



Intergenerational social innovation project "Cos_Avos": active aging through Physical Education

Proyecto de innovación social intergeneracional "Cos_Avos": envejecimiento activo a través de la Educación Física

Authors

Angel Casal Moldes ¹
Adriana López Rodríguez ²
Jose M^a Cancela Carral ^{1,2}

¹ Galicia Sur Health Research Institute (IIS Galicia Sur), Vigo, Spain

² University de Vigo (Spain)

Corresponding author:
Jose M^a Cancela Carral
chemacc@uvigo.gal

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Abstract

Introduction: The population of older adults grows exponentially, age discrimination, negative stereotypes and prejudice towards them are on the rise. To combat this, there is a need for proposals that enhance people's perception of the older adults by presenting aging as a positive paradigm.

Objective: evaluate participants' satisfaction with the intergenerational healthy physical exercise program, considering emotional, social, cognitive, and functional dimensions

Methodology: 767 school (8 to 16 years old), and 141 older adults (65 to 89 years old) took part of physical-sports activities carried out over a 10 days period in the social-health centers. To evaluate the effect of intergenerational project on the emotional, social, functional and cognitive dimensions of the participants, an ad hoc questionnaire was carried out.

Results: The results showed a significant positive effect ($p < 0.05$) across all the groups, with the results obtained by the high school group (in the social, 5.00 ± 0.00), cognitive (5.00 ± 0.00) and emotional (4.90 ± 0.12) dimensions) being particularly noteworthy.

Discussion: The results suggest that intergenerational physical-sport activities effectively reduce age-related stereotypes and promote mutual understanding. The emotional and social benefits observed align with existing literature emphasizing the value of shared movement and cooperation for psychological well-being. Future research should explore long-term effects and strategies for integrating these programs into education and community health.

Conclusions: The project received highly positive evaluations from both students and older adults, who highlighted increased empathy, creativity, and social responsibility, as well as enthusiasm for future participation.

Keywords

Discrimination; education; elderly; integration; sport.

Resumen

Introducción: La población de personas mayores está aumentando de forma exponencial y, con ello, también crecen la discriminación por edad, los estereotipos negativos y los prejuicios hacia este grupo. Para hacer frente a este desafío, es fundamental promover iniciativas que mejoren la percepción social de las personas mayores, presentando el envejecimiento como una etapa positiva y activa de la vida.

Objetivo: evaluar la satisfacción de los participantes con el programa intergeneracional de ejercicio físico saludable, considerando las dimensiones emocional, social, cognitiva y funcional

Metodología: Participaron 767 estudiantes (de 8 a 16 años) y 141 personas mayores (de 65 a 89 años) en actividades físico-deportivas desarrolladas durante diez días en centros socio-sanitarios. El impacto del programa en las dimensiones emocional, social, funcional y cognitiva se evaluó mediante un cuestionario ad hoc.

Resultados: Los resultados mostraron efectos positivos significativos ($p < 0.05$) en todos los grupos participantes, destacando el grupo de educación secundaria, con puntuaciones sobresalientes en las dimensiones social (5.00 ± 0.00), cognitiva (5.00 ± 0.00) y emocional (4.90 ± 0.12).

Discusión: Los resultados sugieren que las actividades físico-deportivas intergeneracionales reducen eficazmente los estereotipos relacionados con la edad y promueven la comprensión mutua. Los beneficios emocionales y sociales coinciden con la literatura previa que resalta el valor del movimiento compartido y la cooperación para el bienestar psicológico.

Palabras clave

Deporte; discriminación; educación; envejecimiento; integración.

Introduction

The aging population is a key issue in developed countries, due to an unprecedented shift in their demographics, from 8% of adults over 60 years of age in 1950 to 22% in 2050, a year during which the number of older adults aged 60 years and above is projected to reach a total of 2 billion (WHO, 2018). Conversely, the percentage of children aged under 15 will go from 34% in the mid-20th century to 20% a hundred years on. Because of these trends, new suggestions are needed to enable the elderly to maintain a relevant, active, and participatory role in society.

Just as the proportion of older adults in the population has varied through the ages, so have the consideration and esteem in which they are held, and the positive or negative views of them changed in different times and cultures. Every society has its own social constructs regarding age in general, and old age in particular. Throughout history, there have always been times of recognition and appreciation of the elderly; in these cases, the veneration and respect in which they were held were often linked to their knowledge, and their economic or political power. Today, instead, we are witnessing the exaltation of youth, with all its connotations of productivity, beauty, and success. Age and the passage of time are perceived negatively, as things to be combated, and because of this we see the proliferation and promotion of “anti-aging” products, related mainly to the preservation of youthful aesthetics.

