A Case Study of Horticultural Instruction as Education of Vocational Rehabilitation: Effects of Horticulture Job Skill Course Based on Employment Practice Model on Personal Performance Indicator of Vocational Rehabilitation for University Students with Disability

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ABSTRACT

The purpose of the study was to examine the effects of the Horticulture Job Skill course based on the employment practice model on personal performance indicator of vocational rehabilitation for university students with disabilities. In the first step of this study, an employment practice model was developed by a focus group composed of six specialists from the industry and academia. The second step consisted of selecting the items of personal performance indicator related to horticulture vocational rehabilitation among all items of vocational rehabilitation. The third step was selecting students to participate in the study. The next step was coming up with a pilot instructional design based on the employment practice model. The final step was examining the effects of pilot course (horticulture job skill) based on the employment practice model on personal performance indicator of vocational rehabilitation for university students with disabilities. As a result, there were significant improvements after treatment in the experimental group with indicator 1 (managing) from 1.8 ± 0.155 to 4.2 ± 0.267 , indicator 2 (planting) from 1.5 ± 0.114 to 4.45 ± 0.153 , indicator 3 (using tool) from 3.2 ± 0.186 to 4.6 ± 0.112 , indicator 4 (packing) from 2.05 ± 0.153 to 4.45 ± 0.114 , indicator 5 (decorating) from 2.65 ± 0.150 to 5.5 ± 0.114 , indicator 6 (cleaning) from 2.85 ± 0.131 to 4.45 ± 0.114 , indicator 7 (observing) from 2.4 ± 0.112 to 4.45 ± 0.112 , and indicator 8 (laboring) from 2.35 ± 0.109 to 4.1 ± 0.180 . However, the control group did not show any significant improvement after 15 weeks of the program. This study determined that the Horticulture Job Skill course based on the employment practice model has an effect on improving the individual performance of vocational rehabilitation for university students with disabilities. Finally, horticulture education-based on the employment practice model will contribute to vocational rehabilitation for university student with disabilities.

Keywords: disability, employment, indicator, industry, practice, rehabilitation

Introduction

More and more persons with developmental disabilities are entering universities, a higher education institution, as the opportunities for higher education have increased with the ‘Act on Special Education for Persons with Disabilities, etc.’

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amended in 2007 and the ‘Act on Guarantee of Rights of and Support for Persons with Developmental Disabilities’ recently enacted (enforcement in November of 2015). Thus, there is a need for studies on various training programs for career move that consider the learning and cognitive skills of persons with developmental disabilities that entered universities and contribute to their employment competencies after graduation. Currently there are many cases in which the job is focused on mindless work for persons with developmental disabilities and the working conditions are poor, which results in high turnover rates caused by problem behavior and maladjustment due to stress (Lee et. al., 2012). Thus, it is significant to examine ways to use horticulture, which is effective in emotional stability of persons with developmental disabilities (Lee, 2007), in regular courses of vocational rehabilitation for developmental disabilities in universities. Cull and Hardy (1973) stated that improving work adjustment is essential in vocational education for persons with mental disabilities, and an effective program for work adjustment must deal with social and psychological problems, aiming for development of self-concept (Jung, 2002). Thus, this study associated a horticultural course, which enables students to feel satisfaction through emotional stability and learn work adjustment skills, with the Na-Engage specialization program of N University. The employment practice horticultural education model (Kim, 2018) developed here is implemented to a regular horticulture course in universities to verify the effects on vocational rehabilitation of university students with developmental disabilities, thereby providing the strengths of horticultural education. Here, the employment practice horticultural education model assigns job coaches as mentors so that participants can apply horticulture-related knowledge and skills to actual practice for work adjustment, helping field experience and providing intensive individualized training for each disability to achieve goals and increase chances of employment (Han and Bang, 2014; Lee, 2018). Meanwhile, the vocational rehabilitation personal performance indicator developed by Oh et al. (2012) is an index with verified reliability in the vocational rehabilitation education setting. This study used this indicator in analyzing the effects of the horticulture course based on employment experience considering the characteristics of developmental disabilities, thereby providing empirical data to use horticulture courses as part of formal education in universities before employment.

