

Preparation for the Generation of the 100-Year-Old, the Development of a Wholeness Program for Brain Health in the Elderly

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Abstract

Background/Objectives: This study is to identify the effects of wholeness programs on brain health of the elderly by recognizing the need for brain health programs to prevent brain diseases such as depression or dementia. **Methods/Statistical Analysis:** Subjects were 10 senior citizens aged 65 or older who participate in life dance classes (experiment group) and 10 senior citizens who do not participate in any leisure or health programs (control group). The physical strength tests and mental health measurement consist of flexibility, muscle strength, cardiovascular endurance and SCL-90-R. The wholeness program was developed over 4 months, during which once a week sessions (90 minutes per session) were held 12 times. **Findings:** There was a significant improvement in the experiment group while the control group didn't show any significant results. The experiment group is higher physical strength than the control group. The wholeness program had a positive effect on improved physical strength of the experiment group. The experiment group saw a significant improvement in post-mental health, with significantly higher scores for physical aspects, depression, anxiety, hostility, fear, obsession, mental disorder and death. There were also significant results for the pre-post variance in these categories, indicating that the wholeness program was more effective in improving mental health in the elderly than the dance classes at existing senior citizens' centers. **Application/Improvements:** This study will provide how much important creative activities to improve social skills and view life positively by recovering self-expression through wholeness programs and accepting physical, psychological and mental issues and overcoming them.

Keywords: Brain Health, Elderly, Mental Health, Physical Strength, Wholeness Program

1. Introduction

Loneliness during one's elderly years results from the boredom of relational deficit, exclusion, self-degradation, and the emotional and social isolation that result from them¹. Tendencies towards depression also increase due to social diseases, death of a spouse, worsening of financial situation, isolation from society and family, loss of self-control in daily life and regrets about past years. According², the increases in incidence of depression among senior citizens lead to suicides, causing a serious social issue.

As such, stress in the elderly causes anxiety and depression and reduced concentration and memory leading to

dementia. With the continued excretion of stress hormones, many studies have reported that the hippocampus in the brain suffers damage^{3,4}. Dementia is defined as a clinical symptom where the cognitive functions of the brain including memory, language and judgment are undermined with age, leading to difficulties in daily life⁵. It is estimated that the number of dementia patients aged 65 or older in Korea exceeded 400,000⁶ and is expected to grow two-fold to 770,000 by 2020⁷. Therefore programs for health improvement, treatment and rehabilitation of the elderly likely to develop depression, anxiety or dementia are needed.

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There is a saying that “there is no point in gaining the world if you lose your health”, most people since the year 2000 agree that exercises are necessary for health. The focus on fitness that includes only physical health led to an explosive growth in improved physical functions that are visible. But the concept of wellness includes both a healthy mind and body, raising the importance of psychological and cognitive aspects. The concept of wholeness goes one step further by arguing for spiritual health where internal and qualitative depth is gained⁸. Wholeness is a three dimensional health concept that includes the body, mind and spirit. Since physical, emotional and psychological issues can cause brain diseases such as anxiety, depression or dementia in the elderly, a wholeness program for brain health in the elderly is needed.

Wholeness can be pursued through religion, literature or art. Creative activities and a focus on humanities for self-training can help recover wholeness and provide an opportunity to become a well-rounded person⁹. Creative activities are not only for great scientists or artists but also for all people who have an innate desire and potential for them¹⁰. Therefore the elderly cannot be excluded, either. However, creative activities are known to be a task for children or teenagers and have often been neglected as a study subject regarding the elderly. With the increase in life expectancy and an aging society, the importance of studies on degenerative diseases is higher than ever. However, there have been no studies on preventive approaches for anxiety, depression or dementia in the elderly.

