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Exploring the Implementation and Actions of Sustainable Development Goals in University Social Responsibility: A Case Study of a Senior Exercise Program in a Remote Area in Taiwan

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Abstract

Original Research Article

This study explores how a university in Taiwan integrates University Social Responsibility (USR) into the design and implementation of a senior exercise program in a remote area. The study examines how the program contributes to achieving the United Nations' Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education), both of which were established in the 2015 UN Agenda. Using in-depth interviews with four participants from the senior exercise program, this study provides a comprehensive understanding of how these SDGs are practically realized in a community setting. It further explores the university's role in implementing USR initiatives to foster sustainable local development. The research findings yield the following conclusions:

1. Implementation of SDG 3 (Good Health and Well-being):
    (1) **SDG 3.4 (Mental Health):** The program provides a space for psychological relief and social engagement, enhancing participants' mental well-being and fostering a positive and optimistic attitude.
    (2) **SDG 3.9 (Reduction of Health Risks):** Participants demonstrate enthusiasm for exercise and develop self-discipline in physical activity, underscoring the significant influence of instructors in promoting regular exercise habits.
    (3) **SDG 3.D (Health Risk Management):** Participants acknowledge the health guidance and exercise techniques provided by instructors, and the emphasis on safety fosters greater motivation and willingness to engage in physical activities.

2. Implementation of SDG 4 (Quality Education):
    (1) **SDG 4.6 (Lifelong Learning):** Participants exhibit strong motivation to acquire new exercise techniques and walking strategies, addressing various health and social adaptation challenges while embracing an active and engaged lifestyle.
    (2) **SDG 4.7 (Education for Sustainable Development):** Participants express deep appreciation for the university-community collaboration, recognizing the program's role in promoting intergenerational learning, gender equality, and lifelong learning opportunities for the elderly.

Keywords: University Social Responsibility (USR), Sustainable Development Goals (SDGs), Mental Health, Lifelong Learning Rights of the Elderly.

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1. Research Background and Objectives

Universities serve as primary drivers of social development, playing a crucial role not only in advancing societal progress but also in fostering institutional growth and adaptation to social change. Historically, universities have been at the forefront of cultivating talent, promoting knowledge innovation, and driving social transformation (Bell, 1976). With the rapid acceleration of globalization and technological advancements, the society evolves and the demands for modern universities shift. Now universities have transcended their traditional role as educational institutions to become essential platforms for addressing complex societal challenges. It means that universities must actively collaborate with society and local communities through education, research, and community engagement to address social challenges, improve educational quality, and drive societal progress (Gustavo, 2023). In this way, University Social Responsibility (USR) has thus emerged as an indispensable commitment for contemporary universities. The scope of USR encompasses knowledge transfer, social innovation, and policy advocacy. By actively implementing USR initiatives, universities can effectively respond to societal expectations regarding their role and obligations, thereby fostering sustainable social development and societal progress. Consequently, universities are not only leaders in education and academic research but also key players in addressing real-world challenges, promoting social equity, and fostering innovation.

In 2015, the United Nations General Assembly announced the Sustainable Development Goals (SDGs), aiming to drive global efforts across 17 core objectives, including No Poverty (SDG1), Zero Hunger (SDG2), Good Health and Well-being (SDG 3), Quality Education (SDG 4), Gender Equality (SDG 5), Clean Water and Sanitation (SDG 6), Affordable and Clean Energy (SDG 7), Decent Work and Economic Growth (SDG 8),Industry, Innovation, and Infrastructure (SDG 9), Reduced Inequality (SDG 10), Sustainable Cities and Communities (SDG 11), Responsible Consumption and Production (SDG 12), Climate Action (SDG 13), Life Below Water (SDG 14), Life on Land (SDG 15), Peace, Justice, and Strong Institutions (SDG 16), Partnerships for the Goals (SDG 17). These goals not only pose challenges to governments and international organizations but also redefine the role and responsibilities of universities. With the advent of a super-aged society, the elderly need to engage in regular physical activity and lifelong learning to effectively extend their healthy life span and improve their quality of life (Ministry of Health and Welfare, 2021). Extensive research has demonstrated that exercise plays a significant role in preventing and managing chronic diseases. The elderly who maintain an active lifestyle exhibit a lower prevalence of functional disabilities in daily activities. Engaging in regular exercise contributes to health, sustains metabolic rate, and enhances immune system function, making it an effective strategy for reducing the risk of chronic diseases and mitigating age-related decline. (Hong, 2020; Frankel et al., 2006; Panzarino et al., 2017). Thus, the habit of regular exercise is a fundamental component of a healthy lifestyle and the health benefits of consistent physical activity have been widely recognized (Yang et al., 2005). Therefore, ensuring that the elderly engage in regular physical activity and acquire proper exercise knowledge has become a pressing social issue. Within the context, universities must actively fulfill their responsibility by putting their research into practice—promoting exercise programs and lifelong learning initiatives for the elderly. Through these efforts, universities can contribute to the sustainable development of a super-aged society, fostering healthier and more active aging populations.

