

International Journal of Agriculture Extension and Social Development

Volume 8; Issue 10; October 2025; Page No. 374-379

Received: 19-07-2025
Accepted: 23-08-2025

Indexed Journal
Peer Reviewed Journal

Identifying differences in the effectiveness of training according to a number of personal, functional, and communication variables for the trainees for the period (2017-2022)

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DOI: <https://www.doi.org/10.33545/26180723.2025.v8.i10f.2559>

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Abstract

This study aims to evaluate the effectiveness of extension training for agricultural extension workers in the northern governorates of Iraq, while determining the effect of some personal, functional and social characteristics of the trainees on the levels of this effectiveness. The study was based on a questionnaire distributed to a sample of workers participating in the courses Training, where the data were statistically analyzed using one-way analysis of variance, t-tests, and LSD to determine differences between different categories of trainees. The results of the analysis showed that the level of effectiveness of guidance training in general is average, with deficiencies in some aspects of the training process, which indicates weakness Take full advantage of the courses. No significant difference appeared between the trainees according to the variables of age, gender, and social participation, which indicates that these variables do not significantly affect the trainees' assessment of the effectiveness of the training. While it was found that there were significant differences between the trainees according to the variable of place of residence, where residents of rural areas showed greater interest and benefit than trainees in cities or districts. It was also shown that the length of job service, educational level, and the number of training courses in which the trainees participated are significantly related to the level of training effectiveness, which reflects the importance of taking these variables into consideration when selecting participants for training courses. Based on these results, the study concluded that it is necessary to pay attention to all aspects of the training process to achieve the desired goals. The importance of listening to the requirements and desires of trainees regarding participation and the content of training programs, with a focus on developing modern training methods and means. The study also recommended taking the variables that showed a significant impact into consideration when selecting course participants, to enhance training efficiency and achieve maximum benefit for agricultural extension workers.

Keywords: Training, variation

Introduction

Human development represents one of the necessary pillars of development, as it is a continuous dynamic process that aims to improve the living conditions of societies, especially rural ones. In this context, rural development emerges as a pivotal strategic issue for improving the social and economic conditions in these societies, which contributes to raising productivity and expanding. Job opportunities and increasing the individual's daily income ^[1]. Scientific and technological progress is the real gateway to development, as it is the best way to build the future of nations, and this depends on employing the expertise of its people and investing their human energies and capabilities in an optimal way with the aim of finding effective solutions to the challenges that hinder the paths of development ^[2]. Training is also a strategic investment to enhance the future performance of the workforce by expanding its capabilities to achieve higher levels of productivity ^[3]. Training is considered a vital element in all sectors, and is doubly important in the agricultural sector Iraqi, given the great challenges facing this sector. Therefore, developing comprehensive training programs for workers in the agricultural field, whether they are government employees,

farmers, or rural leaders, represents a top priority ^[4]. The effectiveness of training is measured by the extent to which trainees benefit from the experiences gained, and comparing the program outcomes with the costs and invested resources. Despite the great importance of evaluating agricultural extension training programs, they still suffer from clear neglect by the institutions and entities responsible for agricultural training ^[5]. Which calls for the need to evaluate the effectiveness of training programs for workers in the field of agricultural extension, and the importance of extension training for workers in any field becomes clear. Extension organization (especially local leaders) for the importance of their role in acquiring modern technologies in agriculture, because trainers are responsible for transferring all types of agricultural technologies and modern information based on the results of scientific research to farmers and encouraging them to apply these technologies through the training program ^[6]. It is necessary that These programs include continuous monitoring and evaluation processes to measure the extent to which they meet the needs of the trainees and the extent of their effectiveness in improving their performance. These training activities must also be designed to develop the cognitive and behavioral

aspects of the trainees, which contributes to achieving the goals of agricultural extension in general. [7]. The shortage of agricultural extension workers, including. This includes experienced and competent trainers in the northern governorates of Iraq, a pivotal issue that has been widely discussed in conferences and workshops over the past years. Therefore, addressing this shortage is a strategic priority that requires taking effective steps to enhance the capabilities of agricultural extension workers through the preparation of integrated training programs [8]. This aims to build efficient, qualified and trained extension cadres at the highest level, capable of conveying extension messages and applying modern agricultural practices efficiently. Extension organizations make great efforts and allocate a significant portion of their budgets to support training programs [9], drawing on local and international expertise to ensure quality These programs. Given the size of the annual financial investments allocated to training, which represents an essential element in the input of these extension organizations [10], evaluating the return and effectiveness of these programs remains extremely important. This calls for a careful analysis of the impact of training spending on the extension organizations' performance, productivity, and ability for continuous development [11]. From the previous presentation, the research problem was formulated through the following questions:

1. What are the differences in the effectiveness of extension training according to some characteristics of the trainees such as social, demographic and functional characteristics, including: (age, gender, place of residence, academic achievement, length of service, social participation, previous training)?