In view of this, it is important to redefine the image of old age, whilst bearing in mind that it is a stage of life that, like all the others, has both positive and negative aspects. Deconstructing prejudices and stereotypes about the elderly is an essential task for society and will contribute towards eradicating discriminatory practices. Currently, as the population of older adults grows exponentially, age discrimination, negative stereotypes and prejudice towards this population are on the rise (Ng et al., 2015). Some young people see older adults as a burden: forgetful, incompetent, and sickly (Levy & McDonald, 2016; McDonald & Levy, 2021). As a result, action plans that value older adults and present aging from a positive paradigm are needed.

Intergenerational Projects (IP) arose from this need and aim to promote cooperative and collaborative activities between different generations, in which everyone’s contribution is valued. IPs aimed at older adults are activities and programs that increase cooperation, interaction and exchange between older adults and other groups from different generations (children, adolescents, adults), and involve sharing skills, knowledge and experiences that benefit both participating groups (Ruiz-Montero et al., 2025; Ventura-Merkel & Lidoff, 1983). The goal of IPs is to increase contact and understanding, to build relationships, to foster emotional and social growth, and to achieve educational and community goals (Kaplan et al., 2004; Newman & Hatton-Yeo, 2008). IPs are designed to engage unrelated older and younger adults in interactions that promote cross-generational bonding and cultural exchange and provide positive support systems that help maintain the well-being and safety of both younger and older generations (Jarrott et al., 2021). IPs are not isolated, one-off proposals, but are part of a larger intergenerational strategy to build more inclusive and involved caregiving communities in which all generations can give and receive support (Whear et al., 2023). This can be framed as an effort to renew the social covenant; each generation learns from its families and the society in which it lives, and receives resources from its predecessors, and in turn, teaches and passes on these and more resources to its own successors. This social covenant takes the obligations of each member of society and extends them towards others. As well as having a sense of interdependence (each participant feels that he or she needs others and, in turn, is needed by them), people also need to have a sense of belonging, and of social inclusion, which is a key component of IPs (Granville, 2022).

Therefore, participation in an IP provides multiple benefits to its participants, although in many cases, these benefits are difficult to quantify and their delimitation is not clear, making it difficult to determine who benefits most in a program in which there is intergenerational communication. According to Goff (2004) intergenerational service-learning provides participants with the opportunity to develop qualities such as initiative, flexibility, openness, empathy, and creativity, and to gain a sense of social responsibility and an understanding of the value of lifelong learning. Marx, Hubbard, Cohen-Mansfield, Dakheel-Ali & Thein (2004), indicate that, for children, the benefits of participating in an IP oriented to older adults include: positive changes in perceptions and attitudes towards older adults, increased empathy for older adults (Lambert, 1990), increased knowledge about aging and institutionalized older people, increased prosocial behaviors such as sharing, higher self-esteem, as well as improved lifestyles



(Kuehne, 2005) and social relationships. For older adults, among the many benefits of participation in an IP, the following stand out: improved self-esteem, reduced situations of loneliness and isolation (Bressler, 2001), improvements to mood and increased vitality, integration into community life and increased opportunities for accompaniment and support in daily activities (Maccallum, 2006). This all highlights the fact that the great potential of an IP is its use at a preventive level (Dominguez, 2012) as it favors active aging both physically, psychologically, and emotionally in older adults.

The “*Cos Avós*” project was conducted entirely within the Autonomous Community of Galicia. The primary objective of the project was to evaluate participants’ satisfaction with the intergenerational healthy physical exercise program. To this end, the study pursued the following specific aims: 1. To assess emotional outcomes by examining participants’ perceptions of affective well-being and enjoyment derived from the program. 2. To analyze social outcomes, through the evaluation of interpersonal relationships, social integration, and the sense of belonging fostered by participation. 3. To measure cognitive outcomes, by exploring participants’ perceptions of mental stimulation and learning opportunities provided during the activities. 4. To evaluate functional outcomes, by determining the extent to which the program supported participants’ perceptions of physical autonomy and functional capacity.

Method

Design study

The study employed a quasi-experimental design using a one-group post-test approach.

Participants

A total of 767 students (children and adolescents; 400 female) aged between 8 and 16, and 141 older adults (84 female) aged between 65 and 89 participated in the IP. The students came from 10 educational centers belonging to the public school system of the Autonomous Community of Galicia (Spain) and the older adults belonged to three social and health centers in the province of Pontevedra (Spain). The mean age of the students was 11.50 ± 2.66 , whereas the older adults had a mean age of 72.5 ± 4.7 . All participants demonstrated complete autonomy, both physical and cognitive. Participation in the project was voluntary, and the participants were able to leave the project whenever they wished. All the groups were given a presentation of the “*Cos Avos*” project and were asked if they would like to participate, and they or their legal guardians/parents signed an informed consent form in which the characteristics of the project were explained in detail. The study was conducted following the ethical principles for medical research on human subjects according to the Declaration of Helsinki and complied with all the provisions established in the Organic Law 3/2018 concerning Personal Data Protection and Guarantee of Digital Rights (Organic Law 3/2018, of May 25). According to this law, strict confidentiality of the data and the results of the tests performed must be maintained.