In recent years, universities worldwide

have actively responded to the United Nations' SDGs by adopting USR initiatives. These efforts encompass a broad spectrum of activities, including engaging in social services, influencing public policy, and fostering community development. Since July 2022, a university in Taiwan has been implementing a social practice project funded by a national research funding agency in Taiwan, aimed at enhancing the institution's social responsibility. The project established a Nordic Walking Program for the elderly in the remote area, and this program seeks to incorporate regular exercise habits and knowledge into the lives of community elders through the professional expertise and guidance of faculty and students. By doing so, it aims to embody the principles of USR while integrating the objectives of SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education) into the curriculum, fostering self-empowerment among seniors, and promoting correct exercise habits and lifelong learning mindsets. Specifically, the course objectives aligned with SDG 3 include: 1. SDG 3.4 (Mental Health): Prioritizing mental well-being. 2. SDG 3.9 (Reducing Health Risks): Encouraging regular physical activity. 3. SDG 3.D (Health Risk Management): Facilitating awareness and sharing of effective health maintenance strategies. Besides SDG 3, the program also focuses on SDG 4, including SDG 4.6 (Lifelong Learning): Promoting continuous educational engagement and SDG 4.7 (Education for Sustainable Development): Ensuring inclusive and equitable access to education for all. Through these educational interventions, the university actively advances the health and well-being of community elders while fostering sustainable development and quality education. This initiative not only reflects the university's commitment to addressing societal challenges but also underscores its vital role and responsibility in contemporary society.

Therefore, this study aims to explore how the senior exercise program for the elderly in the remote area in Taiwan operates under the principles of USR to implement SDG 3.4 (Mental Health), SDG 3.9 (Reducing Health Risks), SDG 3.D (Health Risk Management),

SDG 4.6 (Lifelong Learning), and SDG 4.7 (Education for Sustainable Development). Through in-depth interviews and participant observation, the research seeks to examine the practical actions taken and their impact on local participants. This study focuses on two key research questions:

(1) How is the senior exercise program for the elderly implemented in alignment with SDG 3, and what are the local participants' feedback and experiences regarding their physical and mental well-being?

(2) How is the senior exercise program for the elderly implemented in alignment with SDG 4, and what are the local participants' feedback and experiences regarding their lifelong learning and sustainable education?

2. Literature Review

2.1 Overview of the SDGs and the Relevance of SDG 3 and SDG 4 in This Study

On September 25, 2015, the United Nations General Assembly adopted the resolution titled *Transforming Our World: The 2030 Agenda for Sustainable Development*, which established 17 Sustainable Development Goals (SDGs) and 169 specific targets (Wu, 2018; Sachs, 2015; Walker et al., 2019). The 17 SDGs are as follows: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation, and Infrastructure, (10) Reduced Inequalities, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life on Land, (16) Peace, Justice, and Strong Institutions, and (17) Partnerships for the Goals (Sachs, 2015; United Nations, 2015).This agenda aims to foster international collaboration in addressing global challenges, with a particular focus on environmental protection, resilience-building, and sustainable development. Since its adoption, the SDGs have been widely promoted and implemented across governments, businesses,

and educational institutions, serving as an integrated framework for sustainable development strategies.

This study primarily focuses on the course content of Senior Exercise Program in a remote area in Taiwan and limits its scope to the relevant SDGs, specifically SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education). According to the United Nations (2015), SDG 3 encompasses the establishment of a public healthcare system, ensuring universal access to essential medical services, enhancing the quality and accessibility of primary healthcare, strengthening disease prevention and control measures, promoting health education and healthy lifestyles, and increasing awareness of mental health issues to improve overall psychological well-being, especially in remote area. The challenges outlined in SDG 3 remain a focal point of discussion in international policy and research. For instance, the United Nations (2022) highlighted that the outbreak of COVID-19 has posed unprecedented challenges to global health and well-being, significantly impeding progress toward the achievement of SDG 3. Prior to the pandemic, substantial advancements had been made across various health indicators. However, the latest estimates suggest that by the end of 2021, global "excess mortality" directly and indirectly associated with COVID-19 may have reached 15 million deaths (United Nations, 2022). Consequently, urgent global action is required to realign efforts and accelerate progress toward achieving SDG 3.

The primary goal of SDG 4 is to ensure inclusive, equitable, and high-quality education while promoting lifelong learning for all. According to the United Nations (2015), SDG 4 emphasizes lifelong learning by providing accessible and comprehensive educational resources at all stages of life. It also highlights the importance of expanding public childcare services, advancing science and vocational training, supporting disadvantaged groups, and enhancing cultural literacy. Additionally, SDG 4 aims to foster sustainable development, promote human rights and gender equality, encourage a culture of peace and global citizenship, and recognize cultural diversity as a key factor in sustainable development.

The global discussion on SDG 4 continues to evolve. The United Nations (2021) highlights the crucial role of continuing education and training in improving livelihoods and preparing a workforce that can adapt to economic disruptions and technological advancements. Before the COVID-19 pandemic, the global average participation rate in formal and informal education among youth and adults was only 25%, with nearly half of all countries reporting rates below 10% (United Nations, 2021). Therefore, increasing participation in continuing education and vocational training is essential for building a resilient and adaptable workforce.

