Indian Journal of Extension Education
Vol. 56, No. 2, 2020 (65-71)

Competenciesand Gap Analysis of the *Krishi Vigyan Kendra* Extensionists and Barriers in Acquiring ICT Based Competencies

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ABSTRACT

Agricultural extension services are under pressure to make greater contributions to agricultural development and progress. Agricultural extension services need human resources who arecompetent.As extensionists are aware of training and educational needs of their team members, it is very important to administer extension activities with competent extensionists. For effective and efficient extension, it is important to know thebarriers towards extension to deliver the required services to farmers in order to empower them. Competencies of extensionistsare vital for work as these are associated to their professional development and skills to communicate. Analysisof skill gap(s) is the key to update extensionists as pe rtheir capability in the field. In the present study, a skill gap analysis using 'Borich Need Assessment Model' was used for the extensionists of KVKs of selected districts of two states viz; of UP and Odisha. The total sample size was 200 for astructured interview schedule used to elicit information from the extensionists. A Mean Weighted Discrepancy Score (MWDS) was calculated to find the gap in skill. This study showed, that 'confidence to work without support and guidance' was of the highest level as a skill gap among extensionists, when new methods in extension work were to be introduced, while consideringpros and con of arguments put up to an extensionist, by a farmer. Lowest mean weighted discrepancy score was given to'Conducting survey in operational area, use of PRA tools and evaluating extension program'. Based on Fuzzy Analytical Hierarchy Process/Method, a lack of upgradation of ICT equipment, emerged as the major institutional barrier. As far as professional barriers are concerned inadequate information about training and training institutes and inadequate funding on emerged as the key barriersto acquire required competencies. Updating skill of extensionists, based on gap(s), owing to the importance of confidence to work without support and guidance in order to deliver required extension information/support to farmers, is very important. As of recent emphasis being given to skill development at the national level, the extensionists must be upgraded in their ICT skill(s). Extensionists with the necessary skills in their job will lead to their better performance which will in turn result in enhanced empowerment of farmers.

Key words: Barriers, Borich model, Extensionists, Mean Weighted Discrepancy Score (MWDS), Skill Gap Analysis.

INTRODUCTION

Extensionists play a very important role in agricultural development. It is essential to find out the competencies in extensionists to train them for effective and appropriate extension. that will help them in performing their work. Competence is of numerous types. A competency is a part of generic competence if it is a coherent bunch of knowledge, attitudes and skills, that canbe utilized in context of real performance. As for example, in a crime scene study a forensic expert needs to produce a DNA profileof a piece of evidence. To do this the expert needs knowledge (disciplinary knowledge), skills (to work with artefacts); and attitude (integrity, accuracy and coping with pressure). Together it creates professional competence. Thus competence indicated a set of knowledge, skills and behavior to efficiently perform their role and responsibilities - as their clients would expect (Maddy *et al.,* 2002; Harder *et al.,* 2010). The required knowledge, skills and abilities —will help to

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identify individuals with competencies that match to perform the work they are expected to do (Chong *et al.,* 2000). They emphasized that the necessary knowledge will then enable individuals to apply the right skills to work in any situation that may arise, while having the right attitudes and will also motivate them to put in their greatest efforts.

Developing competencies and understanding the organization and its employees are important to maintain a competitive advantage" (Vakola *et al.,* 2007; Benge *et al.,* 2011). Their study showed that the process to skill extensionists in India is a step forward that India requires. Identified competencies in extension require program planning, execution, implementation, and evaluation; faculty and public relations; professional and personal development; communication and management skills (Cooper and Graham, 2001).

In the realm of human resource management of agricultural extension professionals, it is still not clear as to which of the set of core competencies are required that they must achieve their extension tasks well (Gibson & Brown, 2003; Davis *et al.,* 2014). Previous reports mention the necessary skills for staffs, as planning, learning opportunities and resources, communication and information, professional development, account ability integration (Stone and Coppernoll, 2004).

The most important pre-accesscompetencies reported as required for extensionists were "self-management, program development process, communication skills, technical/ subject skills and interpersonal skills" (Benge *et al.,* 2011). The identified seven core competencies: for extensionists and these knowledge about extension, subject matter knowledge, ICT and communications kills, personal and professional ethics, leadership and human relation skills as desirable in extensionists are on record in this investigation.

