

Strategies for Enhancing Physical Activity and Reducing Sedentary Behaviour in Older Adults: Insights From the Join4Joy Project

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ABSTRACT

Background: Sedentary behaviour (SB) in older adults is a growing public health concern, particularly in community and long-term care settings. The Join4Joy project was developed to reduce SB and promote physical activity (PA) among older adults through inclusive, co-created, and group-based interventions. This study aimed to identify which activities within the Join4Joy project were most and least effective, based on PA facilitators' experiences across two pilot phases.

Methods: A qualitative content analysis was conducted using responses from semi-structured questionnaires completed by 12 PA facilitators across two pilots in five European countries. Facilitators reflected on the activities they delivered, indicating which they found most and least well-received by older adults, and explained the underlying reasons.

Results: Successful activities were characterised as engaging, socially interactive, adaptable, and enjoyable. Examples included *Scape Room*, *Zumba* (with music choice), *Adapted Volleyball*, *Simon Says* (simplified), and *Adapted*



Fishing. These activities aligned with Join4Joy's principles of empowerment, personalisation, and social inclusion. In contrast, activities such as *Circuit Training*, *Guess Who?*, *Storytelling with Movement*, and *Complex Obstacle Courses* were perceived as less effective due to cognitive overload, lack of clarity, or excessive physical intensity. Environmental limitations were also identified as barriers.

Conclusion: Facilitators' insights highlight the value of flexible, enjoyable, and socially engaging PA activities tailored to the cognitive and physical abilities of older adults. These findings can guide the refinement of future PA programmes aiming to reduce SB and improve the wellbeing of older populations.

Keywords: Active ageing, group exercise, facilitator feedback, inclusive intervention

1. INTRODUCTION

Sedentary behaviour (SB) which is characterised as prolonged sitting or lying with minimal energy expenditure, has emerged as a significant public health concern, particularly among older adults living in the community and nursing homes (Ramalho et al., 2018; Tremblay et al., 2017). With advancing age, physical activity (PA) levels tend to decline (Ramalho et al., 2018). Increased SB, which might be linked to decreased PA, is associated with numerous adverse health outcomes, including increased risks of cardiovascular diseases, type 2 diabetes, obesity, and decreased functional abilities (Lavie et al., 2019). The negative impact of a sedentary lifestyle extends beyond physical health, also affecting mental wellbeing and quality of life (Lavie et al., 2019). Older adults who are sedentary are more likely to experience social isolation, which can lead to depression and cognitive decline (Smith et al., 2020). Addressing SB in this population is, therefore, a crucial step towards overall health improvement and wellbeing.

Various PA programmes have been developed to encourage regular movement and exercise among older adults, thereby improving physical fitness, functional independence, and psychological health (Liu-Ambrose et al., 2019). While these programmes primarily focus on promoting PA, they can also contribute to reducing SB as a secondary benefit. PA programmes tailored to the needs and capabilities of older adults have proven useful for the reduction of time spent in sedentary activities, the promotion of social interaction, and the enhancement of quality of life (Marquez et al., 2020). However, the effectiveness of these programmes can vary widely, depending on factors such as activity type, delivery methods, and the specific context in which the programmes are implemented (Heath et al., 2012).

Understanding what strategies work to enhance PA and reduce SB in older adults is essential for optimising their design and implementation. By

examining the experiences of those who conduct these programmes (e.g. physiotherapists, PA trainers), valuable insights can be gained into the factors contributing to the success or failure of different activities (Newitt et al., 2016a). Sharing these insights can help improve the quality of the interventions design and enhance their effectiveness and sustainability, ensuring that older adults receive the maximum benefit. Learning from the experiences of others allows for the identification of best practices, the avoidance of common pitfalls, and the development of more targeted and efficient interventions (Newitt et al., 2016b).

The Join4Joy PA approach is designed to reduce SB among older adults through a structured and engaging set of PA and SB strategies. This approach provides a general framework for intervention design in different settings, including community and nursing homes. Join4Joy has already been implemented at different locations and in different countries, in the form of group-based, person-centred activities and exercise practice, tailored to the needs and abilities of the end-users. The goals of the Join4Joy project are to increase PA levels, improve physical and mental health outcomes, and foster social interaction among older adults (Coll-Planas et al., 2024).

