCESS**

The collection of the participants lasted for 3 weeks in four different Lyceums in Cyprus. Participants filled the questionnaires during the educational time. All participants informed about the subject of the research and that their participation was voluntarily and could withdraw from the research any time they wanted. The fulfillment of the questionnaire lasted about 20-25 minutes.

## **STATISTICAL ANALYSIS**

In this study descriptive and inferential statistics have been used. More precisely, the non-parametric test Mann Whitney was used in order to test whether there are any statistical differences between the intervention and the control group in relation to the Career Decision-Making Profile and Perceived self-efficacy in career planning (the data did not follow the normal distribution, Shapiro Wilk test). The statistical software SPSS22.0 was used in order to conduct the statistical analysis.

## RESULTS

**Table 1**

*Differences between the control group and the intervention group in relation to the Career Decision-Making Profile (1<sup>st</sup> grade)*

|                                               | Group              |      |               |      | U        | p    |
|-----------------------------------------------|--------------------|------|---------------|------|----------|------|
|                                               | Intervention group |      | Control group |      |          |      |
|                                               | M                  | SD   | M             | SD   |          |      |
| Speed of making the final decision            | 3.31               | .86  | 3.12          | .27  | 2732.500 | .148 |
| Information gathering and processing          | 5.01               | .88  | 5.10          | .80  | 3021.500 | .617 |
| Desire to please others- dependence on others | 2.84               | 1.19 | 2.81          | 1.19 | 3168.500 | .983 |
| Consultation with others                      | 4.64               | 1.34 | 4.75          | 1.27 | 3073.000 | .739 |
| Internal locus of control                     | 5.08               | 1.28 | 5.20          | 1.25 | 3071.000 | .734 |
| Aspiration for an ideal occupation            | 5.70               | 1.02 | 5.72          | .87  | 3111.000 | .834 |
| Willingness to compromise                     | 4.23               | 1.39 | 4.25          | 1.30 | 3172.000 | .992 |

According to table 1 there is no statistical difference between the students of the control group and the students of the intervention group of the 1<sup>st</sup> grade of high school in relation to the career decision – making profile (all p – values are above the significant level,  $\alpha = .05$ )

**Table 2**

*Differences between the control group and the intervention group in relation to the Perceived self – efficacy in career planning (1<sup>st</sup> grade)*

| a                   | Group              |     |               |     | U        | p    |
|---------------------|--------------------|-----|---------------|-----|----------|------|
|                     | Intervention group |     | Control group |     |          |      |
|                     | M                  | SD  | M             | SD  |          |      |
| Career management   | 3.91               | .61 | 3.84          | .58 | 3003.500 | .574 |
| Career skills       | 3.66               | .63 | 3.59          | .55 | 2994.000 | .554 |
| Flexibility at Work | 3.59               | .69 | 3.53          | .62 | 3038.500 | .654 |
| Creativity at Work  | 3.69               | .61 | 3.70          | .54 | 3163.000 | .969 |

According to table 2 there is no statistical difference between the students of the control group and the students of the intervention group of the 1<sup>st</sup> grade of high school in relation to the perceived self efficacy in career planning (all p – values are above the significant level,  $\alpha = .05$ )

**Table 3**

*Differences between the control group and the intervention group in relation to the Career Decision-Making Profile (3<sup>rd</sup> grade)*

|                                               | Group              |      |               |      |                   |             |
|-----------------------------------------------|--------------------|------|---------------|------|-------------------|-------------|
|                                               | Intervention group |      | Control group |      | U                 | p           |
|                                               | M                  | SD   | M             | SD   |                   |             |
| Speed of making the final decision            | 4.50               | .37  | 2.79          | .11  | <b>0.000**</b>    | <b>.000</b> |
| Information gathering and processing          | 4.51               | .81  | 4.65          | .77  | 2992.500          | .551        |
| Desire to please others- dependence on others | 2.81               | 1.05 | 2.96          | 1.12 | 2830.500          | .260        |
| Consultation with others                      | 4.79               | 1.17 | 4.23          | 1.09 | <b>2292.000*</b>  | <b>.004</b> |
| Internal locus of control                     | 4.90               | 1.18 | 4.65          | 1.34 | 2887.500          | .346        |
| Aspiration for an ideal occupation            | 5.74               | 1.03 | 5.44          | .84  | <b>2482.000 *</b> | <b>.023</b> |
| Willingness to compromise                     | 4.11               | 1.34 | 4.12          | 1.07 | 3170.500          | .988        |

\*p <.05, \*\*p<.01

According to table 3 students of the intervention group compared to the control group of the 3<sup>rd</sup> grade of high school exhibited higher level of Speed of making the final decision ( $M_I=4.50$ ,  $SD_I=.37$  vs  $M_C= 2.79$ ,  $SD_C= .11$ ), Consultation with others ( $M_I=4.79$ ,  $SD_I= 1.17$  vs  $M_C= 4.23$ ,  $SD_C= 1.09$ ) and aspiration for an ideal occupation ( $M_I=5.74$ ,  $SD_I= 1.03$  vs  $M_C= 5.44$ ,  $SD_C= .84$ ). There was no other statistical difference between the two groups in relation to the information gathering and processing, desire to please others- dependence on others, internal locus of control and willingness to compromise.