On the other hand, additional competencies recognized by Texas Agri Life Extension, talk on competencies on organizational effectiveness and also, to develop and involve others with action orientation as well. There are numerous other studies/reports that support the concept to establish core competencies of Extensionists in a changing world, as an important goal to extend knowledge to farmers (Gonzalez, 1982; Reynolds, 1993; Boyd, 2003; Burke, 2002; Stone & Coppernoll, 2004). With these competencies in mind, the present study was taken up to identify areas where competency was lacking or required essentially in order to empower extensionists on field.

METHODOLOGY

Collecting data from Extensionists: The locale selected for the study was from States of Uttar Pradesh (UP) and Odisha due to their nutritional vulnerability. In UP villages of the districts Auraiya, Jalaun and Chitrakut and in Odisha various villages of district Sonepur were selected, by random sampling technique, to collect data on responses of extensionists. The sample size for extensionists was 200 and it comprised of Extension personnel from KVKs and line departments of the respective states. The categories of Competency in Knowledge; Personal skills Communication, Analysis and diagnosis, Leadership qualities, Initiative Personal qualities were used for data consolidation (Table 1).

The Category wise inventories for gap and desirability of competency-idenification: A need is described as a discrepancy or gap between "what is" (the present state of affairs in regard to the group and situation of interest), and "what should be", or desired state of affairs (Witkin and Altschuld 2000). Thus 'Training need', is operationalized in this study, as the difference in the skills expected or required in extensionists as against actual skills possessed by them, to do their job. In this study we adopted the Borich Need Assessments Model (Borich 1980).

Since this model relies on the extension agents' judgments about their own performance (s), we could set aside their needed skills from skills required by them to perform work. For this a dichotomous importance vs possessed competency in 5 point continuums: from least important to most important and very low to very high, was developed. A score of 1 on the scale showed the very low possession/ least important competency and number 5 signified the very high possession/most important competency. The extensionists were requested to give their self-perceived response on the identified 52 competency statements, on the possessed and importance of competency. To accomplish this objective, data were being then analyzed using mean weighted discrepancy scores (MWDS) and calculated for each competency using a three-step.

Calculated Discrepancy scores (DS):Level of importance -Level of possession.

DS=I-C

I: Importance level

C: Competency level

Weight Discrepancy Scores (WDS):

WDS = I (I-C)

The mean weighted discrepancy scores or weighted discrepancy scoreswere averaged yielding a MWDS. The mean weighted discrepancy scores (MWDS) were averaged yielding a MWDS. After that calculating grand means for level of importance (I), level of possession (C), and MWDS for each of the competency areas.

MWDS=$\sum$I (I-C)/n

MWDS indicate Mean Weight Discrepancies Scores

N indicate number of Extensionists

Barrier for the present study was operationalized as the factor that impeded the acquisition of required ICT based competencies by the extensionists. For assessing the barriers in acquiring the required competencies for the extensionists, a standardized Likert-type value scale was developed. Barriers were recorded on a 5 rating scale from 1 being "very low" to 5 being "very high". The final barrier scale for the extensionists consisted to 30 item statements.

A method of assigning weights, which applies hierarchy structure of Fuzzy Analytical Hierarchy Process (Fuzzy AHP). Fuzzy AHP methods is suitable to establish the weights of quality criteria. A Pairwise Comparison Matrix was constructed of utilizing the theory from (Wittkowski *et al.,* 2004) and converted to fuzzy pairwise comparison matrix. The weights have been computed using employing Genetic algorithm in the nonlinear optimization model the weights have been computed.

RESULTS AND DISCUSSION

Data from Extensionists:

Training is about bridging the gap between what is known (the present) and the level of skills required (the future) (Hughes, 2011). The training need is therefore a difference between the required level of individual competence and his/her present level of competence (Yondeowei and Kwarteng, 2006).

Skill gap analysis, based on mean weighted discrepancy was thus calculated to understand the skill gaps among the extensionists (Table 1). The MWDS (Table 1) differed on level of importance as against the level of possession on rating scalesofall parameters of Knowledge, Personal skills and Personal qualities of the extensionists.

