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Level application of communication technologies for agricultural extension agents in their field of work in the agricultural divisions / Nineveh Governorate

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Abstract

The purpose of this study was to determine the extent to which agricultural extension agents in the Nineveh Governorate's agricultural divisions use communication technology in their line of work. Additionally, the research aimed to ascertain the relationship between the use of communication technology and many factors, such as academic specialization, years of service, training programs, age, and educational background. The study also sought to determine the primary issues extension workers had while using communication technology in their line of work. All agricultural extension workers in the Directorate of Agriculture of Nineveh and its connected branches, as well as personnel at the Agricultural Extension Centre in Nineveh and its attached demonstration farms, participated in the research, which was carried out in the Nineveh Governorate. 290 agricultural workers employed by the main directorate and its 32 subsidiaries made up the study population. A study sample of 116 respondents was obtained by selecting a simple random sample of 40%. All sample members—with the exception of 30 respondents who were employed to assess the instrument's reliability—were given a questionnaire. To gauge how much agricultural extension workers use communication technology, a unique questionnaire was created. The questionnaire was divided into two sections: the first portion examined independent factors pertaining to personal and professional information, and the second half featured a 34-item scale to gauge how often they used communication technology at work. Cronbach's Alpha was used to determine the instrument's reliability coefficient, and the result was 0.92. The research came to a number of conclusions, chief among them being that respondents' use of communication devices was moderate to high. It also showed that the use of communication technology in extension work was not directly correlated with factors like age, academic specialization, or training programs.

Keywords: Agricultural extension, technologies, extension, communication

Introduction

Today, information technology and communication are developing quickly. Since information can now be sent instantly to every location on the planet, the world has shrunk to the size of a town. The people and organisations that comprise society have undoubtedly been directly impacted by these developments. Thus, society has profited from these changes, changed its composition, and used their benefits in a variety of domains (Al-Shahri & Badri, 2013: 12) [2]. Because of its restricted use in the workplace, information and communication technologies are regarded as some of the best options. They have recently been more focused on deploying substantial and plentiful resources to advance agriculture, particularly in poor nations. For all people, the ability to communicate is a fundamental social need. It is the essential mechanism for intercultural communication, interpersonal comprehension, and human group interaction (Al-Hariri, 2013: 12) [3]. One of the fundamental processes in interpersonal interactions is communication, which is an interactive, reciprocal process for sharing information using certain methods in order to accomplish particular objectives (Salam, 2007: 5) [5]. Since communication includes the majority of human contact activities as well as the dissemination of information and perception among individuals, organizations, and communities, it is essential to the survival and growth of human societies (Beebem 2015) [10]. Humanity's social fabric is derived from communication, notwithstanding its particular dimensions and characteristics. It is the key to the continuation of life, a tool for people to express their ideas, inclinations, and motivations, and a way to meet a lot of their psychological, social, cultural, and financial demands, among other things (Al-Saadi, 2009: 8) [6]. Since it allows one to connect with others, communication is a crucial social activity. By making opinions and instructions simple to understand, it facilitates goal achievement, efficient task and activity completion, and obtaining others' support (Shawat, 2017: 1) [1].

Agricultural extension work is said to be based on and fundamentally based on communication. In order to convey extension messages to farmers, agricultural extension workers use an interactive method called extension communication, which depends on their communication abilities. This procedure allows the participants to communicate and share information, feelings, and ideas in a social setting (Al-Saadi & Al-Badri, 2010: 202) [4]. The mechanism that enables all of our behaviours and ties us to mankind is communication (Makawy & Al-Sayyid, 2008: 35) [7]. Speaking with others is a talent that may be learnt since people have been practicing it in different ways since

