Teaching Methods

Effects of a Vocational Horticulture Program on the Self-development of Female Inmates

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SUMMARY. The main objective of this study was to determine the effects of a vocational horticulture program on the

self-development of female inmates in a federal prison camp (FPC) in Bryan, Texas. Subjects were sampled from the inmate population of FPC-Bryan and assigned to two groups. Group A was comprised of 36 inmates participating in the Master Gardener program and Group B, the control group, was comprised of 26 inmates who were not participants in the Master Gardener program. A confidential 55-item survey was administered in a pretest-posttest fashion and contained questions from Rotter's (1966) *Internal-External Control of Reinforcement Scale* and the *Multidimensional IE Scale* (Gurin et al., 1969), Pugh's (1992) *Prison Locus of Control Scale*, the *Rosenberg Self-Esteem Scale* (Rosenberg, 1965), and the *Satisfaction With Life Scale* (Diener et al., 1985). No significant differences were found between the pre- or posttests of the Master Gardener and control groups. In addition, no significant differences were found for generalized internal-external locus of control and situation specific internal-external locus of control when pretest and posttest mean scores were compared within each group. However, Master Gardener and control participants significantly increased their self-esteem and global life satisfaction scores between the pre- and post-tests. Due to the high occurrence of research subjects reporting a history of drug or alcohol abuse, the pre- and posttest mean scores of drug or alcohol abusers and nonabusers participating in the Master Gardener program were compared. No significant differences as a result of participation in the Master Gardener program were found for nonabusers for all variables tested and for generalized internal-external locus of control and global self-esteem for drug or alcohol abusers. Substance abusers did significantly increase their situation specific internal-external locus of control and their global life satisfaction while participating in the Master Gardener program.

More than one million (1,104,074) adults were incarcerated in the U.S. prison system at the end of June 1995 (Beck and Gilliard, 1995b). With society's realization that 95% of those incarcerated will be released from prison and returned to society, an increasing emphasis has been placed on rehabilitating the inmate (Skolnik and Slansky, 1991; Wiley, 1986). From December 1994 to June 1995, the number of female inmates increased at a faster rate (11.4%) than the number of male inmates (8.6%) (Beck and Gilliard, 1995a). The National Center for Research in Vocational Education suggested that female inmates need substantial support in acquiring skills to secure and maintain employment upon release from prison (Norton et al., 1987). In spite of this great need for programming, the inadequacy of programs for incarcerated women has been consistently reported in the literature (Chapman, 1980; Feinman, 1986; Morash et al., 1994; Pollock-Byrne, 1990; Ryan, 1984; Simon, 1975).

The responsibility of undertaking the rehabilitation process lies, in part, with vocational programs, one of which is horticulture. The purpose of these programs is to develop job skills conducive to the successful reentry of inmates into society (Halasz, 1982). The need for inmate improvement lies not simply in skill provision, but in attitudes toward the working environment (Schumacker et al., 1990). It may not be enough to provide inmates with vocational and academic skills; in addition it may be necessary to provide growth in values, beliefs, and attitudes that will enable the offender to return to and function in free society (Wiley, 1986). This research study addressed these needs by investigating the role of a vocational horticulture program, based on the Master Gardener program, on the self-development of female inmates including internal-external locus of control, global self-esteem, and global life satisfaction.

Several studies have been conducted concerning the self-development of inmates, including an assessment of locus of control and self-esteem. Inger (1977) noted positive relationships between internal locus of control and successful parole. Other studies revealed that internally oriented inmates showed significantly better

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adaptive functioning skills in prison than externally oriented inmates (MacKenzie and Goodstein, 1986; Ruback et al., 1986; Seeman, 1963; Wright et al., 1980).

Conflicting results have been reported concerning the self-esteem of inmates. Gattshall (1969) found that, after 4.5 months of imprisonment, no significant differences resulted in the level of self-concept as a result of inmate exposure to the institution's educational program consisting of a state-accredited 12-grade school. However, Cohen (1975) demonstrated favorable changes in self-esteem of inmates of treatment-oriented institutions. Inmates attained maximum benefit from programs with a duration of 8 months, while continued incarceration produced no further favorable change (Cohen, 1975).

The Master Gardener program constitutes a vocational horticulture program and a horticultural therapy program. As a horticultural therapy program, the ultimate goal is the improved well-being of the individual including cognitive, physical, social, and behavioral areas of development [Relf (Hefley), 1972; Shoulders and Wray, 1995]. Horticultural therapy programs have benefitted many special populations including maintaining the life satisfaction level of the elderly (Train, 1974) and improving self-concept, social interaction, and level of physical activity for the mentally retarded [Relf (Hefley), 1972]. In addition, many horticultural therapy programs exist for youth and adults in the fields of substance abuse and corrections (Cornille et al., 1986; Flagler, 1993; Rice and Remy, 1994). The objectives of this research were to determine the effects of participation in a vocational horticulture program on the self-development of female inmates of a federal prison camp (FPC).

