Biological Forum – An International Journal **14(4a): 672-680(2022)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Relationship of Profile characteristics of Extension Personnel with Effectiveness of Programmed Instruction

Manjula N.[1*], Chandregowda M.J.[2], Shivashankar M[3]. and Srinivasa Reddy M.V.[4]

[1]Associate Professor, Department of Agricultural Extension, College of Sericulture, University of Agricultural Sciences, Bangalore (Karnataka), India.
[2]Principal Scientist (Agricultural Extension), ICAR-ATARI, Zone-XI, Bangalore (Karnataka), India
[3]Scientist (Home Science), Department of Food Science and Nutrition, Krishi Vigyan Kendra, Hassana, University of Agricultural Sciences, Bangalore (Karnataka), India.
[3]Assistant Professor, Department of Agricultural Extension, College of Sericulture, Chintamani (Karnataka), India.

(Corresponding author: Manjula N.)*
(Received 10 September 2022, Accepted 22 November, 2022)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: Agricultural Extension is a system of an informal education which aims at improving agriculture by educating the farmers. Hence, the extension functionaries should be educated on the new innovations in agriculture from time to time so that, they inturn educate the farmers in a better way. While searching for the new educational technology, Programmed Instruction (PI) was found to be an effective method, which was proved in many fields and with various categories of subjects. Hence, an experimental study was conducted to analyze the effectiveness of PI in bringing desirable changes in the cognitive and affective domains of extension functionaries on the subject, 'Climate change, its impact, mitigation and adaptation strategies in agriculture', an experimental study was conducted using Solomon four group design: before-after with three controls considering 240 respondents. Correlation coefficients were worked out between effectiveness scores of PI and the personal and situational, communication and extension education variables of extension functionaries. The results revealed that Educational level (0.419), job involvement (0.375), organisational commitment (0.437), leadership abilities (0.380) and participation in capacity building activities (0.391) were positively related to the effectiveness of PI at one percent level. Whereas, the job satisfaction (0.463), achievement motivation (0.726), contacts with research system (0.725), climate change orientation (0.571), exposure to print media (0.663), exposure to electronic media (0.534), agricultural articles reading habit (0.454) and time spent in field extension work (0.681) were positively and significantly related with the effectiveness of the PI of extension functionaries at five percent level. Further, no significant relationship was observed among the variables such as Rural - urban – background (0.261), Experience (0.131), job autonomy (0.070), Job stress (0.105), Organisational stress (0.153), Organisational climate (0.135).

Keywords: Programmed instruction, profile characteristics, extension personnel, effectiveness, relationship.

INTRODUCTION

Programmed instruction is a method of presenting new subject matter to learners in a graded sequence of controlled steps. Learners work through the programmed material by themselves at their own speed and after each step test their learning by answering a question. They are then immediately shown the correct answer (Crowder, 1964). It is described as both a product and a process. As a process, PI is used for developing instruction systematically, starting with behavioural objectives and using tryouts of the instruction to make sure that it works satisfactorily. As a product, PI has certain key features, such as highly structured sequence of instructional units (frames) with frequent opportunities for the learner to respond via questions, typically accompanied by immediate feedback (Bullock,1978). The studies of Jensen (2006) revealed that in PI learning process, slow learners are not kept back and gifted learners would perform to their own higher capacities. Wendy and

Mathew (2007) described that PI is not only a technique for effective learning but also a successful mechanism of feedback device for the modification of behaviour. The research findings of Uhumuavbi and Mamudu (2009) have shown that the technology of PI does not treat learners any differently and hence, bias on the part of teacher is eliminated in teaching through PI. Letina and Dikovic (2012) stated that PI develops critical thinking, which has a potential to produce positive learning environments that are supportive, structured and, most importantly, directed toward training learners for independent lifelong learning. Singh (2014) described that usage of PI eliminates social and emotional problems and can solve the problems of discipline. Further, by incorporating programming principles into text book writing improves the communication potential of conventional text books.

There were very few attempts made to utilize this method by the agricultural extension functionaries to educate the farming communities in the past. Owing to its efficiency and effectiveness in different fields of education, an experimental study was conducted to explore its potential to bring desirable changes in the cognitive and affective domain of extension functionaries. Further, to analyse the Relationship of profile characteristics of extension personnel with Effectiveness of PI, the overall effectiveness scores of PI was correlated with the personal and situational, communication and extension education variables of extension functionaries.

