



# **Training of Prosocial Skills to Migrant Groups Through Serious Games**

**Maria Tountopoulou**

Ison Psychometrica, Athens Greece

**Nikos Drosos**

Ison Psychometrica, Athens Greece  
European University Cyprus, Nicosia, Cyprus

**Maria-Eirini Triantafillopoulou**

Ison Psychometrica, Athens Greece

**Fotini Vlachaki**

Ison Psychometrica, Athens Greece

**Petros Daras**

Visual Computing Lab Information Technologies  
Institute Center for Research & Technology Hellas, Thessaloniki, Greece

**Nicholas Vretos**

Visual Computing Lab Information Technologies  
Institute Center for Research & Technology Hellas, Thessaloniki, Greece

**Athanasios Lelis**

Visual Computing Lab Information Technologies  
Institute Center for Research & Technology Hellas, Thessaloniki, Greece

## **ABSTRACT**

**Due to forced migration migrants, asylum seekers and refugees finding themselves in a new cultural environment and trying to build a new life, they need to feel affiliated, to achieve peer acceptance among natives and diverse migrant groups. Such affiliation needs can be achieved by tailored training interventions aiming to promote the development of prosocial skills of cultural diverse groups, as alternative actions to facilitate better migrants'/asylum seekers/refugees' integration into the host society. The scope of this survey is to study the short-term effects of a social skills and prosocial behaviour training for adult migrants, refugees or asylum seekers. The method is based on the theory of prosociality and explores the effectiveness of a prosocial game in the development of prosocial skills, which are considered important for the social and emotional wellbeing and smoother integration of migrant groups in the new host community. A pre-test-post-test design was used, assigning 110 migrant participants to either an experimental or a control group and comparing them on their prosocial skills as evaluated through the NADINE questionnaire. Those who played the game**

**significantly improved in their teamwork and interpersonal skills. Although further research should be made on the use of serious games in SEL in migrant adults, this study adds to the research literature, supporting the potential of a game-based SEL intervention for effectively assisting migrant groups develop their prosocial skills and facilitating their better integration into the host society.**

**Keywords:** serious games, prosocial skills, migrant groups

## INTRODUCTION

### A. Prosociality and its role in migrants'/asylum seekers' & refugees' integration

It is widely reported that migrants, asylum seekers and refugees are faced with the difficulty of adapting to a new environment and culture in the host countries. They usually experience social exclusion with severe consequences on health and social, emotional and mental wellbeing, discrimination or bullying by their natives, mostly because of their diverse physical characteristics, origin and religious background, as well as low native language fluency. Racism and discrimination as well as negative public attitudes and low acceptance of multiculturalism by the native population are reported as significant barriers to social, cultural and civic integration for migrants/refugees, and especially for the newcomers, as the attitudes and perceptions of the recipient society and institutions play an important role often leading to hostility and marginalization towards migrant communities and impedes adaptation of multicultural [1].

A less researched area linked to personal well-being and social adjustment relates to prosocialness and its importance during adulthood, while it has also been reported that prosocial behaviour has prognostic value for individuals' personal and social adjustment [2], [3], [4]. The term "prosocial" was first introduced during the 1970s by social scientists as an opposite antonym to "antisocial", denoting helping and cooperative behaviour versus negativity and aggression [5]. Prosocial behaviour is defined as the ability of a person to act in ways that benefit others. There have been many efforts by researchers in psychology to provide a more formal definition of prosociality.

Prosocial behaviour is a social voluntary and spontaneous behaviour that "benefits other people than self or society as a whole", "such as helping others in need, sharing resources, donating, comforting, co-operating, displaying interest to others with responsibility and volunteering" [6], [7], [8], [9]. Prosociality is in itself a complex concept and is comprised of many core domains, which include empathy, compassion, social competence, emotional intelligence, trust, fairness, compassion, generosity and cooperation [10], [11]. Empathy which is the most associated emotional response with prosocial behaviour, involves both perspective-taking, as the ability to recognize and understand the feelings, different point of views and perspectives of others and empathic concern, that is the sympathy, compassion, and regard we feel for others [12], [13].

Closely related, the social competence, involving the availability and application of cognitive, emotional and psychomotor resources, denotes that individuals, in private or professional context, use social interaction skills in order to achieve acceptable compromises between social adaptation and their individual needs and goals. Consequently, prosociality involves advanced personal and interpersonal skills, including empathy and active concern for the rights, feelings,

and welfare of other people, self-regulation of one's behaviour, emotions, and thoughts, social competence, collaboration and communication skills, ability to deal with multi-level conflicts, conscientiousness, adaptability, reliability and trustworthiness.

It has been clearly documented that prosocialness is developed from infancy through late childhood and early adolescence, "arising from complex developmental and psychological processes, involving attentional and evaluative processes, moral reasoning, social competence, and self-regulatory capacities" [14], [15]. Also, it has been reported that while prosocial responding follows a quite universal pattern in infancy, it progresses according to individual differences in later childhood and adult life [5]. Furthermore, it is supported that prosocial behaviour in adulthood is of higher importance and social value, as it can be highly threatened by interpersonal experiences and personal values (e.g., competition and personal achievement or coping with authority in work environments or in multicultural contexts). On the other hand, adults are expected to be more in need of assistance and support by others in order to deal with everyday difficulties due to several factors, associated with aging, health problems, unexpected life incidents and traumatic experiences or social distancing and limited interpersonal contact, which increases the significance of adults' capacity to provide support to others, as well as to actively establish or maintain strong social relationships [2].

Especially, adults' prosocial behaviour, mainly demonstrated through social desirable actions (e.g., engaging in volunteer work) indicates improved mental wellbeing, related to lower levels of depression [16], [17], greater life satisfaction, higher self-esteem [18], [19] and having quality social relationships [20]. Research findings also suggest that prosocial behaviour is associated with increased resilience, decreased internalizing and externalizing problems (stress, anxiety, anger and delinquent behaviours) and improvement in anxiety as well depression symptoms among survivors of war and displacement, while baseline social support was not associated with improvement in depression or anxiety. Furthermore, it was revealed that social relatedness factors (e.g. social support and acculturation) are related to mental wellbeing, as well as resilience was also shown to play a significant role in the relationship between social relatedness and mental wellbeing [21]. Resilience, embedding the key elements of adjustment and adversity, refers to an individual's ability to overcome external events and circumstances that cause shock to the individual as well as negative effects of risk exposure, cope successfully with traumatic experiences, or avoid the negative trajectories associated with risks and display positive adaptation [22].

