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Research Article

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The Predictive Power of Social Responsibility, Sustainability Community Development and Sustainability Awareness in Higher Education for Sustainable Development Goals

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Abstract

UNESCO believed that college students play an important role in sustainable development, and service learning in higher education is an important stage in establishing students' social responsibility, sustainable community development and sustainable awareness. The purpose of this study was to design a performing arts service-learning course so that participants could truly understand the actions of social responsibility, devote themselves to the action of sustainable development in the community, cultivate awareness sustainable in action, and predict the achievement of sustainable development goals. This study implemented a 3-month "Performing Arts Service-Learning Course". A total of 90 performing arts college students (57 females and 33 males) voluntarily participated in this research. Reflection activities and questionnaire survey will be carried out immediately after the course ends. The results of the study showed that after the course ended, the participants reflected on the activities and believed that service learning can establish a good partnership between the school and the community. Gain first-hand experience from serving others, serve social justice, serve the less privileged, and spread love and joy to more people. Questionnaires: Both males and females were satisfied with the topics of "social responsibility" and "sustainable community development". All participants agreed with the topics of "sustainability awareness" and "sustainable development goals". Males and females were highly correlated with social responsibility, sustainable community development, sustainable awareness, and sustainable development goals (4, 5, 11, 16, 17). Finally, the social responsibility, sustainable community development, and sustainable awareness of males and females could effectively predict the sustainable development goals (4, 5, 11, 16, 17). The conclusion of this study showed that service learning can help college students learn to solve problems from practice and understand the value of sustainable development through community service and caring for environmental changes. From now on, the 17 goals of sustainable development goals should be planned into courses in various fields. It is helpful to broaden students' horizons and move towards the era of global sustainable development goals.

Keywords: Service learning; Social responsibility; Sustainable community development; Sustainable awareness; Sustainable development goals

Introduction

In 2019, the United Nations announced that Education for Sustainable Development (ESD) by 2030 can be achieved through

critical thinking and contextual analysis [1], let the public better understand the connection and competition between the Sustainable Development Goals (SDGs) [2]. In 2017, the United Nations issued



a report combining ESD and SDGs, pointing out that it is necessary to support the world towards sustainable development [3]. ESD is a part of SDGs, the biggest difference between the two should be the difference in structure, the level of SDGs is extended to explore world problems [4], and try to solve these pressing problems, set the direction of global joint efforts in 2030, and work together to create a better sustainable world.

UNESCO proposed the road map of ESD's global action plan [5] and proposed that learners have the ability to contribute to sustainable development for education, so that young people can become reformers in sustainable development and create a better future for themselves [6]. ESD has clearly pointed out that youth is an important role in sustainable development [7]. Therefore, college students represent a new generation of young people. At this stage, young people are receiving university professional courses and integrating the concept of sustainable education into the courses. For SDGs the grounding of project goals has a positive effect [8]. In fact, the current primary task of higher education in ESD should focus on "university social responsibility" and "sustainable development of education" [9]. The so-called social responsibility of college students refers to a set of characteristics that reflect a student's desire to act with social significance, to implement initiative in practical change activities, and to make responsible decisions based on a rational analysis of their own behavior. It focuses primarily on taking responsibility for one's own actions and working for social, cultural, and ecological causes [10]. The so-called sustainable development of education is a process of lifelong learning and an integral part of quality education. It enhances the cognitive, social-emotional, and behavioral dimensions of learning, including learning content and outcomes, pedagogy, and the learning environment itself [11].

Service learning is the best opportunity to implement university social responsibility (USR) and community sustainability development. "University social responsibility (USR)" originated from "corporate social responsibility", which means that universities should not only focus on academics but should lead students to engage in public services to fulfill their social responsibilities [12]. University service learning emphasizes both service and learning and combines service with courses. Its connotation is that students combine their own majors through service. The integration or balance of the two must be through reflection, continuous inspection, and correction, and learning and learning, growing up [13]. Service-learning courses cultivate students' social responsibility and education for sustainable development. Service learning is multidisciplinary and multidisciplinary in nature, and it can also be interpreted as students using skills and knowledge to benefit society [14], so service learning can also be defined as a promotion of social commitment [15]. Service learning establishes reciprocal activities between the school and the community, which can enable students to gain self-growth and increase opportunities to understand society. After learning by doing, students experience the value of service and the sense of responsibility of caring for society through reflection and internalized thinking [16].

Taiwan's higher education has begun to incorporate sustainable indicators into the scope of school governance, especially the sustainable curriculum as a school-promoted project, such as community service learning to enable college students to take social responsibility. The university campus is an important field for cultivating the future to enter society and shoulders the important mission of the university's social responsibility. Education circles are paying more and more attention to creating a new scene between universities and society to make the theoretical content closer to the reality of students. In this scene, it is necessary to emphasize the significance and value of the educational practice of service learning [17]. Service learning is a kind of responsibility that students are willing to take on for society through practical work, such as community or elderly care centers, to gain new inspiration and self-reflection [18]. University service learning in Taiwan has become one of the important courses for students to practice sustainable development education, because service learning is reflection through action, so as to obtain the goal of sustainable development education [19]. Participating in community service can build a sense of identity with others in society and make service learning a part of life to achieve lifelong activities and develop mature character [20].