Along with the needs raised by social changes, there have been related studies such as those by^{11,12} that presented that various activities and their directions can be maintained even during one's senior years. They argued that there is no correlation between creative activities and age. The creative activities are innate in all people and therefore the elderly who have already experienced a lot in life have a stronger desire for self-expression than their younger counterparts^{10,13}. Moreover, although it is not a study on creative activities, there have been those that verified the effects of physical movement therapy on brain disorders, depression or anxiety¹⁴⁻¹⁶, overseas studies presented a model to improve the physical functions for easing symptoms of depression by focusing on the correlation between depression symptoms and the possibility of physical activities in depressed elderly patients^{17-19,20} reported that those who exercised saw the most improvement in brain health in their study on daily exercise and mental health in middle aged women. This shows that

regular exercise reduces the likelihood of various disease, helps maintain proper weight, reduces stress and helps with brain health.

Meanwhile, there are no studies in Korea on creative activities. There are a couple of overseas studies. According to¹³, people have the potential for growth and development even in their senior years²¹ saw a successful senior period as an optimized concept of personality development and thus argues that one should maintain an openness, autonomy, acceptance of one's own and others' emotions and thoughts, and incorporate personal growth, purpose in life and environmental factors together³ said that creative activities trigger many memories in the elderly and serve as an opportunity to newly accept their crisis and view them in a positive light. Therefore, studies on the creativity of the elderly, their potential, desires and life experience can play an important role in finding life's meaning in one's later years, reduce stress and promote brain health. Wholeness programs developed based on physical activities and creative activities for artistic, mental and spiritual health as well as physical health start with the easing of physical, psychological or emotional issues, brain diseases, treating and preventing them. Wholeness program is a comprehensive health program that includes humanities-related experience in creative activities from an artistic dimension to recover the spirit and train one's mind, along with physical activities such as yoga or pilates to improve physical adjustment.

Therefore the purpose of this study is to identify the effects of wholeness programs on physical and mental health of the elderly by recognizing the need for brain health programs to prevent brain diseases such as anxiety, depression or dementia in an era of the generation of 100 year olds. This study will provide a basic set of data to verify how important creative activities to improve social skills and view life positively by recovering self-expression through wholeness programs and accepting physical, psychological and mental issues and overcoming them.

2. Methods

2.1 Study Subjects

Subjects were 10 senior citizens aged 65 or older who do not participate in any leisure or health programs at such centers (experiment group) and 10 senior citizens who participate in life dance classes including traditional dance classes at senior citizens' welfare center in Seoul

Table 1. Experimental design

Experimental group	O1 Pre-test	X1 Application Wholeness Program class	O2 Post-test
Control group	O3 Pre-test	X2 Dance class	O4 Post-test

(control group). Details are given in Table 1. Experimental design". Participation methods of wholeness programs were explained to the subjects and a consent form was received. The experiment group participated in wholeness programs once a week for 12 sessions, for 90 minutes per session. This was done for four months from September to December, 2013 at the Hong Eun Art Center. The control groups were asked to participate in life dance classes (dance sports, line dance or traditional dance) at senior citizens' welfare center during the same period. Participation in structured exercises was controlled and daily habits were maintained. Table 1 shows the design of the pre and post test.

2.2 Measurement

The physical strength measurement tool is used by the Ministry of Health and Welfare⁷ to estimate physical strength in the elderly who have no abnormalities. It consists of tests on flexibility, muscle strength and cardiovascular endurance. Flexibility is measured in cm, muscle strength is measured in number of repeats and seconds, and cardiovascular endurance is measured in number of pulses per minute. The results are scored with 3 points for 'very good', 2 points for 'good', 1 point for 'lack of exercise'. Scores range from 8 to 24 points, with higher points indicating greater flexibility, muscle strength and cardiovascular endurance. Reliability was high at Cronbach's $\alpha = .70$.

Mental health was measured using Derogatis²² Symptom Checklist-90-Revision (SCL-90-R) the simple mental checklist. It consists of 6 questions on physical aspects, 5 questions on obsession, 8 questions on sensitivity towards interpersonal relations, 4 questions on depression, 7 questions on anxiety, 4 questions on hostility, 4 questions on agoraphobia, 4 questions on compulsiveness, 4 questions on mental symptoms and 1 question on death, making a total of 47 questions. A five point Likert scale was used for 'not at all (1 point)' to 'very much so (5 points)'. Higher scores for sub-categories indicate inferior mental health. Reliability was high at Cronbach's $\alpha = .65 \sim .89$.