Materials and methods

LOCATION. The women's FPC in Bryan, Texas, is a minimum-security prison for female offenders. The Master Gardener program, sponsored by the Texas Agricultural Extension Service, has been adapted as one of the vocational programs at FPC-Bryan. More than 250 inmates have completed the program since its inception in March 1991.

This 3.5-month program is offered three times yearly. The program

requires inmates to have a high-school diploma or GED certificate. Up to 25 students are selected for the program based on their interview, application, previous work reports, and length of sentence.

The Master Gardener program requires a student to complete a minimum of 400 contact hours, maintain a scholastic average of 70 or above, and complete all class projects and exams. Upon completion of the program, participants are certified by the Texas Agricultural Extension Service as Master Gardeners. Participants also receive 40 continuing education units from Texas A&M University.

PROGRAM DESIGN. The Master Gardener class meets 5 days a week for 7 hours a day. The curriculum parallels the Texas Master Gardener Handbook (Texas Agricultural Extension Service, 1995). The 4-hour morning sessions consist of hands-on work activities. The 3-hour afternoon sessions are reserved for classroom instruction. The program is designed to maximize the accomplishments of the individual while developing group cooperation, leadership, and responsibility. The participants are paid a minimal salary from the federal government.

SUBJECTS. Subjects were sampled from the inmate population of FPC-Bryan and nonrandomly assigned to two groups. The study was replicated twice in 1995 with two different experimental and control groups. Due to small sample sizes, the data from both replications were analyzed as one data set. Participation in the study was entirely voluntary. Group A was comprised of 36 inmates participating in the Master Gardener program. This group was selected by their request to be enrolled in the Master Gardener program. Group B, the control group, was comprised of 26 inmates who were not participants in the Master Gar-

dener program. This group was randomly selected from the prison population, and participation in educational-vocational programs was optional.

INSTRUMENTATION. A confidential 55-item survey was administered in a pretest-posttest fashion (see "Tools for Evaluating the Effects of Vocational Horticulture Program on the Self-Development of Female Inmates," M.M. Migura and J.M. Zajicek). The first seven items were biographical. Test items were selected based on their applicability to the study and the subjects and included questions from the internal-external control of reinforcement scale (Rotter, 1966), the multidimensional IE scale (Gurin et al., 1969), the prison locus of control scale (Pugh, 1992), the Rosenberg self-esteem scale (Rosenberg, 1965), and the satisfaction with life scale (Diener et al., 1985).

PILOT STUDY. Before the actual study, a pilot study was conducted to improve the ease of survey administration and to clarify form issues and survey instructions. Fifteen members of the landscape work detail at FPC-Bryan were selected for the pilot study because of their similarities to the participants in the Master Gardener group and control group.

DATA COLLECTION. Subjects in Group A received a pretest before participating in the Master Gardener program and a posttest upon successfully completing the program. Subjects in Group B, while not participating in the Master Gardener program, were pretested and posttested on the same dates as Group A.

DATA ANALYSIS. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows Release 6.1 (SPSS, 1994). Group A and Group B mean scores were compared on differences between pretest and posttest answers. The differ-

Table 1. Instrument reliability of inventories for self-development study (main study) of female inmates at the federal prison camp, Bryan, Texas, using Cronbach's coefficient alpha.^a

	Pilot study n = 15	Master Gardener group n = 36	Control group n = 26
Instrumentation			
Generalized locus of control inventory	0.69	0.69	0.73
Situation specific locus of control inventory	0.28	0.62	0.53
Rosenberg self-esteem scale	0.93	0.73	0.76
Satisfaction with Life scale	0.87	0.81	0.58

^aA measure of internal consistency.

ences, if any, between Group A and Group B for each of the four variables were analyzed using *t* tests for paired samples and *t* tests for independent samples. Descriptive statistics were used to report the ethnicity, age, and other characteristics of the treatment groups. Percentages, means, and standard deviations were reported whenever appropriate. Cronbach's alpha, a measure of internal consistency, was used to determine the reliability of the generalized locus of control inventory (Gurin et al., 1969; Rotter, 1966), the situation-specific locus of control inventory (Pugh, 1992), the Rosenberg self-esteem scale (Rosenberg, 1965), and the satisfaction with life scale (Diener et al., 1985).

Results and discussion

Results from the pilot study indicated no difficulties with the instrumentation chosen, except in the case of the situation-specific locus of control inventory (Table 1). This inventory was included in the main study, and, as shown in Table 1, the reliability increased to an acceptable level.