Procedure

The Project “*Cos Avos*” came about via a collaboration between the Xunta de Galicia, the Government of Spain and the University of Vigo, by means of the “Plan Corresponsables 2023” (Rojas, 2024). It consisted of carrying out a series of physical/sports activities over a period of 10 days in the province of Pontevedra, more specifically in the towns of Vigo, Pontevedra and Sanxenxo. The selection of the locations was based on the high number of inhabitants, and the existence of schools close to social health centers (public-private) for the older adults. In these three locations there were different public/private social-health centers/services for the elderly with which the University of Vigo, through the HealthyFit research group, already had collaboration agreements. The centers chosen as locations to carry out the project were: *Social Health Center Saraiva Senior (Pontevedra)*, *Social Health Center Nuestra Señora del Rocío - Fundación San Rosendo (Vigo)* and *Servicios de Asistencia Social - Concello de Sanxenxo (Sanxenxo)*. As for the schools, the chance to participate was offered to the schools closest to the social-health center/service where it was decided to implement the project. In the end, a total of 10 educational centers (nine primary schools and one high school) accepted the invitation, and the activities were carried out in the following schools: Pontevedra: *CEIP Álvarez Limeses*, *CEIP Xunqueira I*, *CEIP Xunqueira II* and *CEIP Froebel*; Vigo: *CEIP Balaídos*, *CEIP plurilingüe Pintor Laxeiro* and *Colegio Plurilingüe Don Bosco Salesianas*; Sanxenxo: *IES Sanxenxo*, *CEIP Portonovo*, *CEIP Plurilingüe A Florida*.



The Intergenerational Project "Cos_Avos" was carried out between 27/02/2023 and 10/03/2023, with a focus on four main themes: stories of sporting life, physical-cognitive exercise, heart-healthy routes/exercise, and collaborative-collective sports games. Activities related to each of the four themes were carried out in each social-health center/service, depending on the spatial and functional capabilities of the elderly people attending them. In total, a minimum of two and a maximum of four sessions were dedicated to each theme in every center (Table 1).

Table 1. Timeline of executed activities.

| Date | Concello de Sanxenxo (Sanxenxo). | | Saraiva Senior (Pontevedra) | | Nuestra Señora del Rocio - Fundación San Rosendo (Vigo) | |
|-------|--|--|---|--|---|--|
| | School | Activities | School | Activities | School | Activities |
| 27/02 | IES Sanxenxo (3 ^a A) | Stories of Sporting Life Physical-Cognitive exercises | CEIP Alvarez Limeses (5 ^a A) | Stories of Sporting Life Physical-Cognitive exercises | CEIP Balaidos (4 ^a A) | Stories of Sporting Life Physical-Cognitive exercises |
| 28/02 | IES Sanxenxo (4 ^a B & 4 ^a C) | Healthy Heart routes and exercise | CEIP Alvarez Limeses (3 ^a B) | Healthy Heart routes and exercise | CEIP Balaidos (4 ^a B) | Healthy Heart routes and exercise |
| 01/03 | IES Sanxenxo (4 ^a A) | Collaborative/Collective games | CEIP Alvarez Limeses (4 ^a A) | Collaborative/Collective games | CEIP Balaidos (5 ^a A) | Collaborative/Collective games |
| 02/03 | IES Sanxenxo (3 ^a C) | Physical-Cognitive exercise | CEIP Alvarez Limeses (3 ^a A) | Physical-Cognitive exercise | CEIP Balaidos (5 ^a B) | Physical-Cognitive exercise |
| 03/03 | IES Sanxenxo (3 ^a B) | Collaborative/Collective games | CEIP Alvarez Limeses (5 ^a B) | Collaborative/Collective games | Don Bosco (4 ^o) | Collaborative/Collective games |
| 06/03 | Portonovo (4 ^o) CEIP | Stories of Sporting Life Physical-Cognitive exercise | CEIP A Xunqueira 1 (2 ^a B) | Stories of Sporting Life Physical-Cognitive exercise | CEIP Pintor Laxeiro (4 ^a A) | Stories of Sporting Life Physical-Cognitive exercise |
| 07/03 | Portonovo (3 ^o) CEIP | Healthy Heart routes and exercise | CEIP A Xunqueira 1 (2 ^a A) | Healthy Heart routes and exercise | CEIP Pintor Laxeiro (4 ^a B) | Healthy Heart routes and exercise |
| 08/03 | Plurilingue A Florida (5 ^o) CEIP | collaborative/Collective games | CEIP A Xunqueira 2 (3 ^o) | Collaborative/Collective games | CEIP Pintor Laxeiro (5 ^a A) | Collaborative/Collective games |
| 09/03 | Plurilingue A Florida (4 ^o) CEIP | Physical-Cognitive exercise | CEIP A Xunqueira 2 (4 ^o) | Physical-Cognitive exercise | CEIP Pintor Laxeiro (5 ^a B) | Physical-Cognitive exercise |
| 10/03 | Plurilingue A Florida (6 ^o) | Collaborative/Collective games | CEIP FROEBEL (4 ^o) | Collaborative/Collective games | Don Bosco (5 ^o) | Collaborative/Collective games |