2.3 Design and Development Process for a Wholeness Program

The wholeness program was developed over 5 months, during which once a week sessions (90 minutes per

session) were held 12 times for 10 senior citizens aged 65 or older who have experience participating in life dance (dance sports, line dance, traditional dance) classes at senior citizens' welfare centers, one mental health expert, one social welfare worker and 2 dance instructors for the elderly. Trial practices and three open discussions were held to develop the program.

The wholeness program for brain health in the elderly followed the ADDIE model, an instruction system development model, and referenced the ARCS learning motivation model and the multi-dimensional mental health improvement program by²³. It was divided into six steps of meaning. The detailed activities for each session are as shown in Table 2.

2.4 Data Analysis

Collected data were analyzed using Windows SPSS Ver. 18.0. Significance level was set for $p < .05$. First, an independent sample t-test was conducted to review whether the experiment group and the control group were homogenous. Second, to identify the effects on physical strength and mental health, a corresponding sample t-test was conducted between pre-test and post-test. Third, to verify the variance pre and post-test, ANOVA was conducted.

3. Results and Discussion

3.1 Verification of the Homogeneity of Groups

An independent sample t-test was conducted to review whether the experiment group and the control group were homogenous. The experiment group ($M=15.80$) had a higher physical strength level than the control group ($M=16.10$), but this was not statistically significant ($t=-.157, p=.877$). Overall mental health was rather lower in the experiment group ($M=3.53$) than the control group ($M=3.46$) but it wasn't statistically significant ($t=1.545, p=.140$). There were no statistically significant differences between the experiment group and the control group in any of the sub-categories. Therefore, both groups were verified to be homogeneous in terms of physical strength and mental health.

Table 2. Details of the wholeness program⁹

Learning motivation	Stage	Session	Composition	Activities
Relevance	Positive relations with others	1	Goal	Experience consideration of others and learn how the set rules through basic movements. Communication is done through self-established rules, others' opinions are respected and the first step towards trust in others is taken.
			Warm-up	Stretching, methods on how to straighten one's spine
			Thematic activities	Theme A happy first encounter
				<ul style="list-style-type: none"> ♦ Basic movements (walking, running, stopping) are used to perceive relationships in our space ♦ Ice-breaking through contact of body parts (gaze, clapping hands, hugs) rather than language to overcome psychological, physical distance ♦ Basic movement using physical contact
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities
		2	Goal	Use all body parts other than the eyes to perceive space, move within the space to think of relationships and consideration for others.
			Warm-up	Stretching, methods on how to straighten one's spine
			Thematic activities	Theme Dancing altogether
				<ul style="list-style-type: none"> ♦ Physical contact to create intimacy and reduce awkwardness ♦ In groups of two, basic movements learned during the first session are used to guide the partner out of danger. Using go-stop signals, trust and responsibility are formed ♦ The partner uses the hand of the other person to repeat the same movements to create intimacy and learn expressive methods of others
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities
Attention	Self-acceptance	3	Goal	Promote imagination and expression through imitation. Creator and imitator both respect each other's thoughts and expressions.
			Warm-up	Stretching, methods on how to straighten one's spine
			Thematic activities	Theme You seen by me
				<ul style="list-style-type: none"> ♦ The creator moves in five stages (facial expressions → upper body → lower body → overall body → movement) to have the imitator follow him ♦ Imitation activities are used to create and observe movements, share thoughts. The creation Team sets situations and expresses them through movements. The imitation team re-enacts within a given time
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities
		4	Goal	A process of learning about one's own body. Experience one's range of movement and increase confidence by learning expressive methods
			Warm-up	Stretching, methods on how to straighten one's spine

(Continue)