MATERIAL AND METHODS

The experiment was conducted in the Staff Training Unit of University of Agricultural Sciences, Bangalore during trainings organised to Extension Functionaries *viz*., Agricultural Officers (AOs) / Assistant Agricultural Officers (AAOs) of the Karnataka State Department of Agriculture (KSDA), India. The research design used was Solomon four group experimental design: before-after with three controls. The sample for each of PI and Lecture method consisted of four groups with 30 extension functionaries in each group and hence, a total of 240 extension functionaries constituted the sample respondents for the study.

For investigation, the PI material consisting of 65 frames was developed using the linear method of programming on the contemporary subject- climate change, its impact, mitigation and adaptation strategies in agriculture. The readability of PI material was found to be at IX grade indicating that the persons with ninth standard and above can easily read and understand.

In the process of measuring the changes in the cognitive and affective domains, scales were developed and standardized. The scale consisted of five items to measure each of the six sub domains of cognitive domain and five items to measure each of five sub domains of affective domain and thus, totally cognitive domain scale contained 30 items and affective domain scale contained 25 items.

The quantification of effectiveness of stimulus on cognitive domain was worked out using the following formula.

$$ECD = \sum_{n=1}^{5} \frac{AKS}{PKS} X100 + \sum_{n=1}^{5} \frac{ACS}{PCS} X100 + \sum_{n=1}^{5} \frac{AApS}{PApS} X100 + \sum_{n=1}^{5} \frac{AAnS}{PAnS} X100 + \sum_{n=1}^{5} \frac{ASS}{PSS} X100 + \sum_{n=1}^{5} \frac{AES}{PES} X100$$

Where,

ECD = Effectiveness of stimulus on cognitive domain
AKS = Actual knowledge score
PKS = Possible knowledge score
ACS = Actual comprehension score
PCS = Possible comprehension score
AApS =Actual application score
PApS =Possible application score
AAnS = Actual analysis score
PAnS = Possible analysis score
ASS = Actual synthesis score
PSS = Possible synthesis score
AES = Actual evaluation score
PES = Possible evaluation score

Similarly, the quantification of effectiveness of stimulus on affective domain was worked out using the following formula.

$$EAD = \sum_{n=1}^{5} \frac{AReS}{PReS} X100 + \sum_{n=1}^{5} \frac{ARpS}{PRpS} X100 + \sum_{n=1}^{5} \frac{AVS}{PVS} X100 + \sum_{n=1}^{5} \frac{AOS}{POS} X100 + \sum_{n=1}^{5} \frac{AIS}{PIS} X100$$

Where,

EAD = Effectiveness of stimulus on affective domain
AReS = Actual receiving phenomena score
PReS = Possible receiving phenomena score
ARpS =Actual responding to phenomena score
PRpS =Possible responding to phenomena score
AVS =Actual valuing score

PVS =Possible valuing score
AOS =Actual organisation score
POS =Possible organisation score
AIS =Actual internalising values score
PIS =Possible internalising values score

The quantification of overall effectiveness of stimulus was worked out using the following formula.

$$EO = ECD + EAD$$

Where,

EO = Overall effectiveness of stimulus
ECD = Effectiveness of stimulus on cognitive domain
EAD = Effectiveness of stimulus on affective domain

The profile characteristics of extension personnel *viz.*,1) Personal and situational variables; 2) Communication and extension education variables were the independent variables which are measured using the scales as detailed below.

Sr. No.	Variable	Measurement
	I. Personal and situational variables	
X_1	Educational level	Schedule developed for the study
X_2	Rural-Urban background	Procedure by Hosur (1977)
X_3	Experience	Schedule developed for the study
X_4	Job autonomy	Scale of Hackman and Lawler (1971)
X_5	Job involvement	Scale of Lodahl and Kejner (1965)
X_6	Job satisfaction	Scale of Kherde (1971)
X_7	Job stress	Scale of Matteson and Ivancevich (1982)
X_8	Organizational stress	Scale of Matteson and Ivancevich (1982)
X_9	Organizational commitment	Scale of Porter *et. al.* (1974)
X_{10}	Achievement motivation	Scale of Reddy (1976)
X_{11}	Leadership abilities	Scale of Nandapurkar (1982)
X_{12}	Organizational climate	Scale of Kolbe *et al.* (1974)
X_{13}	Contacts with research system	Schedule developed for the study
X_{14}	Climate change orientation	Scale developed for the study
	II. Communication and extension education variables	
X_{15}	Exposure to print media	Scale of Nagaraja (2004)
X_{16}	Exposure to electronic media	Scale of Nagaraja (2004)
X_{17}	Agricultural articles reading habit	Scale of Nagaraja (2004)
X_{18}	Participation in capacity building activities	Schedule developed for the study
X_{19}	Time spent in field extension work	Schedule developed for the study

The correlation test was conducted to the effectiveness scores and the independent variables to know their relationship and influence.