The Sustainable Development Goals (SDGs) were signed by the United Nations General Assembly in 2014. In the same year, the UNESCO World ESD Conference launched a global action plan on ESD. In 2015, the World Education Forum held in Incheon, South Korea also passed the Incheon Declaration (Education 2030: Quality Education and Lifelong Learning Towards Inclusion and Equality), emphasizing education as the main driving force for sustainable development and realization [21]. As time goes by, college students in Taiwan are still not generally aware of this international issue. Therefore, building students' awareness of sustainable development goals is the most direct way to integrate sustainable development goals into the courses of various departments. In this sense, service learning can be an important tool for creating sustainable development of the community [22]. Service learning the community to provide an experiential learning process. Students serve the community directly or indirectly and perform social services without seeking material incentives, increasing the possibility of positive reciprocity in social relationships [12]. Service learning not only cultivates students' knowledge and key skills, but more importantly, students' character and morality. Therefore, the university should provide the necessary funds or resources for the activities or facilities of the local community to which it belongs. The university builds the community through service learning and strengthens the interaction with the local community through the community [6].

The purpose of this study was to design a performing arts service-learning course so that participants can truly take on social responsibilities, invest in the action of sustainable development in the community, cultivate awareness of sustainability in action, and then predict the achievement of sustainable development goals [7,23]. Based on the above statements and literature, the hypothesis of this research was established:

Hypothesis 1: “Social responsibility”, “sustainable community development”, “sustainable awareness” and “sustainable development goals” were highly correlated.

Hypothesis 2: “Social responsibility”, “sustainable community development”, “sustainable awareness” could effectively predict “sustainable development goals”.

Materials and Methods

After the intervention of the performing arts service-learning course, questionnaires and reflection feedback were used to understand participants’ social responsibilities and actions for sustainable community development, as well as participants’ cognition and attitudes towards sustainable development goals. This study belongs to the single-case study method of social work, also known as single-case experimental design [24].

Research Participants

This study uses ESD implemented in service-learning course Taiwan College of Performing Arts. To be clear, this study was conducted on college students who participated in a service-

learning course from freshman to senior year. A total of 90 students voluntarily participated in this course, once a week, with a limit of 3 hours each time, for a period of three months. The participants were all performing arts (rap, music, dance, drama, acrobatics, stunts, painting, magic), aged between 20 and 23 years old (average 21.71 ± 0.83 years old). The sample size conforms to Gay’s proposal that the total sample size for comparative research should be at least 60 people [25]. Participants first checked their personal background information, including gender, age, and years of volunteering (divided into low-income households and non-low-income households). Excludes persons who were unable to participate because of age, mental or physical condition or vulnerability to undue influence and coercion, or who were unable to participate because of circumstances, status, or social and economic conditions, were able to make decisions of their own volition. All participants in this study signed an informed consent form, which complied with scientific and ethical principles. This study was approved by the Human Trials Review Meeting at Tri-Service General Hospital, National Defense Medical College, approval number C202305014. The flow chart of this study was shown in Figure 1.

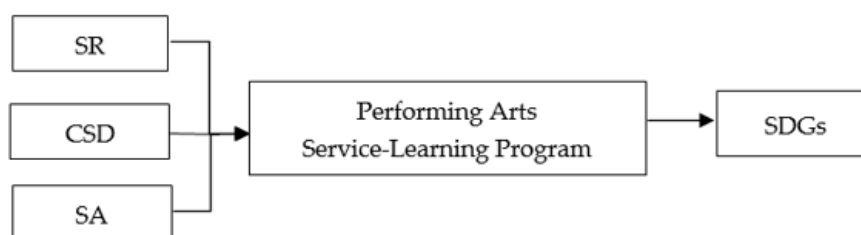


Figure 1: Research flow diagram.

SR is the abbreviation of social responsibility. CSD is the abbreviation for community sustainable development. SA is the abbreviation for sustainability awareness. SDGs is the abbreviation of sustainable development goals.

Research Materials

Service-learning programs in the performing arts

All participants were performing arts students. The course design was implemented in four stages: preparation, planning, reflection, and celebration, and the content of each stage was explained, as shown in Table 1 and Table 2 (Reflection: All participants take practical actions and write a record of reflection after the event; Celebration: Achievement announcement and symposium). Since there were a total of 90 participants, they were

equally divided into three groups according to their specialties (30 people in each group), and the service locations were changed every month (community youth development home, community painting and environmental maintenance, community nursing homes), the service-learning course in performing arts lasts for three months (15 February 2023 to 15 May 2023), as shown in Table 3. The characteristics of this service-learning curriculum were to establish connections between participants and the community, and to promote sustainable development goals through the action of service-learning.

Table 1: The implementation stages and connotation of service learning in this study.

Phase	Connotation
Preparation	Understand the needs of institutions and related social issues, give students orientation counseling before serving, and design courses according to service targets. Teachers guide students to evaluate their abilities and expertise, rehearse in advance, prepare equipment and how to interact with service targets on site.
Service	Emphasis on doing it personally, helping the community and solving community troubles and problems. Participate in community and social welfare organization services as a team.

Reflection	Every month, reflect on the service unit and write up the experience, and reflect on the new problems discovered in the service learning (each participant has three places to serve).
Celebration	Invite representatives of institutions or communities to participate in the sharing of results and put forward their views and suggestions on solving social issues.

Table 2: Directions for writing reflections on service learning.

Number	Content
1	What impressed you most about the service process?
2	How have you grown and benefited through service learning? What do you see as your biggest transformation?
3	What suggestions do you have for the curriculum in order to improve the service-learning curriculum?
4	How do you think combining coursework with service learning has helped you?
5	If there is an opportunity in the future, would you still be willing to participate in the ranks of volunteer services?
6	Do you think every student should take part in a Service-Learning class? What are the reasons for or against it?
7	What experience has service learning taught you? What is the impact on social issues and social justice?

Table 3: Service-learning programs in the performing arts.

Service object	Service strategy
Community Youth Development Home	1. Opera body teaching.
	2. Simple hand-made teaching (face painting).
Community painting and environmental maintenance	1. Stunt and acrobatic performances.
	2. On-site skill teaching (diabolo, stilts, ball skills).
Community nursing home	1. Live performances and accompanying rap (opera singing) in community nursing homes.
	2. Lead the elderly to participate in opera physical activities.
	3. Simple hand-made teaching (face painting).