**Table 4**

*Differences between the control group and the intervention group in relation to the Perceived self – efficacy in career planning (3<sup>rd</sup> grade)*

|                     | Group              |     |               |     |                   |             |
|---------------------|--------------------|-----|---------------|-----|-------------------|-------------|
|                     | Intervention group |     | Control group |     | U                 | p           |
|                     | M                  | SD  | M             | SD  |                   |             |
| Career management   | 3.92               | .60 | 3.70          | .35 | <b>2334.000**</b> | <b>.006</b> |
| Career skills       | 3.64               | .69 | 3.38          | .50 | <b>2387.000*</b>  | <b>.010</b> |
| Flexibility at Work | 3.45               | .78 | 3.53          | .50 | 2978.000          | .517        |
| Creativity at Work  | 3.61               | .70 | 3.43          | .38 | <b>2540.000*</b>  | <b>.037</b> |

\*p <.05, \*\*p<.01

According to table 4 students of the intervention group compared to the control group of the 3<sup>rd</sup> grade of high school exhibited higher level of Career management ( $M_I=3.92$ ,  $SD_I=.60$  vs  $M_C= 3.70$ ,  $SD_C= .35$ ), Career skills ( $M_I=3.64$ ,  $SD_I=.69$  vs  $M_C= 3.38$ ,  $SD_C= .50$ ) and Creativity at Work ( $M_I=3.61$ ,  $SD_I=.70$  vs  $M_C= 3.43$ ,  $SD_C= .38$ ). There was no other statistical difference between the two groups in relation to Flexibility at Work.

## DISCUSSION

This study aimed to investigate whether the intervention group of the 3<sup>rd</sup> grade of high school improved in the area of *Career Decision-Making Profile and Perceived self – efficacy in career planning* due to the intervention that was implemented in 1<sup>st</sup> grade of high school. The statistical analysis resulted that the intervention group compared to the control group of the 3<sup>rd</sup> grade of high school exhibited higher level of Career management, Career skills and Creativity at Work. Also, the intervention group compared to the control group of the 3<sup>rd</sup> grade of high school exhibited higher level of Speed of making the final decision, Consultation with others and aspiration for an ideal occupation. Finally, there was no other statistical difference between the two groups in relation to the information gathering and processing, desire to please others- dependence on others, internal locus of control, willingness to compromise and Flexibility at Work.

The high importance that the students attach in finding the ideal profession might be related to the current market situation. Given the crisis and the difficulties of finding a job, the right choice and the identification of the ideal profession is important to enable the students to enter the labor market under an assurance and stability climate to effectively build their future. Though the intervention helped the students of the intervention group to increase their abilities in career decision-making profile and perceived self – efficacy in career planning, it seems that is effective to be used in students. This is important because the successes strengthen and stabilize self-efficacy beliefs, while the failures undermine the beliefs of the individuals as to their competence in various fields (Kaliris & Sidiropoulou-Dimakakou, 2012).

In any case, what became clear from this work is that both the decision-making characteristics and the self-efficacy in career planning are considered important and necessary skills for the effective career management and response in a labor market which is characterized by complexity and high volatility. The development of decision-making skills and faith in ourselves in exploring career decisions attributes the emphasis on the concept of employability, helping us to use our internal powers and to cope with the constant changes in our career path (European Lifelong Guidance Policy Network, 2012).

A major limitation of the study is the use of a sample derived only from one region in Cyprus. However, this is a limitation we aim to address in the future by expanding the present research into many other regions. Another similar limitation relates to the fact that the two research scales were not examined over time, so it cannot be argued that the decision-making method is a factor of mobilization of self-efficacy in career planning, or rather that high self-efficacy in career planning, results in a high degree of career decision-making skills. Another drawback that should be addressed in future research refers to the sample collection method that was coincidental, and the conclusions apply only to people with the same characteristics of the study sample. In future studies, it would be recommended to explore the decision-making method in relation to the perception of students on their future career choices, to stay or not in the Cypriot labor market, and the self-efficacy in career planning with unemployment. In our country, which is experiencing a particular combination of economic, social and cultural conditions, the continuation of the research project would have great interest in this direction.

All in all, the findings of this research contribute by guiding the career consultants to formulate and evaluate programs and interventions for the development of career decision-making skills and career planning and teach young people how to monitor their time while developing all aspects of their personality in order to assume an active and effective role in the development of their careers.

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## APPENDIX

### Tests of Normality<sup>a</sup>

|                                              | Kolmogorov-Smirnov <sup>b</sup> |     |      | Shapiro-Wilk |     |      |
|----------------------------------------------|---------------------------------|-----|------|--------------|-----|------|
|                                              | Statistic                       | df  | Sig. | Statistic    | df  | Sig. |
| Speed of making the final decision           | ,096                            | 177 | ,000 | ,974         | 177 | ,002 |
| Information gathering and processing         | ,066                            | 177 | ,060 | ,985         | 177 | ,062 |
| Desire to please others-dependence on others | ,084                            | 177 | ,004 | ,967         | 177 | ,000 |
| Consultation with others                     | ,109                            | 177 | ,000 | ,972         | 177 | ,001 |
| Internal locus of control                    | ,094                            | 177 | ,001 | ,955         | 177 | ,000 |
| Aspiration for an ideal occupation           | ,113                            | 177 | ,000 | ,940         | 177 | ,000 |
| Willingness to compromise                    | ,105                            | 177 | ,000 | ,970         | 177 | ,001 |
| Career management                            | ,110                            | 177 | ,000 | ,974         | 177 | ,002 |
| Career skills                                | ,092                            | 177 | ,001 | ,982         | 177 | ,023 |
| Flexibility at Work                          | ,088                            | 177 | ,002 | ,975         | 177 | ,003 |
| Creativity at Work                           | ,104                            | 177 | ,000 | ,977         | 177 | ,005 |