In addition, it has been grounded that prosocial behaviour is a significant indicator to identify if the individuals feel belongingness to society and follow the social norms of what constitutes a good action. Recent studies have also provided causal evidence for the relationship between cultural diversity, intercultural competence and prosociality. Considering the importance of transcultural skills in an increasingly globalized world and of empathy in social interaction, the transcultural perspective-taking (understanding of divergent cultural values) is highly required, as being the ability to understand multiple cultural perspectives, especially those different from one's own norms, values, and beliefs that can inform and motivate certain attitudes, feelings, and behaviours [23]. It has also been documented that people residing in more ethnically diverse countries, more racially diverse metropolitan areas, or in more racially diverse neighbourhoods, are more likely to express prosocial concepts in their everyday

communications and more willing to spontaneously offer help to individuals or strangers in need [24]. It has been also documented that migrants' engagement in volunteering and relevant prosocial activities lowers the hiring discrimination against them [25], [26], as well as facilitates intergroup prosociality, that is group members' benevolent behaviour, charitable giving, positive contact, allyship, and solidarity with others [27], [17] facilitating their overall social and labour market integration.

As far as the development of prosocial skills is concerned, there are several studies focusing mainly in children and adolescents, that show that Social Emotional Learning (SEL) interventions have significantly improved social skills, behavior, and interpersonal relationships [28]. Though, SEL is traditionally delivered in person by trained professionals which has several barriers, such as lack of trained providers, scheduling difficulties, and significant time commitments, which may prevent individuals from participating in SST [28], [24]. Furthermore, traditional training to migrant groups brings up further difficulties, such as need for translation and cultural adaptation of the training material, the presence of cultural mediators during the whole training program and furthermore, higher rates of drop-outs due to the long duration of the training. To help overcome the limitations of in-person SEL, a growing number of intervention developers are employing emerging technologies. Game-based platforms offer a cost-effective way to provide training in an accessible and engaging way [28]. To this context, it is supported that prosocial games, in which game characters help and support each other in nonviolent ways, should increase both short-term and long-term prosocial behaviours.

Playing a game can influence cognitions, feelings, and physiological arousal. Relevant research findings suggest that playing prosocial games tends to increase prosocial behaviour tendencies, and that prosocial tendencies tend to lead to selection of prosocial games [29]. Also, it is identified that group play skill interventions are highly useful and effective strategies for teaching prosocial skills and essential prerequisite to enhance successful social participation. Research on the effectiveness of social skills and prosocial behaviour training in adults' inmates from pre-test to post-test phase has showed significant improvement in social knowledge and social interaction, as well as decreased social anxiety and increased positive feelings in everyday social situations [30].

Due to forced migration migrants and refugees finding themselves in a new cultural environment and trying to build a new life, they need to feel affiliated, to achieve peer acceptance among natives and diverse migrant groups. Such affiliation needs can be achieved by prosocial or antisocial means, while it has been argued that immigrant youth may express aggressive behaviour or bullying others mainly because they want to feel affiliated with other aggressors or to be accepted by peers [31]. In this respect, tailored training interventions aiming to promote the development of prosocial skills of cultural diverse groups, in order to make them affiliated and accepted by others based on common goals or common successes in achievement situations, are highly recommended as alternative actions to facilitate better migrants'/asylum seekers/refugees' integration into the host society [31].

## **B. Digital educational games and game-based learning**

At the apex of the information era, a wide range of innovative technologies has been established for the delivery of educational content. These technologies incorporate features and conveniences that make them more attractive to the learner than traditional education methods. A prominent example of such a technology that has met the increasing interest of research communities in recent years is digital educational games (DEGs). More specifically, DEGs target the education sector and have the potential of administering educational knowledge within an interactive, engaging, and immersive experience [32], [33]. In fact, game-based learning (GBL) has been the subject of several research studies recently [34], [35]. In order to realize knowledge development, GBL requires the definition of specific learning objectives that the player has to achieve in order to complete the game. A lot of scientific discussions exist on the distinction between learning objectives and game goals, explaining that the former consists of the knowledge or abilities that we want the player to learn, while the latter correspond to in-game tasks mandatory for completing the game. This implies that in some games, a learning objective is not the actual game goal, but a means to achieve it.

An innovative type of games that targets the player's social behaviour is prosocial games. The application of sociological theories to educational technology is not something new, e.g., Bourdieu's [36] theory of practice is an example of a sociological theory that can be adopted in educational technology research to move toward understanding the wider complexities of technology practice [37].

A prosocial game can be designed so that it can model one or more of pro-social concepts, such as trust, cooperation, teamwork, compassion, and empathy by defining a player's learning objective as the expression of the corresponding prosocial behaviour. Such a game can positively affect the formation of an individual's personality through non-violent, "prosocial" games, in which helping and caring for others will assist him/her in comprehending that trusting and exhibiting prosocial behaviours have long-term and well-grounded beneficial results.

Furthermore, it has been argued in multiple studies that serious games need to avoid the one-size-fits-all game design principle and provide personalization features to better suit the preferences of their players [38], [33], [39]. In order to satisfy these requirements for player-centric design, game adaptation mechanisms have started to be considered as an essential component of modern serious games. The algorithms behind these technologies have their roots in artificial intelligence research and their central assumption is that adapting game content to certain aspects of player characteristics can assist in learning specific types of skills [40].

Regarding the link between prosocial video game play and positive influences in social behaviour, scientific research appears to converge to a common consensus that supports this link [41] [42]. There is a causal impact of playing prosocial games on helpful behaviour [43], [9], and evidence that prosocial video game exposure increases helping behaviour and decreases aggression. Similarly, Jerabeck & Ferguson [42] have suggested that cooperatively playing violent video games decreases aggressive behaviour regardless of the depiction of violent content [44], [45]. Nevertheless, prosociality in video games has mainly been studied

with respect to modelling helpful behaviours [13], cooperation [44] and establishing empathic links [46], though the majority of games used in several studies incorporate these elements as a means of offering players, multi-player entertainment-oriented outings [47]. However, there is limited research involving specific games that target at teaching the prosocial skills, such as trust, teamwork, reliability, which are essential towards cooperation. Even if the results of those researches on prosocial digital games are mixed, but encouraging, it should be pointed out that they all focus on students and young adolescents [28] [48], while no research targets adults and even more migrant populations. In the remainder of this paper we will present the design methodology for engaging a serious game, which requires trust between players, into the training of prosocial skills in adult migrant groups.

### **C. Research objectives towards Social Skills and Prosocial Behaviour Training in Adult Migrant groups**

A game-based learning methodology and Social Emotional Learning (SEL) was adopted in order to support the development of migrants/refugees/asylum seekers' prosocial skills. Social Emotional Learning (SEL) is the process through which children and adults understand and manage emotions and social interactions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships and finally, make responsible decisions.