Questionnaire survey

This study literature on university social responsibility and sustainable development of education related to service learning, and links it with the United Nations Sustainable Development Goals (SDGs), a questionnaire named "Performing Arts Service-Learning Curriculum and SDGs Questionnaire". The purpose of this questionnaire is to collect the degree of agreement of the participants on service-learning course satisfaction, sustainability awareness, and sustainable development goals. The questionnaire consists of four parts. Part 1: Gather demographic information about participants. Part II: Measures participants' satisfaction with performing arts service-learning programs. The third part: the degree of students' awareness of sustainability. Part 4: Detecting the participants' response to the sustainable development goals, the service-learning course of this research aims to achieve the following sustainable development goals:

SDG 4: Quality education - Service learning provides quality education.

SDG 5: Gender equality - Insist that professions should be treated equally regardless of gender.

SDG 11: Sustainable cities and communities - Community environmental issues everyone should be aware of and take responsibility for. Willing to continue to participate in activities related to community development.

SDG 16: Peace, justice and strong institution - Seeing that social norms are violated leads to justice and acts as a civic responsibility.

SDG 17: Partnership for the goals - Interested in participating in public welfare activities that care for the disadvantaged. Service learning enables sustainable community development. Partners who are willing to encourage students to join SDGs practice.

The first draft of the questionnaire was completed, and 120 students in the senior and junior years of the Taiwan College of Performing Arts were randomly selected as pre-test objects after the content validity of the experts. The pre-test questionnaire is completed, and the correlation between each question and the total score and the decision value were used for project analysis. The decision value was the significant difference between the average number of questions in the high group and the low group. The higher the value, the better the discrimination of the topic. The correlation coefficient of the total score must be above 0.30, and the decision value must be greater than 3.5 before it can be used. The total cumulative explained variance of the questionnaire was 77.19%, which has construct validity. Reliability analysis in order to understand the consistency and stability of the scale, the Cronbach α value was used to analyze the internal consistency of the items with the same factors. The reliability analysis results showed that the Cronbach α value ranges from 0.69 to 0.84, and the internal consistency of this questionnaire was quite high, so the

item was not deleted. Four factors were extracted from the factor analysis, including social responsibility (6 items), sustainable community development (5 items), sustainable awareness (5 items), and sustainable development goals (12 items), with a total of 28 topics named "Performing Arts Service-Learning Curriculum and Sustainable Development Goals Questionnaire", as shown in Table 4. This questionnaire adopts a 5-point Likert questionnaire including the following response intervals: the second part: 1 = very dissatisfied, 2 = dissatisfied, 3 = don't know, 4 = satisfied, 5 =

very satisfied; the third and fourth parts: 1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree [26]. The higher the average score of the second part, the more satisfied the service-learning course was with social responsibility and sustainable community development. The higher the average score of the third and fourth parts, the better the participant's sustainability awareness and achievement of sustainable development goals (Table 4).

Table 4: Performing arts service-learning curriculum and sustainable development goals questionnaire.

Part II: Satisfaction with Service-Learning Programs		
Factor	Items	Content
Social responsibility	1	The knowledge and practice imparted by service learning made me feel...
	2	I feel that service learning can develop good character...
	3	The ability to demonstrate effective problem-solving through service learning makes me feel...
	4	Service learning can touch the inner sense of fairness and justice, which makes me feel...
	5	Service learning being able to put myself in someone's shoes made me feel...
	6	Service learning can show personal professional dedication to society, which makes me feel...
Sustainable community development	7	I feel that service learning can support the underprivileged groups...
	8	Service learning can care about the ecology and environment of the community, which makes me feel...
	9	Service learning being able to solve community problems makes me feel...
	10	Service learning being able to learn respect makes me feel...
	11	Service-learning can foster community-school partnerships that make me feel...
Part III: Sustainability Awareness		
	12	Know the Sustainable Development Goals issued by the United Nations.
	13	Know that service learning has planned or implemented the SDGs.
	14	Be able to understand the Sustainable Development Goals according to your profession.
	15	Partners who are willing to encourage students to join SDGs practice.
	16	SDGs will be mentioned on school websites or classrooms.
Part IV: Sustainable Development Goals		
SDGs 4	17	Service learning provides excellent educational quality.
	18	High-quality education enables effective learning outcomes.
	19	Willing to change oneself to assist others to become a member of quality education.
SDGs 5	20	Know that professions should be treated equally regardless of gender.
	21	Know that regardless of gender, ethnic group can receive equal education.
SDGs 11	22	Everyone should be aware of and take responsibility for community environmental issues.
	23	Willing to continue to participate in activities related to community development.
SDGs 16	24	Seeing that social norms are violated leads to justice and acting as a civic duty.
	25	Willing to gather the expertise of young students to increase the influence of the community.
SDGs 17	26	Interested in participating in public welfare activities that care for the disadvantaged.
	27	Knowing that service learning can realize sustainable community development.
	28	Know how to master relevant knowledge, attitudes and skills, and develop sustainable literacy.

SDGs is the abbreviation of Sustainable Development Goals.

Control Variables

This study only focused on 90 students from the Taiwan College of Performing Arts. Since these students were all performing arts, the

service-learning courses were biased towards opera performance, rap, acrobatics, facial makeup, painted communities, greening communities, community environmental and ecological surveys, etc. These courses are unique and can provide participants with

novel experiences. However, this service-learning course can only allow participants to recognize part of the sustainable development goals and cannot fully infer the sustainable development goals. For example, goals such as eradicating poverty, improving health, ecological environment, protecting oceans and forests, and climate change are not within the scope of this study, and these are the control variables of this study.