a. Grade = 1st grade of high school

b. Lilliefors Significance Correction

### Tests of Normality<sup>a</sup>

|                                              | Kolmogorov-Smirnov <sup>b</sup> |     |      | Shapiro-Wilk |     |      |
|----------------------------------------------|---------------------------------|-----|------|--------------|-----|------|
|                                              | Statistic                       | df  | Sig. | Statistic    | df  | Sig. |
| Speed of making the final decision           | ,231                            | 177 | ,000 | ,860         | 177 | ,000 |
| Information gathering and processing         | ,123                            | 177 | ,000 | ,943         | 177 | ,000 |
| Desire to please others-dependence on others | ,158                            | 177 | ,000 | ,954         | 177 | ,000 |
| Consultation with others                     | ,103                            | 177 | ,000 | ,966         | 177 | ,000 |
| Internal locus of control                    | ,099                            | 177 | ,000 | ,967         | 177 | ,000 |
| Aspiration for an ideal occupation           | ,161                            | 177 | ,000 | ,934         | 177 | ,000 |
| Willingness to compromise                    | ,160                            | 177 | ,000 | ,931         | 177 | ,000 |
| Career management                            | ,125                            | 177 | ,000 | ,969         | 177 | ,001 |
| Career skills                                | ,135                            | 177 | ,000 | ,952         | 177 | ,000 |
| Flexibility at Work                          | ,129                            | 177 | ,000 | ,961         | 177 | ,000 |
| Creativity at Work                           | ,096                            | 177 | ,000 | ,968         | 177 | ,000 |

a. Grade = 3rd grade of high school

b. Lilliefors Significance Correction

## **CP4. CRITICAL THINKING IN VOCATIONAL TRAINING**

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### **ABSTRACT**

Critical thinking, its foundations and methodology are necessary in the teaching-learning process at all levels. From early childhood to university, professionals and researchers of education emphasize the importance of the development of critical thinking skills for the teaching-learning process in order to obtain satisfactory results during the learning period of every student. However, perhaps due to the more instrumental and practical nature of the teachings of vocational training, the development of critical thinking skills is not as widespread as in other education sectors.

In this article some first guidelines to mitigate this situation are given. First, what is meant by critical thinking is succinctly described -since there are different explanations more or less complementary about its definition and objectives- and also what are its essential features. The following explains which of these features are considered particularly relevant to be taken into account in the curriculums of vocational education. Finally, there is a description of some didactic strategies that are considered to be more efficient to be used by the VET providers in order to obtain an optimal performance in their educational task, and thus educate students better prepared for the job market but also more aware of the principles of active citizenship.

### **1. CRITICAL THINKING. TWO COMPLEMENTARY MEANINGS**

Using critical thinking means using reason to try to prove with intellectual honesty the foundations of our points of view and our conclusions. It consists of trying to evaluate as objectively as possible the quality of the evidence on which a statement is based. But all this from a "constructive" point of view, that is, with the intention of using our conclusions for a transformative action of society. Nevertheless there is no generalized consensus on the concept of critical thinking. Following several researchers (Wacquant, 2006; Balaguer 2018) there are two major approaches to the idea of it:

a) A Kantian approach that "in the line of the philosopher of Königsberg designates the evaluative examination of the categories and forms of knowledge in order to determine the validity and cognitive value" (Wacquant, 2006, p.44). The critical nature of this first meaning puts the emphasis on the search for a reliable and universally validatable knowledge, in an "epistemological honesty" that allows offering acceptable results for the scientific community in a broad sense.

b) A Marxist approach that "points the weapons of reason towards the sociohistorical reality and aims to unveil the hidden forms of domination and exploitation to reveal, in negative terms, the alternatives that obstruct and exclude" (Wacquant, 2006, p.44). In this second sense, however, the emphasis of the term "critical" is on its transforming potential, on the capacity to offer alternatives to shape a better world, free of exploitation and domination.

These two both meanings do not really contradict but rather, at least in the field of Social Sciences, complement each other. The confluence between these two traditions allows the harmonization of epistemological criticism and social criticism, the constantly active and radical questioning of established forms of thought and of the established forms of our collective life. This analysis and contextualized study of established knowledge allows us to reveal it at all times as the result of certain relationships (cultural, social, and economic) in our societies.

There should therefore be a synergy between these two meanings, since intellectual criticism - the contributions of the different social sciences from the perspective of critical thinking and the analysis of social discourses and their evolution - favors institutional criticism in turn.

In short, critical thinking is what gives us the means to think about the world as it is, as it should be, and as it may be. The possible is the compromise between the real and the ideal, but there are many "possibles". It is in this wide range of contingencies that the possible offers where critical thinking is most fruitful: "theoretical theses are compared with the thesis of value in order to see to what extent the possible world is also the favourite world" (Galtung, 1995, p.161).

Critical thinking therefore allows us to analyze and adequately focus on any issue or problem, it also empowers us to design an ideal situation for each of them, but above all it must allow us to offer alternatives to correct, refine or improve them in a coherent and flexible way. "This would give a vision of the world, as well as an image of its probable (predicted) future [...]. Vision is both static and dynamic; it contains both diagnosis and prognosis "(Galtung, 1995, p.166).

Considering, for example, the problem of migratory movements in the current globalized world: on the one hand critical thinking allows us to analyze and study the current reality of the phenomenon, the causes and motivations, evident or underlying, of the mass displacements that are occurring in all the continents of the planet, such as the persecution of minorities, conflicts, war, the availability of cheap labor, environmental catastrophes, etc.; on the other hand, critical thinking also encourages activism against such unfair situations, in the search for an ideal situation in which no social group should be displaced from its place of origin and no one should be forced to emigrate except for leisure or pleasure. Finally, critical thinking also empowers us to "design" different possible ways of transition from an unfair or incomplete reality to another fully satisfactory. These different possibilities will have to take into account not only the general framework (a globalized world), but also the specificities of each particular migratory phenomenon, such as the origin and destination of migratory flows, their particular causes, idiosyncrasies and culture of the migrants, groups involved, etc.