The four themes chosen were:

1. Stories of Sporting Life: This activity took place on 02/27/2023 and 03/06/2023, and consisted of two lectures on the evolution of, and changes to, sporting culture in Spain over the last 100 years. Both older adults and children participated actively, by analyzing and discussing the facilities and opportunities that are currently available and the difficulties that existed in the past - facts that were affected in many cases by the gender of the participants. This theme was presented further as conversations and personal stories about the practice of sports by the different participants (students vs. older adults), analyzing and comparing the facilities, obstacles, and opportunities that each participant had experienced. At the end, each participant gave an autobiographical account of their own sporting lives and their experiences of physical exercise up to that time.

2. Physical-cognitive exercise. This activity was carried out on 02/27/2023 and 02/03/2023, 03/06/2023 and 03/09/2023, and consisted of four days of physical exercise combined with some decision-making and short-term memory exercises, which influenced how the exercises were performed. These activities were adapted to the physical environment, and to the capabilities of the older adults and children who participated throughout the project. Whilst carrying out the activities, different types of sports equipment and alternative materials were used to improve the dynamics of the sessions. It is scientifically proven that exercise stimulates neuronal activity in different areas of the brain such as the prefrontal cortex, the parietal lobe, and the cerebellum, and can facilitate retentive functions (Frith et al., 2017; Zapata-Gil et al., 2026). Much more beneficial effects can be achieved, however, if a combination of exercise and cognitive tasks are performed, since this combination improves neuronal plasticity, and encourages the creation of new neuronal connections that improve cognitive function (Cassio et al., 2018).



3. "Healthy Heart" Routes and Exercise. This activity was carried out on 02/28/2023 and 03/07/2023 and consisted of two days of continuous physical exercise that on 02/28/2023 took place through the streets and physical environment of the towns participating in the project (image 1), and on 03/07/2023 took place in the facilities of the social health intervention center due to inclement weather. Once again, the importance of physical activity and sport as a means for healthy aging was highlighted during these days. "Healthy Heart" exercise aims to prevent cardiovascular problems (Cruzat & Tauda, 2025; F. Araujo et al., 2025), so the WHO recommends that people over the age of 65 perform 150 minutes a week of moderate aerobic physical activity, or 75 minutes of some type of vigorous aerobic physical activity, recommendations that were applied during this theme of study.

4. Collaborative collective games. The activities related to this theme took place on 01/03/2023, 03/03/2023, 08/03/2023 and 10/03/2023. In these activities, the participants played adapted folk/traditional games and more modern cooperative games. These types of games were chosen because they are very social, and the results depend on collaborative teamwork. The games promoted integration, respect, companionship, teamwork, self-control and understanding among the differently aged participants, as well as boosting motivation and personal growth (self-esteem), all of which were desired and fundamental aspects in the intergenerational "Cos_Avos" project.

Instrument

Physical Activity Quiz For the systematic planning of the intergenerational healthy physical exercise program, several preliminary visits were conducted to the three participating social and health centers prior to the implementation of the "Cos Avós" project. These visits were intended to obtain detailed information regarding the interests, functional capacities, and psychological profiles of the individuals involved. This preparatory stage ensured that the activities could be appropriately adapted to the participants' abilities and to the infrastructural resources available at each center. To assess participants' satisfaction with the "Cos Avós" project, an ad hoc questionnaire was developed. The design of the instrument considered the target groups of the program (children, adolescents, and older adults) and the four dimensions associated with program satisfaction: emotional, social, cognitive, and functional. Program satisfaction was assessed across four interrelated dimensions: emotional, social, cognitive, and functional. The emotional dimension reflects affective responses such as enjoyment, motivation, and overall well-being during participation (Ryan & Deci, 2017). The social dimension encompasses interpersonal relationships and collaborative behaviors, fostering empathy and a sense of belonging (Haslam et al., 2018). The cognitive dimension refers to opportunities for learning and intellectual stimulation, including exposure to cultural and physical traditions (Hertzog et al., 2008). Finally, the functional dimension addresses perceptions of usefulness and autonomy, promoting active engagement and competence in daily activities (World Health Organization, 2020). Together, these dimensions provide a comprehensive framework for evaluating the psychosocial and practical impact of intergenerational interventions (Villar et al., 2021).