RESULTS AND DISCUSSION

The data related to the Correlation coefficients between effectiveness scores of PI and the selected personal and situational, communication and extension education variables of extension functionaries is presented in the Table1.

It could be seen from the table that the correlation coefficients in respect of eight variables namely, job satisfaction (X_6), achievement motivation(X_{10}), contacts with research system (X_{13}), climate change orientation (X_{14}), exposure to print media (X_{15}), exposure to electronic media (X_{16}), agricultural articles reading habit (X_{17}), and time spent in field extension work (X_{19}), were found positively significant at one per cent level indicating the positive and significant relationship between the effectiveness of PI and these variables. Whereas, five variables *viz.*, educational level(X_1), job involvement (X_5), organisational commitment (X_9), leadership abilities (X_{11}), and participation in capacity building activities (X_{18}) were found to be significant at five per cent level indicating the positive and significant relationship between the effectiveness of PI and these variables also. However, remaining six variables namely, rural-urban background, experience, job autonomy, job stress, organisational stress and organisational climate were found to be not significantly related to the effectiveness of PI. The results of each variable are discussed in the ensuing paragraphs.

Table 1: Correlation between effectiveness of PI and selected personal and situational, communication and extension education variables of extension functionaries (n = 30).

Variable No.	Variable	r value
X_1	Educational level	0.419 *
X_2	Rural - urban - background	0.261 NS
X_3	Experience	0.131 NS
X_4	job autonomy	0.070 NS
X_5	Job involvement	0.375 *
X_6	Job satisfaction	0.463**
X_7	Job stress	0.105 NS
X_8	Organisational stress	0.153 NS
X_9	Organisational commitment	0.437 *
X_{10}	Achievement motivation	0.726**
X_{11}	Leadership abilities	0.380 *
X_{12}	Organisational climate	0.135 NS
X_{13}	Contacts with research system	0.725 **
X_{14}	Climate change orientation	0.571 **
X_{15}	Exposure to print media	0.663 **
X_{16}	Exposure to electronic media	0.534 **
X_{17}	Agricultural articles reading habit	0.454 **
X_{18}	Participation in capacity building activities	0.391 *
X_{19}	Time spent in field extension work	0.681**

NS- Not significant
** - Significant at 5 per cent level*
*** - Significant at 1 per cent level*

Personal and situational variables

Educational level. The educational level of extension functionaries (0.419) had positive and significant relationship with their effective learning in PI indicating that the extension functionaries with higher educational qualifications performed better compared to those with lesser education.

The respondents in the study were AOs and AAOs, whose qualification ranged from 10th class to doctoral degree in agricultural sciences. Among the respondents with higher qualification, it is natural to observe better perception and comprehension than others. Higher education also helps to interpret ideas in a rational manner resulting in pragmatic decision making. A better educated person gathers information and relates it to his environment. In the present study, the technical content was very much relevant to the present day context. The readability of the PI material was at IX grade. Therefore, the better educated extension functionaries could quickly and correctly understand and learn the subject. Therefore, it is natural to expect the findings of the study. There were no studies to highlight the relationship between effectiveness of PI and the level of education. However, similar findings of Sandika, *et al*. (2007) in respect of organisational climate perceptionlend support for the findings of the study.

Rural-urban-background. Extension functionaries' effectiveness of PI had no significant relationship with their rural-urban-background (0.261) indicating that, the learning was almost same among the extension functionaries irrespective of their rural-urban background.

The very nature of work of AOs and AAOs is to work in the rural areas with farm families. Even, an extension worker with urban background (born and studied) will quickly acclimatise to rural set up as there will be more village oriented practical classes in their formal education. The subject included in the PI was topical and relevant to every extension functionary. Therefore, it is justifiable to observe non significant relationship between effectiveness of PI and rural-urban background of extension functionaries. There were no studies to highlight the relationship between effectiveness of PI and the rural-urban background. The findings of Dhiraj and Pandey (2012); Christian and Chauhan (2012) observed no relationship between rural-urban background and knowledge level, attitude and performance of extension functionaries.