Statistical Analysis

The Quantile-Quantile (Q-Q) diagram of SPSS was used to judge the normality [27], and the t test was used for homogeneity test. Service learning completed a questionnaire survey, and the data obtained were presented in standard deviation (SD) and mean [28]. The SPSS 20.0 software (IBM®, Armonk, NY, USA) was used for statistical analysis, and the overall significance level was set at $p < 0.05$. The statistical methods used include the frequency distribution of descriptive statistics, t-test, single-factor variance analysis, Pearson product difference correlation, and finally used multiple regression analysis to understand the social responsibility and sustainable community development of service learning for the

actions of the sustainable development goals.

Results

Normality and homogeneity analysis of participants' age

Normality can be judged by Quantile-Quantile diagram (Q-Q plot). Because both the abscissa and the ordinate in this figure use quantiles, the abscissa is the normal quantile, and the ordinate is the quantile of the actual data. So, Q-Q plot is to compare the gap between the theoretical quantile and the actual quantile. If there is no difference, all the points should be on a straight line (a straight line from the bottom left to the top right), otherwise, it will deviate from the straight line. The age of 90 male and female participants recruited in this study can be regarded as normal, as shown in Figure 2. The age statistics of the participants showed that the average age of females was 21.07 ± 0.72 years (57 persons); the average age of males was 21.39 ± 0.68 years (33 persons). The age of males and females was tested by t test ($t = -0.74$, $p < 0.05$), and the results showed no significant difference, showing that the participants were homogeneous (Figure 2).

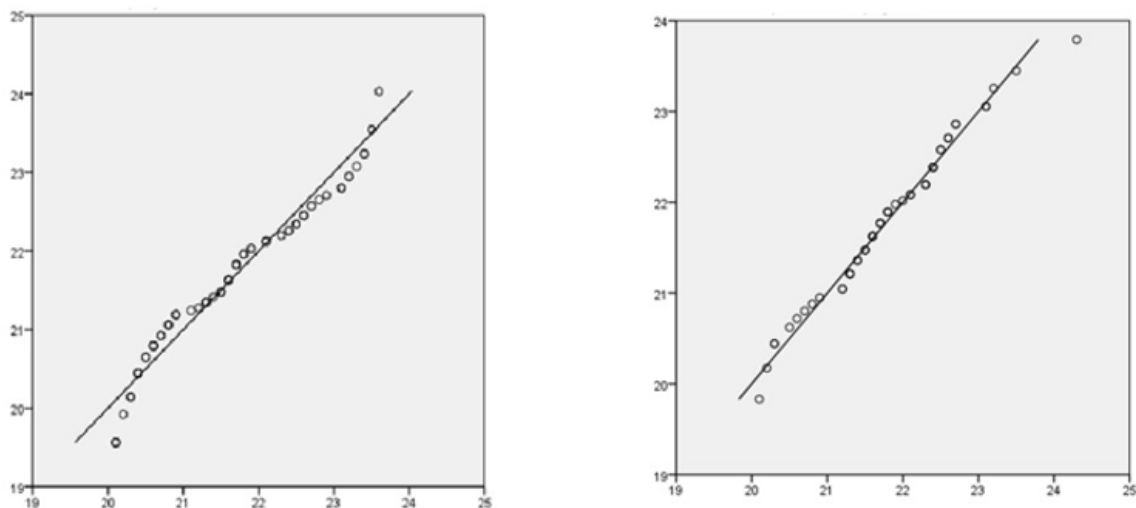


Figure 2: Normal distribution of female and male ages Q-Q plot.

The picture on the left is a female, the picture on the right is a male. The vertical axis is the expected normal distribution, and the horizontal axis is the observed value.

Analysis of participants' volunteer years

Analyze the volunteer experience of the participants in this study. The results of the statistical analysis were as follows: females had the most volunteer experience of 1-1.5 years (accounted

for 26.32%), males had the most volunteer experience of 0.1-0.5 years (accounted for 36.36%). 22.80% of females and 24.24% of males have never worked as volunteers. In addition, there was a significant difference between males and females in volunteering years at 0.1-0.5 years ($t = -4.19$, $p < 0.05$), as shown in Table 5.

Table 5: A comparative analysis of the seniority of volunteers between males and females.

Volunteer years	Female (n=57)	Male (n=33)	t-value	p-value
	%	%		
0	22.8	24.24	-1.36	0.12
0.1-0.5	15.79	36.36	-4.19*	0.01
0.5-1	17.54	18.18	-0.85	0.27
1-1.5	26.32	12.12	3.74*	0.02
1.5-2	10.53	6.06	1.68	0.09
over 2	7.02	3.03	1.59	0.1

Means \pm standard deviations were presented as $M \pm SD$. * $p < 0.05$.

Reflective analysis of participants' service learning

Integrating all participants' post-service-learning reflections, as follows:

What impressed you most about the service process?

In the three service locations, every time I receive thanks or re-invitation from service targets or organizations, the volunteers are moved and happy, and it is also the greatest feedback and encouragement to the participants. All participants are dedicated to the name of the school and to establishing a good partnership between the school and the community.

How have you grown and benefited through service learning? What do you see as your biggest transformation?

At the beginning of service learning, most of the students were not in contact with, rejected, had no interest, and had no time. However, when these students did service learning for the first time, almost all participants felt that they had grown, such as communicating and responding to each other, and using their professional skills to the joy of serving others; From serving the disadvantaged and culturally disadvantaged groups, they are willing to pay more care and arouse their sense of social justice, change their learning attitudes, cherish every minute and every second of learning opportunities, and when encountering difficulties, they can find It is really beneficial for students to learn from each other and ask teachers for advice.

What suggestions do you have for the curriculum in order to improve the service-learning curriculum?