Based on these dimensions, a review of the relevant literature was conducted (Domènech-Abella et al., 2022; Martín et al., 2010; Santini et al., 2018) and an initial 20-item questionnaire was constructed. The instrument underwent two rounds of expert review by three specialists in the implementation and monitoring of social programs, resulting in a final version comprising 15 items distributed across the following dimensions: emotional (5 items), social (6 items), cognitive (2 items), and functional (2 items). Responses were collected using a five-point Likert scale ranging from 1 ("very little") to 5 ("very much").

Given the large sample size—767 students and 141 older adults—data collection was conducted online and organized by groups within each participating institution. For each group, the questionnaire was completed collectively through a structured consensus process: participants discussed each item, shared their perspectives, and agreed on a single response that best represented the group's overall opinion. This approach ensured inclusivity and collective decision-making, while maintaining feasibility for large-scale implementation. Once consensus was reached, the agreed responses were recorded and compiled by the designated coordinators at each school or social-health center.

Data analysis

Due to the characteristics of the data and the research design, a descriptive analysis of the data was carried out using measures of central tendency (mean and standard deviation), with the analysis stratified according to which group was under study (students: primary education and high school education,



and older adults). In order to analyze the achievements of the project according to which educational stage was analyzed, the student's t-test was performed for independent data, since the distribution of the data followed a normal distribution (Shapiro Wilk, $p > 0.05$). All data analysis was carried out using the IBM-SPSS v29 statistical analysis program for Mac.

Results

This intergenerational project was carried out with the participation of 767 and 141 older. Participants were residents of the Galician Autonomous Community. The primary objective of the project was to evaluate participants' satisfaction with the intergenerational healthy physical exercise program, considering four key dimensions: emotional, social, cognitive, and functional. The results are presented below.

Emotional dimension

The emotional dimension was measured by five questions, in which we observed that both students (100%) and older adults (80%) reported high degrees of satisfaction with the IP, and with the activities comprising each of the sessions. Both groups stated that the activities which they carried out positively influenced their psychological and emotional state, giving a rating higher than 4 on a likert scale of 1 to 5, where 1 was "a little" and 5 "a lot". If the emotional dimension is analyzed according to the type of center (school vs. social health center), significant differences were shown, with the schools demonstrating a bigger difference (4.72 ± 0.29). As a function of the educational stage of the students (primary vs high school), the results for the emotional dimension did not show any significant differences. However, when the analysis was stratified by type of center (school vs social/health center) and educational level (primary vs high school), significant differences were observed between social-health centers and schools - both for primary ($p < 0.015$) and high school ($p = 0.003$) stages: i.e. the project seems to have carried a greater emotional weight in schools, with the high school education stage feeling the greatest effect.

Social Dimension

The social dimension was evaluated by six questions in which it was observed that of the 908 participants, none of them had previously participated in a similar experience linked to intergenerational projects, and that all of them, both students and older adults alike, would repeat the experience if there were another similar project in the future. There was a high degree of satisfaction with the work carried out by the educators and with the experience of participating in the different collaborative collective games. The older adults (80%) and the students (100%) reported positive values in terms of the improvements in social relations between the groups and stated that this new intergenerational initiative enhanced integration between the two groups. Both groups recorded a score higher than or very close to 4 (students: 4.73 ± 0.34 ; older adults: 3.97 ± 0.88) on a Likert scale of 1 to 5, with 1 being "a little" and 5 "a lot" (table 2).