2.2 The Concept of University Social Responsibility and Successful USR Implementation Cases in Taiwan

University Social Responsibility (USR) encompasses the duty of universities to serve society while fulfilling their core missions of teaching and research. This involves fostering students' social awareness, promoting societal development, and leveraging university resources for sustainable growth (Wu, 2018). Universities are inherently responsible for addressing social needs, with faculty and students engaging in teaching, research, and public service to drive meaningful change (Chang et al., 2020).

USR extends beyond education and research, requiring universities to actively engage with local communities and uphold broader social responsibilities (Young, 2019). However, its implementation depends on institutional priorities, resource allocation, and varying interpretations of social engagement. Yang and Wang (2023) highlight that USR encourages universities to bridge the gap between academic knowledge and practical application, support local development, and align with global trends. As universities increasingly operate like corporate entities, they face growing societal expectations to demonstrate accountability and social commitment. Effective USR implementation requires universities to contribute to their communities, cultivate talent, enhance the academic environment, and strengthen their

societal impact (Kao & Huang, 2021).

University Social Responsibility in Europe (2018), in its framework titled "USR in Europe and Development of a Community Reference Framework," defines USR as the obligation of European universities to adopt transparent strategies and actions that positively impact society and the environment. These strategies and actions include cultivating students' awareness of justice, fairness, democratic participation, and sustainable development; promoting social well-being; ensuring accountability to stakeholders; aligning with international standards for social responsibility; and adhering to transparency and public performance accountability standards. Vasilescu et al. (2010) further emphasize that the concept of USR encompasses strengthening civic commitment and responsibility by encouraging students and academic personnel to engage in community service or contribute to the sustainable development of local and global ecosystems, thereby fostering civic consciousness. USR has been increasingly recognized as both a philosophy and a movement that bridges local and global dimensions, advancing social, ecological, environmental, technological, and economic sustainability. Simultaneously, USR is described as a mechanism through which universities engage in educational practices, knowledge dissemination, local initiatives, and the establishment of strategic partnerships (Chen et al., 2015). In summary, universities today are expected to go beyond their traditional roles in teaching and research by actively assuming broader social responsibilities that contribute to societal development and progress. Their responsibilities span multiple domains, including education, research, community service, and knowledge transfer. Ultimately, the fundamental goal of USR is to foster meaningful university-society interactions, drive sustainable social development, and enhance overall societal well-being.

Since 2018, the Ministry of Education in Taiwan has implemented the USR Practice Program, emphasizing three key dimensions: local engagement, talent cultivation, and international collaboration. This initiative aims to position USR programs as a central mechanism for university-driven social engagement. The program encourages universities to utilize their expertise and innovation to bridge the gap between academic research and practical application, foster local identity and development, and ultimately align with international standards (Executive Yuan, May 9, 2019). Wu (2018) emphasized that the USR Practice Program focuses on local engagement and talent development, aiming to cultivate socially responsible professionals while positioning universities as key knowledge centers for addressing societal challenges. The program promotes collaboration among universities, the public sector, private enterprises, local communities, and issue-based networks to build an innovative ecosystem driven by public participation. Through targeted funding, the USR program encourages universities to align with national policies, local development needs, and real-world challenges. Institutions are expected to develop long-term strategies in areas such as long-term care, food safety, industrial transformation, environmental sustainability, and community engagement. This approach supports the creation of flexible, skill-based growth pathways that enable universities to adapt to changing societal demands. By shifting from a "closed system" to an "open innovation" model, the USR program fosters cross-sectoral collaboration within universities. This transformation facilitates the exchange of information, talent, and resources, contributing to a strong innovation ecosystem and creating a sustainable cycle of positive societal impact (Wu, 2018).

There are numerous successful cases of USR implementation in Taiwan, and this research highlights three universities as representative examples:

(1) National Taiwan Normal University (NTNU):
NTNU aligns its initiatives with multiple SDGs, including SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 12 (Responsible Consumption and Production), and SDG 17 (Partnerships for the Goals). In terms of SDG 3, NTNU has established a holistic health system for the elderly, fostering an age-friendly

community through initiatives such as age-inclusive mobility, intergenerational learning, and community well-being. Additionally, the university has launched a Community Counseling Center to support public mental health and provide care for the elderly facing socio-economic challenges. In SDG 4, NTNU has implemented the PASSION Teaching Team, dedicated to improving academic performance among low-achieving students and narrowing achievement gaps. Furthermore, the university has integrated special education services in rural areas, enhanced parental knowledge of special education, and developed inclusive education models. It has also enhanced experiential learning opportunities for students from socio-economically and culturally disadvantaged backgrounds, promoting scientific inquiry and active engagement (Sung, 2022).

(2) National Chengchi University (NCCU):

Since the Ministry of Education in Taiwan launched the USR Practice Program in 2018, NCCU has been an active participant. It has collaborated with seven universities, including National Taipei University, to form the "Mountain-Water Alliance", fostering cross-institutional learning and joint USR initiatives. NCCU's flagship project, "Shared Prosperity in Wenshan" (「共好文山」), focuses on community co-development through the "Xinglong-Ankang Shared Prosperity Plan." (「興隆安康」) This initiative aims to strengthen residents' sense of community, enhance public participation, and address social issues through innovative solutions (Chang et al., 2020).

