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Comparative analysis of training needs of on-job trainees of agri machinery operators and power tiller operators in Kerala, India

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Abstract

The Vocational Higher Secondary Education (VHSE) program, initiated in 1983-84, aimed to equip students with the necessary skills for specific professions, including agricultural mechanization. This study is a comparative analysis of the training needs of such on-job trainees enrolled in Agricultural Machinery Operator (AMO) and Power Tiller Operator (PTO) courses in Kerala, India. The research involved 126 respondents from two schools, GVHSS(THS) Kodungallor and GTHS Chittur, of Kerala with 78 AMO and 46 PTO students. Training needs were assessed using a three-point continuum and analyzed through mean scores and Mann Whitney U test. Results indicated a preference for training on safety in operating agricultural equipment, mechanization in agricultural operations, and components and working of a tiller. Socio-demographic factors such as age, mass media exposure, and entrepreneurial intention showed positive correlations with training needs. The study highlights the importance of tailored training programs to enhance the technical capabilities of young students in agricultural mechanization and suggests further capacity-building initiatives to address income disparity and entrepreneurial intentions.

Keywords: Training needs, agriculture, entrepreneurship, vocational training, on-job trainees

Introduction

The Vocational Higher Secondary education (VHSE) was started in Kerala during 1983-84 with the goal of equipping higher secondary students with the knowledge and skill sets required for specific jobs and self-employability. It is targeted towards students with SSLC or equivalent qualifications, with the student being given the opportunity to choose a vocational course of his / her choice from the 35 available skills courses. VHSE emphasises on improving the employability of the students and at the same time acts as a vocational alternative to conventional higher secondary education for those students who are interested in career-oriented courses. Apart from the theoretical and practical classes, On Job Trainings are also provided to these students, during which the students are provided with intensive practical training to improve their skills (GoK, 2025) [1].

Agricultural mechanization is an important area in modern agriculture and requires special training and skill sets for efficient performance of man and machine. As a crucial factor in promoting sustainable and high-quality development of agriculture, agricultural mechanization plays a significant role, particularly in developing countries with small-scale farming systems (Belton *et al.*, 2021) [2]. To enhance the technical capability of young students in the field of agricultural mechanization, VHSE offered the course Agriculture Machinery Operator (AMO) and this course was later modified and renamed as Power Tiller Operator (PTO) with more emphasis being placed on the study of the power tiller. In the agricultural sector On-job training plays a crucial role in promoting sustainable and climate-smart practices. The effectiveness of such trainings significantly influences the adoption rate of sustainable farming practices especially among small-scale farmers (Pandey *et al*., 2024) [3]. Hence On Job Training in these courses help the students gain valuable practical knowledge in the subject area. Mechanization can also promote entrepreneurial diversification and innovation in agriculture (Clark, 2009) [4]. Hence, these trainings also promote entrepreneurial interest in agriculture as skills taught are sustainable, community-focused, and directly marketable as a service (Jayasudha *et al*., 2024) [5].

However, these courses are offered only in three schools in Kerala. Further, single approach to the training, training content that does not effectively meet the needs of trainees, training objectives that are not integrated with organizational objectives, and training that lacks systematicity are certain drawbacks of this training approach. These often lead to a failure to meet the needs of trainees (Chen, 2022) [6]. The effectiveness of training programs is also dependent on the psychological characteristics of the trainees such as the level of intrinsic motivation (Pandey *et al*., 2024) [3]. Hence training needs assessment (TNA) have a significant role in improving the effectiveness of agricultural training programs and its outcomes (Martey *et al*., 2021) [7]. These assessments help identify training needs in resource management, change management, and effective communication which are key

skill gaps, and contribute to improved training utility (Zemmel *et al*., 2022) [8]. Hence this study was undertaken to assess the training needs of the students of the AMO and PTO courses.

Materials and Methods

The study was conducted in state of Kerala (among students of the AMO and PTO courses of two schools - GVHSS(THS), Kodungallor and GTHS Chittur) The sample for the study comprised a total of 126 respondents. A total of 78 respondents were of AMO background and 46 respondents of PTO background. These respondents were exhaustive selection of the two batches of both AMO students and PTO students.

The training needs were assessed by adapting the methodology proposed by Gayathri and Binoo (2020) [9]. In this scale the training needs were assesed on a three-point continuum *viz* 'most needed', 'needed', and 'least needed' for which a score of 3, 2 and 1 respectively was given. Mean scores were used to rate specific areas. Mann Whitney U test was used for comparing the training needs for both courses. Relational analysis of socio-demographic variables and training needs were also assessed.

Results and Discussion

Profile of On-job Trainees

As per the data presented in Table -1, most of the on-job trainees belonged to the age of 17. All the trainees were males and had an average annual income of Rs. 34190.91/-. The higher standard deviation highlighted considerable disparity in annual incomes. In rural areas agricultural income and its distribution play a significant role in overall income inequality. This disparity may be due to several contributing factors such as farm size, regional differences, and off-farm income sources (Alamgir *et al.*, 2020) [10]. Table 2 revealed that their major source of mass media exposure is through TV and Exhibitions. Almost half of the trainees (48.81 per cent) expressed a medium entrepreneurial intention. With 21.43 per cent trainees expressing a higher entrepreneurial intention and 19.05 per cent expressing a lower level of entrepreneurial intention, the on-job trainees of both groups expressed a medium to high entrepreneurial intention. Results of entrepreneurial intention and mass media exposure were in line with finding of Gayathri and Binoo (2020) [9].