Experience. The experience of the extension functionaries (0.131) showed no significant relationship on the effectiveness of the PI material indicating that irrespective of experience of extension functionaries, the performance was same.

People hardly learn anything being told to them. But, they learn quickly when they find it good and suitable for themselves. Experience provides such an opportunity and regarded as most valuable thing. By virtue of extension functionaries' experience on the job, can easily understand and comprehend the technology relevant to their situation. Therefore, all the extension functionaries have equally performed in acquiring the technology on climate change through PI method. Hence, the occurrence of the result is logical.

Job autonomy. It is observed from the results that, job autonomy (0.070) of the extension functionaries had no relationship with the effectiveness of the PI.

The nature of work of AOs and AAOs is to provide technical guidance as well as supply of inputs and extending subsidies to the farmers visiting the Raitha Samparka Kendras (RSKs). Therefore, the extension

functionaries will perform almost the same kind of job irrespective of their geographical distribution in different RSKs. Further, there are no distinct hierarchical positions in RSKs. The line of command and span of control for these categories of extension functionaries is same. Hence, every extension functionary will have autonomy in performing the job. Even there will not be much difference in learning patterns. Therefore, it is logical to expect this result. There were no studies to highlight the non significant relationship between effectiveness of PI and the job autonomy. However, the findings of Patil (1994); Manjunath *et al.* (2008); Manjunath and Shashidhara (2011) showed significant relation between the job autonomy and their job performance.

Job involvement. It has been observed positive and significant correlation between the job involvement (0.375) of the extension functionaries and the effectiveness of the PI.

Job involvement is the extent of identifying oneself psychologically with the work. It is the commitment by an extension functionary towards the job. The theory of commitment to activism by Learner (1981) states that, success in any activity depends on how committed a person to that activity. For this, passive acceptance of innovations coming from outside and also self initiative to innovate is essential. This indicates that a person with high degree of job involvement always try to learn new things from different sources and also innovate by self. These qualities in those extension functionaries could acquire the subject and answered more questions correctly in the PI material. Therefore, findings seem to be valid. There were no studies to highlight the significant relationship between effectiveness of PI and the job involvement. The findings are in line with Sandika *et al*. (2007) on organisational perception of extension functionaries,

Job satisfaction. Extension functionaries' job satisfaction (0.463) had a significant relationship with the effectiveness of the PI of extension functionaries.

Job satisfaction refers to the attributes and feelings people have about their work. Positive and favourable attitudes towards their job indicate the job satisfaction. Negative and unfavourable attitudes towards the job indicate the job dissatisfaction. Job satisfaction theories have a strong overlap with theories explaining human motivation. The satisfied employees tend to be more committed, creative, and more productive to their organisations. The persons with better motivated and satisfied tend to acquire the information for better performance in his job. Hence, the extension functionaries with high job satisfaction might have learnt the subject on climate change in a better way compared to the less satisfied persons.

The findings of Sunil and Sundaraswamy (1998) on job performance, Nagananda *et al.* (2006) on job satisfaction, Sandika *et al*. (2007) on organisational climate perception showed significant relationship between job satisfaction.

Job stress. Job stress (0.105) was found to be not significantly related with the effectiveness of PI of extension functionaries.

Job stress is both psychological and physical pressure on the employee. The job of extension functionaries working in RSKs is to provide need based technical information to the farmers, extending subsidy facilities offered by the Govt. and sale of available agricultural inputs to the farmers. These activities will not exert more physical and psychological pressure on the extension functionaries. Therefore, job stress had no significant effect on the learning of subject on climate change provided in the PI. There were no studies to highlight the significant relationship between effectiveness of PI and the job stress. However, the findings of Sunil and Sundaraswamy (1998) on job performance, Nagananda *et al.* (2006) on job involvement, Sandika *et al*. (2007) on organisational climate perception support the findings.

Organizational stress. There existed no significant relationship between the organisational stress (0.153) and the effectiveness of PI of extension functionaries.