SEL is a deeply ingrained part of the way youngsters and adults interact in formal and non-formal learning environments, enhancing individuals' capacity to integrate skills, attitudes, and behaviours, so as to deal effectively and ethically with daily tasks and challenges and promote intrapersonal, interpersonal, and cognitive competence. According to research findings, trainees participating in SEL programs showed improved social skills, an increased ability to manage stress and depression, and better attitudes about themselves and others [49], [50], [2], [51], [13], [52] [53], [54]. Based on Social Emotional Learning, the widely used CASEL approach (Collaborative for Academic, Social, and Emotional Learning) [55] provides a solid framework for training on social and emotional learning competencies.

In our research we applied CASEL framework through technologically-mediated learning using a game to engage the learner emotionally and collaboratively, supporting cognitive engagement (i.e., mental processing and metacognition), affective engagement (i.e., emotion processing and regulation) and behavioural engagement (i.e., gestures, embodied actions, and movement). It is supported that serious games can provide a very efficient means for skills acquisition, as they are usually defined in constrained environments that allow players to subliminally concentrate on the accomplishment of their task. Particularly, games that involve a group of players offer a dynamic approach for developing and refining fundamental life skills, facilitate learning from each other, as well as provide the opportunity to players to encourage and support each other, solve problems together, and share joys and disappointment.

The aim of our research was to test the impact of a prosocial game on prosocial skills of migrant groups and also to examine whether **gender and category of migration** moderated the impact of the game.

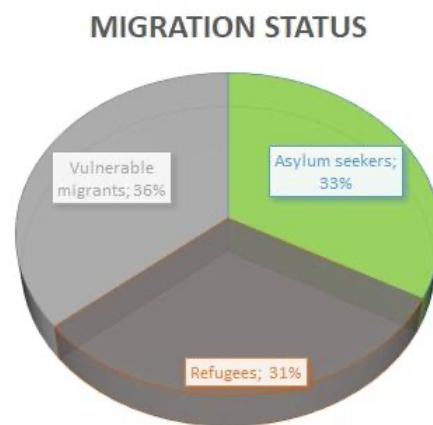
## MATERIALS AND METHOD

### A. Ethics Statement

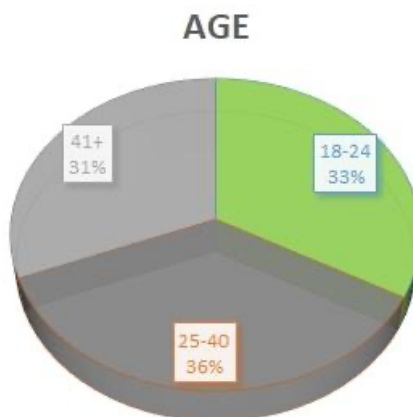
All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments. Informed consent was obtained from all individual participants prior to inclusion in the study.

### B. Participants

In the study 110 persons took part, divided in two groups: intervention group (50%) and control group (50%). Six more participants were engaged in the beginning of the research, but they dropped out before the end of the research. Chi-squared tests revealed no significant differences between participants in the two different groups (experimental, control) regarding gender, age and educational level. Therefore, there were no significant demographic differences across the two groups.

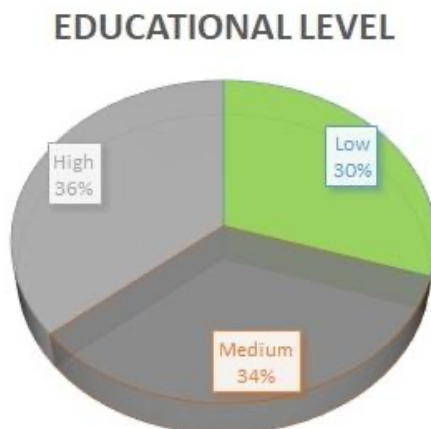


**Figure 1: Participants' migration status**



**Figure 2: Participants' age**

Regarding their status, 37% were vulnerable migrants, 33% asylum seekers and 31% refugees (figure 1). There was almost equal representation between men (51%) and women (49%), with 33% of them being 18-24 years old, 36% 25-40, and 31% 41+ years old (figure 2).



**Figure 3: Participants' educational level**

With respect to the educational level, 30% were of low level, 34% of medium and 36% of high level.

### **C. Path of Trust game**

NADINE implemented in the research the Path of Trust (PoT), a two-player, cooperative, digital serious game, which is based on the gamification of the Prosocial Theory and Social Emotional Learning (SEL). PoT has been validated as a tool to teach the importance of expressing prosociality and understanding each other's needs and the benefits of cooperation as well as expressing trustworthiness [47], mainly targeting children at the ages of 7-10, who face danger of social exclusion.

PoT is an endless running game about two characters having to cooperate in order to collect treasures, while navigating through a maze inside an Egyptian tomb, avoiding mummies and other hazards in the process. The player who assumes the role of wandering around (henceforth referred to as the Muscle) is attributed with Sensory Deprivation while their partner, unable to directly determine the course of movement, uses a top-down map view to navigate both of them safely through the maze, without being caught (henceforth referred to as the Guide).

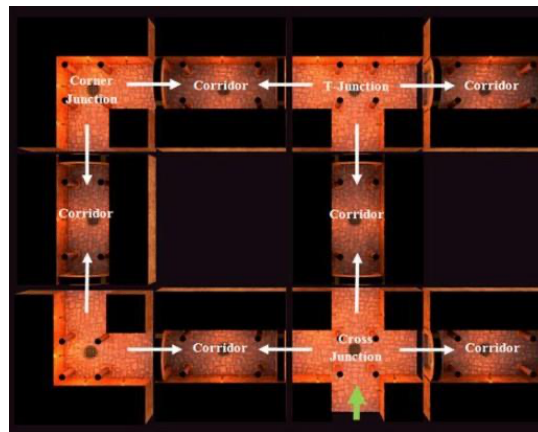
Guide gameplay: The Guide is presented with a top-down view of the common map in a 2D perspective (Figure 5). S/he can see up to three corridors ahead (left, forward, right, Fig. 5a) and can also see the contents of each corridor for a small period of time (Fig. 5b). This way the Guide knows in which corridor lies the Treasure, the Mummy or the portal and can provide guidance to the Muscle. The possible actions are mapped to a direction with 'left', 'right' and 'forward' being possible candidates (Fig 5c). The Guide gets notified when the Muscle is passing through a room containing treasure. Of course it is in the interest of the Guide to sometimes lead the Muscle intentionally towards a Portal in order to change roles [47].