			Thematic activities	Theme	Free gestures
				<ul style="list-style-type: none"> ◆ Range of joint movements are perceived then one's own names are expressed through body joints (consonants and vowels) ◆ Divided into groups of expressor and observer, joint points are determined so that the other team can make movements for comparison. The other person's body is perceived to reflect on self. 	
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities	
Confidence & Relevance	Autonomy	5	Goal	Express own emotions through gestures to increase sensitivity to expressive methods	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Drawing daily lives through dance
				<ul style="list-style-type: none"> ◆ Use one's own gestures and movements to express feelings ◆ In groups of two, gestures are used to have everyday conversation ◆ Relay gestures to change the height and speed of movements and express them to music 	
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities	
		6	Goal	Think of oneself as a conductor and one's movements as a musical instrument. Experience leadership through such movements and reflect on the active and passive aspects of oneself	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Performing with one's body
				<ul style="list-style-type: none"> ◆ Listen to classical music to conduct body part musical instruments. The conductor's movement of hands become the musical instrument. ◆ Changes to height and spatial movements are added to expand the range of possible movement. 	
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities	
Attention & Confidence	Environmental mastery	7	Goal	Feel the other person's energy through identification of central point and build teamwork	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Finding the center of the body
				<ul style="list-style-type: none"> ◆ Recognize body's center, have one's back face the other person's back to learn how to identify body centers of 5:5 ◆ Movement within space using body's weight center by using other body parts than the back 	
			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities	
		8	Goal	Create various links using body parts, and experience the link one has with others	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	The link between you and I
				<ul style="list-style-type: none"> ◆ Use the body to create a link to the other person. Then the other person connects the link. Focus on the feeling when creating a link or coming out of one. Try not to break the form ◆ Increase the number of participants so that 2-3 people can move at once 	

(Continue)

			Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities	
Satisfaction & Relevance	Purpose in life	9	Goal	Use hand-clapping sounds to move freely and perceive one's own movements	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Movement to the handclapping rhythm
				♦ Encourage participants to learn of the 10 types of clapping to create a rhythm ♦ Expand movements to use other body parts in addition to hand clapping ♦ Respond to the hand-clapping of the partner to express one's movements	
				Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities
		10	Goal	Feel the ringing within the body and perceive the changes of movement due to sound waves	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Movements and sound
				♦ Inhale to puff up one's chest and exhale to contract. Recognize the changes in the body ♦ Learn phrases that move along with the ringing of the sound when exhaling ♦ Perceive the changes in movements according to the connection and disconnection of links. Revises the time, rhythm and flow of the learned phrase	
				Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities
Satisfaction	Personal growth	11	Goal	Promote a change in thought and interaction with others by changing movements in a given situation	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Changing situations
				♦ Express situations in daily life through stop movements ♦ Take turns to express other situations by using paused gestures	
				Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities
		12	Goal	Adjust the strength and energy of the movements in the curves and straight lines	
			Warm-up	Stretching, methods on how to straighten one's spine	
			Thematic activities	Theme	Dancing in lines
				♦ Learn movement phrases for curved lines and straight lines ♦ Perceive and compare the softness and slowness of curved movements with the strong energy and rhythm of straight movements	
				Wrap-up	Wrap-up using light stretching → Discussion about feelings after thematic activities

3.2 Verification of the Effects of the Wholeness Program on Physical Strength

To identify the effect of the wholeness program on the physical strength of the elderly, a pre and post-test were conducted for the control group and the experiment group Table 3 and Figure 1. After the pre-test the control group took life dance (dance sports, line dance, and traditional dance) classes at existing senior citizens' welfare centers, while the experiment group took the wholeness program. The same physical strength test was conducted afterwards for analysis. The result showed there was a significant improvement in the experiment group while the control group didn't show any significant results. The variance of pre and post-test was significantly higher in the experiment group than the control group, indicating that the wholeness program had a positive effect on improved physical strength of the experiment group. The experiment group was analyzed using the same physical strength test after undergoing the wholeness program. The result was that they saw a significantly improved physical strength, while the control group didn't see any. The pre and post variance was significantly higher in the experiment group than the control group, indicating that the wholeness program had a positive effect on improved physical strength of the experiment group.

The result of this study is line with that of preceding studies^{12,24} argued that various activities need to be

maintained during one's elderly years, and it was also noted that such physical activities help improve depressive symptoms¹⁷⁻¹⁹. It was confirmed that regular and continued exercise reduces the incidence of illness, helps maintain appropriate body weight and physical strength^{25, 26}. More physical activity programs for the elderly need to be developed for continued physical activities.