One of the key aspects of the implementation of Join4Joy programme was its focus on continuous improvement through feedback. Facilitators play a critical role in this process, as they provided first-hand insights into what activities resonated most with older adults and which ones fell short. As part of the co-creation approach of Join4Joy, end-user and facilitator experiences and observations help refine the project, making it more effective and enjoyable for older adults.

The aim of this study is to describe the strategies that were implemented during the Join4Joy intervention and to identify which were most and least recommended by the facilitators for the

enhancement of PA and the reduction of SB among older adults. Accordingly, this study addressed the following research questions:

1. Which were the most and least effective activities for the enhancement of PA and reduction of SB in older adults, as reported by the Join4Joy project facilitators?
2. What contextual or implementation factors influenced the perceived success and challenges of these activities across settings?

By exploring the factors that contributed to the success or failure of these activities, and incorporating insights from the facilitators, this study seeks to enhance the understanding of the project's impact and provide valuable recommendations for the development of future PA interventions targeting older adults.

2. METHODS

Study Design

A qualitative research design was employed in this study to address the research questions, which were inherently exploratory. As outlined by Creswell and Creswell in 2017, qualitative research is an effective method for examining and understanding the meanings that individuals or groups assign to social or human experiences. This approach facilitated comprehensive and nuanced interviews with Join4Joy facilitators, allowing for an in-depth exploration of their perspectives on the most and least effective practices within their Join4Joy project interventions for older adults aged 65+ years. This approach was designed through a co-creation process involving older adults and their family members, healthcare students and professionals, policy makers and researchers in five European countries: Spain, Denmark, Italy, Germany, and France. The project provides a framework for the design of group-based PA sessions, which for this study had a periodicity of once per week, and a duration of one hour per session. End-users received a total of 12 sessions, in both community settings and nursing homes. The intervention was implemented in two phases: Pilot 1 (from November 2023 to February 2024) and Pilot 2 (from October 2024 to January 2025), with slight variations in dates across the different countries. Following the end of the project, the reflections and insights of the facilitators were captured based on the direct experiences with intervention delivery. This temporal sequencing allowed for a comprehensive post-intervention analysis. Ethical approval for the study was granted

by the Research Ethics Committee of UVic-UCC (282/2023) on June 26, 2023.

Participants and Procedures

After the implementation of the Join4Joy approach, facilitators who agreed to participate in this study voluntarily provided their feedback. The characteristics of the facilitators are presented in the Results section (Table 1). The Join4Joy approach incorporated a variety of activities ranging from low-impact exercises to more dynamic, dance movements, ensuring that they were suitable for the PA level of every end-user. While some sessions required materials such as exercise mats, resistance bands, and light weights, others did not, reflecting the project's flexibility. Some materials were designed or crafted by the end-users themselves, encouraging ownership (a key element of the Octalysis framework (Chou, 2024)) and promoting sustainability and cost-effectiveness for institutions. The activities were always conducted in group settings, promoting a sense of community and mutual support among older adults (Coll-Planas et al., 2024).

Before delivering the project, facilitators completed a co-created 16-hour educational course combining theoretical and practical training. It included video-based modules on topics such as PA, the ageing process, motivational interviewing, equity, and behaviour change strategies. 'Questions and Answers' sessions helped the facilitators to apply this knowledge to local case studies. Facilitators with no prior academic education in PA undertook additional modules on fitness basics and training guidelines for older adults. This comprehensive preparation equipped the facilitators to effectively deliver the intervention to the needs of end-users. After the completion of the pilots, group facilitators were invited to participate in this study. Inclusion was based on their direct involvement in the delivery of at least one full Join4Joy pilot intervention. Although participation was voluntary, efforts were made to include representatives from all participating countries and from both community and nursing home settings.

Data Collection

To gain insights into the facilitators' perspectives on the implementation of the Join4Joy approach, semi-structured questionnaires were distributed to them (see the Appendix 1). Facilitators provided consent for their responses to be documented in notes and subsequently analysed. In the questionnaires, participants were asked to reflect

on the activities from the Join4Joy project that they had personally conducted. They were requested to identify which activity they valued the most and describe it in detail, including what was done, the materials used, and the human resources required, as well as their reasoning for its success. Similarly, they were asked to specify which activity they considered the least successful and provide an explanation for the factors they believed contributed to its shortcomings.