Participants suggested that there should be a variety of options for service-learning courses, or different services should be provided in the same place. Due to the involvement of service-learning courses in service organizations, students provide services through organizations, arousing students' interest. Some interested participants suggested that the school and the organization become a partnership, and in the future, it will be extended to become an internship organization or provide employment opportunities.

How do you think combining coursework with service learning has helped you?

The most important thing about performing arts is the interaction and feedback between the performer and the audience. Therefore, the feedback obtained from the service process can

immediately correct the deficiencies and gradually improve the quality of the service courses. For the combination of professional courses learned in school and service learning, I discovered a lot of skills and academic theories, which cannot be experienced in the classroom. Many convert the meaning of words into practical actions, and this practical experience can deepen the impression.

If there is an opportunity in the future, would you still be willing to participate in the ranks of volunteer services?

Most of the participants hold the willingness to participate in the activities or institutions that can be participated in within the ability and time permitting. Because service is a very meaningful thing, commitment can benefit more people. Passing on help, love, and joy to more people, so that this kind of touch will continue, this is what participating in service learning wants to do.

Do you think every student should take part in a Service-Learning class? What are the reasons for or against it?

Most of the participants were in favor of it. Believes that every student should participate in service-learning courses. Because helping others is the foundation of happiness, and benefiting people is a good thing. Gain first-hand experience from serving others, as most people often only see themselves and don't think of others. If you take on the role of service yourself, I believe you will have a different experience.

What experience has service learning taught you? What is the impact on social issues and social justice?

Small gestures can build confidence. Although it is only a little effort, it can always accumulate sand into a tower, but it can show the greatest love. I no longer think that I can't do anything, and I no longer look at society indifferently. I am a very happy person. The existence of these institutions and personnel serves social justice and the disadvantaged. I deeply admire these people who silently contribute to society. Service learning can make people see more broadly and grow more.

Analysis of questionnaire data of male and female participants

The results of the questionnaires completed by all participants in this study were shown in Table 6. It was found that after 12 weeks of service learning, the average scores of both males and females on all items reached the "satisfactory" or "agree" option.

Table 6: Questionnaire data analysis.

Part D96:H1161: Service-Learning Course Satisfaction		Female (n=57) M ± SD	Male (n=33) M ± SD	t-value (p-value)
Factor 1: social responsibility		4.12 ± 0.27	4.13 ± 0.25	-0.18 (0.46)
1	The knowledge and practice imparted by service learning made me feel...	4.17 ± 0.23	4.21 ± 0.14	-1.15 (0.23)
2	I feel that service learning can develop good character...	4.05 ± 0.37	4.04 ± 0.39	0.33 (0.42)
3	The ability to demonstrate effective problem-solving through service learning makes me feel...	4.03 ± 0.39	4.05 ± 0.36	-0.46 (0.35)
4	Service learning can touch the inner sense of fairness and justice, which makes me feel...	4.11 ± 0.29	4.24 ± 0.10	-3.28* (0.008)
5	Service learning can put oneself in others' shoes, making me feel...	4.23 ± 0.11	4.15 ± 0.26	3.43* (0.006)
6	Service learning can show personal professional dedication to society, which makes me feel...	4.12 ± 0.27	4.10 ± 0.31	0.51 (0.33)
Factor 2: Sustainable community development		4.28 ± 0.07	4.27 ± 0.09	0.63 (0.24)
7	I feel that service learning can support the underprivileged groups...	4.22 ± 0.12	4.24 ± 0.10	-0.84 (0.26)
8	Service learning can care about the ecology and environment of the community, which makes me feel...	4.26 ± 0.09	4.25 ± 0.09	0.51 (0.34)
9	Service learning being able to solve community problems makes me feel...	4.28 ± 0.08	4.21 ± 0.11	2.19 (0.08)
10	Service learning being able to learn respect makes me feel...	4.35 ± 0.07	4.37 ± 0.08	-1.03 (0.15)
11	Service-learning can foster community-school partnerships that make me feel...	4.31 ± 0.08	4.29 ± 0.07	1.24 (0.10)
Part III: Sustainability awareness		4.13 ± 0.21	4.10 ± 0.19	0.62 (0.31)
SDGs		4.10 ± 0.27	4.11 ± 0.24	-0.73 (0.29)
12	Know the Sustainable Development Goals issued by the United Nations.	4.12 ± 0.29	4.10 ± 0.32	1.31 (0.19)
13	Know that service learning has planned or implemented the SDGs.	4.05 ± 0.36	4.07 ± 0.34	-1.28 (0.15)
14	Be able to understand the Sustainable Development Goals according to your profession.	4.09 ± 0.33	4.06 ± 0.35	1.64 (0.10)
15	Partners who are willing to encourage students to join SDGs practice	4.25 ± 0.23	4.13 ± 0.15	3.57* (0.005)
16	SDGs will be mentioned on school websites or classrooms.	4.14 ± 0.10	4.15 ± 0.17	-0.75 (0.16)
Part IV: Sustainable development goals				
SDGs 4		4.15 ± 0.18	4.12 ± 0.22	1.75 (0.09)
17	Service learning provides excellent educational quality.	4.01 ± 0.41	4.05 ± 0.37	-1.28 (0.13)
18	High-quality education enables effective learning outcomes.	4.19 ± 0.20	4.13 ± 0.27	1.13 (0.21)
19	Willing to change oneself to assist others to become a member of quality education.	4.25 ± 0.15	4.18 ± 0.22	1.84(0.09)
SDGs 5		4.16 ± 0.16	4.18 ± 0.13	-1.17 (0.13)
20	Know that professions should be treated equally regardless of gender.	4.15 ± 0.08	4.16 ± 0.24	-0.83 (0.24)
21	Know that regardless of gender, ethnic group can receive equal education.	4.16 ± 0.35	4.19 ± 0.31	-1.17 (0.16)
SDGs 11		4.18 ± 0.15	4.19 ± 0.13	-0.62 (0.11)
22	Everyone should be aware of and take responsibility for community environmental issues.	4.16 ± 0.25	4.14 ± 0.26	0.81 (0.14)
23	Willing to continue to participate in activities related to community development.	4.19 ± 0.19	4.23 ± 0.14	-1.46 (0.09)
SDGs 16		4.10 ± 0.22	4.18 ± 0.12	-3.51* (0.008)
24	Seeing that social norms are violated leads to justice and acting as a civic duty.	4.04 ± 0.37	4.17 ± 0.23	-5.37* (0.001)
25	Willing to gather the expertise of young students to increase the influence of the community.	4.16 ± 0.24	4.19 ± 0.19	-2.22 (0.009)
SDGs 17		4.30 ± 0.09	4.20 ± 0.15	3.57* (0.006)