(3) National Chi Nan University (NCNU):
USR initiatives emphasize environmental sustainability while integrating science, technology, and the humanities into teaching practices. The university employs gamified teaching methodologies to seamlessly merge learning with instructional development and professional training, thereby enhancing both teaching effectiveness and student engagement. NCNU's USR projects focus on deepening community engagement in the Shuishalian

region, expanding educational outreach to Southeast Asia, and advancing sustainable education. These initiatives aim to foster stronger connections with emerging communities while extending the university's societal impact (Wu et al., 2022).

3. Research Methods and Design

This study employs in-depth interviews, supplemented by participant observation, to examine how the Senior Exercise Program in a remote area in Taiwan implements USR in achieving the SDGs. The research method and design are outlined as follows:

3.1 In-depth interviews and analytical

This study primarily adopts the in-depth interview method. Van Manen (1997) suggests that intersubjective in-depth interviews allow phenomena to re-emerge through dialogue, uncovering their meaning through subjective understanding. Interpretation, in this context, serves to enhance and solidify participants' personal experiences and the latent significance of phenomena, enabling readers to engage empathetically and resonate with the lived experiences described. The in-depth interview process is structured into three key stages, as detailed below:

3.1.1 Research Participants

This study employed purposive sampling to select interviewees, primarily recruiting participants from a senior exercise program offered by a university in the remote area in Taiwan. The program was conducted from February 27 to May 24, 2024, with classes held twice weekly on Tuesdays and Fridays from 9:00 to 10:30 AM, totaling 24 sessions. The instructor held a Level 2 National Physical Fitness Instructor Certificate issued by the Ministry of Education's Sports Administration, along with a Silver-Level Instructor Certification from the Original Nordic Walking Federation (ONWF) in Finland.

Prior to conducting interviews, the researcher attended seven sessions for participant observation. Following the principle of purposive sampling, individuals who

expressed willingness to participate in the study were selected. Upon obtaining informed consent, four participants signed consent forms and engaged in in-depth interviews. Each interview lasted approximately 30 minutes, with schedules coordinated in advance to accommodate participants' availability. Given the subjective and case-specific nature of qualitative interviews, the researcher employed corrective and probing questions to minimize retrospective bias. After verbatim transcription, interviewees were invited to review and verify the content. When necessary, triangulation was applied to enhance the accuracy and reliability of the data. To uphold research ethics, all participants requested anonymity. Therefore, pseudonyms were used to protect their identities, as presented in Table 1.

Table 1. Basic Information of Interviewees

Pseudonym	Gender	Age	Occupation Before Retirement	Interview Location	Health Condition
Sheng	Male	63	Private company employee	Shin-Wen Senior Center	Good
Hui	Female	62	Private company employee	Shin-Wen Senior Center	Good
Fang	Female	68	Garment industry employee	Shin-Wen Senior Center	Good
Jun	Female	61	Private company employee	Shin-Wen Senior Center	Good

Source: Compiled by the researcher.

3.1.2 Analysis of Interview Data

A. Transcription and Comprehensive Reading

First, all recorded interview content was transcribed verbatim to serve as the primary

text for subsequent reading and analysis. Before transcription, the researcher documented essential information, including text identification codes, interview dates, and locations. The recordings were reviewed multiple times to ensure precise word-for-word transcription. Upon completion, the printed transcripts underwent an initial comprehensive reading.

To maintain objectivity, the researcher refrained from adopting preconceived notions or personal biases, instead striving to fully immerse in the contextual framework of the interviewees.

To enhance reliability and validity, the researcher conducted content verification with the four interviewees following transcription and engaged in discussions with research collaborators to resolve any ambiguities. Additionally, the triangulation method was employed to cross-check the data, ensuring its accuracy, consistency, and credibility.

B. Coding Process

Each interviewee was assigned a unique identification code based on the interview date. For example, Sheng, who was interviewed on April 16, 2024, was assigned the code "1130416 I – Sheng," while Hui, interviewed on April 23, 2024, was designated as "1130423 I – Hui," and so forth.

C. Re-reading and Data Examination

The researcher systematically re-examined all transcribed texts and organized materials, revisiting the experiential world of the interviewees to validate interpretations and identify any overlooked details. This process involved the following steps:

a. Ensuring the completeness and accuracy of coding.

b. Identifying any significant information that may have been missed.

c. Continuously documenting new insights and reflections.

d. Structural Analysis and Experience Reconstruction

The primary objective of the textual analysis was to identify common themes and underlying meanings shared among the interviewees. The findings were synthesized into concise propositions or meaningful descriptions, effectively capturing the essence of the events and concepts conveyed within the interview narratives.

3.1.3 Methods for Enhancing Research Quality

To enhance the quality and credibility of this study, the participant validation method was employed during the data analysis process. If any discrepancies or ambiguities arose during the coding process, and consensus could not be reached with the interviewees, the researcher conducted a second-round interview with the participants to clarify, revise, and validate the interpretations. This approach ensured that the interview content and conceptual interpretations accurately reflected the participants' perspectives, thereby enhancing the trustworthiness and reliability of the research data.