Data Analysis

The data collected from the semi-structured questionnaires were analysed using a content analysis approach, chosen for its ability to systematically categorise and interpret textual data, as described by Graneheim and Lundman (2004). Responses were carefully reviewed to identify key phrases and descriptions related to participants' evaluations of their activities. Activities and their associated features, such as 'engaging', 'enjoyable', or 'difficult', were coded and categorised into 'best' and 'worst' groups based on participants' descriptions. For instance, activities frequently described as 'collaborative' or 'enjoyable' were classified as successful, while those deemed 'too challenging' or 'uninteresting' were classified as less successful. The categorised data were analysed for patterns and trends, examining the frequency and context of the categories to identify the most and least favourable activities. Excel table was used to organise and compare the

coded data systematically, enabling clear presentation of findings. This structured approach provided insights into the activities participants consistently evaluated as the best or worst, as detailed in the results section.

3. RESULTS

The study sample involved 12 facilitators who were volunteers to provide feedback from among all the facilitators of the Join4Joy project, and they were selected based on their willingness to fill out the questionnaires. Pilot 1 included seven facilitators from five European countries: three facilitators (42.8%) from Germany, and one from Spain, Denmark, Italy, and France (14.3% each). There were six females (85.7%) and one male (14.3%). The age of the facilitators ranged from 29 to 58 years, with a mean age of 41.6 years. Previous experience working with older adults ranged from 5 to 12 years, with an average of 8.4 years. Pilot 2 included five facilitators, with three participants from Spain (60.0%) and one from Italy and France (20.0% each). This pilot included four female (80.0%) and one male (20.0%) facilitators. The mean age of the facilitators in Pilot 2 was 37.2 years with age range from 28 to 46 years. Their mean years of experience working with older adults was 8.4 years with the range from 9 months to 20 years. Detailed socio-demographic characteristics of the facilitators are presented in Table 1.

Table 1. Sociodemographic characteristics of professional PA facilitators by pilot phase

Characteristic	Pilot 1 (N = 7)	Pilot 2 (N = 5)
Gender distribution	6 females (85.7%) 1 male (14.3%)	4 females (80.0%) 1 male (20.0%)
Mean age (years)	41.6 (SD = 13.6)	37.2 (SD = 8.0)
Countries represented	Denmark, Italy, Spain, Germany, France	Italy, Spain, France
Educational backgrounds	Physiotherapy, Sports Science, PA & Health	Physiotherapy, Sports Science, Neuropsychology, Occupational Therapy
Mean years of experience working with older adults	8.4 (SD = 2.7)	6.9 (SD = 7.9)

Notes: SD – standard deviation; PA – physical activity.

The analysis of the Join4Joy project activities revealed that several key factors contributed to either the success or the failure of specific interventions. Insights gained from facilitators' feedback highlighted the critical elements that made activities effective or problematic.

Successful Activities

Successful activities were marked by high levels of engagement, enjoyment, and collaboration reflecting core principles of the Join4Joy framework, such as fostering empowerment, ownership, and social connection. For example, in Pilot 1, an activity

named *Scape Room*, where end-users were presented a series of movement-based challenges, stood out for its novelty and the sense of teamwork it encouraged. PA facilitators appreciated the innovative combination of physical and cognitive challenges, with one noting, “Its novelty, it was fun, they had to collaborate to achieve success.” *Simon Says*, when simplified to match cognitive abilities, became an engaging group activity, in which end-users followed commands involving basic motor tasks (e.g. “Simon says touch your toes”, “Simon says march in place”), with facilitators adapting tempo and complexity in real time. It was mentioned as a successful one in Pilot 2. Facilitators described this activity as “interactive” and “encouraging movement and fun.” The Italian facilitator emphasised the value of keeping older people mentally stimulated through tasks that combined movement with cognitive processing. The use of materials like balloons or large exercise balls added an element of playfulness while also enhancing safety, which was important for frail end-users.

