

Full Length Research Paper

Analyzing the immediate effects of in-service education on expert attitude level regarding the importance of soil conservation by using Solomon four group design in Jihade Keshavarzi in Ahwaz Township

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Advanced in-service education has provided the development regarding individual's knowledge and attitude level, in the high quality form. The application of in-service education has been a key component of knowledge and attitude improvement of Jihad Keshavarzi experts. The study utilized experimental Solomon four group designs to determine the effect of in-service education on Jihad Keshavarzi experts' attitude regarding soil conservation importance. Results demonstrated that subjects learned from the presented course and achieved higher level of attitude, and demonstrated that there is significant difference among attitude level of clients. Post hoc analysis demonstrated that participants in treatment groups (E and C₂) answered significantly greater numbers of questions correctly on the posttest exams and achieved significantly higher level of attitude than the control groups (C₁ and C₃) and there was significant difference between attitude level of participants in pretest and posttest in E group but there was no significant different between attitude level of participants in pretest and posttest in C₁ group.

Key word: Jihad Keshavarzi experts, Solomon four group design, in-service educational, soil conservation.

INTRODUCTION

Land and water are the most worth natural resources, the importance of which in human civilization needs is clear. The total available land area in the Iran country, the limits within which the competing human needs have to be met. The needs of agricultural and industrial and others often result in 'deflection' from one use to the other. Deflection of land from agriculture to non-agriculture uses adversely affects the growth in agriculture sector. Even the available land is targeted to soil-erosion of varying degrees and degradation difficulties of different measures. Soil erosion takes place when ingredient are separated and then transported by wind or water. Until

recent years, soil erosion was seen as a physical difficulty. Soil conservation is about solving the difficulties of land degradation, specially accelerated soil erosion. Accelerated soil erosion is a consequence of the operation of the physical forces of wind and water on soil which has become susceptible, usually because of human interference with the natural environment. The most important cause of this condition is Agriculture. Soil erosion can be viewed as a sign of bad land use and management (Sanders, 2004). There are many strategies for soil protection. In order to create conditions for farmers using the technologies should be increased farmers knowledge in the field of soil conservation. Increasing the knowledge of farmers will lead them to improving attitude in the field. According to the Khuzestan province's natural resources organization (2011), this province soil erosion is very severe. Unbalanced and

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excessive use of agricultural chemicals leads to lower productivity, declining soil fertility and groundwater pollution. The dissemination of soil conservation technologies in the Khuzestan province could reduce soil erosion, prevent destructive floods and to improve agriculture. Catching up increasing knowledge and technology is mostly relying on doing reform in education. Educational reform mostly starts with curriculum development (Coruhlu and Cepni, 2010).

The education word brings to mind many different images. We can present the definition of education as "the process of training and developing the knowledge, skill, mind, character, etc, especially by formal schooling, teaching and training" (Seevers, 1997). Adult education is the sort of education that take place in all sorts of building that often is not even labeled "adult education" but such things as "staff development", "manpower development", "development education", "in-service education" and many others. In-service education follows several goals and needs. These objectives are the following items:

- 1) The development of individual's institutions constituency in direction of the institution goals for them. Most institution wants to have the kind of members that believe to "committed" concept. Sometimes needs and interests of individuals come into conflict with needs and interests of institutions. In such cases should be helping individual to grow or helping institution to survive.
- 2) The improvement of institutional operation by improving attitude and knowledge of individuals.
- 3) Development of public understanding and involvement (Knowles, 2001).

Purpose and philosophies of in-service education are interrelated. In-service education was first recognized as a vital component of our educational system during the 1920s. The purpose of in-service education are the following items:

- 1) To facilitate change in dynamic society.
- 2) To support and maintain the goal social order.
- 3) To promote productivity.
- 4) To enhance personal growth through making better the attitude and knowledge of individuals.

Objective of personal growth is production of whole person. The whole person drives from traditional liberal education. The whole person is one who can think rationally, critically and who has high moral character and maintains good physical conditioning. Objective of personal growth is maturity. A maturing person is continually advancing towards understanding and constructive action. Maslow told the goal of personal growth is self actualization. Personal growth has three levels consisting of:

- 1) Rational level: develop more effective relationship with

others.

- 2) Self actualization: understand their own potential and to actualize them.
- 3) Enrichment level: assist learner in making creative use of leisure time.