## **1.1. AN INTEGRATIVE POSSIBILITY**

Some definitions of the concept of critical thinking are proposed now. They complement each other and help to define and enrich it, also presenting a possibility that integrates them. They are the following:

- Critical thinking is "that way of thinking -on any subject, content or problem- in which the thinker improves the quality of his thought by seizing the inherent structures of the act of thinking and submitting them to intellectual standards" (Elder and Paul, 2003, p.4).

- Also in this same sense, it is conceived as a "state of doubt, of perplexity, of uncertainty [...]. Instead of being carried away by the easiness, the reflective thinker strives to avoid the superficial, is mentally activated and suspends his judgment "(Boisvert, 2015, p.4).

These first two definitions put the emphasis on what might be called the "technical" approach to critical thinking. The important thing is to generate reflective thought of quality, situating the fact of thinking as the object of reflection itself and submitting it to constant revision. The aim is to

generate an improved thinking in the same way that reflecting critically on Economy or History, for example, would improve the quality of the affirmations and conclusions about such disciplines.

- Other definitions also consider critical thinking as a "reflective and reasonable thought oriented towards a decision about what to believe or do" (Norris and Enis, 1989, p.45).

- And also a "totally action-oriented thinking [that] always makes its appearance in a context of problem solving" (Díaz and Montenegro, 2010, p.1).

In these last two definitions appear a finalist approach. Without excluding what has been said in the first group of definitions, now the emphasis shifts to the "practical" aspect of critical thinking. We speak here of a thought that, besides being of quality, is aimed at solving problems and making the right decisions, both on a personal (what to believe) and a social level (what to do).

- Finally, another group of definitions conceive critical thinking as "all intellectual approach, product of analysis, interpretations and rational problematizations about the manifestations of reality [...] to generate questions, judgments and proposals oriented to the promotion of changes and transformations in benefit of the humanity" (Saladino, 2012, p.2).

- Or for example the one that considers that "critical thinking unites epistemological criticism and social criticism, constantly, actively and radically questioning established forms of thought and the established forms of collective life" (Wacquant, 2006, p.4). ).

These last two definitions complement the finalist character of the previous two in the sense of extending it. We must not only act, but this action has an obvious "ethical" intention. It seeks to build a better and fairer world, identifying through permanent criticism those situations that generate social unrest and concern and proposing solutions that correct them. There is still a second aspect in which these last two definitions extend the previous ones. When speaking of "collective life" or of "humanity" these definitions of critical thinking are making it clear that actions aimed at transforming reality must have a societal as well as an individual component; that is to say, they must be inserted in the framework of social movements of various kinds that, in some way, are those that show the issues on which critical thinking should focus. In other words, critical thinking must give voice to reasoning that implies "Societal alternatives when perceived as the main coders of the results of human rationality and consequently support of truly humanistic and libertarian projects for their inherent utopian pretensions" (Saladino, 2012, p, 3).

Although the different definitions analyzed so far complement each other, the controversy over the concept is far from resolved, attending, on the one hand, to points of view that emphasize one of the three possibilities described to the detriment of the others, and, on the other hand, to the different regional peculiarities at planetary level, that cause that the subjects on which the critical thinking puts the accent are different (pacifism, feminism, globalization, ecologism, indigenous movements, etc.). Broadly speaking what is addressed are "the various ways of defining critical thinking and its link with the academy, where one point of view only accepts that being critical should be done through the link with social movements, and another that admits the possibility of private commitment to the production of knowledge that tends to generate new relationships and not only those imposed by the prevailing system" (Ramírez, 2011, p 153).

But in reality the three kinds of definitions analyzed do not oppose but complement each other. Critical thinking must be expressed through social movements, but social movements have to be thought critically. The only nuance subject to discussion is in fact the degree of commitment to these movements, an issue that since the arrival of the information society has been deeply modified by taking into account the new possibilities of information exchange and the exercise of social and political activism offered by the virtual world. On the one hand, the so-called cyber-activism complements the traditional political activism, but on the other hand it is no less true that specific people without any connection or specific affiliation have the possibility to denounce,

inform, collaborate, participate and, in short, use a way of critical thinking (in its activist meaning in search of a fairer society) that sometimes may have as much impact and capacity for mobilization as the praiseworthy work of many social movements.

It is clear, from all that has been said so far, that absolute unanimity about the meaning of the term "critical thinking" is far from being agreed upon. To establish more precisely what critical thinking means could probably help to determine the main characteristics of it.

## **2. CHARACTERISTICS OF CRITICAL THINKING**

Some of the essential features that shape critical thinking, according to different authors (Dirk, 2015, Saladino, 2012, Elder and Paul, 2003), are the following:

A. Formulation of problems and vital issues, with clarity and precision. This first characteristic refers to the deep philosophical feature of critical thinking. This is so from the moment in which the subjects or objects of study of the same are "vital", and supposes a clear example of how the meanings of critical thinking already explained before complement each other. Indeed, the critical rigor, clarity and precision with which a problem is analyzed seek a final aim of mobilization, of a call to action -either to preserve, or to improve a given situation- on a subject that is considered vital.

B. Collection and evaluation of information and use of abstract ideas. In this phase of the critical thinking process, an adequate evaluation of the credibility of the information sources is required, a permanent effort to review and improve them, but also the ability to transcend the concrete and be able to extrapolate the conclusions to other similar situations in search of more information.

C. Reach conclusions and solutions with relevant criteria and standards. Critical thinking ultimately has an unquestionable utilitarian character. In the search for solutions to vital problems is the willingness to put the conclusions into practice. Conclusions that in turn have to be continually reviewed in a critical manner and according to previously established parameters.