Muscle gameplay: The Muscle is shown a 3D view of the tomb scene in third-person view (Figure 6). The player when s/he is inside the corridor can see the junctions and corridors, the two characters of the game and the items. Once the Guide chooses his command, a direction indicator is shown on the screen for a brief period of time (Fig. 6a). During this time window,

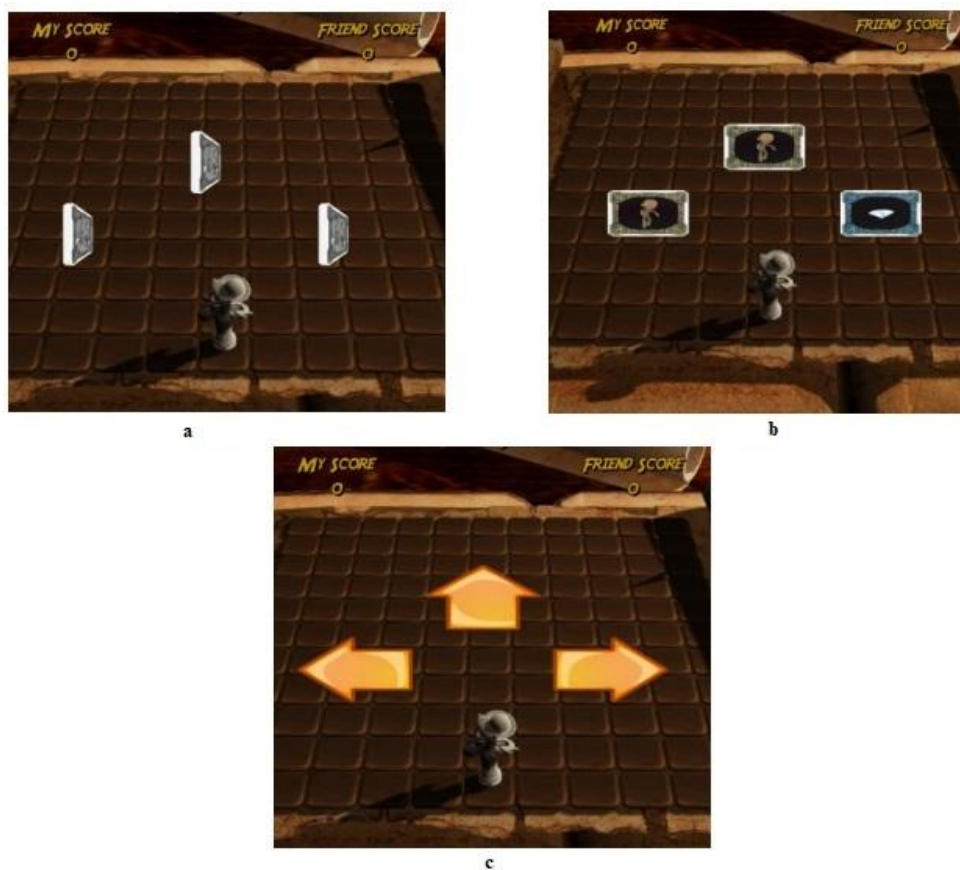


the Muscle player will be able to input his next move. When s/he chooses which direction to go (Fig. 6b), the characters will enter a corridor and have a limited room in which they can place their bodies in order to touch treasure points or avoid Mummies in a limited time frame (Fig. 6c).

Players are expected to work as a team and a sense of trust must be built between them in a way that will allow them to finish the game; the Muscle players must trust their partner to provide guidance towards treasure and away from danger and on the other hand, the Guide must place his/her trust in his/her partner to follow directions. As an end game condition, the game will end when any one of the players reaches a designated number of points, featuring also a time limit and a set of different endings to players to reach according to their performance. The game also features personalisation and adaptation capabilities, to maintain a high level of the players' engagement. The algorithms behind these technologies have their roots in artificial intelligence research and their central assumption is that adapting game content to certain aspects of player characteristics can assist in learning specific types of skills [47].



**Figure 4: A map of the PoT**



**Figure 5: Guide Player Game Loop**



**Figure 6: Muscle Player Game Loop**

In the context of NADINE research, the PoT game was introduced and evaluated as a tool to train adult migrants/asylum seekers and refugees, which face high risk of exclusion and marginalization, towards the improvement of personal and interpersonal skills related to helping behaviour and empathy, collaboration and team-working, social interaction and communication skills, self-regulation, conscientiousness, adaptability, reliability and trustworthiness. The collaborative game, served as a tool to train players from diverse cultures skills such as reliability, collaboration, empathy, adaptability or emotional state [56], [57], enabling the interpretation of experiences or perspectives in intercultural context from more than one worldview [20].

#### **D. Instruments**

For the assessment of prosocial skills of migrant groups, the personal and interpersonal scales and subscales of NADINE soft skills questionnaire were used. The NADINE soft-skills questionnaire was developed within the NADINE project itself, in order to assess the soft skills of vulnerable migrants, refugees and asylum seekers. The NADINE Skill Tests' scope is to facilitate the production of concrete and realistic profiling results on the specific soft skills of each vulnerable migrant/ refugee/asylum seeker. Regarding the construct definitions of the soft skills, the constructs' operationalization was based on thorough literature review and focus groups with employers and migrant groups. European and national frameworks on skills were used, such as ESCO skills classification, OECD competency frameworks, definitions and descriptions used at the Survey of Adult Skills [58], the OECD Learning Framework 2030 [59],

[60], [61], the ILO competency standards [62], [63], the EU Key Competencies Framework [64], the EU Skills Profile Tool for Third Country Nationals [65], as well as international surveys and studies on skills needed to enable migrants labour market integration in the host countries (e.g. [66], [67], [68] etc.). The questionnaire was culturally adapted [69] and standardised by the working team.

Participants were asked to state the level of his/her agreement towards several statements describing specific behaviours in different situations using a 5-likert scale, where 1= disagree, 2= slightly agree, 3=Neutral, 4= slightly agree and 5= Agree.

Two scales of the NADINE Soft Skill Tests were used (interpersonal skills, personal skills), which provide scores for 6 sub-scales as well. The tests were found to have good psychometric properties. Their internal consistency reliability coefficients were above 0.70, while construct validity was established via factor analyses.

More analytically, the scales that were used are:

- Interpersonal skills (22 items): Teamwork (5 items), Extraversion (5 items), Social interaction (4 items) & Conscientiousness (5 items) (item examples: “I believe it is always better to cooperate with others rather than to compete with them”, “I find it enjoyable to team up with others and help them” etc.)
- Personal skills (11 items): Adaptability (2 items), Reliability (3 items), Emotion management (3 items) (item examples: “I tend to feel uneasy when things change around me”, “I can manage to control the way I reach, even when I am emotionally tense”, “I do not usually lose my patience” etc.)

## E. Research design

The participants in the research were recruited in cooperation with NADINE pilot partners by providing information to potential end users regarding the training, guaranteeing anonymity and confidentiality, and asking them to participate on a voluntary basis.

A pre-test-post-test design was used, assigning 110 migrant participants to either an experimental or a control group. The participants were divided into 3 sub-groups according to their migration status, i.e. refugees, asylum seekers and vulnerable migrants. Table 1 presents the research design.