they were young (Frank, 2001) [12]. Since it allows one to connect with others, communication is essential in social situations. By making ideas and instructions understandable, it helps achieve goals, complete tasks or activities quickly, and gain others' participation (Shawat and Hanan, 2017: 1) [1]. The efficacy of agricultural extension may also be increased by using these technologies to communicate with rural populations and share information and skills via audio and video (Saravanan R. and Bhattacharjee, 2017:89) [8]. Agricultural extension workers often lack the information and training needed to utilise these technologies efficiently, despite their significance. According to studies, extension workers' inability to provide farmers with the right technical advice is hampered by their lack of training and certification in digital technologies (McPheat, 2010) [15]. This results in ineffective extension services and delays in the spread of agricultural innovations in the plant and animal sectors (Abdulwahid, 2015: 63) [9]. The creation of efficient and long-lasting extension networks is also made more difficult by the institutional players' inadequate coordination. Other issues facing agricultural extension systems include a lack of funding, a growing divide between scientific research and real-world extension, and a shortage of skilled workers in this field (Lynch, 2001) [14]. However, by improving contact between extension agents and farmers, closing knowledge transfer gaps, and extending the reach of agricultural advances to all agricultural sectors, the use of contemporary technologies, like social media, may aid in overcoming these obstacles (Hun *et al*., 2009) [13]. Given these difficulties, it is crucial to create efficient training curricula for agricultural extension agents and concentrate on increasing knowledge of the role that ICT plays in boosting agricultural output and operational effectiveness in this crucial industry.

Research Objectives

to determine the extent to which agricultural extension agents in the Nineveh Governorate's agricultural divisions use communication technology in their job to investigate how the following factors—age, years of service, training, academic specialization, and educational background—correlate with the use of communication technology by agricultural extension agents in their job.
To determine the main obstacles agricultural extension agents have while using communication technology in their job.

Materials and Methods

This study was carried out in Iraq's Nineveh Governorate. In addition to the employees of the Agricultural Extension Centre in Nineveh and its attached demonstration farms, the study population included all persons employed in the agricultural extension field within the Directorate of Agriculture of Nineveh and its related branches. 290 agricultural workers employed by the Directorate of Agriculture and its 32 subdivisions made up the research population. A study sample of 116 respondents was obtained by selecting a simple random sample that represented 40% of the population. Every person in the sample received a copy of the questionnaire. However, in order to assess the questionnaire's dependability, thirty respondents were disqualified. To gauge how much agricultural extension agents use communication technology in their job, the researcher created a customised questionnaire. There were two sections to the questionnaire:
The independent variables pertaining to the respondents' personal and professional attributes—namely, age, gender, years of service, educational background, training programs, and attitude towards the use of communication technologies—were assessed in Part One.
A collection of questions designed to gauge how much agricultural extension agents use communication technology in their line of work were added in Part Two. These questions were developed after a study of pertinent academic and scientific literature. The following is how the variables were measured:

- **Age:** Determined by asking the responder how old they are at the moment.

Asking the responder about their greatest level of agricultural education—Agricultural High School, Agricultural Institute, College of Agriculture, or Postgraduate Degree—measures their educational qualification. The following number codes were assigned to these qualifications: 1, 2, 3, 4.

- **Years of Service:** Determined by asking participants how long they had worked in the agriculture industry.

Asking whether the respondent has gotten training in communication technologies relevant to their job is one way to measure training courses. The following codes were applied to the responses: One for "Not Trained" and two for "Trained."
Asking whether the respondent had focused on agricultural extension throughout their academic studies is one way to gauge academic specialisation. (1) For "Non-specialized" and (2) for "Specialised" were the codes assigned to the replies.