26	Interested in participating in public welfare activities that care for the disadvantaged.	4.37 ± 0.09	4.13 ± 0.27	8.85* (0.0001)
27	Knowing that service learning can realize sustainable community development.	4.19 ± 0.20	4.21 ± 0.15	-1.66 (0.09)
28	Know how to master relevant knowledge, attitudes, and skills, and develop sustainable literacy.	4.34 ± 0.08	4.26 ± 0.12	3.94* (0.008)

*p < 0.05

SDGs is the abbreviation of Sustainable Development Goals. SDGs include 17 core goals, and the questionnaire includes five goals including SDG 4, 5, 11, 16, and 17. Questionnaire data presented as means ± standard deviations (M ± SD). T test value was presented as t-value (p-value).

The second part of the data showed that the t test of SR and SCD of male and female participants did not reach a significant difference, but the overall average of SR and SCD reached above "satisfactory". For the items of SR, "service learning can touch the inner sense of fairness and justice, which makes me feel... (t=-3.28, p<0.05)", "service learning can put oneself in others' shoes, making me feel... (t=-3.43, p<0.05)", the t-test of male and female reached a significant difference.

The third part of the data showed that the average number of all items of "sustainable awareness" of males and females, the t-test found that 4 items (a total of 5 items) did not reach a significant difference, but the average number of these items all reached "agreement" above. Only "partners who are willing to encourage students to join SDGs practice", t=-3.57, p<0.05, there was a significant difference between males and females.

The fourth part of the data showed that the average number of all items of the "sustainable development goals" for males and females, the t-test found that there was no significant difference in the items, but the average number of these items was above "agree". Among them, there was a significant difference in SDG 16 (t=-3.51, p<0.05), among them, "seeing violations of social norms will uphold justice and act as a citizen", t=-5.37, p<0.05", males were better than females. SDG 17 (t=3.57, p<0.05) reached a significant difference, with "interested in participating in public welfare activities caring for the disadvantaged (t =8.85, p<0.05)", "knowing and mastering relevant knowledge, attitudes and skills to develop sustainable Literacy (t=3.94, p<0.05)", females were better

than males. In addition, SDG 4, 5, 11 and other goals did not reach a significant difference, but the average of each goal reached "agree" or above. The above results confirmed the acceptance of hypothesis 1: "Social responsibility", "sustainable community development", "sustainable awareness" and "sustainable development goals" were highly correlated (Table 6).

Correlation analysis of SR, SCD, SA and SDGs

The correlation analysis between social responsibility (SR), sustainable community development (SCD), sustainable awareness (SA) of males and females and SDGs (4, 5, 11, 16, and 17), since each group was on an equidistant scale (5-point scale), this study uses Pearson product-moment correlation analysis.

In the correlation analysis of SR, SCD, SA and SDGs (4, 5, 11, 16, 17) for females, the correlation coefficient was between 0.82 and 0.93, reached a significant high correlation, as shown in Table 7. After a 3-month service-learning course for females, the highest correlation coefficient between SCD and SDG 17 was 0.93 (p < 0.05). Second, the correlation coefficient between SR and SDG 11 was 0.92 (p < 0.05).

In the correlation analysis of SR, SCD, SA and SDGs (4, 5, 11, 16, 17) for males, the correlation coefficient was between 0.78 and 0.91, reached a significant high correlation, as shown in Table 8. After 3 months of service-learning courses for males, the highest correlation coefficient between SR and SDG 11 was 0.92 (p < 0.05). Second, the correlation coefficient between SCD and SDG 17 was 0.91 (p < 0.05) (Tables 7,8).

Table 7: Correlation analysis of SR, SCD, SA and SDGs in females.

	SDGs				
	SDG 4	SDG 5	SDG 11	SDG 16	SDG 17
SR	0.82*	0.83*	0.92*	0.88*	0.91*
SCD	0.88*	0.87*	0.91*	0.90*	0.93*
SA	0.90*	0.91*	0.90*	0.91*	0.91*

*p < 0.05

SR is the abbreviation of social responsibility. SCD is the abbreviation for sustainable community development. SA is the abbreviation for sustainability awareness. SDGs is the abbreviation of Sustainable Development Goals. SDGs include 17 core goals, and the questionnaire includes five goals including SDG 4, 5, 11, 16, and 17.

Table 8: Correlation analysis of SR, SCD, SA and SDGs in males.

	SDGs				
	SDG 4	SDG 5	SDG 11	SDG 16	SDG 17
SR	0.78*	0.81*	0.92*	0.86*	0.90*
SCD	0.85*	0.84*	0.88*	0.87*	0.91*
SA	0.89*	0.90*	0.88*	0.89*	0.90*

*p< 0.05

SR is the abbreviation of social responsibility. SCD is the abbreviation for sustainable community development. SA is the abbreviation for sustainability awareness. SDGs is the abbreviation of Sustainable Development Goals. SDGs include 17 core goals, and the questionnaire includes five goals including SDG 4, 5, 11, 16, and 17.