The objective of in-service education is to assist learners in making choices that maximize their human potential. Learners are responsible for their action, they should control learning content and process and evaluation (Beder, 1999). Several researchers have investigated the role of education on knowledge and attitude. Following are the results of related researches. Ehiri et al. (1997) indicated that after training, significant improvements were observed in course participants' pre-course knowledge and attitude of a number of crucial aspects of food safety. The conducted study by Bos et al. (2001) indicated that educators of in-service education demonstrated limited knowledge of phonological awareness or terminology related to language structure and phonics. Additionally, they understand the need to learn to raise their awareness. They indicated a continuing mismatch between what educators require and need to know and what educators know. Therefore, the in-service educators need in-service education also. Harry et al. (2006) indicated that providing information regarding biotechnology by agricultural education teachers in West Virginia, affected on the attitudes and knowledge of agricultural students. A major finding of the study was the agricultural education teachers possessed a positive attitude towards biotechnology after receiving the education. The conducted investigation by Murray et al. (2011) examines the relationship between in-service training and university staff members' attitudes toward optimal water consumption. Total number of training types experienced, time spent engaged in training activities, and the amount of time elapsed since training experiences predicted different aspects of staff members' attitudes and perceptions as well as their satisfaction toward current condition of optimal water consumption.

Dimitrov and Rumrill (2003) illustrated the usage of Solomon four design in nursing literature, and present its use in a smoking prevention, promoting knowledge and science, study with fifth-grade children. Analyzing the impact of education on statistical population knowledge and attitude, indicted that education lead them to promote knowledge and attitude. Wambugu and Changeiywo (2007) used the Solomon four group design for analyzing effect of Mastery Learning Approach (MLA) on students' achievement in Kenya. The results of the study show that MLA teaching method resulted in higher achievement but gender had no significant influence on their achievement. The researchers concludes that MLA is an effective teaching method which physics teachers should be encouraged to use and should be implemented in all teacher education programmes. Ramirez (2007) indicated by using Solomon four group design that

cultural intelligence and conflict resolution ability are essential for 21st-century leaders when considering the increased interaction with individuals from different cultural backgrounds that is now prevalent due to the technological advances of the internet and improved modes of mobility. With increased frequent interactions, there is greater opportunity for cultural differences to create conflict. Wachanga and Gowland (2004) accomplished the research by using Solomon four group design. This study sought to examine how the co-operative class experiment (CCE) teaching methods affect students' achievement. Students taught through the CCE method performed significantly better than those that do not receive education. This implies that the CCE method enhanced students' achievement.

A comparison of lecture and cooperative learning on students' chemistry achievement at the university undergraduate level found no significant difference.

METHODOLOGY

The article examines issues involved in comparing groups and measuring change with pretest and posttest data. Different pretest-posttest designs are presented in a manner that can help rehabilitation professionals to better understand and determine effects resulting from selected interventions. Intervention is education regarding soil conservation, in this article. The purpose of this research was to determine whether attitude change was accomplished after utilization of in-service education method in Jihad Keshavarzi experts' attitude in Ahwaz Township. The research design for this study was an experimental method, Solomon four group design (Boone et al., 1996). This method controls all jeopardizing factors of internal and external validity. The external validity jeopardizing factor of interaction of selection and treatment was controlled through random selection of subjects from the Client group. Reactive effects of experimental agreements were controlled by random assignment of subjects to groups (Campbell and Stanley, 1963). The Solomon four group design permits the researcher to apply complete control over the variables and permits them to check that the pretest did not influence the results. Its test is a standard pretest-posttest two-group design and the posttests only control design. The various combinations of tested and untested groups with treatment and control groups permit the researcher to ensure that intervening variables and extraneous factors have not influenced the results (Avers et al., 2000). This research design involves two experimental groups, E and C₂, and two control groups, C₁ and C₃. All four groups complete posttest measures, but only groups E and C₁ complete pretest erasures' in order to allow for better control of pretesting effects. In general, the Solomon four group RD enhances both internal and external validity. This design, unlike other pretest-posttest RDs also allows the researcher to evaluate separately the magnitudes of effects due to treatment, maturation, history and pretesting (Dimitrov and Rumrill, 2003).