In the *Zumba* session, end-users were able to choose their preferred music, a feature that resonated with the framework’s principles of ownership and personalisation. This element empowered older adults, creating a sense of belonging and enhancing their engagement. One facilitator observed, “They enjoyed dancing and listening to their choice of music”, demonstrating how incorporating user-driven choices and familiar elements contributed to a positive and meaningful experience. By aligning with the Octalysis framework’s core drives, this activity created an environment where older adults felt motivated, connected, and engaged, and it was mentioned as a successful one in Pilot 1. Group dynamics were cited as a key driver of success in Pilot 2 as well. Facilitators noted that shared laughter, peer encouragement, and a sense of playful challenge created a positive atmosphere, with one facilitator reporting that older people “actively asked to play the same games again.” Moreover, personalisation, such as adjusting rules on the spot or integrating familiar music, was a recurring strategy that boosted motivation and inclusivity.

Familiarity and accessibility were crucial in the success of activities. *Adapted Fishing*, where small groups passed a ring between them as part of a low-intensity movement task, got success among end-users in Pilot 1 because of using simple materials and low physical demands. Facilitators observed that it was “A different type of exercise, fun, many people liked it”, reflecting the ease of participation for individuals with varying physical abilities.

Furthermore, the activity’s design allowed individuals to engage at a level appropriate to their cognitive and physical abilities, ensuring inclusivity for a broad range of end-users. Similarly, *Adapted Volleyball*, a game where end-users worked in teams to hit a large beach ball over a makeshift net while seated, was well-received due to its simplicity and its ability to foster group collaboration. This activity was mentioned as a successful one in both pilots. One of the facilitators described it as “It was fun. They had to do it collaboratively using a big beach ball”, emphasising the activity’s success in promoting social connection and playful competition.

Unsuccessful Activities

Conversely, several activities faced challenges due to physical and cognitive overload, lack of engagement, and inadequate adaptation to older adults’ abilities. For example, *Circuit Training*, which involved three series of five exercises performed at 75% of maximal oxygen uptake for 45 seconds, was mentioned as problematic in Pilot 1 because of its excessive physical intensity. Facilitators who attempted this approach declared that end-users found it “too high”, as the activity’s demands were beyond their comfortable limits. This lack of adaptability meant that many struggled to keep up, leading to lower satisfaction and disengagement.

Cognitive complexity was another major issue. The *Guess Who?* game, based on the classic 1990s board game but adapted with movement elements, was criticised for being too complex, with facilitators finding it “cognitively too complicated” for the end-users. Its rules led to confusion and frustration, diminishing the enjoyment of the activity. This activity was mentioned as an unsuccessful one in both pilots. In Pilot 2, *Storytelling with Movement* involved end-users acting out or mimicking elements of a shared story through guided physical gestures. While conceptually creative, this activity required sustained attention and imagination – these demands exceeded the comfort level of some older people. Facilitators noted that the instructions were often “too long or abstract”, which led to confusion and loss of interest, especially among those with cognitive impairments. Lack of engagement was often tied to activities that did not align with the idea of providing a gradual increase in challenge. For example, the *Guess Who?* game, while holding potential, failed to engage older adults effectively due to its steep cognitive demands and insufficient interactive elements.

Inadequate adaptation to end-users’ abilities also contributed to the failure of some activities. For

instance, in Pilot 1, *Circuit Training* was delivered without sufficient modifications, leaving end-users struggling with formats that were too challenging. The disconnect between the activities' demands and older adults' capabilities led to frustration and disengagement. This highlights a core principle of the Join4Joy framework: the importance of facilitators being highly attentive to older adults' responses and capable of making immediate adjustments to meet diverse needs. *Complex Obstacle Course*, which involved navigating around cones, chairs, or balance equipment in sequence, was similarly challenging in Pilot 2. This activity required both physical coordination and memory of multi-step tasks. For end-users in nursing homes, this format became overwhelming. As one of the facilitators noted, "End-users lost track of what to do next, and some simply stood still, unsure how to continue." The lack of clear progression was seen as a major barrier to maintaining engagement.

Differences between community and nursing home settings were evidenced. Activities requiring higher autonomy or mobility – such as *Obstacle Courses* and *Circuit Training* – tended to be better suited for community-dwelling older adults. In contrast, seated, collaborative, and lower-intensity activities, such as *Adapted Volleyball* or *Adapted Fishing*, seemed more engaging for nursing home residents. These distinctions underscore the need for interventions to be tailored to setting's physical environment, available resources, and end-users' cognitive and functional capacities. Facilitators in nursing homes reported to have had easier access to equipment and materials (e.g. sufficient number of chairs, tables, or other objects that could be repurposed for activities), which supported implementation. Conversely, community sessions typically took place in rented or shared venues, such as civic centres, which meant the availability of equipment was inconsistent. This constrained activity choices and frequently forced facilitators to make on-the-spot plan adjustments.