Table 2. Evaluation of questionnaire dimensions based on the type of center.

| | School | | | | Social-Health Center | | | |
|----------------------|--------|------|------|------|----------------------|------|------|------|
| | Mean | sd | Min | Max | Mean | sd | Min | Max |
| Emotional dimension | 4.72 | 0.29 | 4.40 | 5.00 | 4.04* | 0.51 | 3.20 | 4.60 |
| Social dimension | 4.73 | 0.34 | 4.33 | 5.00 | 3.97* | 0.88 | 3.00 | 5.00 |
| Cognitive dimension | 4.60 | 0.52 | 4.00 | 5.00 | 4.10 | 0.84 | 3.00 | 5.00 |
| Functional dimension | 3.30 | 0.54 | 2.50 | 4.00 | 3.50 | 0.75 | 2.50 | 4.50 |
| Total score | 4.34 | 0.28 | 4.06 | 4.75 | 3.90* | 0.69 | 3.05 | 4.78 |

(* $p < 0.05$)

The social dimension is analyzed according to the type of center (school vs social-health center) significant differences were observed, particularly for the schools ($p < 0.05$). Depending on the educational stage of the students, significant differences were also reported in the results of the social dimension's evaluation and were greater for those in High School Education (Table 3). Finally, as regards the analysis of the differential effect of the Intergenerational Project, the results of the social dimension evaluation were also significant, depending on the type of center (educational vs. social-health center) and the stage of education ($p < 0.05$) (Table 4). Finally, as regards the analysis of the differential effect of this Project,



significant differences were found according to the type of center (school vs. social-health center) and stage of education (primary vs. High school) these being greater in schools ($P=0.010$) and for high school ($P=0.020$). The results show that greatest effect of the Intergenerational Project, in its social dimension, was on high school children rather than on older adults (Table 3).

Table 3. Evaluation of questionnaire dimensions based on the educational stage of students.

| | School | | | | | | | |
|----------------------|-------------------|------|------|------|-----------------------|------|------|------|
| | Primary Education | | | | High School Education | | | |
| | Mean | sd | Min | Max | Mean | sd | Min | Max |
| Emotional dimension | 4.60 | 0.31 | 4.40 | 5.00 | 4.90 | 0.12 | 4.80 | 5.00 |
| Social dimension | 4.56 | 0.34 | 4.33 | 5.00 | 5.00* | 0.00 | 5.00 | 5.00 |
| Cognitive dimension | 4.33 | 0.52 | 4.00 | 5.00 | 5.00* | 0.00 | 5.00 | 5.00 |
| Functional dimension | 3.67 | 0.26 | 3.50 | 4.00 | 2.75* | 0.29 | 2.50 | 3.00 |
| Total score | 4.29 | 0.36 | 4.06 | 4.75 | 4.41 | 0.10 | 4.33 | 4.50 |

(* $p<0.05$)

Cognitive dimension

The cognitive dimension was covered by two questions in the questionnaire and indicated high levels of satisfaction with the cognitive and physical activities that were carried out over the two weeks of the IP, highlighting that 100% of the participants (children and older adults) would have liked the activities to have lasted longer. 100% of the students and 60% of the older adults who participated in the project stated that they learned new things with the different adapted games. All the participants interviewed gave a rating of higher than 4 (students: 4.60 ± 0.52 ; older adults: 4.10 ± 0.84), on a Likert scale of 1 to 5, with 1 being "a little" and 5 "a lot". If the evaluation of the cognitive dimension is analyzed according to the type of center (school vs social health center), significant differences are not observed (Table 2). However, differences were found according to the educational stage of the students (table 3), and these were greater in the high school stage (5.00 ± 0.00), achieving the maximum score on the scale. Finally, regarding the differential effect analysis of this project, we found significant differences according to the type of center and educational level (table 4), and again, these were greater in the high school stage ($p=0.030$). In other words, as with the emotional and social dimension, the project seems to have had a greater influence on the high school group than on the primary school group.

Functional Dimension

The questionnaire investigated the functional dimension through two questions, in which both students and older adults stated that the different activities they carried out involved physical and motor effort and indicated a variable perception of effort which depended on their physical condition and involvement in the activities. 67% of the students mentioned improvements in their physical condition and thought that the IP sessions had influenced this. Similarly, 80% of the older adults interviewed indicated improvements in their physical condition and stated that the sessions they carried out in the IP involved a physical and cognitive effort and generated an adaptation of their physical capacity. If the functional dimension is analyzed according to the type of center (school vs. social health center) no significant differences are observed (table 2). However, some differences were observed according to the educational stage of the students, with the effects of the IP on the functional dimension perceived to be greater by the primary education stage group (3.67 ± 0.26) than by the high school group (Table 3).

Lastly, the differential effect analysis of the Intergenerational Project (table 4), according to the type of center (school vs. social health center) and educational level (primary vs. high school), indicated significant differences, which were greater in the high school stage ($p=0.040$). If we consider the total score of the questionnaire, the results show that the IP generated significant differences according to the type of center (school's vs social health center) and had a greater effect on the students (4.34 ± 0.28). Similarly, the differential analysis according to the type of center (school vs social health center) and the educational stage (primary vs high school), revealed the existence of significant differences, and these were greater in the s high school group ($p=0.023$).