The explanatory power of SR, SCD, SA for SDGs

After Pearson product-moment correlation analysis, it was found that the SR, SCD, SA and SDGs (4, 5, 11, 16, 17) of males and females were highly correlated, and then the SR, SCD, SA were independent variables, for the explanatory power of dependent variables (SDG 4, 5, 11, 16, and 17), multiple regression analysis was used to first test the statistical significance of this regression model. There were significant differences in the dependent and independent variables between females and males after the F-test results, females $F=78.216^*$ ($p < 0.01$), males $F=64.393^*$ ($p < 0.01$). Finally, multiple regression analysis was used to analyze the explanatory power of SDGs (4, 5, 11, 16, 17) of the dependent variable by the forced entry method (the independent variable was considered in the regression model).

The explanatory power of SR, SCD, SA of females to SDGs (4, 5, 11, 16, 17) reached a significant level, and the explained variation was $R^2=78.7%$ ($p < 0.01$). As the independent variable, the

estimated value of "sustainable awareness" had the greatest impact on "SDGs (4, 5, 11, 16, 17)" ($\beta=0.792$, $p < 0.01$), followed by "social responsibility" ($\beta=0.763$, $p < 0.01$). The β values of SR, SCD, SA of the independent variable were positive, showed that the independent variable of female college students had a positive impact on SDGs (4, 5, 11, 16, 17), as shown in Table 9.

The explanatory power of SR, SCD, SA of males to SDGs (4, 5, 11, 16, 17) reached a significant level, and the explained variation was $R^2=71.1%$ ($p < 0.01$). As the independent variable, the estimated value of "sustainable awareness" had the greatest impact on "SDGs (4, 5, 11, 16, 17)" ($\beta=0.774$, $p < 0.01$), followed by "social responsibility" ($\beta=0.739$, $p < 0.01$). The β values of SR, SCD, SA of the independent variable were positive, showed that the independent variable of male college students had a positive impact on SDGs (4, 5, 11, 16, 17), as shown in Table 10. Verify and accept hypothesis 2: "Social responsibility", "sustainable community development", "sustainable awareness" could effectively predict "sustainable development goals" (Tables 9,10).

Table 9: Multiple linear regression analysis of females.

Variables	β	R	R^2	Adjusted R^2	p
SR	0.725*	0.887	0.787	0.784	< 0.001
SCD	0.763*				< 0.001
SA	0.792*				< 0.001

Independent variables: SR is the abbreviation of social responsibility), SCD is the abbreviation for sustainable community development. SA is the abbreviation for sustainability awareness. Dependents: SDGs (the questionnaire includes five goals including SDG 4, 5, 11, 16, and 17). *p< 0.01.

Table 10: Multiple linear regression analysis of males.

Variables	β	R	R^2	Adjusted R^2	p
SR	0.691*	0.843	0.711	0.709	< 0.001
SCD	0.739*				< 0.001
SA	0.774*				< 0.001

1Independent variables: SR is the abbreviation of social responsibility), SCD is the abbreviation for sustainable community development. SA is the abbreviation for sustainability awareness. Dependents: SDGs (the questionnaire includes five goals including SDG 4, 5, 11, 16, and 17). *p< 0.01.

Discussion

Universities have educational and ethical advantages in fulfilling social responsibilities. This research was of great significance for universities to implement service-learning courses to internalize social responsibility (SR) and sustainable community development (SCD) to cultivate sustainable awareness. In fact, service learning was the most appropriate role of education for sustainable awareness, and there have been many similar related studies in recent years [29-31], which were also towards the goal of sustainable development in 2030. Both UNESCO and the United Nations Environment Program have shown the importance of education to implement SDGs [2]. Therefore, the teaching method of service learning must be emphasized to provide services to the community so that students can integrate into the society, and at the same time students build a sense of sustainability in the actual service, and then achieve the goal of sustainable development [29,30]. Integrating sustainable issues into the curriculum is the most direct way for students to practice sustainable development goals [31]. In particular, service-learning courses are integrated into SDGs, which can adopt a wide range of and diverse activities, and students will gradually internalize them in the service process [32]. This study confirmed that students, teachers, and the community participate in positive and in-depth actions through service-learning courses to promote sustainable community development [33]. Scholars pointed out that service learning was not only a kind of education, but also a tool to achieve sustainable development [34]. According to the research results, service learning plays an important role in the education system, giving students the practice of social responsibility and sustainable development goals [35].

The reflection results of service learning in this study show that college students participate in service learning to inject vitality into the community and practice social responsibility, and also allow students to participate in community service actions and research [36]. Students could help solve social problems, be able to see the attitudes and values of social reality, and participate in solving social problems, so that students feel the fulfillment of the social responsibility of the university, these results were consistent with many studies [37-39]. From the questionnaire, it was found that service learning can deepen social responsibility actions, cultivate good character from practice, and learn how to solve problem's ability, through serving the disadvantaged groups in the community (community nursing home), could touch the inner sense of fairness and justice and empathize with caring emotions. The most important thing was to show personal expertise in a timely manner and win the applause and laughter of the masses. It has also reached SDG 11 and 16 [40]. In terms of the sustainable development of service learning, participants learn to respect and care for the environment, and promote the partnership between the community and the school through the actions of service learning, supporting the disadvantaged groups, caring about the community ecology, and helping to solve the problems of the community environment. The concept of sustainable development has deepened the awareness of college students and has become the quality of building a good citizen in the future. This result was consistent with many studies [12,41-44]. The purpose of this performing arts service learning

was to establish the attitudes of performing arts talents and the values of performing arts, and use "community service" and "social welfare organizations" as the entry methods to build the connection between college students and society. Through service learning, the works of community painting are completed to create sightseeing areas for community beautification and becoming permanent environmental transformation. This similar practice of sustainable development has been confirmed in many studies [45-48].