Research Methods

Design

This study used the pretest-posttest design to determine the effects of the ‘Horticulture Job Skills’ course, which applied the employment practice horticultural education model for students with developmental disabilities consisting of ‘individualized concentration on learning, service learning, and work experience,’ on the increase of vocational functioning among the categories of the vocational rehabilitation personal performance indicator for university students with developmental disabilities (Table 1).

Subjects

Selection criteria

The subjects of this study are students in the specialized department for developmental disabilities at N University,

Table 1. Research design for this study

Experimental group	O ₁	X	O ₂
Control group	O ₁		O ₂

O₁ = Pretest; O₂ = Posttest; X = Horticulture job skill course based on employment practice model.

where 20 students that participated in the ‘Horticulture Job Skills’ course were classified into the experimental group and 20 students who only took the regular horticulture course into the control group. The regular horticulture course is a course focused on theory without implementing the employment practice model. There were 13 male and 7 female students in the experimental group, and 15 male and 5 female students in the control group. The age of the subjects was between 20 and 23, and 16 of them had intellectual disabilities and 4 had autism each in the experimental group and control group, all of which belong to the category of developmental disabilities. As for the level of disability, 3 subjects had Level 2 intellectual disabilities and 17 had Level 3 intellectual disabilities in the experimental group, and 4 had Level 2 intellectual disabilities and 16 had Level 3 intellectual disabilities in the control group classified according to the welfare card (Table 2).

Procedures

Organizing the FGI (Focus Group Interview) committee

This study selected those with experience in special education and field experts related to horticulture as members of the focus group, that is, the committee of horticultural education experts in developmental disabilities. The qualified members were six experts running a business related to horticulture with experience in employing persons with developmental disabilities, who also have at least 20 years of field experience such as horticultural therapy, floral design, indoor gardening, management of botanical garden, or management of floral tea farm, or who have experience being in charge of running a horticultural program for persons with disabilities at an organization.

Coming up with the employment practice horticultural education model for developmental disabilities

The employment practice horticultural education model for developmental disabilities refers to an education model that assigns job coaches as mentors so that participants can apply horticulture-related knowledge and skills to actual practice for work adjustment, helping field experience and providing intensive individualized training for each disability to achieve

Table 2. Characteristics of subjects

Group	Classification	Type	Frequency	Percent(%)
Experimental group	Gender	Male	13	65%
		Female	7	35%
	Disability type	Intellectual disabilities	16	80%
		Autism	4	20%
	Level of disability	Level 1	0	0%
		Level 2	3	15%
		Level 3	17	85%
Control group	Gender	Male	15	75%
		Female	5	25%
	Disability type	Intellectual disabilities	16	80%
		Autism	4	20%
	Level of disability	Level 1	0	0%
		Level 2	4	20%
		Level 3	16	80%

goals and increase chances of employment. This model consists of (a) field placement, (b) intensive individualized concentration on learning and (c) service learning. More specifically, (a) field placement refers to work experience that includes field training and short-term internship experience. (b) Intensive individualized concentration on learning includes a special and individualized training course. (c) Service learning includes volunteer activities for rural communities and weekend farms, or for plant management on campus (Table 3). This is associated with the N-Engage specialization model of N University (N University specialization report—not published) and reorganized according to the characteristics of the horticulture course into the employment practice horticultural education model for developmental disabilities (Table 3). Some examples of associating employment practice with a college course include the cases of the University of Cincinnati in the US, University of Waterloo in Canada, and Central Washington University in the US. In Korea, there is the case of using a model consisting of work experience, concentration on learning, and service learning in the IPP (Industry Professional Practice) Work-Learning Dual System currently funded by the Ministry of Employment and Labor (Jang et al., 2017).