Additionally, some other environmental factors, such as adverse weather conditions during outdoor exercises, further limited participation and enjoyment. Facilitators also reported that in some community facilities narrow rooms restricted movement and made it difficult to safely conduct group activities. In a few cases, the lack of appropriate ventilation affected the comfort level of the end-users. These challenges highlighted the importance of flexibility in planning, including the need for alternative indoor versions of outdoor activities,

mobile equipment, and adaptations to ensure safety and engagement regardless of the setting. Such logistical responsiveness is also a key element of the Join4Joy delivery approach. The visual summary of the most successful and unsuccessful activities is presented in Appendix 2.

4. DISCUSSION

This study collected the perspectives of facilitators to identify the strategies and activities that were most and least effective in enhancing PA and reducing SB among older adults. The findings in this qualitative study underscore the importance of designing physical activities that are engaging, enjoyable, and adaptable – even sometimes in real time – to the needs of older adults. Activities succeeded by fostering enjoyment and social interaction while being designed to accommodate older adults of varying ability levels, enabling each individual to engage meaningfully and contribute within a group setting. Devereux-Fitzgerald et al. (2016) found very similar results in their systematic review, where older adults emphasised that fun and the enjoyment of social interaction were key motivators for being physically active. Furthermore, they noted that maintaining these social bonds could be crucial for sustaining PA levels even after the intervention has concluded. Similarly, Collado-Mateo et al. (2021) identified key factors relevant to increasing adherence to physical exercise in their umbrella review. Among those factors, they highlighted the importance of enjoyment, social support, relatedness, communication, and feedback as essential components for improving adherence to physical exercise in older adults and patients with chronic diseases (Collado-Mateo et al., 2021).

In contrast, activities that were too physically or cognitively demanding, or that failed to engage older adults meaningfully, were less successful. This is especially important in nursing homes, where dementia is common, requiring activities to be carefully designed with manageable cognitive demands and flexibility. Baker et al. (2007) highlighted a similar issue in their study, noting that to achieve optimal levels of adherence, it would be wise to start with a single exercise modality to allow the sedentary older adult to gradually adapt to the new exercise routine before adding other components. This suggests that PAs that are introduced too quickly or are overly strenuous may overwhelm older adults, leading to lower levels of engagement and adherence. Furthermore, the International

Exercise Recommendations in Older Adults (Izquierdo et al., 2021) also support the need for tailored exercises that are not excessively demanding. They emphasise that exercise can be individualised using different modalities, volumes, and/or intensities, as appropriate to the health state or medical condition (Izquierdo et al., 2021). These insights align with the findings of the current study, reinforcing the importance of balancing demands with the individual capabilities, needs, and personal significance of activities for older adults, as this plays a key role in sustaining motivation. To conclude, the findings offer valuable guidance for optimising future PA approaches to better meet the needs and preferences of older adults, while also addressing access barriers to ensure a more inclusive and satisfying experience for all.

The findings in this study reflect experiences from five European countries, and the implications are likely to extend to a wider range of cultural and institutional contexts. Our analysis points at local factors (e.g. exercise traditions, available facilities, and staff expertise), as well as characteristics of older people (e.g. physical and cognitive ability) being strong determinants of how activities are delivered and received. Nevertheless, the underlying principles of enjoyment, social interaction, and adaptability appear to be universally relevant and provide a flexible framework that can be tailored to diverse settings and older people needs.

Limitations

This study is based on the experiences of a relatively small sample of facilitators involved in the Join4Joy project. Consequently, its findings may not be fully generalisable to other settings or populations. Contextual factors (e.g. certain community centres and nursing homes) might limit the applicability of the results to broader or different populations of older adults. The data collection primarily relied on self-reported experiences and observations from Join4Joy facilitators, reflecting their perceptions of the activities. Such reliance may introduce bias, as participants might overemphasise the success of certain activities or downplay the challenges they encountered. Finally, the voluntary participation of facilitators may have introduced a self-selection bias, as those more engaged or motivated may have been more likely to respond. Moreover, some contextual differences between community and institutional settings may have influenced the reported experiences, potentially limiting transferability.