The study subjects were chose from list of experts of Jihad Keshavarzi in Ahwaz Township of Khuzestan province in Iran. Then 100 experts were selected by random sampling and they allocated to four groups. Then, selected subjects were divided into four groups. First group was named Pretest-posttest treatment group (E) and another groups was named Pretest-posttest control group (C₁), Posttest-only treatment group (C₂) and Posttest-only control group (C₃). According to Figure 1, the comparison between the posttest results of groups C₂ and C₃ marked by line 'D', permits the

researcher to locate if the actual act of pretesting influenced the results. The comparison between the Group C₁ pretest and the Group C₃ posttest permits the researcher to make if any external factors have caused an impermanent sophistication. The comparison between Group E posttest and the Group C₂ posttest permits the researcher to determine the effect that the pretest has had upon the treatment. The comparison between the Group C₁ posttest and the Group C₃ posttest shows whether the pretest itself has affected behavior, independently of the treatment. Figure 1 shows the experimental Solomon four group design (Avers et al., 2000). A questionnaire was designed to measure attitude level of agricultural experts. 15 questions were written for measuring attitude level. Panel of experts from faculty members of university participating is established content and face validity. For reliability, 30 questionnaires were fulfilled by university employee and Cronbach Alpha was defined 0.72 which was suitable for research (Table 1). The treatment was an education course regarding soil conservation importance includes learning objectives to improve attitude level of experts.

The experimental group and first control group were completed appropriate pretest and posttest, treatment was done for experimental group and second control group and all groups were completed appropriate posttest.

ANALYZING DATA AND RESULTS

Data were analyzed using personal computer version of statistical package for the social science (SPSS version 18). Descriptive and inferential statistics were calculated on data. T-test for dependent groups was used to determine differences between pretest and post test in both E and C₁ groups. Independent F-test was used to determine differences among posttests in all groups. Table 2 indicates pretest and posttest attitude scores of each group regarding soil conservation. Table 3 indicates comparisons between posttests in some groups by using independent T-test. The results show that there is significant difference between posttests attitude score of C₂ and C₃ and E and C₁. There is significant difference because of C₂ and E receiving education (treatment). According to Table 4, there is significant difference between pretest of C₁ group and posttest of C₃ group. The result demonstrates that anything else could have caused the results shown and is a check upon causality. Comparison between E and C₂ groups shows that there is no significant difference between them. Because of the posttest results for these two groups did not differ, the pretest had not had some effect upon the treatment. Comparison between posttests of C₁ and C₃ group indicate in Table 4. There is no significant difference between posttests of them. So, the act of pretesting had not influenced the overall results. The differences between attitude of experts about soil conservation in experimental group and C₁ group in pretest and posttest were analyzed by independent t-test. The comparison between pretest and posttest are shown in Table 5.

The results show that there is a significant difference between pretest and posttest in experimental group that indicate the impact of treatment on attitude level of agricultural experts. But there is no significant difference