Designing a course that implements the employment practice horticultural education model

The title of the course is ‘Horticulture Job Skills,’ which is a three-hour-long weekly course that went on for 15 weeks (45 hours) as shown in Table 4. The first step is the basic learning process in which the students learn horticulture job skills and have theoretical understanding of plants for two weeks. In Week 1, they learn how to use horticultural tools with fine motor skills to improve physical ability. In Week 2, they are mostly asked to draw plants to improve concentration and observation.

(1) Work experience

For work experience, a time table is set up at the botanical garden and floral tea café in partnership with the university from Weeks 10 to 14. For three hours every week, the students are to repeatedly perform individualized tasks with the help of the job coach and individually complete them. Insufficient job coaching according to the characteristics of the disability is to be complemented by individual mentoring system. The mentor fills out the job evaluation, and the student is to make an individual work portfolio and a roadmap for employment in the form of a report.

(2) Concentration on learning

Among the employment practice model, concentration on learning is the process of training customized jobs for horticulture. Students are to participate in three hours of intensive learning every week and seven weeks of job training at the

Table 3. Model of horticulture employment practice

Contents of employment practice	Application for university students with disability
(1) Work experience	Industry field training
	Internship-professional mentoring system
(2) Concentration on learning	Individual training-intensive course
	Practical skill training-customized education
(3) Service learning	Volunteer activities for rural communities
	Volunteer activities for campus communities

Table 4. Horticulture Job Skill course based on employment practice model

Subject	Education model	Application of education	Contents	Time	Week
Horticultural Job Skill	Basic learning	Physical training	Muscular motion skill	1	1
			Locomotion skill	1	
			Using tool skill	1	
		Cognition training	Concentration training	1	2
			Memory training	1	
			Observation training	1	
	Concentration on learning	Industry field training 1: Botanical garden	Gardening - watering	3	3-5
			Gardening - repotting	3	
			Gardening - arrangement	3	
		Industry field training 2: Flower shop cafeteria	Shop-product classification	3	6
			Shop-cleaning	3	7
			Shop-product packing	3	8
			Shop-service	3	9
	Work experience	Internship with mentoring system	Individual field report Industry field training report	15	10-14
	Service learning	Volunteer activities for campus communities	Individual portfolio Service learning report	3	15
	Total			45	

linked site with the help of the job coach. From Weeks 3 to 5, they polish their skills of watering, repotting and arranging at a botanical garden in partnership with the university in the community. From Weeks 6 to 9, they form groups of five to polish their skills of product categorizing, arranging, cleaning up, product packing and serving at a flower shop and floral tea café in partnership with the university.

(3) Service learning

Service learning is designed for students to undergo the volunteer activities of floral tea tasting at a local welfare center and plant management on campus in Week 15.

Evaluation tool

One of the reasons why vocational rehabilitation is difficult for persons with developmental disabilities is because evaluation is not properly performed (Lee, 2007). Thus, to evaluate the performance before and after participating in the program, the vocational rehabilitation personal performance indicator with verified reliability will be used as the evaluation tool. The indicator was developed by Oh et al. (2012) and it measures educational performance of vocational rehabilitation training in career and vocational education for middle and high school students with developmental disabilities. This tool was redeveloped for more convenient use in school settings, supplementing the weakness of the vocational rehabilitation training performance indicator in career and vocational education for students with disabilities developed in 2011. The key performance indicator consists of 4 categories and total 71 items: 15 items in basic work, 21 items in vocational life, 25 items in vocational functioning, and 10 items in career exploration. This study used the

category of vocational functioning to evaluate the Horticulture Job Skills course. The reliability of vocational functioning was very high with Cronbach's $\alpha = .998$. Here, whether the items of vocational functioning are suitable for horticulture job characteristics of developmental disabilities in a higher education institution was reviewed through the FGI (Focus Group Interview). Thus, this study came up with 8 evaluation items such as managing plants, planting, cutting materials with tools, packing products, cleaning, decorating, observing and recording, and doing laborious work. Both the experimental group and control group performed evaluation before Week 1 and after Week 15 using a self-administered questionnaire rated on a 5-point Likert scale.