Research objectives

Determine the variation in the effectiveness of extension training from the trainees' point of view (as a dependent factor), according to some characteristics of the trainees such as social, demographic and functional characteristics, including: (age, gender, place of residence, academic achievement, length of service, social participation, previous training).

Importance of the study

1. Providing specialists with the most important personal and functional factors that affect the effectiveness of training to take them into consideration.
2. Achieving feedback by getting to know the trainees'

point of view.

3. The research comes within the framework of recent global directives that emphasize the importance of extension training.
4. Providing the competent authorities with the most important problems facing the trainees in order to work on finding solutions to them.

Operational definitions

1. **Effectiveness of extension training:** A systematic method for evaluating extension training courses after their completion, as well as for measuring the results obtained by trainees by evaluating various aspects of the training program from the trainees' point of view.
2. **Agricultural extension workers:** All workers who participated in the training course, workers in the field of agricultural extension, and those who hold an agricultural graduation certificate.

Results and Discussion

The first goal: to determine the differences (variability) in the effectiveness of training according to a number of personal, functional, and communication variables for the trainees.

1. **Age:** The results of the statistical analysis showed that the youngest age of the respondents was (28) years and the oldest age was (58) years, with an average age of (41.26) and a standard deviation of (7.52). The respondents were divided into three categories using the range law, and it appeared that the highest percentage was within the middle category, as shown in Table (1).

Table 1: Distribution of respondents according to age variable categories

Categories	Duplicates	%	Average	sd
Young people (28-37) years old	96	35.0	470.92	25.65
Average age (38-47) years	128	46.7	469.64	26.69
Seniors (48-58) years old	50	18.3	478.74	26.95
the total	274	100%	Sd=7.52	

It is clear from Table (1) that the highest percentage (46.7%) of the respondents are in the middle age category with an average of (471.45) scores, followed by the young age group with (35%) of the respondents with an average of (478.74) scores. To identify the difference between the averages of the respondents, a one-way analysis of variance was conducted and the results are as shown in Table (2).

Table 2: Analysis of variance of the difference between the means of the respondents according to the age variable.

Sources of variance are	sum of squares	df	Mean calculated	square F	tabular F	significant
Between transactions	3049.658	2	1524.829	2.116	2.9957	0.112
Inside transactions	195284.458	271	720.607			
Total	198334.117	273	Insignificant difference between means			

It is clear from Table (2) that there is no significant difference between the means of the respondents according to the age variable categories when comparing the calculated f value of (2.116) with the tabulated f value of (2.9957) with a degree of freedom (2.271), and thus the null hypothesis is accepted which states (there is no difference between the means of the respondents) and the reason for this may be that Respondents of different age groups do not differ in their answers about the effectiveness of extension

training and have similar information. This may be due to the fact that respondents from all age groups have been exposed to training courses that may be similar in terms of training content or use of the same training methods and methods during the implementation of the courses.

1. **Gender:** The gender variable was divided into two categories (males, females) and given numerical symbols (2, 1) respectively, and the highest percentage was within the male category as shown in Table (3).

Table 3: Results of the difference test between the means of two independent samples

Repetition	Categories	%	middle	T Calculated	T tabular	Significance	Connotation
Male	214	78.1	472.78	1.208	1.645	0.228	Not a sign
Feminine	60	21.9	468.03				
The total	274	100%	Insignificant difference between the means of the two samples				

It is clear from Table (3) that there is no significant difference between the averages of the male and female respondents according to the calculated t value when compared with the tabulated t value of (1.645) at the probability level (0.05). Thus, the null hypothesis is accepted which states (there is no significant difference between the averages of the respondents). The reason for this may be that trainees of both genders are nominated for training courses regardless of the gender of the trainee. This means that they are exposed to the same training courses, and this is reflected in their answers about the effectiveness of the training as a result of their exposure to the same experiences, knowledge, and skills, and therefore no significant difference appeared between the genders.