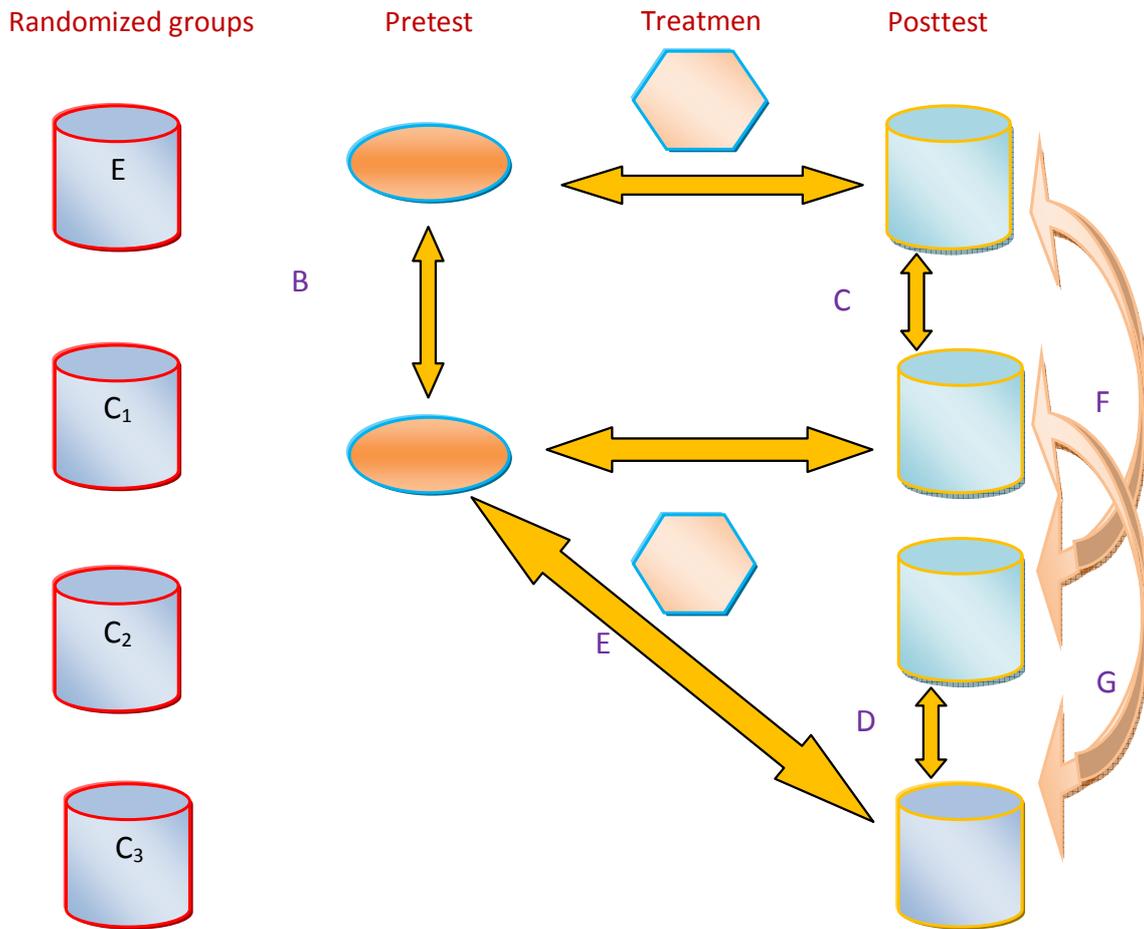


Figure 1. Solomon four group design.

Table 1. Solomon four group experimental design.

Group name	Pretest	Treatment	Posttest
Pretest-posttest treatment group (E)	Y ₁	X	Y ₂
Pretest-posttest control group (C ₁)	Y ₁	-	Y ₂
Posttest-only treatment group (C ₂)	-	X	Y ₂
Posttest-only control group (C ₃)	-	-	Y ₂

Table 2. Groups attitude.

Group name	Y ₁	Treatment	Y ₂
Pretest-posttest treatment group (E)	42.42	Education	66.86
Pretest-posttest control group (C ₁)	36.33	-	40.03
Posttest-only treatment group (C ₂)	-	Education	67.65
Posttest-only control group (C ₃)	-	-	41.02

between pretest and posttest in first control group. It seems that there is no significant difference between

pretest and posttest in first control group because of lack of treatment (education) for C₁ group. The differences

Table 3. Comparisons between posttests in some groups.

Comparison groups	Groups	Pre/posttest	Frequency	Mean	t	Sig
C ₂ and C ₃	C ₂	Y ₂	25	67.65	2.95*	0.044
	C ₃	Y ₂	25	41.02		
E and C ₁	E	Y ₂	25	66.86	2.80*	0.049
	C ₁	Y ₂	25	40.03		

Table 4. Comparisons posttests and posttest between some groups by independent T-test.

Comparison groups	Groups	Pre/posttest	Frequency	Mean	t	Sig
C ₁ and C ₃	C ₁	Y ₁	25	36.33	2.02*	0.047
	C ₃	Y ₂	25	41.02		
E and C ₂	E	Y ₂	25	66.86	1.12	0.42
	C ₂	Y ₂	25	67.65		
C ₁ and C ₃	C ₁	Y ₂	25	40.03	1.34	0.64
	C ₃	Y ₂	25	41.02		

Table 5. Comparisons between pretest and posttest in E and C₁ groups by dependent T-test.

Group	Pre/posttest	Frequency	Mean	t	Sig
Experimental group	Y ₁	25	42.42	3.21*	0.042
	Y ₂	25	66.86		
First control group	Y ₁	25	36.33	1.04	0.32
	Y ₂	25	40.03		

Table 6. Comparisons among posttest in all groups.