Data analysis

This study compared the vocational rehabilitation performance indicators of the experimental and control group before and after the 'Horticulture Job Skills' course to test individual performance improvement in vocational rehabilitation using SPSS PC 21.0, and conducted a paired t-test. For the paired t-test, the result statistics of 'equal variances assumed' was used.

Results and Discussion

Homogeneity test

To statistically compare the personal performance indicators in vocational rehabilitation according to the participation in the 'Horticulture Job Skills' course designed by applying the employment practice model for students in the specialized department for developmental disabilities at N University, this study first conducted a homogeneity test between the experimental and control group, and the t-test was conducted on the mean and standard deviation of the pretest results. As a result, Table 5 shows that there was no significant difference in all items, thereby proving homogeneity of the two groups. The equality of variances of F-value and p -value was verified through Levene's test.

Analysis of the vocational functioning performance indicator

The results of the test showed that in the experimental group, the skill of managing plants increased from 1.8 ± 0.155 to

Table 5. Result of homogeneity of the experimental and control group

Indicator	M $\pm$ SD		t	p
	Experimental	Control		
Maintenance skill	1.80 $\pm$ 0.155	1.45 $\pm$ 0.114	7.002	.053 ^{NS}
Planting skill	1.50 $\pm$ 0.114	1.95 $\pm$ 0.153	11.558	.223 ^{NS}
Using tool skill	3.20 $\pm$ 0.186	3.00 $\pm$ 0.145	12.798	.555 ^{NS}
Product packing skill	2.05 $\pm$ 0.153	2.60 $\pm$ 0.183	10.996	.290 ^{NS}
Decorating skill	2.65 $\pm$ 0.150	3.10 $\pm$ 0.160	7.568	.365 ^{NS}
Cleaning skill	2.85 $\pm$ 0.131	3.00 $\pm$ 0.162	11.771	.980 ^{NS}
Recording skill	2.40 $\pm$ 0.112	2.60 $\pm$ 0.112	8.912	.371 ^{NS}
Labor skill	2.35 $\pm$ 0.109	2.25 $\pm$ 0.175	9.797	.155 ^{NS}

^{NS}Non-significant by t-test

4.2±0.267, the skill of planting increased from 1.5±0.114 to 4.45±0.153, the skill of cutting materials with tools increased from 3.2±0.186 to 4.6±0.112, the skill of packing products increased from 2.05±0.153 to 4.45±0.114, the skill of decorating increased from 2.65±0.150 to 5.5±0.114, and the skill of cleaning up increased from 2.85±0.131 to 4.45±0.114 after the experiment. The skill of observing and recording plants also increased from 2.4±0.112 to 4.45±0.112, and the skill of doing laborious work using the body increased from 2.35±0.109 to 4.1±0.180, thereby showing statistically significant improvement in all 8 items. The fact that all 8 items of vocational functioning considering the characteristics of developmental disabilities is a significant outcome proving that the employment practice model can be used in education of vocational rehabilitation for university students with developmental disabilities. On the other hand, in the control group, the skill of managing plants changed from 1.45±0.114 to 1.95±0.153, the skill of planting changed from 1.95±0.153 to 2.3±0.105, the skill of cutting materials with tools changed from 3.0±0.145 to 2.55±0.114, the skill of packing products changed from 2.6±0.183 to 2.5±0.135, the skill of decorating changed from 3.1±0.160 to 3.05±0.153, and the skill of cleaning up changed from 3.0±0.162 to 2.55±0.114. The skill of observing and recording plants changed from 2.60±0.112 to 2.65±0.152, and the skill of doing laborious work using the body changed from 2.25±0.175 to 2.25±0.993, but all 8 items did not show statistical significance (Table 6). In other words, only the experimental group showed a significant improvement in all 8 items after the 'Horticulture Job Skills' course, which indicates that the work experience-based class in the form of employment practice had an effect on improving performance related to horticulture job skills of university students with disabilities compared to the control group. In other words, unlike general horticulture class focused on theories, the employment practice class based on intensive training and individualized mentoring system proved to have a positive effect on improving individual competencies of persons with developmental disabilities. In particular, the impro-