Organisational stress is the extent of physical and psychological pressure on an extension functionary with respect to procedures, policies, requirements, orders *etc*. The AOs and AAOs are supposed to be the field level extension functionaries in KSDA. The department does not seem to have policies and procedures to exert higher degree of physical and psychological stress on the respondent category officials. Therefore, the organisational stress had no bar on learning by the respondents in the PI approach. There were no studies to highlight the significant relationship between effectiveness of PI and the organisational stress. However, the findings of Sunil and Sundaraswamy (1998) on job performance of extension functionaries, Manjunath *et al*. (2008) on teaching productivity of teachers, Manjunath and Shashidhara (2011) on scientific productivity of teachers of Agricultural Universities support the findings.

Organizational commitment. There existed a positive and significant relationship between the organisational commitment (0.437) and the effectiveness of PI of the extension functionaries. One of the probable reasons might be that, the extension functionaries with organisational commitment tend to serve for the organisation in whatever the means as possible. It is no exceptional that, the learning of new information related to the farming problems which will be very much useful in their daily interface with the farming community which in turn provide reputation for their organisation. They might have wanted to fully utilise the opportunity provided to them to learn the subject through innovative method of PI. The committed extension functionaries might have wanted to learn the new subject on climate change covered in the PI material which will be useful to

them in their routine contacts with the farmers. There were no studies to indicate the significant relationship between effectiveness of PI and the organisational commitment. However, the results are in line with the findings of Sunil and Sundaraswamy (1998) on job performance of extension functionaries, Manjunath *et al.* (2008) on teaching productivity of teachers, Manjunath and Shashidhara (2011) on scientific productivity of teachers.

Achievement motivation. Achievement motivation (0.726) was found to have positive and significant relationship with the effectiveness of PI of the extension functionaries. Similar findings were reported by Sunil and Sundaraswamy (1998) on job performance, Jahagirdar and Balasubramanya (2008) on feedback behavior. The findings of Gangadharappa and Ganesamoorthi (2010) are also in line with the findings related to communication efficiency of researchers involved in watershed development.

Achievement motivation is the important determinant of striving towards excellence and perfection. Hence, the extension functionaries with high achievement motivation might have the pride of becoming the outstanding personnel in the department. In order to achieve this distinction, the extension functionaries might have learnt the subject covered in the PI material and might have exercised adequately in acquiring all the sub-domains of the cognitive and affective domains. Further, achievement oriented individual strives without regard for reward which automatically gets manifested. Thus, the achievement motivation might have correlated with the effectiveness of PI on the extension functionaries.

Leadership abilities. The positive and significant correlation was observed between the leadership abilities (0.380) and the effectiveness of PI of the extension functionaries.

The extension functionaries with high leadership abilities tries to learn the new information much earlier and faster compared to the others. It is quite natural that the efficiency of the leaders will be much higher compared to the others. The extension functionaries with high leadership abilities might have wanted to acquire the new information on the climate change subject so that they can suggest the others in management of the climate change through mitigation and adaptation strategies in agriculture. They might have also felt that, if they know the new information, the followers will be more, and the pleasure of leadership increases with the increase in followers. Hence, the study might have yielded such results. There are no studies supporting the results with respect to learning through PI. However, the results are in line with the findings of Chandargi (1996) on job satisfaction, Sebsibie (2002) on information management system of extension functionaries.

Organizational climate. It is found that the organisational climate (0.135) had a no significance influence on the effectiveness of PI of the extension functionaries.

Organisational climate is the perception of extension functionaries about their work place, facilities, support of fellow workers, control mechanism, reporting system *etc*. By and large, the KSDA provides good organisational climate with reasonably good facilities, scope for updating the technical competence from time to time and good working relationship among peers. The staff working in RSKs (respondents of the study) had good and uniform feeling about organisational climate leading to this kind of findings. No findings to directly support or contradict were available. However, the results are contradicted by the findings of Sunil and Sundaraswamy (1998) on job performance. of extension functionaries.

Contacts with research system. It has been found that the contacts with the research system (0.725) had a significant correlation with the extension functionaries' effectiveness of PI.