Table 2 illustrates the percentages of selected demographic variables as they relate to the Master Gardener group, the control group, and the total for all research participants. Due to the differences in ethnicity and education between the two groups, it was necessary to verify that the treatment groups were equal at the onset of the study for each of the four variables. A Levene's test for equality of variances determined that there was equal variance between the two treatment groups. No significant differences were found at $p = 0.05$ when pretest scores of the two groups were compared, verifying that the groups were similar.

There were no significant differences found between posttests of the Master Gardener and control groups. In addition, no significant differences were found for generalized internal-external locus of control and situation-specific internal-external locus of control when pretest and posttest mean scores were compared within each group (Table 3). Murphy (1990) reported similar results with a 10-week volunteer rehabilitative decisionmaking program called "Thresholds" where there were no significant changes in mean locus of control scores for male inmates of a maximum security facility.

However, an 11-week program, which focused on goal setting, decisionmaking, self-motivation, and self-discipline, significantly increased the internal locus of control of male inmates (Prerost and Reich, 1982).

Master Gardener and control participants significantly increased their global self-esteem and global life satisfaction scores between the pre- and posttests (Table 3). Master Gardener and control group participants' posttest mean global self-esteem scores were 1.06 and 1.22 higher and global life satisfaction scores were 1.17 and 1.04 higher than their pretest mean scores, respectively. At FPC-Bryan, all inmates are encouraged to participate in the educational and vocational programs offered by the prison. Most inmates in the control group were either participating in or had participated in one or more programs other than the Master Gardener program. These results indicate that women participating in the vocational horticulture program had similar gains in self-esteem and life satisfaction compared to women participating in other types of programs. These findings differ with those of Gattshall (1969), who found that, after 4.5 months of imprisonment, no significant differences resulted in the level of self-concept as a result of male inmate exposure to the institution's

educational program consisting of a state-accredited twelve-grade school. The findings, however, are consistent with those of Cohen (1975), who demonstrated favorable changes in self-esteem of male inmates who participated in vocational or educational programs with a duration of up to 8 months.

Due to the high occurrence of research subjects reporting a history of drug or alcohol abuse, the pretest and posttest mean scores of drug or alcohol abusers and nonabusers were compared for inmates participating in the Master Gardener program only. No statistically significant differences as a result of participation in the Master Gardener program were found for nonabusers for all variables tested and for generalized internal-external locus of control and global self-esteem for drug or alcohol abusers (Table 4). Statistically significant differences were found for situation-specific internal-external locus of control and global life satisfaction for drug or alcohol abusers (Table 4). Master Gardener participants reporting a history of drug or alcohol abuse had a situation-specific internal-external locus of control posttest mean score that was 0.80 higher than their pretest mean score and a 1.66 increase in mean scores from the pretest to the posttest on the

Table 2. Selected demographics of treatment groups at the federal prison camp, Bryan, Texas.

Demographic variable	Master Gardener group n = 36	Control group n = 26	Total n = 62
Ethnicity			
African American	14%	31%	21%
Caucasian	58%	23%	44%
Hispanic	22%	35%	27%
Other	6%	11%	8%
Age			
20-29	28%	27%	27%
30-39	33%	42%	37%
40-49	33%	27%	31%
50+	6%	4%	5%
Education			
No diploma or GED	0%	23%	10%
GED	39%	19%	30%
High school diploma	47%	50%	48%
Associate degree	11%	8%	10%
Bachelor degree	3%	0%	2%
Drug-alcohol abuse			
Yes	50%	50%	50%
No	50%	50%	50%

satisfaction with life scale (Diener et al., 1985) indicating an improvement in both areas. Positive results on the self-development of drug and or alcohol abusers participating in horticulture programs has been reported by several institutions (Cornille et al., 1986; Rice and Remy, 1994). The Florida Alcoholism Treatment Center, an accredited alcohol and drug abuse treatment center, has a horticultural therapy program as part of its occupational therapy department.

Cornille et al. (1986) reported that recovering male addicts who participated in the horticultural component of the treatment process developed group responsibility, an improved sense of belonging, and an increased feeling of personal effectiveness. Another program developed by the San Francisco Sheriff's Department for male inmates on substance abuse related charges is the Garden Project (Rice and Remy, 1994). This program is designed to provide food and flowers to homeless

shelters and home-bound AIDS patients. Rice and Remy (1994) reported that Garden Project participants had reduced postrelease substance abuse compared to nonparticipants.

As reported above, research on the impacts of vocational training on the self-development of inmates has centered around male inmates, disregarding the female inmate population. Findings from this study indicate that, in institutions such as FPC-Bryan, where vocational and educational pro-

Table 3. Pretest and posttest comparison of treatment groups at the federal prison camp, Bryan, Texas, using a *t* test for paired samples.