3.3 Verification of the Effects of the Wholeness Program on Mental Health

A test pre and post was conducted to analyze the effects of the wholeness program on the mental health of the elderly Table 4 and Figure 2. The experiment group saw a significant improvement in post-mental health, with significantly higher scores for physical aspects, depression, anxiety, hostility, fear, obsession, mental disorder and death. There were also significant results for the pre-post variance in these categories, indicating that the wholeness program was more effective in improving mental health in the elderly than the dance classes at existing senior citizens' centers.

This result is in line with that of^{10,13} that show that creative activities to the elderly who have had a long life are positive because they have more experience and stronger self-expression desires. Moreover,¹³ noted that creative activities trigger many memories in the elderly to newly accept and adapt to crises, which positively affects self-image. In terms of physical activity,²⁷ noted that regular

Table 3. Physical strength after participation in wholeness program

Variable	Group	Pre-test	t(P)	Post-test	t(P)	Variance Pre-post	F(P)
		M(SD)		M(SD)			
Physical strength	Experimental	15.80(4.26)	-.157	21.00(3.29)	2.499*	-5.200	6.246*
	Control	16.10(4.28)		17.50(2.95)			

*p<.05, **p<.01, ***p<.001

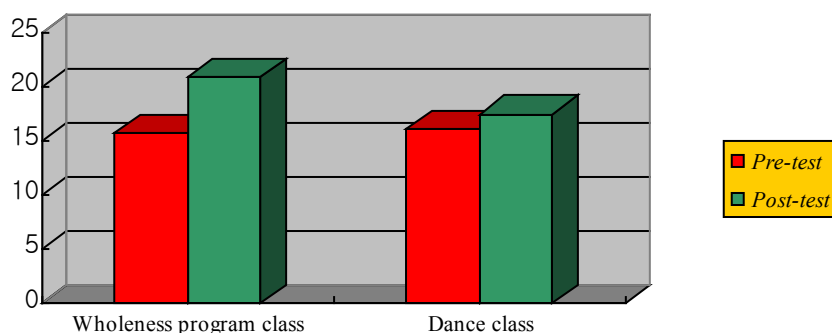
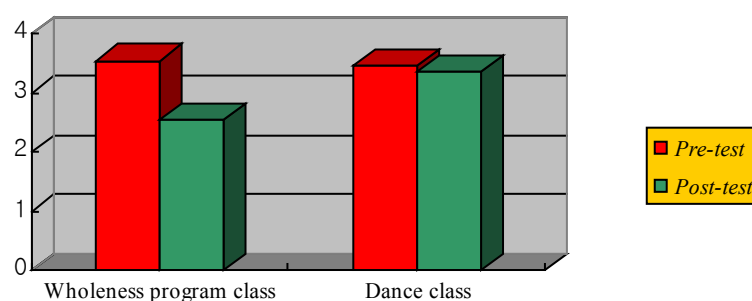


Figure 1. Physical strength after participation in wholeness program.

Table 4. mental health after participation in wholeness program

Variable	Group	Pre-test	t(P)	Post-test	t(P)	Variance Pre-post	F(P)
		M(SD)		M(SD)			
Mental health	Experimental Control	3.53(.09) 3.46(.10)	1.545	2.53(.18) 3.34(.24)	-8.232***	.993 .112	67.759***
Physical aspects	Experimental Control	3.63(.29) 3.68(.27)	-.393	2.45(.15) 3.33(.39)	-6.596***	1.183 .350	43.513***
Obsession	Experimental Control	3.14(.23) 3.24(.26)	-.901	2.60(.29) 3.10(.56)	-2.466*	.540 .140	6.081*
Sensitivity to relationships	Experimental Control	3.22(.21) 3.21(.28)	.111	2.68(.24) 3.23(.27)	-4.745***	.537 -.025	22.512***
Depression	Experimental Control	3.97(.18) 3.70(.38)	2.027	2.52(.27) 3.35(.33)	-5.992***	1.450 .350	35.901***
Anxiety	Experimental Control	3.65(.22) 3.72(.12)	-.876	2.15(.33) 3.41(.30)	-8.810***	1.500 .314	77.612***
Hostility	Experimental Control	3.37(.21) 3.57(.33)	-1.596	2.52(.34) 3.22(.32)	-4.710***	.850 .350	22.189***
Agrophobia	Experimental Control	3.60(.37) 3.42(.33)	1.099	2.47(.55) 3.27(.38)	-3.742**	1.125 .150	14.006**
Compulsiveness	Experimental Control	3.47(.29) 3.27(.36)	1.346	2.50(.35) 3.62(.55)	-5.400***	.975 -.350	29.160***
Mental disorder	Experimental Control	3.62(.31) 3.37(.33)	1.704	2.85(.29) 3.52(.29)	-5.092***	.775 -.150	25.933***
Death	Experimental Control	3.60(.51) 3.40(.51)	.866	2.60(.69) 3.40(.84)	-2.309*	1.000 .000	5.333*