3.2 Participant observation and reflection on phenomena

This study employs participant observation as a supplementary research tool, with the researcher actively engaging in the observed setting. Participant observation refers to the process in which the researcher immerses themselves in the social environment under study, not merely as an observer but also as an active participant, systematically recording and categorizing observations to obtain a more comprehensive understanding of the phenomenon. This method allows the researcher to experience and directly observe the research setting, reducing personal biases and enabling a deeper understanding of the phenomenon from an insider's perspective.

Through participant observation, the researcher gains a comprehensive and contextualized understanding of the cultural framework underlying the studied phenomenon, as well as deeper insights into the participants' internal cultural perspectives. This study includes 24 observation sessions, systematically documenting participants' engagement and external behavioral patterns within the course. Observational data is recorded in a research journal, accompanied by personal reflections and field notes. Additionally, observations are coded based on the date of documentation. For instance, an observation recorded on May 3, 2024, is labeled as "1130503 Research Observation," with subsequent records following the same format.

4. Results and Discussion
4.1 Implementation Process of SDG 3 in the Senior Exercise Program

The Senior Exercise Program aligns with the objectives of SDG 3 by addressing SDG 3.4 (Mental Health), SDG 3.9 (Reduction of Health Risks), and SDG 3.D (Health Risk Management). The program focuses on three key aspects: (1) Promoting mental health. (2) Encouraging regular physical exercise. (3) Enhancing knowledge and awareness of maintaining a healthy lifestyle through exercise. The following section provides a detailed discussion of each sub-goal.

4.1.1 SDG 3.4 – Mental Health Sub-goal

Mental health is a comprehensive state of psychological, emotional, and social well-being, encompassing not only the absence of mental disorders but also an individual's capacity to manage stress, engage in social interactions, and make informed decisions (Keyes, 2005). The U.S. Department of Health & Human Services (2017) emphasizes that mental health profoundly

influences cognitive processing, emotional regulation, and behavioral responses, shaping how individuals navigate stress, social relationships, and daily decision-making.

The Hunter Institute of Mental Health (2010) conceptualizes mental health through the P.O.W.E.R. framework, including Positivity, Optimism, Wholistic well-being (integrating life and cultural aspects), Enjoyment of life and social connectedness, and Resilience coupled with coping mechanisms. Given the psychosocial challenges faced by aging populations, fostering mental resilience and a sense of social belonging is essential.

Rowe and Kahn (1998) argue that successful aging involves a dynamic interplay between psychological, physiological, and social well-being. However, while the physiological and functional decline associated with aging has been widely studied, the psychological dimensions of aging remain comparatively underexplored (Yang & Li, 2022). The experiences of program participants illustrate the role of exercise in maintaining mental well-being and emotional stability: Sheng said:

> *As I age, my movements become slower, and sometimes I cannot keep up with the exercises. When that happens, I pause, take my time, and redo the movements step by step. The instructor assistants patiently guide me, helping me stay in rhythm. This supportive environment makes me feel comfortable and motivated to keep attending.* (I-Sheng 1130423)

According to Hui, "Attending these sessions brings me joy—not only do I get to exercise, but I also make new friends. It's a win-win situation" (I-Hui 1130423). Fang shared a similar sentiment, stating, "After retirement, I felt somewhat lost—my children are not around, and I lacked a sense of purpose. Coming here allows me to socialize, and that makes me feel incredibly happy" (I-Fang 1130423). Likewise, Jun expressed, "Being able to exercise in my later years brings me so much joy. Exercise lifts my mood—I feel truly happy and fortunate" (I-Jun 1140503).

The participants' reflections underscore the importance of social connectedness and emotional support in maintaining mental well-being post-retirement. The researcher's field observations reinforce this perspective, "*Beyond the physical benefits of exercise, the social interactions in this program provide participants with psychological satisfaction and a sense of community* (1130430 Research Observation)." The Senior Exercise Program, implemented under the USR framework, serves as both a recreational space and a mental health support system for the elderly. By creating a structured, inclusive, and positive exercise environment, the program alleviates psychological distress and promotes optimism among participants. This observation aligns with existing literature, which emphasizes that active engagement in family and community life contributes to successful aging by addressing physical, psychological, and social needs (Li, 2010).

The feedback from Sheng, Hui, Fang, and Jun highlights the program's effectiveness in promoting mental health, social belonging, and emotional resilience. Their positive experiences validate that SDG 3.4's mental health objectives are effectively implemented within the Senior Exercise Program.

4.1.2 SDG 3.9 – Reducing Health Risks

Research has demonstrated that regular exercise offers not only physical benefits but also significant psychological advantages (Wu et al., 2013; Struck & Ross, 2006). The physical relaxation it induces often facilitates mental relaxation, enabling individuals to reassess challenges and adjust their emotional perspectives. Exercise also enhances physiological, psychological, and social functions in the elderly, reducing disease risk and disability (Elder, 2002; Young & Dinan, 1994). Additionally, it helps prevent hypokinetic syndrome, alleviates stress, anxiety, depression, and mood disorders, and fosters emotional well-being (Brehm, 2000; Thayer, 1996). Recent research reinforces these findings, highlighting the role of regular physical activity in lowering the risk of chronic diseases and mitigating age-related decline (Panzarino et al., 2017; Hung, 2020; Fan et al., 2018). Thus, exercise is not only essential for physical health but also an effective

strategy for mental well-being.