The contact with the research system by extension functionaries will provide scope for sharing the technological problems and seeking solutions to the field problems, know the latest developments in the research system, the technologies in pipeline, emerging issues, *etc*. Also, such persons try to get the scientific literature, videos and other forms of information on new and novel technologies. This habit naturally widens the scientific orientation and innovative proneness. Therefore, it is possible to expect better performance by those extension functionaries having higher degree of contacts with the research system. Although there are no direct findings to support or contradict the results of the study, the findings of Sarada *et al.* (2005) indicated positive and significant relationship between the research system contact and communication effectiveness of extension functionaries. Whereas, the findings of Nagananda *et al.* (2006) indicated that research system was a credible source of information for extension functionaries.

Climate change orientation. The climate change orientation (0.571) of the extension functionaries had found significant correlation with their effectiveness of PI.

The climate change orientation is the individual's perception towards climate change, his attitude towards mitigation and adaptation strategies in agriculture for the changing climatic conditions. The extension functionaries having favourable perception and orientation towards effect of climate change, mitigation and adaptation strategies will evince keen interest when information on the subject is presented to them. They will be in the habit of updating the information on this subject. When, climate change, its impact, mitigation and adaptation strategies in agriculture was presented in the form of PI material, it could have influence on learners in two ways. Firstly, interest in the subject itself and secondly, novelty in presenting the subject in the form of PI frames. Therefore, it is logical to expect

positive and significant relationship between the climate change orientation and the effectiveness of PI.

Communication and extension education variables

Exposure to print media. There existed a significant relationship between respondents' exposure to print media (0.663) and effectiveness of the PI of the extension functionaries. The higher levels of exposure to print media would facilitate the individual to develop habits of gathering more information through, bulletins, journals, magazines, leaflets and other publications in addition to newspapers. Such individuals are in readiness to read and learn the new information than the others who do not have exposure to other forms of print media. The reading and learning rate is more among those expose to print media and their grasping power will be more. The respondents with such exposure can definitely perform better in acquiring the information presented in the PI material. Therefore, it is logical to obtain such results.

Exposure to electronic media. Effectiveness of PI of extension functionaries and their exposure to electronic media (0.534) was positively and significantly related.

In the recent years, the electronic media plays a very significant role in dissemination of agricultural technology. The important electronic media in present day use are, television, cable network/DTH, videos/DVDs, internet, mobile, smart phone, radio, agricultural technology related portals etc. The extension functionaries also have exposure to several of these media in acquiring variety of information and also use personally to disseminate technology to farmers. The persons with more exposure to electronic media will access the required information from different electronic media to solve field problems, to educate and convince the farming community. Therefore, it is obvious to observe significant relationship between exposure to electronic media and acquisition of information through PI. There were no studies indicating the significant relationship between effectiveness of PI and exposure to electronic media. However, the findings of the study gets the support from previous studies relating to Sunil and Sundaraswamy (1998) on job performance, Jahagirdar and Balasubramanya (2008) on feedback behavior, Jahagirdar and Balasubramnya (2010) on communication behaviour of extension functionaries.

Agricultural articles reading habit. There was a positive and significant relationship between reading habit of agricultural articles (0.454) and effectiveness of PI of extension functionaries. This might be due to the fact that regular reading of agricultural articles provides an opportunity to the reader to quickly understand the message presented in similar subjects. They can also accurately grasp the technical content. Theory of association states that, interrelated practices or items are learnt faster by the learners. This will significantly operate among such readers. Also, media system dependency theory, which envisions cognitive psychological process that increases the likelihood of one's being affected by particular media content, decides actively what he or she wishes to read. Greater the dependence on media, greater would be the degree of cognitive and affective arousal. If the reader is cognitively and affectively aroused, then he engages in careful processing of information that allows them to recall or remember the information after exposure. Thus, it is natural to expect a positive and significant relationship between reading habit of agriculture articles and effectiveness of PI of extension functionaries. There were no studies indicating the significant relationship between effectiveness of PI and agricultural articles reading habit of extension functionaries.

Participation in capacity building activities. Extension functionaries' participation in capacity building activities (0.391) had a positive and significant relationship with their effectiveness of PI.