A scale with 34 questions was also added in Part two to gauge how often the respondents used communication tools at work. The scale's first iteration was created using prior research on the topic as well as other pertinent sources. A number of items were changed or rewritten to better fit the goals of the study, and the researcher added new things.
The relative relevance of each research domain was taken into consideration while creating the first draft of the questionnaire. To get input on the importance of each domain, it was shown to a group of experts and assessors. Experts from the Department of Agricultural Extension and Technology Transfer and the College of Agriculture and Forestry at the University of Mosul, as well as the Department of Agricultural Extension and Economics at the College of Agriculture at the University of Tikrit, were consulted in order to establish face validity. By submitting the questionnaire to specialists in the Department of Media at the College of Arts, University of Mosul, content validity was verified. They assessed each item's suitability for the respondents' understanding level as well as its relevance and clarity. After considering the opinions and recommendations of the experts, some elements were removed and others were revised and reworded. Consequently, the completed questionnaire has 34 questions in four different areas. Cronbach's Alpha was used to determine the instrument's reliability coefficient, and the result was 0.92, indicating a

good degree of dependability. Following data gathering, the information was cleaned, tallied, categorised, and processed. After looking at the data distribution, the researcher concluded that it was normally distributed. As a result, the SPSS software used parametric statistical techniques for analysis.

Results and Discussion

First Objective: To determine the extent to which agricultural extension agents in the Nineveh Governorate's agricultural divisions use communication technology in their job. With a mean of 98 and a standard deviation of 13, the lowest recorded score was 34 and the highest was 138. Based on the true range of values, the scores were divided into three levels: Low category: 14.65% of those surveyed (34–68) Medium group (69–103): 68.10% of those surveyed High category: 17.24% of those surveyed (104–138) Table (1) presents these findings.

Table 1: Respondents were grouped based on how often they used communication tools in their extension activities.

Catogries	Freq	%	x	s.d
Low category (34-68)	17	14.65	98	13
Moderate catogry (69-103)	79	68.10		
High catogry (104-138)	20	17.24		
Total	116	100		

The respondents' moderate to high level of use of communication technology in their profession is seen from Table (1). This outcome is attributable to the important role that communication technologies play, as they are a fundamental component of contemporary media and have emerged as the main tool for quickly disseminating information and extension initiatives in a style that is easy for the greatest number of recipients to understand. Hence, in order to perform their assigned tasks efficiently, extension agents endeavour to enhance their knowledge and proficiency of these instruments.

Second Objective*:* To investigate the relationships between the following factors and the degree to which agricultural extension workers use communication technology in their fieldwork: age, years of service, educational background, training programs, and academic specialization*.*

1. **Age:** The range and class interval approach was used to split the respondents' ages into three age groups in order to handle this issue. With a mean age of 33.79 and a standard deviation of 6.55, the youngest responder was 26 years old, and the oldest was 49. The basic Pearson correlation coefficient was used to ascertain the association between age and the degree of communication technology usage. The results are shown below in Table (2).

Table 2: The degree to which agricultural extension agents use communication technology and the age variable are correlated.

Catogries	Freq	%	r value	x	s.d
Low category (26-33)	40	34.48	0.050	33.79	6.55
Moderate catogry (34-41)	50	43.10			
High catogry (42-49)	26	22.41			
Total	116	100%			

The largest percentage of responders, or around 43.10% of the sample, were in the medium age range (34–41 years), as seen in Table (2).

The younger age group (ages 26 to 33) came next with 34.48%, while the oldest age group (ages 42 to 49) had the lowest proportion (22.41%). The findings showed no discernible relationship between the age variable and the degree to which agricultural extension personnel used communication technology. There was no statistical significance in the Pearson correlation coefficient (r), which was 0.050.

As a result, the alternative hypothesis is rejected and the null hypothesis is accepted. According to the alternative hypothesis, age and the significance of agricultural extension agents' use of communication technology in their job are significantly correlated. This absence of a significant association implies that respondents understand the value of communication tools in extension work, irrespective of age. These results align with those of Gad *et al*. (2021) [16].

2. **Educational Qualification*:*** The respondents were divided into a number of groups according to their educational backgrounds in order to address this variable. For every category, percentages and frequencies were computed. The Spearman rank-order correlation coefficient was used to ascertain the connection. The findings are shown in Table (3) below.

Table 3: Relationship between agricultural extension specialists' degree of communication technology use and their educational background.