Test	Pairs (no.)	Corr	Mean ^z	SD	Two-tailed significance
Generalized internal-external locus of control					
Master Gardener Pretest	27	0.510	10.41	3.9	0.486
Posttest			9.85	4.3	
Control Pretest	20	0.708	11.15	4.4	0.690
Posttest			10.85	4.3	
Situation specific internal-external locus of control					
Master Gardener Pretest	31	0.562	1.26	1.46	0.266
Posttest			1.61	2.08	
Control Pretest	25	0.566	1.96	1.67	0.637
Posttest			2.12	1.90	
Global self-esteem					
Master Gardener Pretest	36	0.472	40.47	4.6	0.184*
Posttest			41.53	4.5	
Control Pretest	23	0.805	39.48	4.6	0.111*
Posttest			40.70	5.9	
Global life satisfaction					
Master Gardener Pretest	36	0.587	13.89	4.8	0.127*
Posttest			15.06	5.1	
Control Pretest	24	0.609	12.92	3.2	0.145*
Posttest			13.96	4.2	

^zPossible scores range from 0 to 25. A high score indicates external control and a low score indicates internal control.

^yPossible scores range from 0 to 8. A high score indicates external control and a low score indicates internal control.

^xPossible scores range from 10 to 50. A high score indicates high self-esteem and a low score indicates low self-esteem.

^wPossible scores range from 5 to 25. A high score indicates high life satisfaction and a low score indicates low life satisfaction.

*Significant at *p* = 0.20.

grams including horticulture are available, inmates can maintain their internal locus of control and, in some cases, significantly increase their self-esteem and level of life satisfaction while incarcerated. One advantage to a horticulture program such as the one at FPC-Bryan is its association with the Master Gardener program of the Cooperative Extension Service. Fifty states and three Canadian provinces currently offer Master Gardener programs. This nationwide network may prove valuable

to inmates in providing job placement and in offering positive group membership and leisure time activities upon their release from prison. Due to confidentiality issues, the prison would not allow access to information on the location of prisoners after their release. Therefore, follow-up studies were not possible. However, unsolicited cards and letters to the FPC-Bryan Master Gardener coordinator from former students have reinforced the successfulness of this program. Past students

have indicated that they are currently working in some aspect of horticulture, taking advantage of horticulture as a hobby, gone on to further their education in horticulture, or have found personal growth and satisfaction by being involved in horticulture.

Results from this study are particularly encouraging for institutions with high percentages of substance abusers. Implementing horticulture programs in these institutions may help maintain or even increase the level of

Table 4. Pretest and posttest comparison of Master Gardener drug or alcohol abusers at the federal prison camp, Bryan, Texas, using a *t* test for paired samples.

Test	Pairs (no.)	Corr	Mean ^z	SD	Two-tailed significance
Generalized internal-external locus of control					
Drug-alcohol abuse Pretest	14	0.519	11.36	3.1	0.853
Posttest			11.14	4.9	
Drug-alcohol nonabuse Pretest	13	0.491	9.38	4.5	0.427
Posttest			8.46	3.2	
Situation specific internal-external locus of control					
Drug-alcohol abuse Pretest	15	0.488	1.07	1.4	0.138*
Posttest			1.87	2.2	
Drug-alcohol nonabuse Pretest	16	0.689	1.44	1.5	0.864
Posttest			1.38	2.0	
Global self-esteem					
Drug-alcohol abuse Pretest	18	0.500	40.33	5.0	0.377
Posttest			41.39	4.9	
Drug-alcohol nonabuse Pretest	18	0.432	40.61	4.2	0.338
Posttest			41.67	4.3	
Global life satisfaction					
Drug-alcohol abuse Pretest	18	0.630	12.78	4.9	0.154*
Posttest			14.44	5.9	
Drug-alcohol Nnonabuse Pretest	18	0.511	15.00	4.5	0.517
Posttest			15.67	4.1	

^zPossible scores range from 0 to 25. A high score indicates external control and a low score indicates internal control.

^yPossible scores range from 0 to 8. A high score indicates external control and a low score indicates internal control.

^xPossible scores range from 10 to 50. A high score indicates high self-esteem and a low score indicates low self-esteem.

^wPossible scores range from 5 to 25. A high score indicates high life satisfaction and a low score indicates low life satisfaction.

*Statistically significant the *p* = 0.20.

life satisfaction of inmates reporting a record of drug or alcohol abuse. In addition to these benefits to the prison inmates, horticulture programs, like the one at FPC-Bryan, directly benefit the prison by providing other types of services at a minimal cost (inmates enrolled in the program receive \$0.12 per hour). These services include landscaping the prison grounds, producing fruit and vegetables for the food services department, and maintaining office plants.

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