**Table 1: Pretest-Posttest Control Group Design: Effects of “Path of Trust” Game on pro-social skills**

<i>Subjects</i>	<i>Random Assignment</i>	<i>Pretest measures</i>	<i>Intervention</i>	<i>Posttest measures</i>
Asylum seekers, refugees or vulnerable migrants	Group A (Control group)	NADINE Soft Skill Tests	No intervention	NADINE Soft Skill Tests
	Group B (Experimental group)	NADINE Soft Skill Tests	“Path of Trust” Game	NADINE Soft Skill Tests

The control group is consisted of participants who didn't take part in the training that is they didn't play the PoT game, while the experimental group participants played the game systematically for at least 4 weeks.

Testing occurred in April, May and June 2021 in Greece. All the participants in both the control and experimental groups were assessed at least 1 month prior to the training using the NADINE skill assessment questionnaires (personal and interpersonal skills' scales). All the participants went through the NADINE questionnaire online on an individual basis, taking support from a facilitator with whom they were communicating through an online platform. Detailed and common instructions on the administration of the questionnaire were provided to all participants before starting completing it.

The participants in the experimental group were then guided to play the game for a period of one month. A short demo of the game with a brief description of its story and the mission of participants were shown to them before playing. It was specifically pointed out that the game's mission was for both players "to collect as many precious stones as possible" in a limited period of time and that the best way to achieve this goal was to collaborate and trust their partners. Although they could decide on their own for how long to play, participants were asked to play with the game at least 5 days per week for 5-10 minutes.

Facilitators were also supporting the process when the participants were asking for it and checking whether the process was running smoothly.

The outcome of the training, namely the effects of playing the prosocial game on adult migrants' social skills and prosocial behaviour were assessed at the end of the 4-weeks experimental duration using the same NADINE skill assessment questionnaires (test-retest method) to all participants.

## RESULTS

To establish internal validity, random numbers were used to assign participants into the control or the experimental group. Furthermore, we ensured that both groups were equal in terms of gender (men/women) and migrant status (asylum seekers/ refugees/ migrants) representation. Since participants were randomly assigned to each, any group differences should be attributed to chance. However, to ensure equivalency between the two groups we proceeded to test their comparability on various demographic variables (age, family status, level of education) finding no difference. Moreover, we examined whether the two groups had significant differences in the NADINE Soft Skill Tests prior to the intervention. To determine whether we will use parametric or non-parametric tests we investigated whether the underlying one-dimensional probability distributions of the two groups differ. The use of the two-sample Kolomogorov-Smirnov test showed no difference. T tests were used to determine whether the two groups differed in soft skills prior of the intervention and no significant difference was found as well.

Paired-samples t-tests were conducted to compare the scores on Soft Skills before and after the intervention for both groups (control and experimental). As expected for the control group there was no significant differences found before and after the intervention. For the

experimental group there was a significant difference in the scores of the “Team Work” sub-scale before the intervention (M=19.58, S.D.=4.93) and after the intervention (M=20.24, S.D.=4.71) [t(54)=-4.31, p<.001]. Moreover, there was a significant increase in the score of the combined scale “Interpersonal Skills” after the intervention (M=105.66, S.D.=11.17) than before the intervention (M=105.10, S.D.=11.18) [t(54)=-3.65, p<.001]. No differences in the other scale and sub-scales were found. The results of the paired-samples t-tests are presented in table 2.

**Table 2: Paired-samples t-tests for the scores on Soft Skills before and after the intervention for the experimental group**

Variables	Condition	Mean	S.D.	t	df	sig
Social interaction	Before	15.47	3.67	-1.42	54	.16
	After	15.50	3.61			
Team Work	Before	19.58	4.93	-4.31	54	<b>.000</b>
	After	20.24	4.74			
Extraversion	Before	18.71	4.80	-5.74	54	.57
	After	18.73	4.83			
Interpersonal Skills (combined scale)	Before	105.10	11.43	-3.65	54	<b>.001</b>
	After	105.65	11.18			
Reliability	Before	12.51	2.81	-1.63	54	.11
	After	12.62	2.74			
Adaptability	Before	7.20	2.15	.000	54	1.00
	After	7.20	2.11			
Emotional Management	Before	10.16	3.71	-1.00	54	.32
	After	10.18	3.69			
Personal Skills (combined scale)	Before	41.82	6.56	-0.44	54	.66
	After	41.84	6.60			

Furthermore, we examined whether gender differentiated the aforementioned results. Wilcoxon signed-rank tests showed that the intervention elicited a statistically significant change in “Team Work” score and “Interpersonal Skills” score for both men and women participants of the experimental group. For men the results were Z = -2.85, p<.01 (Team Work) and Z=-2.39, p<.05 (Interpersonal Skills). For women the results were Z = -2.39, p<.05 (Team Work) and Z=-2.22, p<.05 (Interpersonal Skills). No other differences in soft skill scores were found. Table 3 presents the descriptive statistics for “Team Work” and “Interpersonal Skills” per gender.

**Table 3: Descriptive statistics of “Team Work” and “Interpersonal Skills” for men and women of the experimental group before and after the intervention**

(sub) Scales	Gender	Condition	Mean	S.D.	Median
Team Work	Men	Before	18.78	5.13	20.00
		After	19.43	5.09	21.00
	Women	Before	20.40	4.66	21.00
		After	21.08	4.21	22.00
Interpersonal Skills	Men	Before	102.42	10.19	102.00
		After	102.89	10.13	102.50
	Women	Before	108.00	12.12	108.00
		After	108.52	11.67	108.50

Finally, we examined whether migration status (asylum seeker, refugee or vulnerable migrant) differentiated the results of the intervention's effectiveness. Wilcoxon signed-rank tests showed that the intervention elicited a statistically significant change in "Team Work" score for all migrant groups (asylum seekers:  $Z = -1.93$ ,  $p < .05$ ; refugees:  $Z = -2.04$ ,  $p < .05$ , and vulnerable migrants:  $Z = -2.54$ ,  $p < .05$ ). They, also, showed a significant change in "Interpersonal Skills" for the "vulnerable migrants" ( $Z = -2.23$ ,  $p < .05$ ). The statistical significance in "Interpersonal Skills" for the other two migration status groups was  $0.05 < p < 0.10$ . No other differences in soft skill scores were found. Table 4 presents the descriptive statistics for "Team Work" and "Interpersonal Skills" per migration status.