The effect of implementing service learning and SDGs in this study: social responsibility, sustainable community development, sustainable awareness, and SDGs (4, 5, 11, 16, 17) in both females and males have significantly high correlations. However, for the explanatory power of SDGs (4, 5, 11, 16, 17), females had 78.7% and males had 71.1%. In addition, the sustainable awareness of females ($\beta=0.794$) and males ($\beta=0.774$) had the greatest influence on the estimates of SDGs (5, 6, 11, 16, 17). Data from social responsibility, sustainable community development, sustainable awareness show that SDGs (4, 5, 11, 16, 17) can be practiced. For example, linking the indicators of "Sustainable Cities and Communities" (SDG 11) and "Sustainable Partnerships" (SDG 17) allows teachers and students to develop an attitude of protecting the ecology, caring for the community, and participating through the investigation of the painted community and community ecology, and then achieve the sustainable development of school and community partners [49].

The study confirmed that "service learning in performing arts" could effectively predict SDGs (4, 5, 11, 16, 17). Sze-Yeung et al. confirmed that reflection activities could clarify and solve problems faced in the service process [50], which was in line with the goal of SDG 4 "quality education" [51-53]. In this study, the performing arts service-learning course was completed by all participants without gender differences. Gender equality was crucial to the realization of sustainable development goals [54], which was in line with the goal of SDG 5 "gender equality" [55]. From the findings of this study on the relevance of service-learning courses to SDG 11, the study confirmed that students realize that service-learning could maintain the environment and created community benefits for the community and provided services for the community to ensure sustainable development [19,56], which was in line with the goal of SDG 11 "sustainable cities and communities" [31]. In addition, research has confirmed that service learning was a kind of practice. Through service-learning activities, students could develop critical thinking, enhanced their sense of responsibility to solve social problems, and be able to broaden their horizons and respect different opinions as citizens" [57,58], which was in line with the goal of SDG 16 "peace, justice and strong institution" [59]. In conclusion, the Matthews findings confirmed that service learning partnerships were often established by universities, and that these partners (community development associations) were eager to partner with universities, that communities value service learning partnerships and believed that the presence of students meets the needs of the community needs [60], which was in line with the goals of SDG 17 "partnership for the goals" [61,62].

Service learning is being seen as an approach to sustainable community development in more countries, and universities are

adopting service learning as part of implementing sustainable community development [63,64]. Based on the above empirical research, service-learning provided students with social learning and community engagement and provided students with systems thinking to solve problems [34]. Reflection and feedback on service learning can provide service learning courses, an important course planning for sustainable development education, how to enable learners to think about the development of sustainable goals in the future world in a systematic way, how to learn to understand the ways of creating change and how to think and solve problems in the living environment in the course, to reflect on global problems with a more comprehensive world perspective [65,66]. The study found a mutually beneficial relationship between service learning and community or institution. From a school perspective, teachers and students first understand the needs of the community, develop action plans, and solve problems through reflection, and finally invite the community to share knowledge and celebrate the results [18,67,68]. And from the intervention of reflective activities, students are allowed to contact and experience the real society, discover problems from life, and expand their horizons to have the literacy of SDGs [334]. This is also an important finding of this study. Service learning allows students to practice sustainable development goals in a direct way.

The performing arts service-learning course not only allows students to understand the meaning of service-learning from practical experience, but also reflect on the problems encountered by service targets or communities. However, it was found from research and reflection that many community services require various talents, and not a single skill can satisfy the needs of the community. This is one of the important limitations of this study.

Conclusions

This study implemented a performing arts service-learning course, 3-month intervention, and used "Performing Arts Service-Learning Curriculum and SDGs Questionnaire", all participants after the course. The results showed that the intervention measures of service-learning courses were helpful to improve college students' social responsibility actions and the practice of sustainable development. The above questionnaire survey echoes the course reflection. Students learn to discover problems in social reality and their proper attitudes and values. They also deeply feel that service actions can demonstrate the sense of social responsibility of college students. They learn to solve problems from practice. Understand the value of sustainable development of education through community service and caring for environmental changes. In this study, service-learning courses were integrated into SDGs (4, 5, 11, 16, 17) and students were also aware of global SDGs in ESD practice. Therefore, according to the questionnaire survey results, performing arts service-learning courses could effectively predict SDGs (4, 5, 11, 16, 17). It is suggested that in order to deepen the 17 goals of SDGs, no matter in the curriculum or school administration in various fields, efforts should be made to integrate SDGs into the curriculum, so as to cultivate students' awareness of sustainability and take actions to facilitate integration with society and the world.

The research value of these SDGs will help teachers to design courses and students to broaden their horizons and move towards the era of global SDGs.

Author Contributions

Conceptualization, W.K.C., and W.C.E.; methodology, W.K.C.; software, W.C.E.; validation, W.K.C.; formal analysis, W.K.C.; investigation, W.C.E.; resources, W.K.C.; data curation, W.C.E.; writing—original draft preparation, W.K.C.; writing—review and editing, W.K.C., and W.C.E.; supervision, W.K.C. and W.C.E.; project administration, W.K.C. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Human Trials Review Meeting at Tri-Service General Hospital, National Defense Medical College, approval number C202305014.

Informed Consent Statement

Written informed consent was obtained from the participants to participate in the study.

Data Availability Statement

The results used real data obtained from the study participants and the measurement data obtained after the service learning courses. The participants agreed with the data structure via confirmation, and confirmation can be disclosed with reasonable availability. All of the datasets on which the conclusions of the paper rely are available to editors, reviewers, and readers.

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Conflicts of Interest

The authors declare no conflicts of interest. This manuscript has not been published elsewhere, and it has not been submitted simultaneously for publication elsewhere.

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