Table 1: Skill gap analysis of extensionists based on competency levels of possession and importance Sample size

n=200

Competency categories	Level of possession		Level of importance		MWDS
	Scale 5 to 1 Very High-Very Low		Scale 5 to 1 Very Imp to Not Imp		
	Mean	SD	Mean	SD	
Knowledge					
Understand KVK mandate and objectives	2.58	1.309	2.45	1.352	1.96
Awareness of the current government Policies	2.61	1.187	2.28	1.289	2.07
Good understanding of district, people and Culture	2.43	1.391	2.31	1.362	2.08
Adequate technical knowledge in the subject matter	2.6	1.517	2.55	2.515	2.51
Awareness to approaches towards adult education	2.56	1.329	2.52	1.311	2.18
Personal skills					
Organization and planning					
Setting objectives for an extension program	2.74	1.159	2.52	1.131	2.28
Coordinating work schedules with otherpeer staff	2.57	1.383	2.51	1.359	2.39
Assessing training needs of the farmers	2.46	1.345	2.41	1.312	2.02
Evaluating extension program	2.45	1.264	2.47	1.315	1.96
Designing and conducting farmers trainings	2.6	1.483	2.48	1.319	2.08
Involving farmers in program planning	2.52	1.322	2.43	1.329	2.32
Dealing effectively with field /extension problems	2.46	1.403	2.42	1.346	2.22
Conducting survey in operational area	2.43	1.358	2.29	1.294	1.82
Designing a work plan for extension activities	2.54	1.41	2.44	1.406	2.11
Curriculum development	2.6	1.418	2.47	1.272	2.13
Managing time effectively	2.52	1.389	2.47	1.33	1.99
Conducting situational analysis of extension program	2.44	1.31	2.54	1.392	2.50
Use of PRA tools	2.41	1.246	2.3	1.273	1.89
Laying out FLD	2.43	1.286	2.37	1.35	2.33
Laying out OFT	2.48	1.323	2.51	1.284	2.25
Identifying appropriate educational delivery Technology Communication	2.62	1.398	2.65	1.456	2.58
Delivering radio talks	2.53	1.245	2.51	1.33	2.03
Establishing rapport with the farmers	2.59	1.281	2.6	1.308	2.66
Ability to prepare visual aids to help deliver information	2.71	1.284	2.47	1.322	2.66
Ability to use PowerPoint presentation	2.49	1.308	2.49	1.296	2.53
Ability to convey extension messages effectively	2.63	1.32	2.64	1.334	2.43
Ability to present seminar	2.55	1.276	2.41	1.293	2.34
Ability to persuade farmers to adopt technologies	2.62	1.34	2.6	1.429	2.66
Write effectively for target audience	2.74	1.384	2.69	1.395	2.60
Provide feedback of researchable problems to researchers	2.8	1.408	2.74	1.423	2.27
Delivering TV talks	2.48	1.233	2.52	1.418	2.68
Analysis and diagnosis					
Using local leaders to influence farmers to change	2.71	1.337	2.68	1.3	2.65
Analyzing traditional culture and its effect on change	2.68	1.28	2.7	1.393	2.78
Analyzing how change in social status affect farmers	2.65	1.318	2.48	1.341	2.46

Finding ways to encourage farmers to adopt innovations	2.75	1.487	2.58	1.464	2.58
Identifying problems of farmers and why they arise	2.67	1.309	2.54	1.322	2.51
Recognizing learning differences in age groups	2.75	1.284	2.61	1.338	2.59
Leadership qualities					
Visualizing future extension prospects and problems	2.72	1.298	2.65	1.345	2.62
Possessing self-motivation, determination & dedication	2.63	1.32	2.53	1.389	2.48
Leading farmers	2.86	1.336	2.48	1.311	2.72
Seeing both sides of arguments in question	2.77	1.428	2.69	1.305	2.95
Providing leadership in program planning and execution	2.68	1.326	2.6	1.225	2.72
Applying persuasive style to inform clientele	2.69	1.333	2.52	1.204	2.53
Initiative					
Introducing new methods in extension work	2.82	1.26	2.69	1.339	2.99
Implementing extension activities without supervision	2.6	1.257	2.39	1.207	2.59
Confidence to work withoutsupport and guidance	2.66	1.227	2.62	1.186	3.02
Personal qualities					
Sensitive to the feelings and wishes of farmers	2.67	1.229	2.62	1.231	2.31
Maintaining relationship with farmers	2.73	1.199	2.63	1.336	2.64
Confidence in own abilities to meet set objectives	2.65	1.284	2.73	1.393	2.94
Commitment to extension work	2.65	1.33	2.44	1.291	2.45
Reliability in implementing extension work	2.61	1.252	2.4	1.232	2.17
Sure of what is being done everyday	2.66	1.215	2.49	1.261	2.46