Participant interviews further underscore these benefits. I-Sheng emphasized strict adherence to an exercise schedule, including weekend activities (I-Sheng 1130423). I-Hui described regular attendance as routine and beneficial (I-Hui 1130423). I-Fang maintained consistent participation without missing sessions (I-Fang 1130430). Jun, beyond scheduled sessions, incorporated evening walks into daily life (I-Jun 1140503). These accounts reflect a strong commitment to maintaining an active lifestyle.

Field observations support these findings, indicating that most participants consistently attend sessions and engage in additional physical activities outside class (1140503 Research Observation). This highlights the instructor's role in fostering self-discipline and long-term exercise habits among the elderly. Through the USR framework, this initiative effectively addresses physical inactivity in aging populations, contributing to broader societal well-being.

Structured rhythmic exercise significantly enhances overall health and functional fitness in the elderly while reducing health risk factors (Schwartz & Evans,1995). Long-term participation in exercise programs promotes healthier lifestyles and decreases reliance on medical care. Regular physical activity also fosters self-awareness of bodily functions, reinforcing the importance of consistent and appropriate exercise while encouraging lifelong fitness habits. Beyond disease prevention, these benefits include fall risk reduction, improved body composition, maintenance of a healthy metabolic rate, and strengthened immune function, collectively increasing life expectancy and enhancing quality of life (Chen et al., 2016).

The self-discipline demonstrated by Sheng, Hui, Fang, and Jun in maintaining regular exercise habits aligns with the objectives of SDG 3.9, which emphasizes the role of physical activity in mitigating health risks. Their participation in the Senior Exercise Program exemplifies the successful integration of regular exercise into the lifestyle of the elderly, contributing to the broader goal of reducing health risks and promoting well-being in aging populations.

4.1.3 SDG 3.D – Health Risk Management

Li et al. (2009), and Huang et al. (2007) emphasized that effective exercise prescriptions for the elderly should incorporate aerobic exercise, endurance training, flexibility and balance training, and lifestyle modifications. Key components include frequency, intensity, type, duration, and progressive overload. However, sustained participation is often hindered by factors such as lack of motivation, low self-confidence, fear of injury, gait instability, illness-related functional decline, financial constraints, weather conditions, cognitive impairment, and the absence of exercise companions (Li et al., 2009).

Participant interviews underscore the importance of structured guidance and a supportive environment in sustaining engagement. Sheng highlighted the Nordic walking program's suitability for aerobic and endurance training (I-Sheng 1130423). Hui noted that professional instruction fosters a sense of safety, enhancing enjoyment (I-Hui 1130423). Fang appreciated the clear guidance that prevents injuries (I-Fang 1130430), while Jun emphasized the convenience and social benefits of exercising at the senior activity center (I-Jun 1130503). These responses indicate that participants highly value professional guidance and health safeguards, which enhance their motivation and willingness to participate. Field observations further confirm this: "Before each session, participants frequently exchange experiences from previous workouts, discuss their exercise progress, and express appreciation for their instructors' guidance" (1140503 Research Observation).

Furthermore, the instructors of the exercise program prioritize safety as a fundamental principle. Hsu and Huang (2003), drawing on exercise physiology principles, emphasized that safety must be the foremost consideration in exercise prescription. Prior to designing an exercise regimen, it is essential to assess participants for cardiovascular, musculoskeletal, or systemic conditions, including angina,

cerebrovascular disease, hypertension, diabetes, hyperlipidemia, and osteoarthritis, as these conditions significantly affect exercise tolerance and safety. For instance, individuals with arthritis should focus on functional movements such as sitting, standing, and stair climbing while adhering to low-intensity, low-frequency routines to prevent joint pain. Moreover, exercise should be avoided during pain flare-ups or acute phases of illness (Huang et al., 2007).

Participants' interview reinforces the emphasis on safety. Sheng noted that instructors remind them to slow down and modify movements if they experience knee discomfort, advising against exceeding their physical limits (I-Sheng 1130423). Hui highlighted the importance of adjusting activity levels based on personal health conditions, particularly avoiding strenuous exercise when experiencing high blood pressure (I-Hui 1130423). Fang acknowledged the precautions taken during outdoor Nordic walking, where participants are instructed to stop if temperatures become too high to prevent heat exhaustion (I-Fang 1130430). Jun affirmed that instructors consistently stress safety, encouraging participants to exercise cautiously and recognize their own limitations (I-Jun 1130503).

These responses illustrate the instructors' strong emphasis on safety, ensuring participants remain mindful of their physical condition and make necessary adjustments. Field observations further confirm this, "During sessions, participants frequently remind and look out for one another, fostering collective awareness of safety precautions and self-monitoring of their physical conditions" (1140503 Research Observation). Huang et al. (2007) further emphasized that before initiating any exercise program, whether independently or under professional guidance, individuals should conduct self-assessments, as certain pre-existing conditions may necessitate avoiding contraindicated exercises to prevent injury or health complications. The findings demonstrate that instructors' emphasis on safety and proper exercise techniques aligns closely with SDG 3.D's goal of promoting health risk management through exercise. The Senior Exercise Program successfully incorporates health safety measures,

fosters participant engagement, and ensures the sustainable practice of safe exercise routines, thus effectively implementing SDG 3.D objectives within the community.