D. Think with an open and alternative mind. This characteristic of critical thinking refers to aspects previously discussed in relation to the different alternatives or ways that the use of critical thinking offers. This is a type of dynamic, changing thought, subject to constant revision according to the different possibilities that appear as it deepens, and it is also an empathic, intellectually honest thought; so that the critical thinker puts himself in the place of the other and makes the effort to understand other reasons and motivations different from his, trying to avoid mechanisms of self-validation. It is therefore based on "the firm conviction that the proposal of the proponent, however deep and differentiated, is not the whole truth, it is limited and finite" (Wohlrapp, 2008, p.214).

E. Recognize and evaluate the practical consequences. The applied character of critical thinking appears in this characteristic. The object of reflection is, especially in the field of Social Sciences, insofar as it is intended to draw conclusions about it from a practical point of view, to the extent that there are opportunities for improvement and social transformation that will be advisable to carry out.

F. Propose solutions and communicate them effectively. What has been said about the previous characteristic has as corollary the propositive aspect of critical thinking. Ultimately, what is discovered as useful or practical in the improvement or transformation of a given reality must be proposed in an effective way, that is, in a way that allows its correct and effective communication and application.

G. Morally implicate in the solution to the problems. This has to be said clearly: critical thinking is not aseptic, at least in the Social Sciences. Since it supposes an awareness of social problems, it also involves taking sides (even if only individually), which in turn is a call for participation in

defense of the groups that focus their activity on the solution to said problems. Social problems. It is consequently a thought capable of transforming society in a profound way.

In summary, "critical thinking is self-directed, self-disciplined, self-regulated and self-correcting. It means to submit to rigorous standards of excellence and conscious mastery of its use. It implies effective communication and problem solving skills and a commitment to overcome the natural egocentricity and sociocentrism of the human being "(Elder and Paul, 2003, p.4).

From the analysis of the aforementioned characteristics, the integrated and complementary character of critical thinking emerges. It is clear that it is a way of thinking honestly in their practice, but at the same time is committed to its procedures and purposes. Applied to the Social Sciences, critical thinking can not be neutral, insofar as its objects of study refer to social problems of different types and scope. This is how it is understood that certain aspects of it appear applied to specific issues or focused on more burning social problems in certain regions of the planet. That is why there are, for example, critical feminist thinking or pacifist critical thinking and also, from a regional point of view, a Latin American critical thinking or an African critical thinking. Finally, in addition, it must also take into account "the existing opposition between the critical dimension of participation, and the one that argues that one can be critical without direct militancy in social movements but with commitment to them" (Ramírez, 2011, p. 153).

### **3. CRITICAL THINKING IN VOCATIONAL TRAINING**

Vocational training is subject to permanent changes that must respond to the processes of globalization and internationalization, as well as to a society that must be transformed to respond to quality indicators required in the current labor market. This leads to rethink the teaching activity and professionalization in the area of vocational training, in order to respond to new challenges and train the future workers in an active, creative, reflective and critical way.

Traditional education does not provide answers to the needs of current world of work, therefore, it is essential to incorporate teaching and learning methodologies in the vocational training that allow developing the competence of critical thinking.

Currently the profiles of graduates of vocational schools aim to obtain creative professionals, autonomous and with critical thinking. Because of this, it is essential that teaching and learning methods are consistent with the desired achievements, as opposed to teaching traditional methods based on lessons that are questionable from the point of view of the development of critical thinking, for the limited contribution to deep learning, and for the restricted application and integration of knowledge that is imparted to students. All that hinders the resolution of problems that happen daily in work activities.

For the development of critical thinking it is essential to have creative teachers, capable of using teaching, learning and assessment methods that promote this type of thinking, essential for decision-making skills that contributes to improving the quality of workers. To achieve this is important that teachers adopt new strategies that favor critical analysis, where the student can think and develop the know-how. This implies enhancing cognitive abilities in the academic curriculum, in conjunction with communicative and investigative skills.

In vocational training, the development of critical thinking can be fostered through reflective practices, understanding these as a methodology to develop habits and reflection skills in students that promote a pertinent and competent task to respond to complex situations, collaborating with the generation of knowledge through research, not only in the practical sphere but also in the disciplinary one.

Critical thinking contributes to education by developing a willing attitude to address the problems that arise in daily experience and that are likely to be resolved, allowing the student to clarify information, give meaning and focus on problems from a critical point of view. In this way it allows facing relevant issues through systematic processes that develop significant knowledge of the corresponding professional branch. Finally, the development of critical thinking allows students to acquire an intellectual autonomy to respond to the demands of any branch of world market.

In addition to the above, it must be taken into account at European level, that it is still far from achieving a harmonization of curriculums and methodologies in relation to vocational training. This fact obviously also influences the lack of consensus when applying educational methodologies that encourage critical thinking. It is not that European countries do not work on this aspect, but that it is done in an uncoordinated way and attending to the specific concerns of each country, without a homogeneous and comprehensive vision. Among the main shortcomings in terms of this lack of homogeneity are the following:

- Practical and applied, less theoretical in some cases according to branches of study and subjects. Nursing/carpentry, plumbing/sports.
- Lack of homogeneity across European countries: educational levels, importance of practice period, training and qualification of teachers, degree of collaboration between education and business, more or less importance in ethical values, etc.
- Direct participation of the business world (practices/internships): qualification and training of company instructors.

#### **4. CONCLUSION**

For the development of critical thinking is essential to have creative teachers, capable of using teaching, learning and assessment methods that promote this type of thinking, essential for good decision-making that contributes to improving the quality of service/product. For this, it is vital that teachers adopt new strategies that foster critical analysis, where the student can think and develop the know-how. This implies enhancing cognitive abilities in the academic curriculum over the psychomotor skills; in conjunction with communicative and investigative skills. Although the concept of critical thinking has been developed a lot, and its application in the formation of different areas of knowledge has been encouraged, the impact of it in Vocational Training has not been developed yet. It is paradoxical that the importance of critical thinking in Vocational Training has not been enough investigated, since it is an essential tool both for learning processes as well as for a better insertion in the working world.