**Table 4: Descriptive statistics of "Team Work" and "Interpersonal Skills" for asylum seekers, refugees and vulnerable migrants of the experimental group before and after the intervention**

(sub) Scales	Gender	Condition	Mean	S.D.	Median
Team Work	Asylum seekers	Before	21.05	4.34	22.00
		After	21.50	4.19	22.50
	Refugees	Before	19.47	6.04	22.00
		After	20.00	5.74	22.50
	Vulnerable Migrants	Before	18.35	4.21	18.50
		After	19.30	4.15	20.50
Interpersonal Skills	Asylum seekers	Before	104.77	9.80	103.50
		After	105.06	9.84	103.50
	Refugees	Before	105.00	14.24	101.00
		After	105.53	14.07	105.00
	Vulnerable Migrants	Before	105.65	10.65	103.50
		After	106.30	10.03	104.00

## CONCLUSIONS AND DISCUSSION

As it has been pointed out, tailored training interventions aiming to promote the development of prosocial skills of cultural diverse groups can function as an alternative action towards better migrants'/asylum seekers/refugees' integration into the host society, as prosocial skills, such as teamwork, trustworthiness, emotion management etc. lead to increase of the feeling of belongingness to society and social conformity. The scope of this survey was to study the effectiveness of a serious game on adult migrant groups' prosocial behaviour. The results of our study demonstrated the potential of the game as a tool for teaching important prosocial behaviour to vulnerable migrants, asylum seekers and refugees. Participants, who played the PoT, significantly improved in their interpersonal skills and mainly the skill to collaborate with others, whereas those who did not participate in the training intervention showed essentially no change in these skills. These results were expected given that the Path of Trust directly targets teamwork in order to achieve the goal. The same results occurred regarding gender and migration status variables. Both women and men increased their teamwork and interpersonal skills after the intervention. All migrant groups got improved on the teamwork skill, while regarding interpersonal skills vulnerable migrants had significantly higher scores after the intervention, whereas refugees and asylum seekers showed a tendency of improvement. On the other hand, no significant difference by treatment condition was found for the Personal skills (adaptability, trustworthiness, stress management) and the Communication and Extraversion. These findings may be attributed to the duration of the study, which was too brief (4-5 weeks) to impact migrant groups' skills. Furthermore, skills such as communication,

trustworthiness, adaptability, communication and stress management may take more time and real-world experience to alter than possible with this study design.

Especially for trustworthiness, the PoT could be enriched by engaging real-time adaptation mechanisms designed to give feedback to the player according to their choices, in order to guide them towards actions based on trustworthiness, by replacing for example items inside Corridor tiles as a response to player choices, followed by praise or corrective feedback. Players could be rewarded with Treasure Points whenever they trust the Guide's instructions, or, in case of a cynical approach, they could be reminded via text, or audio message that distrust should be reconsidered, or complementary switching a potential reward item with an enemy.

To sum up, despite the brief intervention period, our results provided initial support for the efficacy of the Path of Trust game for increased teamwork and interpersonal skills to asylum seekers, refugees and vulnerable migrants and in consequence they add in the growing literature, indicating that serious games can effectively be used for training purposes and effectively address a wide range of social and behavioural issues. Though, further research is needed, engaging a larger sample size for a longer intervention period in order to test whether personal skills, communication and extraversion can be affected by PoT and to validate the strong potential of a serious prosocial game in teaching prosocial behaviour to adult migrants, refugees and asylum seekers.

#### ACKNOWLEDGEMENT

This article is part of the NADINE project, which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 822601.

#### References

- [1] Beißert, H, Seçil Gönültaş, S. & Mulvey, K.L. (2019). Social Inclusion of Refugee and Native Peers Among Adolescents: It is the Language that Matters!: SOCIAL INCLUSION OF REFUGEES, *Journal of Research on Adolescence*, 30(1), DOI:10.1111/jora.12518
- [2] Caldarella, P., Millet, A. J., Heath, M.A., Warren, J.S., & Williams, L. (2019). *School Counselors Use of Social Emotional Learning in High School: A Study of the Strong Teens Curriculum*. Brigham: Brigham Young University.
- [3] Caprara, G. V., Steca, P., Zelli, A., & Capanna, C. (2005). A New Scale for Measuring Adults' Prosocialness, *European Journal of Psychological Assessment*, 21(2), 77–89. DOI:10.1027/1015-5759.21.2.77
- [4] Caprara GV, Barbaranelli C, Pastorelli C, Bandura A, Zimbardo PG (2000). Prosocial foundations of children's academic achievement. *Psychol Sci*, 11(4):302-6. DOI: 10.1111/1467-9280.00260.
- [5] Hay, D. F. (1994). Prosocial development. *Child Psychology & Psychiatry & Allied Disciplines*, 35(1), 29–71. <https://doi.org/10.1111/j.1469-7610.1994.tb01132.x>
- [6] Adachi, P. & Willoughby, T. (2013) More Than Just Fun and Games: The Longitudinal Relationships Between Strategic Video Games, Self-Reported Problem Solving Skills, and Academic Grades, *Journal of Youth and Adolescence* 42(7). DOI:10.1007/s10964-013-9913-9
- [7] Passmore, H.-A., & Howell, A. J. (2014). Eco-existential positive psychology: Experiences in nature, existential anxieties, and well-being. *The Humanistic Psychologist*, 42(4), 370–388. <https://doi.org/10.1080/08873267.2014.920335>
- [8] Tear, M. J., & Nielsen, M. (2014). Video games and prosocial behavior: A study of the effects of non-violent, violent and ultra-violent gameplay. *Computers in Human Behavior*, 41, 8–13. <https://doi.org/10.1016/j.chb.2014.09.002>