5. CONCLUSIONS

This study provides useful insights into the factors that contribute to the effectiveness of PA interventions aimed at reducing SB among older adults. Through a qualitative analysis of the Join4Joy pilot interventions, the research highlights the importance of designing activities that are engaging, enjoyable, and adaptable to the diverse needs and preferences of this population group. Successful activities within the project demonstrated that when PAs are accessible and foster social interaction, they can significantly enhance participation and satisfaction among older adults, potentially leading to more sustainable behavioural changes over time. Conversely, the study also identified several challenges, often associated with activities that were too physically or cognitively demanding, or those that failed to engage end-users meaningfully. These findings underline the necessity of creating approaches to match the varying capabilities of older adults, ensuring that activities are not only effective in reducing SB but are also inclusive and enjoyable for all end-users.

In conclusion, the insights gained from this study offer valuable guidance for the development and implementation of future PA programmes targeting older adults. By integrating key elements from the Join4Joy educational course, such as behaviour change techniques, interviewing, and gamification, these programmes can prioritise adaptability, inclusivity, and engagement. This holistic approach not only enhances the immediate impact of the interventions by reducing SB but also fosters long-term behavioural changes, ultimately contributing to the overall wellbeing of older adults.

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SUPPLEMENTARY MATERIAL

Appendix 1. Example of the questionnaire for facilitators

POST PILOT 1 QUESTIONS TO FACILITATORS

SECTION 1: FACILITATOR SOCIODEMOGRAPHICS

- Your first name/s and family name/s:

- Name of your work center:

- Your most relevant educational background:

- Type of work experience with older adults:

- Duration of work experience with older adults (specify months or years):

- Additional areas of expertise:

- Your age today (2024):

- Gender:

- Country:

SECTION 2: STRENGTHS & CHALLENGES

Please look back on your experience and share your view on those aspects which have worked best (**strengths**) AND those which have been most challenging (**limitations**) during your participation in the Join4Joy intervention. For challenges, let us know how you think this could be avoided or improved in future occasions.

- About the Educational Training Course (strengths and limitations)

- About the physical activity Exercises/Dynamics that were conducted

1. One-to-one interview before the group (strengths and limitations)

2. Strategies, approaches, dynamics or exercises during the sessions (successful and not so successful)

3. Activities outside the classroom (e.g., ‘home-work’). What worked and what didn’t work.

- About the Project Implementation:

1. Profiles reached:

2. Your experience including users who don’t typically participate in physical activity groups:

3. Delivering intervention based on enjoyment (please always mention strengths and limitations)

4. Adherence to the group (for example, you may have found that session reminders were needed, or nursing home residents needed to be picked up from their bedrooms, etc.)

5. Engagement in the activity

6. Participant satisfaction, enjoyment in group, socialization (social interaction)

7. Adverse events/outcomes

8. Global (outside the classroom) impact on sedentary behaviour, physical activity, other benefits (health, wellbeing, friendships, emotional support, etc.)

9. In your opinion, what typology of participant that has benefited the most/the least and why?

10. Impact in user's context (beyond the group: e.g., relatives, neighborhood, nursing home, etc.)

11. As a facilitator, how different were your J4J sessions compared to the sessions you were used to before?

12. Would you say Join4Joy has constituted an improvement?

Yes / Neutral / No

13. Potential sustainability/continuity of the J4J approach in your given context

14. At this point in your career, what would your Personal Recommendations be for a successful conduction of physical activity interventions in older adults, in general:

**SECTION 3: RATE YOUR EXPERIENCE
FROM Zero 0 (not at all) to 100 (totally)**

- How much (0–100) have your planning skills improved by working in the J4J group?:

- How much (0–100) have your delivery skills improved by working in the J4J group?:

- How much has your motivation towards working with ageing population increased (0–100)?:

- How much (0–100) has your knowledge about behavior change techniques increased?:

***THANK YOU VERY MUCH FOR SHARING
YOUR VIEW TOWARDS BETTER, JOYFUL
INTERVENTIONS!***

Appendix 2. The visual summary of the Join-4Joy facilitator-reported activities

Figure 1. The visual summary of the Join4Joy facilitator-reported activities