Group	Frequency	Mean	SD	Z	Sig.	Duncan
E	25	66.86	2.21	2.43*	0.023	E and C ₂
C ₁	25	40.03	3.21			
C ₂	25	67.65	1.32			C ₁ and C ₃
C ₃	25	41.02	3.24			

among attitude of experts about soil conservation in all groups posttest were analyzed by independent F-test. Table 6 shows these comparison among all group posttests. The results show that there is a significant difference among posttests in all groups that indicate the impact of treatment on attitude level of agricultural experts. Post hoc analysis indicates that attitude mean ranking in C₂ and E groups have significant differences with attitude mean ranking in C₃ and C₁ groups. This condition was created by treatment (education regarding soil conservation). So, in-service education can be used to achieve higher level of attitude regarding soil

conservation and other fields and may be able to improve cognitive abilities as well as knowledge because participants with a greater store of knowledge and accessing abilities tend to learn more efficiently from courses. The current study has found that educators that involved in in-service education can expect significant learning effects from increase education lessons.

DISCUSSION AND RECOMMENDATIONS

The most important result of this research is introducing

impact of in-service education on attitude level of agricultural experts regarding soil conservation. The result reconfirms most previous result studies such as Ehiri et al. (1997), Bos et al. (2001), Harry et al. (2006), Murray et al. (2011), Dimitrov and Rumrill (2003), Wambugu and Changeiywo (2007), Ramirez (2007) and Wachanga and Gowland (2004). This study has provided data on the effectiveness of in-service education in enhancing academic attitude achievement. This means that the use of in-service education course in the teaching of soil conservation at Jihade Keshavarzi agricultural experts' attitude level can address importance of in-service education in the subject. In order to attitude improvement of in-service education, the following recommendation can be suggested:

- 1) Curriculum developers should be found that the study is helpful in designing appropriate instructional strategies involving in-service education which would enhance the attitude and knowledge level.
- 2) Capacity and enthusiasm for learning is a crucial factor to sustained improvement attitude and knowledge. In-service education should consider creating and enhancing this capacity.
- 3) The dedicated team should create with the skills, competencies and authority to understand and should make interventions in the management of the in-service education.
- 4) The government should establish a more formal and integrated dialogue with the in-education supply community to support the design and development of in-service strategies.
- 5) The organizations should create incentives to support future in-service strategies.

REFERENCES

- Avers J, Hopf T, Will A (2000). Are reduction in CA an experimental artifact? Solomon Four Group Answer. *Commun. Quarterly J.*, 48(1): 19-26.
- Beder H (1999). *Handbook of adult education and continuing education.*
- Boone K, Miller L, Brown L (1996). Reaching Higher Levels of Cognition Using Publications. *J. Agric. Educat.*, 73: 53-66.
- Bos C, Mather N, Dickson S, Podhaiski B, Chard D (2001). Perceptions and knowledge of pre-service and in-service educators about early reading instruction. *Educ. Educat. Res. J.*, 51: 97-120.
- Campbell D, Stanley J (1963). *Experimental and Quasi- Experimental designs for research.* Skokie, IL: Rand McNally.
- Dimitrov D, Rumrill Ph (2003). *Pretest-posttest designs and measurement of change.* College of Education, Kent State University, Kent, USA.
- Ehiri JE, Morris GP, Mcewen J (1997). Evaluation of a food hygiene training course in Scotland. *J. food control*, 8(3): 137-147.
- Harry NB, Deborah AB, Jason EH (2006). Modernizing the Agricultural Education Curriculum: an Analysis of Agricultural Education Teachers' Attitudes, Knowledge, and Understanding of Biotechnology. *J. Agric. Educat.*, 47(1): 78-89.
- Khuzestan province's natural resources organization (2011). *Annual report of Khuzestan province's natural resources organization, Iran: Khuzestan province.*
- Knowles M (2001). *Andragogy.* Available on: <http://nlu.nl.edu/academics/cas/ace/resources/malcomknowles.cfm>
- Murray C, Lombardi A, Wren C (2011). The Effects of Disability-Focused Training on the Attitudes and Perceptions of University Staff. *Remedial Spec. Educ. J.*, 32(4): 290-300.
- Sanders D (2004). *Soil Conservation.* Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK.
- Seevers B (1997). *Education through cooperative extension.* Delmar publishers.
- Wambugu P, Changeiywo J (2007). Effects of Mastery Learning Approach on Secondary School Students' Physics Achievement. *Eurasia J. Mathe. Sci. Technolo. Ducat.*, 4(3): 293-302.
- Wachanga S, Gowland Mwangi G (2004). Effects of the Cooperative Class Experiment Teaching Method on Secondary School Students' Chemistry Achievement in Kenya's Nakuru District.