Table 6. Differences in indicator of vocational rehabilitation between before and after Horticulture Job Skill course by group

Indicator	Group	Treatment (M±SD)		t	p
		Before	After		
Maintenance skill	Experimental	1.80±0.155	4.20±0.267	-10.790	.000*
	Control	1.45±0.114	1.90±0.190	-1.831	.083 ^{NS}
Planting skill	Experimental	1.50±0.114	4.45±0.153	-13.968	.000*
	Control	1.95±0.153	2.30±0.105	-1.926	.069 ^{NS}
Using tool skill	Experimental	3.20±0.186	4.60±0.112	-6.658	.000*
	Control	3.00±0.145	2.55±0.114	2.131	.046 ^{NS}
Product packing skill	Experimental	2.05±0.153	4.45±0.114	-14.236	.000*
	Control	2.60±0.183	2.50±0.135	0.357	.725 ^{NS}
Decorating skill	Experimental	2.65±0.150	5.50±0.114	-9.454	.000*
	Control	3.10±0.160	3.05±0.153	0.195	.847 ^{NS}
Cleaning skill	Experimental	2.85±0.131	4.45±0.114	-8.107	.000*
	Control	3.00±0.162	2.55±0.114	2.015	.058 ^{NS}
Recording skill	Experimental	2.40±0.112	4.45±0.114	-9.706	.000*
	Control	2.60±0.112	2.65±0.166	-0.237	.815 ^{NS}
Labor skill	Experimental	2.35±0.109	4.10±0.161	-8.596	.000*
	Control	2.25±0.175	2.25±0.993	0.001	.988 ^{NS}

^{NS}Non-significant, **p* < .05 by paired t-test

ved skill of managing plants indicates that plant management requires repeated intensive training as proved in previous research (Kim, 2017), and that individualized practice focused on training of fine motor skills also improves the job functions of packing products and cleaning up. By using such detailed evaluation tool for vocational functioning, it is possible to resolve the issue of evaluation that is the greatest weakness of vocational rehabilitation (Lee, 2007), while also providing the basis for establishing an individualized vocational education roadmap for university students with developmental disabilities by creating a database of personal performance indicators (Kim, 2016).

Conclusion

This study developed an employment practice horticultural education in association with the employment competency reinforcement and specialization program of a university based on emotional stability and cognitive/physical effects of horticulture, as an alternative to stress and problem behaviors caused by poor employment conditions of persons with developmental disabilities. It also analyzed how the course applying this model affects the improvement of the vocational functioning indicator among personal performance indicators of vocational rehabilitation training for developmental disabilities. In Step 1 of the research, a group of experts in horticultural education for developmental disabilities was formed. In Step 2, the employment practice horticultural education model was developed, after which the items related to horticulture job skills in vocational functioning were selected among the performance indicators of vocational rehabilitation. In Step 3, the employment practice 'Horticulture Job Skills' course was operated for 15 weeks. Then the individual performance of vocational functioning before and after the program was evaluated, and the changes were analyzed. This statistically proved that a horticulture course based on employment practice, which reflected the recent shift of educational objectives of universities toward a realistic direction, brings significant improvement to all items of vocational functioning of university students with developmental disabilities, such as managing plants, planting, cutting materials, packing products, decorating, cleaning up, observing and recording plants, and doing laborious work. Based on the results, this study also proved that employment practice horticultural education, which combined the job coach mentoring system, work experience and individualized concentration on learning, improves detailed vocational functions of university students with developmental disabilities. Thus, it is effective for their job confidence, emotional stability and work adjustment. Therefore, by taking one step further and systematically managing university horticultural education for students with developmental disabilities in the form of employment practice, it can be adequately used in vocational rehabilitation of the formal education for students with developmental disabilities.

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