Table 4. Analysis of the differential effect of the Cos_Avos project based on the type of center (School vs. Social health center).

| | School vs. Social Health Center | | | | |
|----------------------|---|---------------|--------|-------|------------|
| | Mean dif. | Dif Error std | t | P | CI (95%) |
| Emotional dimension | 0.68 | 0.18 | 3.700 | 0.001 | 0.29-1.06- |
| Social dimension | 0.76 | 0.29 | 2.571 | 0.010 | 0.14-1.39 |
| Cognitive dimension | 0.50 | 0.31 | 1.599 | 0.064 | -0.11-1.15 |
| Functional dimension | -0.20 | 0.29 | 0.688 | 0.250 | -0.81-0.41 |
| Total score | 0.43 | 0.23 | 1.850 | 0.045 | -0.05-0.93 |
| | Primary School vs. Social Health Center | | | | |
| | Mean dif. | Dif Error std | t | P | CI (95%) |
| Emotional dimension | 0.56 | 0.23 | 2.432 | 0.015 | 0.06-1.05 |
| Social dimension | 0.59 | 0.37 | 1.555 | 0.071 | -0.22-1.40 |
| Cognitive dimension | 0.23 | 0.38 | 0.608 | 0.276 | -0.58-1.05 |
| Functional dimension | 0.16 | 0.31 | 0.523 | 0.305 | -0.51-0.85 |
| Total score | 0.38 | 0.30 | 1.261 | 0.114 | -0.27-1.04 |
| | High School vs. Social Health Center | | | | |
| | Mean dif. | Dif Error std | t | P | CI (95%) |
| Emotional dimension | 0.86 | 0.26 | 3.289 | 0.003 | 0.29-1.42- |
| Social dimension | 1.03 | 0.44 | 2.298 | 0.020 | 0.05-1.66 |
| Cognitive dimension | 0.90 | 0.43 | 2.083 | 0.030 | -0.04-1.50 |
| Functional dimension | -0.75 | 0.39 | -1.917 | 0.040 | -1.60—0.14 |
| Total score | 0.51 | 0.35 | 2.274 | 0.023 | 0.01-1.01 |

Discussion

Intergenerational programs (IPs) are measures created for the intentional and continuous exchange of resources and learning between generations, with the end of achieving individual and social benefits. Implementing well-designed and effective IPs will help their participants overcome age-related stereotypes, in addition to providing multiple physical, emotional, social and cognitive benefits. Intergenerational practice increases tolerance, levels of comfort, and intimacy between young and old, and helps dispel the clichés and myths which exist around the aging process (Manheimer, 1997). In the present study, 141 older adults and 767 students took part, and the results showed that this Intergenerational Project resulted in high levels of satisfaction in all of the 4 areas studied (emotional, social, cognitive and functional), results that are in line with those obtained in the study by Webster et al. (2024) in which the participants reported improvements in their self-esteem, health and their level of satisfaction about feeling productive in society.

Another study carried out by Osborne et al. (2000) also reported results like those of the present study, where a high level of satisfaction was recorded by the older participants as their social interaction and activity increased. Younger participants of the above study reported learning a lot about themselves and about the needs of older people, which were results like those obtained in this Intergenerational Project. Newman et al. (1995) carried out an Intergenerational Project at a school, gathering evidence of increased cognitive abilities and memory, results that are shared with the present project, where high levels of satisfaction with the cognitive activities and their effects were reported, with improvements in cognition and task learning standing out. In their analysis of intergenerational programs carried out in Australia, MacCallum et al. (2006) observed an increase in motivation, as well as a reintegration into community life, results which are like those of this project, where high values were gathered in the social and cognitive dimensions.

Different academic research (Merz & Huxhold, 2010; Chen & Feeley, 2014) has emphasized the importance of social relationships for elderly people in improving their personal well-being and quality of life. Intergenerational Programs promote social relationships and interpersonal communication, and therefore, are useful tools for improving the quality of life of this sector of the population. Following the same line of research, a study by Huxhold et al. (2014), states that social relationships improve subjective well-being, in that they facilitate opportunities for participation, and doing activities in a social context. The study also found that involvement in social activities by the elderly is especially beneficial if these activities make them feel useful and like protagonists.