Knowledge of Extensionists: Table-1 clearly depicts that in the "knowledge" category Adequate technical knowledge in the subject area was highest (MWDS 2.51) and Understand KVK mandate and objectives was lowest (MWDS 1.96), a skill gap expressed in the assessment. This aspect of knowledge in an extensionist along with low awareness of current government Policies, understanding of district, people and culture and Awareness to approaches so as to deal with low educated adult farmers also is important, while an extensionist is working at ground level, (Table 1). Extensionists thus chiefly need empirical learning that can provide them with opportunities to relate to rural people in an interactive process so that both technical and scientific knowledge with local indigenous knowledge is client-centered to problem solving during extension activities (Radhakrishna and Thomson, 1996). To satisfy this condition, there is a need to regularly analyze the technical competence and job performance of extensionists in the organization.

Personal skills: In sub category "Organization and Planning" Identifying appropriate educational delivery technology showed highest mean score (MWDS 2.58) while Conducting survey in operational area showed lowest mean score (MWDS 1.82).

In subcategory "Communication", extensionist showed ease in Delivering TV talks as shown by highest mean score (MWDS 1.82), while in Delivering radio talks it was at lowest mean score (MWDS 1.82), skill gaps expressed by the extensionists.

The sub category "Analysis and diagnosis" in Analyzing traditional culture and its effect on change had highest mean score (MWDS 2.78) while Identifying problems of farmers and why they arise was at lowest mean score (MWDS 2.51) of skill gap among the respondents.

It is clear from the Table-1 In the sub category "Leadership qualities", the extensionists perceived Seeing both sides of arguments in question, as a highest mean score (MWDS 2.95) whereas Possessing self-motivation, determination & dedication showed a lowest mean score (MWDS 2.48) skill gap.

Working in the field condition requires lot of determination and motivation, which has been exhibited by the extension professionals as exemplified by the sub category of "Initiative" Confidence to work without support and guidance which had highest mean score (MWDS 3.02) but Implementing extension activities without supervision was at lowest mean score (MWDS 2.59) value skill gap.

The above information on skill gaps in extensionists, there is need to rationalize training to of the same messageand more exposure to relevant technology, communication skills and techniques for personal development and frequent contact between several categories of extensionists as was reported earlier (Allo, 2001).

Personal qualities: This category showed that Confidence in own abilities to meet set objectives was highest mean scored (MWDS 2.94) and Reliability in implementing extension work had lowest mean score (MWDS 2.17) as skill gap. This information may point to a medium level of competency among extensionists and a clear gap that exists between the perceived current level of competency and level of importance (Ghimire, 2016).

Barriers in acquiring the required competencies

The competency development is essential in all fields to perform at the fullest level. Nevertheless, the development of competencies is subjected to many barriers. The barriers to competency were thus grouped into three categories, such as Institutional barrier, Personal barriers and Professional barriers (Table 2). These barriers were identified using AHP.A perusal of

data in Table 2 indicated that the highest value (weight= 8.08) on this scale was reported for "Lack of up gradation of ICT equipment" followed by "Erratic Internet connectivity and High cost of repairing ICTs" (weight= 7.75). However, the other barriers also persist at lower values and thus a barrier free competency will be ideal for the best extension results.

Table 2: Extensionists identified Barriers to acquiring the ICT competencies

n=200

Category A: Institutional barrier/ Maintenance	Weights (AHP)
Lack of latest infrastructure.	5.97
Lack of financial resources/ budget	4.52
Bureaucratic delays and focus on paper works	5.73
Failure to provide timely transportation facilities	4.05
Failure in delineating the work (multiple roles)	4.39
Apathy towards extension system and professionals	6.51
Lack of training needs assessment.	3.94
Lack of training institutes and experts in the required areas.	4.83
Problem of viruses and junk mails	4.40
Erratic Internet connectivity	7.75
Insufficient number of ICT tools in the organization	7.31
Insufficient regional specific language apps etc.	7.08
High cost of repairing ICTs	7.75
Technical and Infrastructure problem encountered while using ICTs	6.42
Lack of up gradation of ICT equipment	8.08
Lack of familiarity with modern tools	6.31
Electricity Supply	4.95
Category B: Personal barriers	
Lack of willingness to learn among the extensionists	19.29
Lack of professionalism.	21.68
Inadequate information about training and training institutes.	32.13
Problems of maintenance/ Poor maintenance of ICT tools	26.90
Category C: Professional barriers	
Lack of training need assessment	9.20
Inadequate training based on the assessed need	8.08
Lack of credible information	10.33
Educational resources out of reach	11.03
Lack of training opportunities	10.36
Ineffective training delivery methods	7.82
Inadequate funding	21.59
Lack of facilities for professional growth in the organization	13.54
Inadequate technically competent personnel in using ICTs	8.06