Trainings and capacity building approaches provide the means by which desired changes in knowledge, attitude and skills related to the technologies can be brought about. The KSDA has a built in mechanism to depute the extension functionaries to different training and capacity building programmes organised by State Agricultural Universities, MANAGE, Hyderabad, NIRD, Hyderabad and other agencies. Hence, the staff will have opportunity to participate, interact, and acquire the latest agricultural technologies from time to time. Similarly, they do participate in the other capacity building activities such as field days, krishimela, study tours, workshops, seminars, conferences etc., which also provide an opportunity to acquire new technological innovations. The trainings on climate change related areas such as agro advisory, climate resilient agriculture, disaster management practices *etc*., would have also influenced their acquisition of information. Therefore, it is apparent that, greater the participation in the capacity building activities by the extension functionaries, greater will be their effectiveness of the PI. Therefore, the effectiveness of PI of the extension functionaries might have been influenced their effectiveness. There were no studies indicating the significant relationship between effectiveness of PI and participation in capacity building of extension functionaries. However, the results are in line with the findings of Sandika *et al*. (2007) on organisational climate perception.

Time spent in field extension work. There was a positive and significant relationship between extension functionaries' time spent in field extension work (0.681) and their effectiveness of PI.

The probable reason might be that, more intensive their field extension work, they acquire more and more of field level problems and the new problems which were not known earlier. As well, when they read through PI material, their experiences of field situation would support and strengthen their learning. The theory of association, where interrelated practices are learnt faster by the learner will operate in this situation. Therefore, it is evident to observe strong relationship between time

spent in field extension work and learning from PI method on a topical subject. There were no studies directly to support the learning with respect to PI. However, the findings Sebsibie (2002) indicated positive correlation between field contact span and the information management system by the extension functionaries.

CONCLUSIONS

The findings of the study clearly revealed that, Educational level, job involvement, job satisfaction, organisational commitment, achievement motivation, leadership abilities, contacts with research system, climate change orientation, exposure to print media, exposure to electronic media, agricultural articles reading habit, participation in capacity building activities and time spent in field extension work were positively and significantly related with the effectiveness of the PI of extension functionaries. Hence, PI may be considered as an effective method to teach the extension functionaries on agricultural subjects from time to time. The PI instructional approach can be used to educate the para extension workers like facilitators in Bhoochethana programme, Assistant Technology Managers, Block Technology Managers, Subject Matter Specialists of ATMA, contact farmers in KVKs *etc*.

Acknowledgement. Authors are thankful to the Staff Training Unit and Directorate of Extension, UAS, Bangalore for providing support to conduct the experiment in their institute and the Staff of Karnataka State Department of Agriculture, who served as sample for the study.
Conflict of Interest. None.

REFERENCES

Bullock, D. (1978). *Programmed instruction.* Educational Technology Publications, Englewood Cliffs, NJ.

Chandargi, D. M. (1996). A study on leadership styles and their impact on job performance of extension personnel of Karnataka State Department of Agriculture. *Ph.D. Thesis (un pub.),* Univ. Agric. Sci., Dharwad.

Christian, B. M. and Chauhan N. B. (2012). Consequence of profile of woman research scholars on their computer proximity. *Gujarat Journal of Extension Education, 23*, 123-127.

Crowder, N. A. (1964), On the differences between linear and intrinsic programming. In: *Educational technology.* Eds. DeCecco, J. P., Rinehart & Winston, New York, pp.142–151.

Dhiraj, K. Singh and Pandey. N. K. (2012). Impact of model training course on enhancement of knowledge of extension functionaries in application of scientific potato production technologies. *Indian Res. J. Ext. Edu, 12* (3), 8-12.

Gangadharappa, N. R. and Ganesamoorthi, S. (2010). The Analysis of Communication Efficiency in Selected Systems in Karnataka. *International Conference on Communication for Development in the Information Age: Extending the Benefits of Technology for All.* Eds. BasavaprabhuJirli Editor in Chief, Diapk De, K. Ghadei and Kendadmath, G.C., Department of Extension Education, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, (India).

Hackman, T. R. and Lawler, E. E. (1971). Employee reaction to job characteristics. *Journal of Applied Psychology*, *55*, 259-286.

Hosur, P. G. (1977). A study on Achievement Motivation of Gramasevaks of Dharwad district, Karnataka State. *M.Sc. (Agri.) Thesis (Unpub.),* University of Agricultural Sciences, Bangalore.

Jahagirdar, K. A. and Balasubramanya, A. S. (2008). A study on feedback behaviour of extension personnel of Karnataka state department of agriculture. *Karnataka J. Agric. Sci., 21*(1), 89-91.

Jahagirdar, K. A. and Balasubramanya, A. S. (2010). A study on communication behaviour of extension personnel. *Karnataka J. Agric. Sci., 23*(2), *384-385.*

Jensen, E. (2006). *Enriching the Brain: How to maximize every learner's potential.* Jossey-Bass, SanFrancisco, California.