- [9] Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Ming, L. K., et al. (2009). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies, *Personality and Social Psychology Bulletin*, 35 (6), 752-763. DOI: 10.1177/0146167209333045
- [10] Keltner, D., Kogan, A., Pif, P. K., & Saturn, S. R. (2014). The sociocultural appraisals, values, and emotions (SAVE) framework of prosociality: Core processes from gene to meme. *Annual Review of Psychology*, 65, 425-60. <https://doi.org/10.1146/annurev-psych-010213-115054>.
- [11] Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. (2005). Prosocial behavior: Multilevel perspectives, *Annu. Rev. Psychol.*, 56, 365-392. DOI: 10.1146/annurev.psych.56.091103.070141
- [12] Davis, M. H. (1980). A multidimensional approach to individual differences in empathy, *JSAS Catalog of Selected Documents in Psychology*, 10, 85.
- [13] Hirn, S. L., Thomas, J., & Zoelch, C. (2019). The role of empathy in the development of social competence: A study of German school leavers. *International Journal of Adolescence and Youth*, 24(4), 395-407. <https://doi.org/10.1080/02673843.2018.1548361>
- [14] Eisenberg, N., & Fabes, R. A. (1998). *Prosocial development*. In W. Damon & N. Eisenberg (Ed.), *Handbook of child psychology: Social, emotional, and personality development* (p. 701-778). John Wiley & Sons, Inc.
- [15] Krebs, D. L., & Van Hesteren, F. (1994). The development of altruism: Toward an integrative model. *Developmental Review*, 14(2), 103-158. <https://doi.org/10.1006/drev.1994.1006>
- [16] Weinstein, N., & Ryan, R. M. (2010). When helping helps: Autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology*, 98(2), 222-244. <https://doi.org/10.1037/a0016984>
- [17] Wibisono, S., Mirnajafi, Z., Droogendyk, L., Chapman, C. M., Achia, T., Thomas, E. F., & Louis, W. R. (2019). Teaching and learning guide for intergroup prosociality. *Social and Personality Psychology Compass*, e12473. DOI:10.1111/spc3.12473
- [18] Nai, J., Narayanan, J., Hernandez, I., & Savani, K. (2018). People in more racially diverse neighborhoods are more prosocial. *Journal of Personality and Social Psychology*, 114(4), 497-515. <https://doi.org/10.1037/pspa0000103>
- [19] Newman, S., Vasudev, J., & Onawola, R. (1986). Older volunteers' perceptions of impacts of volunteering on their psychological well-being. *Journal of Applied Gerontology*, 4(2), 123-134.
- [20] Weeks H. W., Pedersen, P., Brislin, W., R. (1979). *A Manual of structured experiences for cross-cultural learning, Society for Intercultural Education, Training, and Research*. LaGrange Park, Ill. Intercultural Network, Inc.
- [21] Khawaja, N., Ibrahim, O. & Schwitzer, R. (2017). Mental Wellbeing of Students from Refugee and Migrant Backgrounds: The Mediating Role of Resilience, *School Mental Health* 9(1):1-10. DOI:10.1007/s12310-017-9215-6
- [22] Daniel, B. and Wassell, S. (2002) *The early years; assessing and promoting resilience in vulnerable children* (1). London: Jessica Kingsley Publishers Ltd.
- [23] Guan, S.-S. A., Greenfield, P. M., & Orellana, M. F. (2014). Translating Into Understanding, *Journal of Adolescent Research*, 29(3), 331-355. DOI:10.1177/0743558413520223
- [24] Mueser, K. T. & Bellack, A. S. (2007). Social skills training: Alive and well?, *Journal of Mental Health*, vol. 16, no. 5, pp. 549-552.
- [25] Baert, S., & Vujić, S. (2016). Immigrant volunteering: A way out of labour market discrimination? *Economics Letters*, 146, 95-98. DOI: 10.1016/j.econlet.2016.07.035
- [26] Wilson, J., & Musick, M. (1999). The Effects of Volunteering on the Volunteer. *Law and Contemporary Problems*, 62, 141-168. <https://doi.org/10.2307/1192270>
- [27] Louis, W. R., Thomas, E., Chapman, C. M., Achia, T., Wibisono, S., Mirnajafi, Z., & Droogendyk, L. (2019). Emerging research on intergroup prosociality: Group members' charitable giving, positive contact,

allyship, and solidarity with others, *Social and Personality Psychology Compass*, e12436. DOI:10.1111/spc3.12436

[28] DeRosier, M.E & Thomas, J.M. (2019). Hall of Heroes: A Digital Game for Social Skills Training with Young Adolescents, *International Journal of Computer Games Technology*, 2019(6), 1-12. <https://doi.org/10.1155/2019/6981698>

[29] Boduszek, D., Debowska, A., Jones, A.D, Ma, M. Smith, D., Willmott, D, Jemmott, E.T., Da Breo, H. & Kirkman, G. (2019). Prosocial video game as an intimate partner violence prevention tool among youth: A randomised controlled trial, *Computers in Human Behavior* 93:260-266. <https://doi.org/10.1016/j.chb.2018.12.028>

[30] Schippers, G. M., Märker, N., & De Fuentes-Merillas, L. (2001). Social skills training, prosocial behavior, and aggressiveness in adult incarcerated offenders. *International Journal of Offender Therapy and Comparative Criminology*, 45(2), 244–251. <https://doi.org/10.1177/0306624X01452009>

[31] Strohmeier D., Fandrem H. 2, Spiel C. (2012). The need for peer acceptance and affiliation as underlying motive for aggressive behaviour and bullying others among immigrant youth living in Austria and Norway, *Anales de Psicología*, 28(3), 695-704. DOI: <http://dx.doi.org/10.6018/analesps.28.3.155991>

[32] Law, E. L.-C., Kickmeier-Rust, M. D., Albert, D., & Holzinger, A. (2008). Challenges in the development and evaluation of immersive digital educational games. In A. Holzinger (Ed.), *HCI and usability for education and work* (pp. 19–30). Berlin, Heidelberg: Springer.

[33] Kickmeier, M., Mattheiss, E., Steiner, M., & Albert, D. (2011). 01). A psycho-pedagogical framework for multi-adaptive educational games. *IJGBL*, 1, 45–58. DOI: 10.4018/ijgbl.2011010104

[34] Wouters, P., & Oostendorp, H. V. (2013). A meta-analytic review of the role of instructional support in game-based learning. *Computers & Education*, 60(1), 412–425. DOI: 10.1016/j.compedu.2012.07.018.

[35] Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist*, 50, 258–284. DOI: 10.1080/00461520.2015.1122533

[36] Bourdieu P (1977) *Outline of a Theory of Practice*. Cambridge, MA: Cambridge University Press.

[37] Beckman, K., Apps, T., Bennett, S., & Lockyer, L. (2018). Conceptualising technology practice in education using Bourdieu's sociology. *Learning, Media and Technology*, 43(2), 197–210. <https://doi.org/10.1080/17439884.2018.1462205>

[38] Hamari, J., Shernof, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, ow and immersion in game-based learning. *Computers in Human Behavior*, 54, 170–179. DOI: 10.1016/j.chb.2015.07.045

[39] Li, B., & Riedl, M. O. (2010). An offline planning approach to game plotline adaptation. In G. M. Youngblood & V. Bulitko (Eds.), *Proceedings of the Sixth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, AIIDE 2010, October 11-13, 2010, Stanford, California, USA*. AAAI Press

[40] Stefanidis, K. Apostolakis, K., Psaltis, A., Dimitropoulos, K. & Daras P. (2019). Learning prosocial skills through multi-adaptive games: a case study, *Journal of Computers in Education*, Springer, 6 (1), pp 167–190. DOI: 10.1007/s40692-019-00134-8

[41] Greitemeyer, T., & Osswald, S. (2010). Effects of prosocial video games on prosocial behavior, *Journal of personality and social psychology*, 98(2), 211.