- 2. Place of residence:** The respondents were divided according to place of residence into three categories: (district, district, village), Numerical codes (3, 2, 1) were given respectively, and it appeared that the highest percentage of them was within a category of village

residents, as shown in Table (4).

Table 4: Distribution of respondents according to categories of place of residence.

Categories	Repetition	%	Middle	SD
Judiciary	68	24.8	463.60	27.06
Hand	96	35.0	471.44	27.93
village	110	40.2	471.74	27.62
the total	274	100%	471.76	26.99

It is clear from Table (4) that the highest percentage of 40.2% of the respondents came within the village residence category with an average of (471.74) degrees and a standard deviation of (27.62), followed by (35%) of the respondents who came within the district residence category with an average of (471.44) degrees, while the lowest percentage (24.8%) of them were within the district residence category with an average of (463.60) degrees. To find the difference between the means For the respondents, a one-way analysis of variance was conducted as shown in Table (5).

Table 5: Analysis of variance of the difference between the means of the respondents according to the variable of place of residence.

Sources of variation	Sum of squares	Degree of freedom	Mean squares	F _{Cal}	F _{Tab}	Sig
Between transactions	7649.298	2	3824.649	5.418	4.605	0.005
Inside transactions	191302.28	271	705.912			
Total	198951.58	273	**Significant at probability level 0.01			

It is clear from Table (5) that there is a significant difference between the means of the categories of respondents according to the variable of place of residence according to the calculated F value of (5.418) when compared with the tabulated F value of (4.605) at the probability level of 0.01.

Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted which states (there is at least a significant difference between two means). To calculate the difference between the means of the respondents, the LSD post-test was conducted as shown in Table (6).

Table 6: LSD post-test results for the difference between the means of the respondents according to the variable of place of residence.

Place of residence categories	Number		Average first class	Average of the second category	Average difference	L.S.D	Moral
	Fig-1	Fig-2					
District - district	68	96	463.60	471.44	----	----	0.06
District - village	68	110	463.60	477.03	13.43	8.223	0.01
District - village	96	110	471.44	477.03	----	----	0.133

It is clear from Table (6) that there is a significant difference between the averages in the two categories of housing in the district and housing in the village, and in favor of the higher average for the respondents from the village residence, according to the value of the average difference between the two categories of respondents, which is (13.43), when compared to the LSD rate of (8.223). The reason for this may be that The respondents, residents of the villages, have accumulated experiences and information about the agricultural environment and the variables that surround it, as well as experiences about agricultural crops, as well as their knowledge about the economic, social, and living conditions in rural villages. This is often shared within the

training hours of participants in the training courses, and thus their experiences are added through housing and other educational experiences.

- 3. Duration of job service:** The results of the statistical analysis showed that the minimum period of job service for the respondents was (5) years and the maximum number of years of job service was (58) years, with an average of years (33.70) and a standard deviation of (20.95). The respondents were divided into three categories using the range law, and the highest percentage of respondents appeared within the category of long job service, as shown in Table (7).

Table 7: Distribution of respondents according to categories of the length of job service variable

SD	Arithmetic average	%	Duplicates	Categories
30.18	474.16	33.6	92	Few (5-22) years
27.15	476.56	32.5	89	Medium (23-39) years
21.71	464.74	33.9	93	Many (40-58) years old
Sd=20.95		100%	274	the total

It is clear from Table (7) that the highest percentage (33.9%) of the respondents came in the category of long length of service with an average of (464.74) grades, followed by a percentage of (33.6%) of the respondents who came in the category of short duration of job service with an average of (474.16) grades, while the lowest percentage of 32.5% of

them was in the category of medium length of service with an average of (476.56) grades. To find the difference between the averages of the respondents, a procedure was conducted. One-way analysis of variance as shown in Table (8).