Kherde, R. L. (1971). Role performance and role prediction of the VLWs in the strategy of agricultural production. *Ph.D. Thesis (Unpub.),* IARI, New Delhi.

Kolbe, D. A. Rubin, I. M. and MC. Intyre, J. M. (1974)., *Organisational psychology* (2nd Edn.), Prentice hall Inc., New Jersey.

Letina, A. and Dikovic, M. (2012). Problem-Based Teaching vs. Programmed Teaching: Challenges for the Future of Education. In *International Conference «The future of Education.*

Learner, D. (1981). Literacy and initiative in Turkish village development: in Crouch, B.R. and Chamala, S. (Eds.), *Extension education and Rural development* (Vol-1), John Wiley and Sons Ltd., New York.

Lodahl, F. M. Kejner, M. (1965). The definition and measurement of job involvement. *Journal of Applied Psychology*, *49*, 24-33.

Manjunath, L. and Shashidhara, K. K. (2011). Determinates of Scientific Productivity of Agricultural Scientists. *Indian Res. J. Ext. Edu*., *11* (1), 7-12.

Manjunath, L., Tyagarajan, S., Vasantkumar, J. and Ansari, M. R. (2008). Determinants of teaching productivity and characteristics of scientists of university of agricultural sciences, Dharwad, *Karnataka J. Agric. Sci., 21*(4), 83-85.

Matteson, M. T. and Ivancevich, M. M. (1982). *Managing job stress and health*. The free press, New York.

Nagananda, C., Hirevenkanagoudar, L. V. and Chandargi, D. M. (2006). Organizational climate perception of officers of Karnataka state department of agriculture. *Karnataka J. Agric. Sci., 19*(4), 966-969.

Nagaraja, N. (2004). An Analysis of Agricultural Articles Published in Kannada Dailies. *Ph.D. Thesis (Unpub.) in Mass Communication and Journalism,* Karnatak University, Dharwad.

Patil, S. L. (1994), National agricultural extension project as perceived by farmers and extension personnel of Department of agriculture, Karnataka. *Ph.D. thesis (un pub.),* Univ. Agric. Sci., Dharwad.

Porter, L. W., Steers, R. M., Mowday, R. T. and Bovlin, P. V. (1974), Organisational commitment, job satisfaction and turnover among psychiatric technicians. *Journal of Applied Psychology, 59*, 603-609.

Reddy, H. N. B. (1976), An analysis of patterns and procedures in communication of farm information by VLW's and factors associated with their communication behaviour. *Ph.D. Thesis (Unpub).* IARI, New Delhi.

Sandika, A. L., Angadi, J. G. Hirevenkanagoudar, L. V. and Basavaraj, H. (2007). A study on organizational climate perception by veterinary officers (VOs) and veterinary livestock inspectors (VLIs) of the department of animal husbandry and veterinary service, Karnataka. *The Journal of Agricultural Sciences, 3*(2), 75-81.

Sarada, O. Prabhakr, K. and Sudarshan Reddy, M. (2005). Perceived communication effectiveness among researchers, extension personnel and farmers. MANAGE Extension Research Review, PP:34-43.

Sebsibie Zuber Mohammed (2002). Information management system of department of agriculture for farm production in Karnataka state, India. *M.Sc. thesis (Unpub.),* University of Agriculture Sciences, Dharwad.

Singh, S. (2014), Role of educational technology for the children with special needs. *Educationia Confab, 3*(4), 7.

Sunil, V. Halakatti and Sundaraswamy, B. (1998). Job performance of agricultural assistants in training and visit system. *Karnataka J. Agric. Sci., 11*(2), 436-440.

Uhumuavbi P. O. and Mamudu, J. A. (2009), Relative effects of programmed instruction and demonstration methods on students' academic performance in science. *College Student Journal*, *43*(2), 658-668.

Wendy J. and Mathew L. M. (2007). Feedback types in programmed instruction: a systematic review. *The Psychological Record, 57,* 219-232.

How to cite this article: Manjula N., Chandregowda M.J., Shivashankar M. and Srinivasa Reddy M.V. (2022). Relationship of Profile characteristics of Extension Personnel with Effectiveness of Programmed Instruction. *Biological Forum – An International Journal, 14*(4a): 672-680.