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## **CP5. ENHANCING ON EMPLOYABILITY SKILLS THROUGH A CURRICULUM OF A CO-CREATIVITY METHODOLOGY**

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### **ABSTRACT**

Investing in people has been identified as key to the economic growth in the EU, yet Eurostat estimates still show an average 14.9% youth unemployment rate in the EU-28. This is more than twice as high as the general unemployment rate, reflecting the difficulties faced by young people in finding jobs. To address skills' mismatches, member states take measures such as involving young people in the development of curricula and training methods. In the framework of the B2ECLoC project we are developing a "Learning and Co-Creativity Product Package". The package offers a comprehensive curriculum that combines the enhancement of digital skills and social skills through the co-creativity learning methodology that is based on non-formal education.

### **INTRODUCTION**

The latest statistics about youth unemployment in EU 28 are encouraging [13], yet the unemployment rate is still very high in certain countries. For instance, Greece has the higher unemployment rate (18.5%), followed by Spain (14.1%), Italy (10.5%), Croatia (7.6%) and Cyprus (7.5%). The lowest unemployment rate appears in Czechia (2.1%) in Jan 2019 [14]. It is important to note that youth unemployment rates are in general much higher, even double than any unemployment rates in any other age ranges.

Several reasons can be identified as causing high unemployment rate in youth population. The financial crisis of the past few years is one of them, which affected mostly the young population. For example, the unemployment rate in Cyprus following the 2013 financial crisis was double comparing to 2011 (16% in 2014 over 7.9% in 2011), with youth unemployment presenting even higher figures (28.2% in 2014 over 15.5% in 2011 [13]). Another cause of unemployment in youth is the disengagement from education or else the early school leaving, which increases the lack of employability skills. The Europe 2020 strategy identifies drop-out from school or vocational education and training as a key challenge to meeting employment targets. The mismatch between acquired and required skills also results in low self-employment and entrepreneurship rates. Unemployment is in turn a reason for social exclusion, poverty and poor health, which puts EU under pressure of finding solutions to support the youth employability. The strategic framework

for European cooperation in education and training (known as ET 2020) adopted a benchmark to be achieved by 2020, namely, that the share of early leavers from education and training in the EU should be not more than 10 % [15]. According to Eurostat, the percentage of early leavers from education and training already fell in the EU by 1.3 points between 2013 and 2018, however, it remains a challenge.

In order to address the above challenges, EU is funding initiatives that will support youth with acquiring employability skills. Such initiatives are strengthening the link between education and labour market, by developing curricula, training content and methods to catch up with the changing needs of economy. The objectives are to give opportunities to young people, improve the quality of early childhood education, invest on skills needed for future employment, support children at risk of exclusion and equip teachers with appropriate education on new methodologies. Our work naturally lies within the above framework, contributing by adopting the “co-creativity methodology” [24] previously tested in the Code RED project [28]. This methodology has been applied in different target groups, with content from different education subjects and has been already used in initiatives that address early school leaving. In this work, we present a review of the latest research results in the development and application of the participatory and co-creativity methodology in different user groups and education topics. The collected knowledge will then guide is through the creation of a complete package for games’ design and robotics, to offer the participatory design and cooperative creativity experience as a comprehensive product to children in the age range 8-14. These results are mainly available in the UK but also in other EU countries, e.g., Greece, Sweden, Germany, etc.

## **EDUCATION METHODS LITERATURE REVIEW**

Many studies argue that existing educational systems [12] are focusing on facilitating students to become “experts at consuming knowledge” rather than good in “producing and creating knowledge” [25], [26], [23]. In other words, currently applied teaching methods in most cases help the students to solve certain problems rather than to have the abilities or the confidence to respond to unexpected situations or to deal with more complicated challenges [9]. Building knowledge without any links to practice, serves mostly in passing an exam, while most of learnt things are unfortunately forgotten soon after. Considering how people learn, educational studies conclude that the focus should be on the student being an active and not a passive learner, and this will be accomplished by him/her getting involved in numerous tasks, having the opportunity to collaborate with peers and exchanging ideas [5]. According to other research findings, people tend to remember only 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they discuss with others, 80% of what they personally experience and 95% of what they teach others [10]. For the knowledge to be meaningful and long-lasting it is important that the student engages in different ways in the process.

Adopting non-effective education methods, has also a very negative effect in employability of students. Young job candidates need to present a set of skills in order to acquire a certain job fitting their profile. Employers want to employ people that have a combination of skills, not only relevant hard technical capacity, but also very good soft skills such as communication skills, problem-solving skills, self-confidence skills, to act as team players, creative thinking, etc. Those skills are important for the person not only to find a job but also to retain it for long. They are equally important for the business not only to survive but to be successful, since human capital is a big investment for companies.

## Projects Related to Youth Employment

Reducing the average rate of Early School Leaving by 1% would provide the European economy with nearly 500,000 additional qualified potential young employees per year [16]. There are many projects and other initiatives that received EU funding since then, emphasizing on reducing early school leaving and improving the employability skills for young population. Examples of such projects are presented hereafter:

- The **Euro iVET Project** - <http://euro-ivet.eu> - (initial Vocational and Educational Training) aims to equip professional Vocational and Educational Trainers (VET) to bridge the 'culture clash' between disadvantaged young people living in major urban and inner-city environments, employers and vocational education. The project created new occupational profiles, a competency framework, a training curriculum, a training network and a new assessment, certification and qualification framework at European level.
- The **GBL4ESL** project [29] - (Game Based Learning to Alleviate Early School Leaving) has introduced new innovative teaching methodologies using gamification in English and Maths lessons. The project created a game-based learning (GBL) scenarios guidebook and an open-source toolkit based on international best practices and made them available to educators. These outputs opened up the possibility of building a GBL framework for Maltese and international teachers.
- The **GOET** project [6] supported people with learning disabilities and additional sensory impairments in getting and keeping a job by helping them to acquire, via GBL, skills that would help them in their working environment. The developed games aim to help students learn how to prepare themselves for work, dealing with everyday situations at work, including money management, independent traveling, etc.
- The **Code RED** project [28] has experimented with a (serious) games' co-creativity methodology through a dedicated co-design workshops' series, run within 2014 in the UK, Greece, Italy and Cyprus. The workshops engaged young people in an interactive (participatory) process of designing and implementing digital educational games' prototypes, aiming at paving the way towards adopting these paradigms in the education and skills' acquisition process and maximizing the benefit of young participants.