Table 8: Results of the analysis of variance for the difference between the means of the respondents according to the variable of length of job service

Sources of variation	Sum of squares	df	Mean	square F calculated	tabular F	significant
Between transactions	20829.652	2	10414.826	15.84	4.605	0.01
Inside transactions	178121.929	271	657.276			
Total	198951.580	273	**Significant at 0.01 probability level			

It is clear from Table (8) that there is a significant difference between the averages of the categories of respondents according to the variable of job duration, according to the calculated F value of (15.84) when compared with the tabulated F value of (4.605) at a probability level of 0.01. Therefore, the null hypothesis is rejected and the alternative

hypothesis is accepted, which states (There is a significant difference in. The lowest between two means) and to calculate the difference between the means of the respondents, the LSD post-test was conducted as shown in Table (9).

Table 9: LSD post-test results for the difference between means among respondents according to the variable of length of job service

Functional service categories	Number		The average of the first	Category, the average of the second	Category, the average difference	L.S.D	Moral
	Fig-1	Fig-2					
Few - medium	92	89	474.16	476.56	2.4	---	0.54
Few - many	92	93	474.16	464.74	9.42	6.056	0.01
Average - many	89	93	476.56	464.74	11.82	6.252	0.003

It is clear from Table (9) that there is a significant difference between the short period of service category and the long period of service category, and in favor of the higher average with a mean difference of (9.42) degrees when compared with the L.S.D value of (6.056). Thus, the null hypothesis is rejected and the alternative hypothesis is accepted which states (there is at least a significant difference between two averages), as well as a significant difference between the medium years of service category and the many years of service category, with a mean difference of (11.82). degree compared to the L.S.D value of (6.252). Thus, the null hypothesis is rejected and the alternative hypothesis is accepted, which states (there is at least a significant difference between two means). The reason for this may be that the respondents with many years of service have been exposed to more training courses, and thus their experience and information about the effectiveness of training in developing Their knowledge, skills, and attitude towards the trainees. They also have increased experience with the indicative means and methods used in presenting the training content, and this is reflected in their answers about the effectiveness of indicative training and determining the level of effectiveness of indicative training better than their peers with medium or few years of service, who may have a lower level of exposure to training courses.

4. Academic achievement: The achievement variable was divided into four categories: (Institute, Bachelor's, Master's, Doctorate) and numerical codes were given, and it appeared that the highest percentage came within the Bachelor's degree category, as shown in Table (10).

Table 10: Distribution of respondents according to the academic achievement variable.

SD	middle	%	Repetition	Attainment categories
23.41	461.66	10.6	29	Institute
21.39	468.00	43.0	118	Bachelor's
29.51	471.65	25.2	69	Master's
31.52	484.60	21.2	58	Ph.D
26.99	471.76	100%	274	the total

It is clear from Table (10) that the highest percentage (43%) of the respondents came in the Bachelor's degree category with an average of (468) degrees, followed by (25.2%) of the respondents who came in the Master's degree category with an average of (471.65) degrees, followed by (21.2%) the percentage of respondents who held a doctorate degree with an average of (484.60) degrees, while the lowest percentage (10.6%) of them was in the category of diploma holders with an average (481.66) degrees. To find the difference between the means of the respondents, a one-way analysis of variance was conducted, as shown in Table (11).

Table 11: Results of the analysis of variance test to determine the difference between the means of the respondents according to the academic achievement variable.

Sources of variation	Sum of squares	df	Mean squares	F _{Cal}	F _{Tab}	Sig
Between Transactions	14197.497	3	4732.499	6.916	3.781	0.000
Inside transactions	184754.083	270	684.274			
Total	198951.580	273	**Significant at probability level 0.01			

It is clear from Table (11) that there is a significant difference at the probability level of 0.01 between the means of the respondents according to the educational level variable when comparing the calculated f value (6.915) with the tabulated f value (3.781) at the probability level of 0.01. Therefore, the null hypothesis is rejected and the alternative

hypothesis is accepted which states (there is at least a significant difference between two means). To calculate the significance of the difference, the LSD post-test was conducted, and the results of the LSD test are as shown in the table. (12).

Table 12: LSD post-test results for the difference between the means of the respondents according to the change in academic achievement.