[42] Jerabeck, J. M., & Ferguson, C. J. (2013). The influence of solitary and cooperative violent video game play on aggressive and prosocial behavior. *Computers in Human Behavior*, 29(6), 2573–2578. <https://doi.org/10.1016/j.chb.2013.06.034>

[43] Anderson, C. A., Gentile, D. A., & Dill, K. E. (2012). *Prosocial, antisocial, and other effects of recreational video game*, Sage Publications, Inc.

[44] Greitemeyer, T., & Mügge, D. O. (2014). Video games do affect social outcomes a meta-analytic review of the effects of violent and prosocial video game play, *Personality and Social Psychology Bulletin*, 40 (5), 578-589. DOI: <https://doi.org/10.1177/0146167213520459>

- [45] Greitemeyer, T., Traut-Mattausch, E., & Osswald, S. (2012). How to ameliorate negative effects of violent video games on cooperation: Play it cooperatively in a team. *Computers in Human Behavior*, 28(4), 1465–1470. <https://doi.org/10.1016/j.chb.2012.03.009>
- [46] Greitemeyer, T. (2013). Playing video games cooperatively increases empathic concern. *Social Psychology*, 44(6), 408–413. <https://doi.org/10.1027/1864-9335/a000154>
- [47] Apostolakis, K. C., Psaltis, A., Stefanidis, K., Kaza, K., Thermos, S., Dimitropoulos, K., Dimaraki, E., & Daras, P. (2016). Exploring the prosociality domains of trust and cooperation, through single and cooperative digital gameplay in Path of Trust. *International Journal of Serious Games*, 3(3). <https://doi.org/10.17083/ijsg.v3i3.125>
- [48] Saleme, P., Pang, B., Dietrich, T. & Parkinson, J. (2020). Prosocial digital games for youth: A systematic review of interventions, *Computers in Human Behavior Reports*, 2. <https://doi.org/10.1016/j.chbr.2020.100039>
- [49] Belfield, C., Bowden, B., Klapp, A., Levin, H., Shand, R., & Zander, S. (2015). The economic value of social and emotional learning. *Journal of Benefit-Cost Analysis*, 6 (3), pp. 508 – 544. DOI: <https://doi.org/10.1017/bca.2015.55>
- [50] Dymnicki, A. B., Taylor, R. D. & Schellinger, K. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions, *Child Development*, 82, 405–432. DOI: 10.1111/j.1467-8624.2010.01564
- [51] Herman, B., & Collins, R. (2018). *Social and Emotional Learning Competencies*. Wisconsin: Department of Public Instruction.
- [52] Oliver, B. (2018). *Social Emotional Learning Toolkit*. Indiana: Department of Education.
- [53] Solberg D., A., de Baca V. S. C., & Gore, T. H. (2014). Use of Social Emotional Learning Skills to Predict Future Academic Success and Progress Toward Graduation, *Journal of Education for Students Placed at Risk (JESPAR)*, 19(3-4), 169–182. DOI:10.1080/10824669.2014.972506
- [54] Taylor, R., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects, *Child Development*, 88, 1156–1181. DOI:10.1111/cdev.12864
- [55] Collaborative for Academic, Social and Emotional Learning (2003). *Safe and sound: An educational leaders' guide to evidence-based social and emotional learning (SEL) programs*. Chicago, IL: Author
- [56] Gerace, A., Day, A., Casey, S., & Mohr, P. (2015). Perspective Taking and Empathy: Does Having Similar Past Experience to Another Person Make It Easier to Take Their Perspective? *Journal of Relationships Research*, 6. DOI:10.1017/jrr.2015.6
- [57] Hassenstab, J., Dziobek, I., Rogers, K., Wolf, O. T., & Convit, A. (2007). Knowing What Others Know, Feeling What Others Feel. *The Journal of Nervous and Mental Disease*, 195(4), 277–281. DOI: 10.1097/01.nmd.0000253794.74540.2d
- [58] OECD (2018). *Skills on the Move: Migrants in the Survey of Adult Skills*. OECD Skills Studies, OECD Publishing, Paris. <https://doi.org/10.1787/9789264307353-en>
- [59] OECD (2005). *Definition and Selection of Key Competencies - Executive Summary*. <https://www.oecd.org/pisa/35070367.pdf>
- [60] OECD (2014). *OECD – Learn, Perform, Succeed, Competency Framework*. [https://www.oecd.org/careers/competency\\_framework\\_en.pdf](https://www.oecd.org/careers/competency_framework_en.pdf)
- [61] OECD (2018a). *Skills for Jobs*. [www.oecdskillsforjobsdatabase.org](http://www.oecdskillsforjobsdatabase.org)
- [62] ILO International Labour Organization (2008). *Conclusions on skills for improved productivity, employment growth and development*, International Labour Conference, 2008 / International Labour Office. Geneva: ILO, 2008.
- [63] ILO International Labour Organization (2015). *Labour migration and skills matching*. Labour Migration Highlights, No. 6. Labour Migration Branch and Skills and Employability Branch International Labour Office CH-1211 Geneva 22, Switzerland.

[64] European Commission (2018). Council Recommendation of 22 May 2018 on key competences for lifelong learning (Text with EEA relevance.) ST/9009/2018/INIT OJ C 189, 4.6.2018, p. 1–13 (BG, ES, CS, DA, DE, ET, EL, EN, FR, HR, IT, LV, LT, HU, MT, NL, PL, PT, RO, SK, SL, FI, SV) Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.C\\_.2018.189.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.C_.2018.189.01.0001.01.ENG)

[65] European Commission (2020). *EU Skills Profile Tool for Third Country Nationals*. Luxembourg: Publications Office of the European Union. DOI: 10.2767/301427. The tool is available at: <https://ec.europa.eu/migrantskills/#/>

[66] ILO International Labour Organization (2017). *How To Facilitate The Recognition Of Skills Of Migrant Workers - Guide For Employment Service Providers*. ILO, Geneva, Switzerland.

[67] The Adecco Group (2017a). *'The labour market integration of refugees' white paper: A focus on Europe*. June, 2017. Commissioned to the Reallabor Asyl, Heidelberg University of Education. Available at <https://adeccogroup.it/wp-content/uploads/2017/07/FULL-WHITE-PAPER-labour-market-integration-of-refugees-focus-europe.pdf>

[68] The Adecco Group (2017b). *The Soft Skills Imperative*. White Paper 1/2017. Available at <https://www.adecco.com.sg/media/adecco-singapore/client/the-adecco-group-white-paper-the-soft-skills-imperative.pdf>

[69] Tountopoulou M., Karaminas N., Drosos N. & Vlachaki F. (2020). The NADINE Soft Skills Tests for Migrants, Refugees and Asylum Seekers: Cultural Adaptation and Preliminary Testing of Their Psychometric Properties, *Psychology*, 11. DOI: 10.4236/psych.2020.1112121