## COOPERATIVE CREATIVITY AND LEARNING

The participatory design methodology involves cooperative creativity and learning, and these concepts are discussed in the sequel.

### Cooperative learning

Co-operative learning is "The educational use of small groups so that students can work together by supporting and encouraging each other to accomplish the same target." [18],[19],[20],[27]. A key component is that the emphasis is put on the collaboration and not so much in putting students competing in learning. Forward looking people are expected to use their intelligence and collaborate with each other. As observed in different projects the cooperative learning activity offers a stronger structure than what experienced in traditional group work, because it encourages teachers to ensure that: all students are engaged in some way, team members work in close proximity and all students contribute to the given task. Studies show that students who provide

and receive intricate explanations and recap of learning gain most from collaborative learning. Cooperative learning is a way for students to improve their social interactions, inter-personal skills in learning, life quality, as well as employment opportunities. The process builds trust between the group members, promotes open communication and increases enjoyment and motivation.

Johnson et al. [21] indicate six characteristics of cooperative learning groups:

- a. Positive Interdependence: team members are obliged to rely on one another to achieve their goal
- b. Individual Accountability: all students in a group are held accountable for doing their share of the work.
- c. Face-to-face Promotive Interaction: group assignments.
- d. Appropriate Collaborative Skills: students are encouraged and helped to develop and practice trust building, leadership, decision-making, communication and conflict management.
- e. Group Processing: team members set up group goals, periodically assess whether they are doing well as a team, and identify changes they will make to function more effectively in the future.
- f. Heterogeneous Groups: individuals benefit the most from working with people different from themselves.

According to [27], cooperative learning can be applied in three different ways (listed below) in an educational setting and in can be used for teaching any topic, such as solving problems, reading complex text material, writing an essay or report, conducting a survey or experiment, learning a new vocabulary or answering questions at the end of a chapter. Moreover, cooperative learning can be applied in different age groups.

- The cooperative learning methodology can be used in a **“formal cooperative learning”** framework. An example of this is that students need to complete an assignment that will take several weeks. The teacher will play the role of the facilitator who will assign roles, monitor student interaction and intervene when a student has not understood the expectations of a task or if she/he notices a problem in the functioning of the group. In this case, when students finish their assignment they are evaluated not only as individual but also on how well they function as a team. Working cooperatively helps students to realise they are mutually responsible for each other's learning and have a stake in each other's success.
- On the other hand, **“informal cooperative learning”** groups are typically temporary and last from few minutes to one class period. Such setting is used during a lecture, demonstration or a film in order to attract student attention on the material they need to learn.
- **“Cooperative base groups”** are long-term cooperative learning groups (lasting for one semester or year) that give each member the support, help, encouragement, and assistance he/she needs to make academic progress (attend class, complete all assignments, learn) and develop cognitively and socially in healthy ways.

Many more studies, available in the literature, demonstrate the effectiveness of cooperative creativity in different settings and for different topics. According to [7],[8], “possibility thinking” – also involving knowledge co-creation processes – can be viewed as the core of creative learning. To facilitate understanding of new concepts or phenomena, learners should have the opportunity to develop multiple and flexible perspectives and to apply their knowledge creatively [5],[22]. In a pilot study in 2010 in Finland, children ages 7-12 had the opportunity to study in a novel formal

and informal learning setting. The pilot study explored the role of creativity and playfulness in collaborative learning using an innovative outdoor playground and its technological applications. The results indicated that the children considered learning in groups, through co-creation and turning fact into fiction, to be a rewarding way to learn, practice group work and use their imagination for a common goal [23]. The stages of a cooperative learning process are presented below.

## Stages of co-creativity methodology

As can be seen in Figure 1, there are five core stages identified in the co-creativity methodology. The first is the “*introduction stage*”, where the facilitator may run an ice-breaking activity in order to make the participants feel more comfortable and create a sense of community among them. After that he/she explains the scope of the project and gives the opportunity to participants to make questions and express their expectation and preferences about the project. At this stage, the facilitators introduce the project journal, a method that participants can record their thoughts, contributions and deliverables. The second is the “*experimentation stage*”, where participants can explore on existing examples and create prototypes. The third is the “*create idea stage*” where the students need to decide upon an idea to implement, also making decisions on how they distribute the tasks. The fourth stage is the “*record idea*”, where students need to decide upon the design criteria of their idea, the weekly deliverables and finally create a low-tech prototype, recording their decision and contributors through the process. The final stage is the “*presentation stage*”, where students are given the time to reflect on their contribution through the journal of activities and present/demonstrate their final product. It is recommended to give also an accreditation for the participation of students.