Catogries	Freq	%	rs value
Agricultural High School	29	25.00	**0.181
Agricultural Institute	11	9.48	
Bachelor's Degree	55	47.41	
Higher Degree	21	18.11	
Total	116	100%	

According to Table (3), 47.41% of respondents, or the great majority, had a bachelor's degree. Those with postgraduate degrees come in second at 18.11 percent. The lowest proportion of respondents, 9.48%, have a diploma from an agricultural institute, whereas around 25.00% have a diploma from an agricultural secondary school. The findings showed a strong positive relationship between the variable of educational qualification and the degree to which agricultural extension agents used communication technology in their fieldwork. At the 0.01 level, the Spearman's rank correlation coefficient value of (**0.181) is significant. As a result, the alternative hypothesis—that there is a substantial relationship between agricultural extension workers' educational backgrounds and the significance of using communication technology in their work—is supported and the null hypothesis is rejected. This result may be explained by the fact that during extension work, the respondents' educational background has a significant impact on the dissemination of agricultural innovations and knowledge via these technologies. The significance and efficacy of using these instruments in the accomplishment of extension work increase with the workers' educational background. This outcome aligns with the research conducted by Al Hassan *et al*. (2023) [17].

3. **Years of Work Experience:** The range formula and class length were used to divide the respondents into three groups in order to accomplish this goal. For every category, percentages and frequencies were computed. As shown in the table below, Spearman's rank correlation coefficient was used to ascertain the correlation link.

Table 4: Demonstrate the relationship between the number of years of work experience and the degree to which agricultural extension agents use communication technology in their extended practice.

Catogries	Freq	%	r value	x	s.d
Low (8-13) year	25	21.55	*169. 0	23.67	4.45
Moderate (14-18) year	75	64.65			
High (19-23) year	16	13.80			
Total	116	100%			

According to Table (4), the largest proportion of responders—roughly 64.65%—fall into the 14–18 year service years group. Those in the 8–13 age group come next at around 21.55%, while those in the 19–23 age group come last at 13.80%. The findings showed a strong relationship between the variable of years of work experience and the degree to which agricultural extension agents employed communication technology in their fieldwork. At the 0.05 level of significance, the Pearson correlation coefficient value was *r = 0.169. As a result, the alternative hypothesis—that there is a substantial association between the number of years of work experience and the significance of utilising social media communication tools in extension work—is accepted and the null hypothesis is rejected. This outcome may be explained by the fact that the respondents' years of service actively and significantly influence how vital they think it is to use communication technology while doing agricultural extension work. When it came to utilizing these tools, respondents with 6–18 years of service were found to be more proficient than other groups. This result is consistent with research by Elgazzar.

Training Courses: The responses were split up into two groups in order to accomplish this goal. For every category, percentages and frequencies were computed. Spearman's rank correlation coefficient was used to ascertain the correlation, as the table below illustrates.

Table 5: Demonstrate the relationship between training programs and the degree to which agricultural extension agents use communication technology in their extended activities.

Catogries	Freq	%	rs value
Not participating in training courses	90	77.58	0.122
Participating in training courses	26	22.42	
Total	116	100%	

According to Table (5), the largest proportion of respondents—about 77.58%—fall into the category of non-participants in training courses, while the proportion of participants in training courses was around 22.42%. Spearman's rank correlation coefficient, which has a value of 0.122, was used to ascertain the connection between the two variables. At the 0.05 significance level, this shows that there is no meaningful relationship between the two variables. As a result, the null hypothesis—which holds that there is no meaningful relationship between the variable of training course attendance and the degree to which agricultural extension agents use communication technology in their fieldwork—is accepted. This implies that extension workers' perceptions of the value of using agricultural communication technology are not much impacted by their involvement in training programs. This might be because training course participants and non-participants alike continue to see the value and efficacy of social media technologies in extension work. The results of Elgazzar are not consistent with this outcome.