Table 1: Personal Profile of On-job Trainees

Characteristics	Mean	Median	SD
Age	17	17	0.57
Annual Income (Rs.)	34190.91	20000	41275.1

Table 2: Socio-Psychological Profile of Respondents

Characteristic	Frequency	Percent	Mean	Median	Sd
Mass Media Exposure					
Print			1.91	2	0.58
Radio			1.49	1	0.66
TV			2.46	3	0.59
Melas			1.74	2	0.55
Exhibition			1.81	2	0.55
Demonstration			1.53	1	0.66
Entrepreneurial Intention			39.46	40	5.66
Low (<Q1)	24	19.05			
Medium(Q1-Q3)	61	48.41			
High (>Q3)	27	21.43			

Training needs of On-job trainees

Analysing the preference of the training needs (Table 3), the training on "Safety in operating agriculture equipment" were more preferred by the group with a mean score of 2.65. This underlies the awareness on importance of safe use of agricultural equipment and machineries. This was followed by the topics "Mechanization in agricultural operations" with a mean score of 2.57, "Components and working of a tiller" with a mean score of 2.56 and "Tiller driving practice" with a mean score of 2.51. As basic agriculture knowledge could improve their skill set both groups expressed their need for information on "Basics of Agriculture" which was ranked fifth rank with a mean score of 2.41. This is in line with the findings of the study by Aryal *et al*., (2021) [11] where it was suggested that training should focus on the operation, maintenance, and safety aspects of agricultural machines. Also, the study by Papageorgiou (2015) [12] suggested that trainees should be taught about the appropriate selection of machinery based on farm size, crop type, and local conditions to ensure efficient use and avoid issues like lack of spare parts while explaining the rankings of training needs.

Table 3: Distribution of the respondents according to their preference of training needs

Sl. No	Training topic	Mean Score	Rank
1.	Safety in operating agriculture equipment	2.65	1
2.	Mechanization in agricultural operations	2.57	2
3.	Components and working of a tiller	2.56	3
4.	Tiller driving practice	2.51	4
5.	Basics of Agriculture	2.41	5
6.	Agriculture Tractor: Engines, Components, working, power outputs	2.39	6
7.	Tiller attached implements	2.39	7
8.	Tractor Driving practice	2.38	8
9.	Different tractor attached implements and Applications	2.20	9
10.	Combine harvesters	2.19	10
11.	Plant protection equipment	2.10	11
12.	Seed drill & transplanters	2.10	12
13.	Custom hiring of agriculture machineries	2.05	13

Comparison of training needs of PTO and AMO

Both groups were compared using Mann Whitney U Test to examine whether there was a difference in training needs. Results exhibited in Table 4 indicated that there were no significant differences in training needs among both groups. The study by Choi *et al*., (2015) [13], which focused on structured on-the-job training (S-OJT) in small and medium-sized enterprises, found that the level of S-OJT activities is influenced by various factors including job requirements, rewards, learning agility, and self-efficacy of workers. Since job requirements and rewards of both PTO and AMO trainees are similar in nature, lack of significant difference between training needs, is supported by the results obtained by Choi *et al.*, (2015) [13] in his study.

Table 4: Comparison of training needs of PTO and AMO

Groups	N	Mean Rank	p-Value
Power Tiller Operator	46	59.87	0.527
Agricultural Machinery Operator	78	64.05	
Total	124		

Correlation between Personal Traits and Training Needs

Spearman's Correlation was used to calculate the relationship between profile variables and training need of the respondents. Age, mass media exposure and entrepreneurial intention exhibited positive correlation with training need. Mass media exposure exhibited significant positive correlation with both entrepreneurial intention and training need. This suggested the influence of mass media in creating positive attitude towards training and entrepreneurial intention. Combined results of Tables 2 and 5 indicates that TV commercials and contents can influence the trainees to take decisions on entrepreneurship and training. This is similar to the results obtained by Gayathri and Binoo, (2020) [9]. The negative correlation between annual income entrepreneurial intention and training need also indicated that income class had low influence in on these variables. The disparity in income combined with this negative correlation suggested that lower-income respondents tend to express a greater need for training. Evidence from the study of Bamne *et al*., (2023) [14] suggests that lower income may create higher training needs to improve their economic condition. Since most of the respondents were young and had lower median annual income, this study indicated a similar result.

Table 5: Correlation between Personal Traits and Training Needs

	Age	Annual Income	Mass Media Exposure	Entrepreneurial Intention	Training Need
Age	1.00	-0.20	0.079	-0.042	0.002
Annual Income	-0.020	1.00	0.021	-0.073	-0.082
Mass Media Exposure	0.079	0.021	1.00	0.273**	0.240**
Entrepreneurial Intention	-0.042	-0.073	0.273**	1.00	0.064
Training Need	0.002	-0.082	0.240**	0.064	1.00

** Significant at 0.01 level

Conclusion

The courses AMO and PTO are essential to create a group of young personnel skilled in the operation, repair, service and maintenance of agricultural machinery to support the agricultural activities of the State. The study conducted among 126 VHSE students of AMO and PTO indicated that the students of both subject areas had similar training requirements in the broad areas related to agricultural mechanization. Most students opined the need for training on safety in operating agricultural equipment, followed by topics such as mechanization in agricultural operations, components and working of a tiller etc. The topic on basics of agriculture was also indicated as a requirement by the students. This may indicate that these topics could be given increased consideration during the theory and practical classes. Enterprises in areas connected to agricultural mechanization have tremendous scope for providing employment opportunities to the youth. The students of VHSE (AMO or PTO) have the technical know how about the operation, repair, and maintenance of agricultural machinery. However, the mean entrepreneurial intention exhibited by them was 39.46, with only 21.43% of the students expressing a higher inclination towards starting an enterprise. Also income class disparity reflects a knowledge gap underlying higher training needs for lower income class students. This emphasizes that further capacity building programmes and awareness creation through mass media, which are stakeholder focused will help these students realize their goals and opportunities available in agricultural mechanizations sector.

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