4.2 Implementation Process of SDG 4 in the Senior Exercise Program in a remote area in Taiwan

The Senior Exercise Program aligns with SDG 4 (Quality Education) by integrating two key sub-goals: SDG 4.6 (Lifelong Learning) and SDG 4.7 (Education for Sustainable Development and Inclusive Learning Opportunities). The following section explores the program's implementation in relation to these two sub-goals.

4.2.1 SDG 4.6 – Lifelong Learning

Learning is a lifelong process that should not be perceived as an additional burden for the elderly but as an integral aspect of daily life—a continuous journey of "learning as long as one lives." Hu (1997) emphasized that lifelong learning transcends traditional school-based education, encompassing adult and senior education to create a coherent, continuous process that meets the evolving needs of different life stages.

Interviews with participants reveal a strong enthusiasm for learning new exercises. Sheng noted the benefits of acquiring new skills in later life, stating: "The instructor teaches very well, and I actively participate. Learning new exercises is enjoyable and helps to prevent functional decline" (I-Sheng 1130423). Hui underscored the cognitive engagement involved in mastering Nordic walking techniques: "The instructor taught us how to properly use Nordic walking poles, which is excellent. It engages both the mind and body" (I-Hui 1130423). Fang valued the dual benefits of physical activity and knowledge acquisition, remarking, "Being willing to learn Nordic walking, gain new knowledge, and stay physically active is truly valuable" (I-Fang 1130430). Similarly, Jun highlighted the practical impact of learning proper walking techniques, explaining, "I used to walk incorrectly, which caused knee problems. Learning the correct method has been extremely helpful" (I-Jun 1130503). These responses reflect participants' intrinsic motivation, not only

to adopt new exercise practices but also to engage in cognitive learning and critical thinking. Field observations further corroborate this: "Participants demonstrated a positive and proactive learning attitude. They were open to acquiring new knowledge and unafraid of learning" (1140503 Research Observation). As Knapper and Cropley (1985) asserted, lifelong learners consistently pursue educational activities to acquire, refine, and expand their knowledge, skills, and attitudes, thereby enhancing their capacity for future learning endeavors.

Participants also articulated the motivations and anticipated benefits of joining the exercise program. Sheng emphasized physical well-being: "I come to exercise to maintain my physical fitness. When I am in good shape, I am less likely to get sick" (I-Sheng 1130423). Hui highlighted the holistic benefits, noting, "Exercising and sweating make me feel healthier, while also allowing me to socialize with friends" (I-Hui 1130423). Fang valued the social connections facilitated by the program, stating, "Besides exercising, I get to meet old classmates, which helps me stay socially connected and maintain a sense of belonging" (I-Fang 1130430). Jun further emphasized the program's impact on overall well-being: "Staying active improves my quality of life and gives my life meaning" (I-Jun 1130503).

These findings indicate that lifelong learning among the elderly addresses diverse needs, including disease prevention, health maintenance, nutrition, leisure, and social engagement. Participants exhibited psychological resilience, social adaptability, and crisis management skills, enabling them to navigate challenges effectively. They approached aging with a proactive mindset, embracing life with a sense of purpose while continuing to contribute meaningfully to their communities. Field observations further revealed that participants utilized exercise as a conduit for lifelong learning, integrating their physical, psychological, and social needs to achieve holistic self-fulfillment (1140503 Research Observation). This aligns with Chang's (2007) assertion that lifelong learning fosters social participation and enhances overall well-being among the elderly. Moreover, the participants, guided by dedicated instructors, actively engaged in and consistently pursued lifelong learning. Their interviews and feedback provide compelling evidence of the successful implementation of SDG 4.6, demonstrating how the Senior Exercise Program exemplifies an effective model for lifelong learning within aging communities.

4.2.2 SDG 4.7 – Education for Sustainable Development

In recent years, SDGs have emerged as a universal framework for global governance, business, and education, with Education for Sustainable Development (ESD) recognized as a key driver for promoting sustainability. Integrating SDGs into curricula and pedagogy has become essential for broadening community perspectives. ESD emphasizes personal awareness, mutual respect, and inclusive learning, encouraging individuals to engage with diverse viewpoints and cultivate reciprocal relationships with institutions such as schools and communities. This collaborative educational model extends learning beyond classrooms into community practice, fostering self-worth and active citizenship (He, 2023).

Field observations revealed that participants enthusiastically embraced exercise resources introduced into the community, describing the experience as revitalizing and invigorating (1140503 Research Observation). Participants also valued intergenerational learning opportunities. Sheng remarked, "It's fantastic that the community offers diverse courses. Learning new exercises from younger people makes me feel younger" (I-Sheng 1130423). Hui highlighted the benefits of peer learning, noting, "Beyond learning from the instructor, we also learn from each other, exchanging different ideas among participants" (I-Hui 1130423). Fang expressed gratitude for university-community collaboration, stating: "We are truly grateful for the partnership between universities and the community to offer such courses—they are incredibly beneficial to us" (I-Fang 1130430). Jun further emphasized the cognitive benefits of

intergenerational learning: "Learning with younger people keeps our mindset youthful and prevents mental stagnation" (I-Jun 1130503).