As a type of shared social activity, some of the results of these intergenerational programs include: the promotion of active aging with recognized benefits in confidence, self-perception, and social skills (Teater, 2016), contributions to emotional health (Whitehouse, 2013; Young & Janke, 2013) and improved well-being for participants of all ages. These results are like those of this present project, where

positive values were collected regarding improvements in social relations between the different groups. These results indicate that this IP enhanced integration between the two age groups, as well as having a positive effect on the emotional dimension - regarding which, both groups commented that the activities carried out over the 4 work areas positively influenced their psychological and emotional states. Other studies, such as those by García et al. (2014); Machielse & Duyndam (2020); O'Connor (2012) & Shedletsky (2012) also share these results, all showing that relationships between individuals of different ages exerts a positive impact not only socially and cognitively, but also emotionally and physically. Furthermore, these studies also show that the creation of intergenerational communities can contribute to improving social relationships between generations and can condition participants to better address aging related challenges (Zhong et al., 2020).

In a recent systematic review carried out by Velarte et al. (2021), the results are similar to those outlined above, where the benefits found after carrying out an IP were: reduced loneliness and isolation, increased self-esteem and memory, a greater ability to cope with mental and physical illnesses, improved use of social skills as well as increased physical, social, cognitive and emotional well-being. In relation to physical well-being, the increase in social relationships resulting from intergenerational interactions improves the vitality of older people (Belgrave, 2011; Ferguson, 2012). Similarly, Maccallum et al. (2006) demonstrated that intergenerational programs contribute to increased vitality and an improved ability to cope with physical illnesses.

Other researchers have shown that older people who regularly participate in activities with children experience fewer falls, and rely less on walking aids (Fried et al., 2004), results like those found in this project, where high values of functional satisfaction were recorded both by older adults and by children. Older people generally consider that volunteering in an intergenerational program helps them to improve both their mental health and physical well-being, facts which the results of this project and other research have corroborated by showing that participants are characterized by greater longevity and functional capacity (Corporation for National and Community Service, 2007), thus helping IPs not only to combat ageism, but also to enhance the well-being of older people at the social, cognitive, emotional and functional levels.

In relation to the 'Cos_Avos' Intergenerational Program (IP), the findings indicate that the greatest impact was observed among older students, with the exception of the functional dimension. This exception may be explained by the lower physical demands of the activities, which were intentionally adapted to accommodate the functional capacities of older adults. Despite these positive outcomes, several limitations should be acknowledged. First, the activities were characterized by high intensity but short duration, which may have influenced the sustainability of the effects. Second, the heterogeneity among older participants required continuous adaptation of the interventions, introducing variability in implementation. Third, linguistic challenges emerged, as a substantial proportion of older adults communicated primarily in Galician while most children spoke Spanish, necessitating frequent translation during interactions. Additionally, the study employed a post-test design without a control group, limiting causal inferences, and data collection was based on group consensus rather than individual responses, which may have reduced the granularity of the findings.

Conversely, the study demonstrated significant strengths. These comprised the large sample size ($n = 908$), the active engagement of all participant groups, and the successful integration of children and older adults irrespective of age, functional status, or cognitive abilities. Furthermore, the project was met with enthusiastic acceptance, as all participants unequivocally expressed their willingness to repeat the experience.

Future research should focus on assessing the long-term effects of intergenerational programs on physical, cognitive, and psychosocial outcomes, while optimizing functional components to enhance physical engagement. Additionally, studies should explore strategies for overcoming linguistic and cultural barriers and evaluate the impact of program duration and intensity. Finally, incorporating digital tools and conducting comparative analyses across diverse sociocultural contexts could provide valuable insights for improving program effectiveness.

Conclusions

This intergenerational project was highly valued by both students and their teachers, as well as by the older adult participants and their caregivers. All groups emphasized the active involvement of participants, along with the enthusiasm, vitality, joy, collaboration, and satisfaction demonstrated following the implementation of the various proposed activities during the 10-day duration of the project. All educational institutions and social and health centers/services have expressed their interest in participating in future editions, as this intervention has led to a high level of satisfaction among children, adolescents, and older adults across the four dimensions analyzed (emotional, social, cognitive, and functional), while simultaneously fostering values such as initiative, empathy, creativity, and social responsibility. Furthermore, regarding the age groups involved in the activities of the 'Cos_Avos' project, students experienced improvements in self-esteem and active lifestyle, whereas older adults reported enhanced feelings of usefulness (functional dimension) and cooperation. In addition, students' self-confidence was strengthened, enabling them to learn about cultural, physical, and sporting traditions. For older participants, the project contributed to increasing self-esteem, reducing situations of loneliness and isolation, promoting active aging, and facilitating opportunities for lifelong learning. The results obtained corroborate the comments and contributions of the various participants and highlight that the greatest impact was observed among high school students, followed by primary school students, and finally among residents of social and health centers.

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Authors' and translators' details:

Angel Casal Moldes
Adriana Rodríguez López
Jose M^a Cancela Carral

angel.casalmoldes@gmail.com
adrianalopez102@gmail.com
chemacc@uvigo.gal

Author
Author
Author