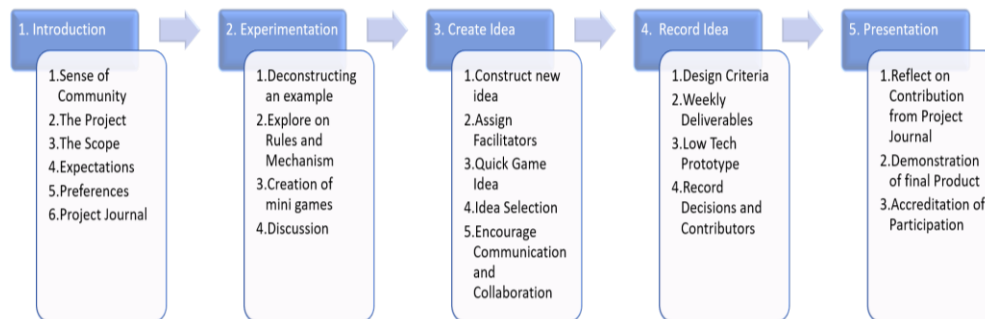


Figure 1. Stages of Co- Creativity Methodology

## COOPERATIVE DESIGN OF GAMES: THE CODE-RED PROJECT CASE

Studies have shown that the co-design facilitation method presented in previous section, if applied at Level 6 of Hart’s Ladder (adult initiated, shared decisions, roles and responsibilities) produces the most effective educational artefacts [17],[4]. The model can be also used to work with adults who have low literacy skills as part of multidisciplinary design projects between academics, educators and adults on non-conventional educational programmes, such as those provided by a National Probations Service [3].

In the framework of the CodeRED project, the aim of the cooperative design workshops had been to work with young adults at risk of exclusion and to co-develop serious games [1], inspired by

best practices, like : “i) children can learn from each other, if an initial provision is given (hardware and adequate setting); ii) schools are too often a limit to children's expression instead of encouraging and enhancing their capabilities; iii) adults can play a major role of mentors providing confidence and proactive context.” The methodology was applied in four countries in different educational settings and with different user groups. UK worked with two different groups: with a special needs school with student with learning difficulties and with a mainstream school who were having student in danger of early school leaving. Greece worked with a foundation who offers services to youth up to 25 years old who have learning and other developmental disabilities. Italy applied this methodology working with a group of students from a cooking course (FOMAL), ages 16-19, previously excluded from regular school. Finally, Cyprus applied this methodology with mainstream school students. In order to measure the effectiveness of the methodology results were collected against characteristics, such as: *confidence, self-esteem, attendance to class, participation, time and track keeping, engagement, concentration*. The results were very encouraging across all characteristics. While participation and timekeeping were already evaluated at high levels, thus not showing significant increase, the results for confidence, self-esteem, engagement and concentration were noteworthy [24].

## **EXPLOITING RESULTS THROUGH THE B2ECLOC PROJECT**

Children spend 85% of their active time outside school, therefore the positive impact of non-formal education (NFE) on their development can be huge and affect them in various ways. All non-formal education programmes are common in that they cover many objects of knowledge and science, many skills, volunteer work, sports etc. Children and teenagers can get non-formal education in Cyprus in different settings such as Creative Learning Centres, Youth Board of Cyprus, the State Institutes of Further Education, open schools, private institutes, state all-day primary schools, museums, educational establishments and non-governmental organization. Usually NFE includes lessons and activities which aim to develop skills and built knowledge, such as language learning, ICT skills, theatre, robotics, programming, film making, graphic design, creative learning. Statistics produced by the Statistical Service in Cyprus show that in the year 2017 there were at least 3615 non-formal education schools in the country.

On another note, the European council (20 Dec. 2012) invites member states to recognize and validate the learning outcomes of non-formal and informal education in order to equip young people with the basic skills relevant to the labour market. For this reason, a curriculum based on an innovative NFL methodology seems to be needed as a product for non-formal education centres. The B2ECLoC project [30] comes as a response and aims to transfer the results of the CodeRED project, including the curriculum of applying the cooperative design methodology and the curriculum for soft and hard skills, and adopt them in order to serve a new curriculum for cooperative robotics applications. B2ECLoC will develop a “Learning and Co-Creativity Product Package” (L2CP) that aim to: i) increase the hard and soft employability skills of children, i.e. soft skills related to team working, behavior, problem solving, etc.; ii) increase the hard skills on specific subject areas widely recognized as key skills in approaching the labor market, i.e. ICT, digital games, machine programming and service robots, etc.; iii) implement courses based on the above innovative learning methodology. The key objective is to give an educational product to help students achieve higher self-motivation and engagement, valuing several qualities like trust-building, significant degree of experimentalism, flexible organization of time and work, and many more. B2ECLoC will also provide validation and accreditation of learning outcomes, by

applying for becoming an accredited education package by education authorities in Cyprus and abroad.

## **The proposed cooperative creativity and learning package**

The proposed co-creative learning package will expand the already available education and employability curriculum from the GOET and the Code RED projects. The package will offer a comprehensive curriculum that combines the enhancement of digital skills (ICT, coding, robotics, games design, etc.) and social skills (critical thinking, collaboration, communication, creativity, community, curiosity) [2],[11]. The result will be a complete set of learning material, and specifications, including also a guide that will enable formal and non-formal educators and trainers to run the curriculum successfully within local co-creativity centres. The package will first be introduced to non-formal education institutions and settings in Cyprus, acting as part of lifelong learning.

## **CONCLUSIONS**

In order to address the challenges of the 21<sup>st</sup> century, we need to invest on the key skills needed in order to succeed. We need to equip students not only with the hard technological or other skills they need but also with the necessary skills in order to move from being “consumers of knowledge” to being “producers of knowledge”. Therefore, applying co-creative learning and other similar methodologies must be at the cornerstone, in order to support creative and critical thinking, innovation, adaptation, collaboration and cooperation, team trust building, inclusion of the different personalities and multiculturalism. The result will be the creation of confident people, able to seek for the right employment and to sustain their career with their group-working skills and creativity skills that will help them engage with their innovative ideas and increase the impact in their work environment and society in general.

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