4. **Academic Specialization*:*** The responses were split up into two groups in order to accomplish this goal. For every category, percentages and frequencies were computed. As shown in the table below, Spearman's rank correlation coefficient was used to ascertain the correlation.

Table 6: Illustrates the relationship between the academic specialisation variable and the degree to which agricultural extension agents use communication technology in their extension activities.

Catogries	Freq	%	rs value
Specialized	16	13.79	0.033
Non-specialized	100	86.21	
Total	116	100%	

Approximately 86.21% of respondents were not specialized in agricultural extension, while 13.79% of respondents were specialized in the sector, according to Table (6). This suggests that only a tiny percentage of people employed in the agricultural industry are experts in agricultural extension, with the bulk coming from a variety of agricultural disciplines. The findings revealed no discernible relationship between the variable of specialization and the degree to which agricultural extension workers used communication technology in their fieldwork. It is not statistically significant that the Spearman's rank correlation coefficient was 0.033. Consequently, the alternative hypothesis is rejected and the null hypothesis is supported, indicating that there is no meaningful correlation between the specialization of the extension agents and the significance of using social media communication tools in extension work. This might be explained by the fact that the use of agricultural communication technology in extension work is crucial regardless of the extension agents' level of expertise in the field.

Third Objective: Finding the biggest issues that agricultural extension workers have while using communication technology in their job.

To achieve this objective, the mean and percentage weight for each problem item were calculated, and the items were ranked according to their importance, as shown in the table below.

Table 7: Ranking of the problems faced by agricultural extension agents when applying communication technologies in their work according to their importance.

Problems	Mean	Percentage Weight	Rank
Difficulty in dispensing with electronic technologies when transferring agricultural information	3.230	80.75	1
Weak capacity of advisees in using extension communication technologies	3.226	80.65	2
Lack of trust among advisees in some agricultural information delivered through extension technologies	3.223	80.57	3
Absence of a designated authority responsible for communication technologies in extension work	3.211	80.27	4
Lack of direct interaction between agricultural extension workers and advisees	3.207	80.17	5
Poor internet access for a large number of advisees	3.184	79.6	6
Insufficient training courses for agricultural extension workers on how to use communication technologies	3.111	77.77	7

With a mean score of 3.230 and a percentage weight of 80.75%, the item "Difficulty in dispensing with electronic technologies when transferring agricultural information" came in first place, as shown in Table (7). This outcome can stem from agricultural extension agents' continued reliance on antiquated, conventional techniques to impart extended expertise and information to advisees. Furthermore, their professional tasks have resulted in a poor utilization of social media due to the restricted amount of training courses they get on the subject. However, with a mean score of 3.026 and a percentage weight of 75.65%, the item that came in last place was "Insufficient training courses for agricultural extension workers on how to use communication technologies." This can be because the training programs provided by the Directorate of Agriculture or extension offices address broad agricultural subjects rather than communication technology particularly, which the respondents might have thought was less relevant.

Conclusions

1. The level of application of communication technologies by respondents in their fieldwork was moderate tending towards high, indicating that the extension role in the study area was highly effective and influential on the respondents in this regard.
2. It was found that age, specialization, and training courses are variables that do not have a direct relationship with the application of extension communication technologies. Regardless of these variables, they do not diminish the importance of using such tools.
3. Educational qualification and years of work experience play a very important and effective role in the use of these technologies in extension work. These variables serve as strong motivators that encourage workers to use such tools due to their awareness of their importance.

Recommendations

1. In light of the results showing a low level of training among extension workers, the study recommends that authorities focus on organizing and holding intensive and specialized training courses on the use of social media in extension work.
2. More study in this area is required to provide findings that will assist the extension system function better and stay up to date with new developments in technology..
3. It is important to encourage respondents to use these tools in their extension work by highlighting their importance, addressing the reasons behind their non-use, and working to overcome the obstacles that hinder their usage.
4. There is a need to improve infrastructure and internet access in rural and remote areas of the province to ensure that both farmers and agricultural extension workers can benefit from social media platforms.

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