*p<.05, **p<.01, ***p<.001

**Figure 2.** Mental health after participation in wholeness program.

rhythmic exercise improves mental health,²⁸ too, noted that exercise participation by the elderly increases their life satisfaction through improved mental health.²⁹ This study supported a result as this study that exercise participation improves the quality of life of elderly men, and have a positive influence on physical, mental and social health. In addition, through such exercise programs, they can always check their physical health status, form social relationships while socializing with a variety of people

and relieve their mental stress. It becomes the lifeblood and ultimately increases the quality of life.

Therefore, physical and creative activities by the elderly can help tap into their potential, desires and life experience to discover the meaning of life, ease stress and help with brain health. A wholeness program for brain health incorporates openness, autonomy towards new experience, acceptance of one's own and others' thoughts and feelings, review of life's meaning and personal growth.

More programs based on the concept of wholeness that triggers physical and creative interest in the elderly need to be developed.

4. Conclusions

Brain diseases have become a major issue both for families and society, as it is caused by stress and leads to anxiety, depression, dementia and suicide. Regardless, studies on health education programs on the brain health of the elderly are rare in Korea or abroad. There is a need for multi-faceted studies to develop programs that reflect the perception of the elderly and meet their needs. This study is meaningful in its timeliness and academic context. It is anticipated to complement the findings of preceding studies and better establish related knowledge.

The developed wholeness program led to the following findings based on the comparison with the control group who took life dance classes at existing senior citizens' welfare centers. First, education for the elderly for social welfare and in particular brain health education based on the concept of wholeness is a way to promote physical, mental and cognitive activities of the elderly. Therefore, wholeness programs for brain health will raise awareness on the importance of such programs through creative activities among instructors of dance classes for the elderly. It will also provide quantifiable data for developing efficient health education programs for successful aging. Second, instructors of health exercises, regardless of their audience, are deeply involved in physical, mental and social health of the individual. In particular, given that the elderly have a high interest in health and efficient use of leisure time, this study will provide practical information on forming a discourse for a whole life through physical activities, creative activities and self-expression. Third, an extended life expectancy, quality of life and preventive education for brain diseases should be considered important in an aging society. Health exercise policies for better leisure welfare for the elderly also need attention, which is currently lacking. Therefore this study will provide important data on related policies and decision-making.

The following are suggestions for follow-up studies based on the findings of this study. First, because this study was conducted on only a small number of subjects in a specific area, it may not be representative. Developing and applying a creative activity program that converge physical activities and self-expression activities to prevent

brain diseases in the elderly is recommended to review whether such programs positively affect the elderly through recovery of self-expression skills. Second, this study addresses the development of brain health education programs through creative activities of the elderly, which has been a subject that was neglected in the past. Many artists and academics continue to live a passionate life in their later years yet studies on how to develop the potential of the elderly have not been active. Therefore, follow-up studies on developing various programs that take into account the traits of leisure activities of the elderly and the required instruction and learning strategies would be recommended to provide basic information and examples of practice. Education programs can be re-developed to better cater to each audience, and development of textbooks could also be a study theme that can be addressed in follow-up research.

5. Acknowledgment

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2012-S1A5B5A01-024116)

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