Institutional barriers: The other barriers the extensionists identified were "Insufficient number of ICT tools in the organization" (weight= 7.31) and Insufficient regional specific language apps *etc.* (weight=7.08). Apathy towards extension system and professionals (weight= 6.51) and Lack of familiarity with modern tools (weight= 6.31). Lack of latest infrastructure (weight 5.97). Bureaucratic delays and focus on paper works (weight= 5.73), and Electricity Supply (weight= 4.95). Lack of training institutes and experts in the required areas with the lowest value (weight= 4.83).

Data in table further show that "Lack of financial resources/ budget" (weight= 4.52) and "Problem of viruses and junk mails" (weight= 4.40). Failure in delineating the work (weight= 4.39), Failure to provide timely transportation facilities (weight= 4.05) and Lack of training need assessment (weight= 3.94).

Personal barriers: Data related to personal barriers in Table-2 depict that Inadequate information about training and training institutes (weight= 32.13), Problems of maintenance/ Poor maintenance of ICT tools (weight= 26.90) and Lack of professionalism (weight= 21.68). Lack of willingness to learn among the extensionists (weight=19.29). Training (in-service) is required to assist extensionistslearn how to manage their resources for effective programmimg, professional and organizational development.

Professional barriers: It was observed that "Inadequate funding was reported as barrier in acquiring the desired competencies (weight= 21.59)". Lack of facilities for professional growth in the organization (weight= 13.54) and "Educational resources out of reach" (weight= 11.03). It was found that "Lack of training opportunities" (weight= 10.36). "Lack of credible information were also affecting barriers (weight= 10.33)" and Lack of training need assessment (weight= 9.20); Inadequate training based on the assessed need (weight= 8.08); Inadequate technically competent personnel in using ICTs (weight= 8.06). Ineffective training delivery methods (weight= 7.82); Understanding the root cause of these inter-related barriers is important to overcome these barriers.Similar findings were alsoreported earlier (Lakai, 2012; Rohit *et al.,* 2020).

Information was not adequate about training and training institutes, the problems in poor maintenance of ICT tools, lack of professionalism and inadequate funding. In this regards for instance, lack of funding has limited the hiring of new Extensionists, compelling existing Extensionists to stretch their service to meet the needs of increasing clientele. This situation has led to an increase in the Extensionists workload along with limited available time that is needed to acquire the competencies. Understanding the root cause of these inter-connected barriers is essential to overcome these barriers. Lack of training opportunities and ineffective training delivery

methods are barriers that would have in turn led to better delivery of information to farmers. These barriers could be removed by properly planning training opportunities with effective teaching methods beforehand to ensure participants to acquire desired competencies. Extensionists perceived that face-to-face small group training workshops were the most effective educational delivery method(s) in acquiring competencies. The most important implication of this finding is that in-service training as small groups for the extensionists were organized. Since it is important significant to take essential steps to overcome the barriers and significant to acquire desired competenciesby Extensionists . If needed steps were not taken, overstretched Extension will compromise its quality of service that can be avoidable.

CONCLUSION

The development of a unified approach to the determination of the essence and structure of global competence and its place in extensionists-competence, will help to strategise/organize national (regional) policies and Programme, with a focus on the challenges and prospects in the age of globalization. As achievement of extension targets largely depends on extensionists skillsthe lack of such skills will lead to unsatisfactory extension services and education to farmers. Extension evaluation has now gained attention as an important link between planning and reaching out, for the future programmes. Our study has shown the various parameters on which extensionists can be further trained and Institutional barriers can be removed as much as possible to have a hassle free extension that can be used as a model to overcome barriers to reach out to farmers through extension.

Paper received on : October 02, 2019
Accepted on : January 15, 2020

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