These reflections underscore the value of university-community partnerships in fostering intergenerational learning and knowledge transfer. Through peer-to-peer interactions, sustainable development principles are seamlessly integrated into the program, ensuring the continuity of educational engagement across generations. Universities thus serve as catalysts for community empowerment, introducing new educational resources that participants actively embrace. This inclusive learning environment nurtures intellectual curiosity, encouraging participants to broaden their perspectives through diverse viewpoints. Consequently, the integration of SDGs into community education exemplifies best practices for leveraging USR to maximize community impact (Sterling & Maxey, 2013).

The rise of aging societies necessitates a reimagining of educational frameworks to ensure lifelong learning opportunities for the elderly. Educational equality must accommodate individual differences by providing diverse learning opportunities that address the unique needs of aging populations (Yang, 2008). The Senior Exercise Program exemplifies SDG 4.7's commitment to inclusive education by fostering safe, supportive environments where individuals of all ages and genders can participate.

Participants emphasized the program's accessibility and inclusivity. Sheng observed, "Here, everyone can exercise together—regardless of age or gender. The instructors teach with dedication" (I-Sheng 1130423). Hui highlighted the program's sensitivity to age-related needs, noting, "Even participants in their 80s are welcomed, and instructors take extra care to guide them attentively rather than neglecting them due to age" (I-Hui 1130423). Fang valued the program's role in preventing social isolation among retired women: "These courses provide an opportunity for women like me to engage in exercise after retirement, preventing social isolation" (I-Fang 1130430). Jun further praised the program's flexible, pressure-free approach: "If I have to miss a class, I can simply notify the instructor—there's no pressure. But I always try to attend" (I-Jun 1130503).

These insights highlight the pivotal role of university-community partnerships in advancing gender equality and lifelong learning rights. The researcher observed that the majority of participants were women, with a significant proportion aged 65 and above (1130430 Research Observation). This aligns with Wang's (2018) assertion that elderly education should prioritize participation, care, and dignity, integrating formal, non-formal, and informal learning to create an inclusive and accessible education system.

Under the guidance of instructors committed to adaptive and inclusive teaching, participants actively adjusted their learning approaches to meet their individual needs. Their experiences provide compelling evidence of the effective implementation of SDG 4.7's principles, promoting sustainable education and equitable access within the Senior Exercise Program.

5. Conclusion

Higher education institutions must not only integrate knowledge and expertise to address societal needs but also identify their unique characteristics and positioning in the process (Roper & Hirt, 2005). This study focuses on the implementation of USR through community-based initiatives, specifically examining the Senior Exercise Program in a remote area in Taiwan. By aligning with SDG 3(Good Health and Well-being) and SDG 4(Quality Education), this study employs in-depth interviews and participant observations to explore how the program embodies the principles of USR. The key findings are as follows:

5.1 Implementation Process of SDG 3 in the Senior Exercise Program

(1) SDG 3.4: Mental Health

Under the USR framework, the Senior Exercise Program provides a recreational and psychologically supportive space for its participants. The program enhances the psychological well-being of the elderly, fostering a positive and optimistic mindset, thereby increasing their motivation to engage

in regular exercise and fulfill their personal needs.

(2) SDG 3.9: Reducing Health Risks

Participants not only enjoy attending the exercise program but also demonstrate strong self-discipline in maintaining regular physical activity. This high level of adherence underscores the pivotal role of instructors in fostering self-regulated exercise habits. Through USR-driven community engagement, the program effectively combats physical inactivity among the elderly, addressing a prevalent societal challenge.

(3) SDG 3.D: Health Risk Management

Participants strongly acknowledge the importance of health protection measures and the guidance of professional exercise provided by the instructors. Moreover, the program prioritizes safety, with instructors continuously reinforcing awareness of personal well-being. This approach enhances participants' motivation and willingness to engage in exercise programs, ensuring sustained participation and long-term benefits.

5.2 Implementation Process of SDG 4 in the Senior Exercise Program

(1) SDG 4.6: Lifelong Learning

Participants exhibit a strong learning motivation in acquiring new exercise techniques, walking strategies, and cognitive stimulation through the program. Lifelong learning fulfills multiple needs, including disease prevention, nutrition, recreational activities, and social participation. Additionally, it helps the elderly cope with mental health challenges, social adaptation, and crisis management. Through their active participation, the elderly embrace life positively, respect its value, and seek meaningful engagement in society.

(2) SDG 4.7: Education for Sustainable Development

Participants highly appreciate the collaborative efforts between the university and the community in providing educational opportunities. Through peer learning and interactions, the program facilitates intergenerational knowledge transfer and sustainability education. The integration of USR with community education enriches local learners by injecting new educational resources, which participants not only accept but actively pursue. Furthermore, the program ensures gender equality and lifelong learning rights, reinforcing the fundamental principles of inclusive and equitable education.

The Senior Exercise Program demonstrates a comprehensive realization of SDG 3 and SDG 4 objectives through systematic implementation of its sub-targets. The program serves as a model of USR in action, illustrating how universities can bridge academic and community engagement to foster sustainable health promotion and lifelong learning opportunities for aging populations.

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