Tenure categories	Number		Average first class	Second class average	Average difference	L.S.D	Moral
	Fig-1	Fig-2					
Diploma - Bachelor's degree	34	109	461.66	468	1.04	---	0.243
Diploma-Master	34	84	461.66	471.65	5.35	---	0.85
Diploma-PhD	34	47	461.66	484.60	18.30	9.687	0.01
Bachelor's - Master's degree	109	84	468	471.65	6.39	---	0.358
Bachelor's degree-PhD	109	47	468	484.60	19.34	7.507	0.01
Master-PhD	84	47	472.73	485.68	12.9	7.836	0.01

It is clear from Table (12) that there is a significant difference at the probability level of 0.01 between the level of a diploma holder and a doctorate degree holder with a mean difference of (18.30) degrees, when compared with the value of the least LSD difference of 9.687. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted which states (there is at least a significant difference between two means), as well as a significant difference between the educational level of a bachelor's degree holder and a doctorate degree holder with a mean difference of (19.34). degree, when compared with the value of the least difference LSD of 7.507, so the null hypothesis is rejected and the alternative hypothesis is accepted which states (there is at least a significant difference between two means). Likewise, the difference was significant between the level of a holder of a master's degree and the level of a doctorate when compared with the value of the least significant difference (LSD) of 7.836 with a probability level of 0.01. Therefore, the null hypothesis is rejected and

the alternative hypothesis is accepted, which states (there is at least a significant difference Between two averages) and in favor of the higher average in all comparisons. The reason for this may be that the respondents with higher education have a greater understanding of the content of the training material and are more understanding and aware of the experiences and information covered in the training. They have added to their academic experiences new experiences and a greater understanding of the methods. And the indicative methods used in the training process by their peers with lower education, and this in turn is reflected in the level of their answers about the effectiveness of indicative training.

5. Social Participation: The respondents were divided into two categories (participant, non-participant) and were given numerical codes (2, 1) respectively, and the highest percentage of respondents appeared in the participant category, as shown in Table (13).

Table 13: Distribution of respondents according to social participation categories.

Moral	t tabular	t value	Arithmetic average	%	Duplicates	Categories
160	1.645	1.309	467.23	58.4	160	Participant Not
114			459.48	41.6	114	participating
There is no significant difference between the two categories				100%	274	the total

It is clear from Table (13) that most of the respondents fell into the category of participant with an average score of (467.23), followed by 41.6% of the respondents who came in the category of non-participant with an average score of (459.48). The reason for this may be that the answers of the respondents did not show any difference between the two categories according to the social participation variable. This indicates that social participation has no relationship to the effectiveness of extension training.

6. Number of training courses: The respondents were

divided according to the variable of participation in the number of training courses into three categories using the range law, and it appeared that the highest percentage was within the category of a small number of courses, as shown in Table (13).

Conclusion

The results showed that the level of effectiveness of extension training in general is average and tends to decline. It is concluded from this that there is a deficiency and weakness in the effectiveness of extension training in the

northern governorates of Iraq. The reasons for this may be due to either the lack of interest of the respondents in the training process, or many of the respondents were nominated without their opinion being sought to participate. In the training courses, or the lack of interest of the respondents in the information and experiences during the implementation of the training hours, or part of the reasons may be related to the planning and implementation of the training course, which includes many stages and steps, and weaknesses and shortcomings at any stage reflect negatively on the training decision and its effectiveness

1. The levels of moral difference between the averages of the respondents' answers vary according to some independent variables related to them:
 - A. There is no significant difference between the respondents according to the variables of age, gender, social participation, and career ambition. It follows from this that the assessment of the level of training effectiveness from the trainees' point of view is not affected by these variables.
 - B. A significant difference was found between the respondents according to the variable of place of residence and in favor of the respondents residing in rural areas. It can be concluded from this that the respondents residing in rural areas have more interaction and interest in information and training experiences than their trained peers.
 - C. It was found that there was a significant difference between the averages of the respondents and the following variables: length of job service, academic achievement, number of training courses, attitude towards training, and from this it is concluded that it is important to take into consideration these variables when choosing trainees to participate in training courses.

Recommendations

1. It is necessary to pay balanced attention to all areas of the training process, without making any comparisons between those areas, in order for the training process to achieve its goals and the desired benefit.
2. It is very important to get the guidance employee's opinion about his desire to participate in the training course.
3. It is important to take into account the employees' opinions about the objectives and content of the training program and to rely on traditional methods and means.
4. It is important to use modern technologies, including training methods and means, to implement the training course.
5. It is very necessary to take into account the variables that showed a significant difference in the level of effectiveness of extension training when selecting trainees to participate in training courses.

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