

## Study of Perception of Vocational Teachers on the Use and Effectiveness of Teaching Methods in Agriculture Vocational Subject at Higher Secondary Schools of Haryana & Himachal Pradesh

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### Abstract

The purpose of this study was to understand the perception of vocational teachers in schools of Haryana and Himachal Pradesh regarding the use and effectiveness of teaching methods in agriculture. The sample of the study consisted of a total of 100 vocational teachers of agriculture and students from government schools of Haryana and Himachal Pradesh. A descriptive survey design was adopted for this study. The survey instruments were questionnaires, which were administered to students and vocational teachers. The questionnaire for students had questions on their preferences for teaching methods on selected topics and the questionnaire for vocational teachers had questions on the extent of use and effectiveness of teaching methods in agriculture for the chosen topics.

Findings showed that students of vocational subjects in agriculture in Haryana preferred practical training, field visits, presentation, and lecture method for learning the selected topics in agriculture. In Himachal Pradesh, vocational students mostly preferred field visits, practical training, demonstration, and lecture method in agriculture. Further, in Haryana, although the vocational teachers perceived practical training as more effective than other teaching methods, in practice however, most of them used the lecture method for teaching a majority of the topics in agriculture. In Himachal Pradesh, practical training, lecture method, field visit, and demonstration were considered the most effective for teaching agriculture. However, while teaching the selected topics most of the vocational teachers used the lecture method. With regard to the application of teaching methods, vocational teachers of Haryana and Himachal Pradesh need to endorse the use of practical training methods, like field visits and demonstration methods, over lecture and discussion methods so as to promote experiential learning for imparting knowledge and skills to students in agriculture.

**Keywords:** Agricultural education, teaching methods, vocational education, perception of vocational teachers.

### Introduction

Agriculture has been introduced as a vocational subject at the secondary stage under the *Samagra Shiksha* - an integrated centrally sponsored scheme of school education, introduced in 2018. It subsumes the three schemes of *Sarva Shiksha Abhiyan* (SSA), *Rashtriya Madhyamik Shiksha Abhiyan* (RMSA), Teacher Education (TE), and the scheme of vocationalisation of higher secondary and secondary education. The vocationalisation of education aims to make students more employable by integrating practical subjects into the

curriculum that provide basic knowledge, skills, attitudes, and dispositions. Vocationalisation of education in schools supports students in developing the skills and personality required for the current and future world of work. Pavlova (2005) identified three components of vocationalisation: learning for work (work-related knowledge, practices), learning about work (settings and conditions), and understanding the nature of work (socio-cultural, economic, and political forces that influence work). Vocationalisation of education in school is critical for providing necessary vocational exposure to all students so that they can make informed choices and acquire necessary employability skills, values and vocational skills for a smooth transition from the school to the world of work. India has a long history of vocationalisation of education and Vocational Education and Training. In the formal general education system, secondary and higher secondary stages are considered as important stages, as at these stages students decide to pursue higher education or opt for vocational education and training to join the workforce (Mehrotra 2017).

In 2012, the Indian government launched the revised Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education, which aims to enhance the employability of youth, maintain their competitiveness and reduce the gap between the educated and employable. Subsequently, with the aim of consolidating the various schemes for optimum utilisation of infrastructure and resources, *Samagra Shiksha* scheme was introduced in 2018. A paradigm shift from input-based education to learning outcome-based education is also taking place for qualitative improvement of education under *Samagra Shiksha*. Learning outcomes are related to the level of learning and indicate the intended gain in knowledge and skills that a student will achieve on completion of the module or course. To align with this overarching goal, learning outcome-based curricula, student textbooks, and e-learning material for vocational education in schools under the *Samagra Shiksha* are being developed by the Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE). Vocational education programmes are designed to teach young people soft and hard skills to meet the requirements of the world of work and enhance their employability through classroom teaching and work-based learning. Work-based learning, popular in the vocational education and training (VET) sector, connects classroom learning with work to equip students with real-life skills and help them to enter the workforce. It includes on-the-job training, internship, and apprenticeship/training.

Agricultural education teaches students about agriculture, food, and natural resources. Empowering children and youth with knowledge and skills through work-based learning in agriculture can be rewarding in terms of entering into jobs, development of small informal-sector businesses, and supporting the transition of students from school to work or higher education. Overall, the aims and objectives of teaching agriculture as a vocational subject include the following: (i) provide students with a strong foundation of scientific principles of agriculture, (ii) teach students essential skills necessary for a modern or progressive farmer, (iii) train the workforce for the agricultural and rural sector, (iv) prepare students to be innovators, problem solvers, leaders, entrepreneurs, and organic growers, (v) provide students with an education and professional skills that will allow them to return to the farms in the village, and (vi) provide students with diverse knowledge and hands-on training that helps in expanding knowledge and skills and appreciating community service. Agriculture education should therefore be in a position to develop skills among students that promote avenues for food security through the application of relevant teaching approaches. It plays a crucial role in the development of the economy, particularly the green economy.

According to the National Education Policy (NEP) 2020, both capacity and quality of agriculture and allied disciplines must be improved in order to increase agricultural productivity through better skilled graduates and technicians, innovative research, and market-based extension linked to technologies and practices.

The preparation of professionals in agriculture and veterinary sciences through programmes integrated with general education will be increased sharply. The design of agricultural education will shift towards developing professionals with the ability to understand and use local knowledge, traditional knowledge, and emerging technologies while being cognizant of critical issues, such as declining land productivity, climate change, food sufficiency for our growing population, etc. (MHRD 2020).

The NEP 2020 also lays emphasis on the integration of vocational education with general education at school and higher education level. Vocational exposure is to be given at early ages and 50% students have to be covered through school and higher education by 2025. Under the *Samagra Shiksha*, pre-vocational education for Grades 6 to 8 and vocational education under the National Skill Qualifications Framework (NSQF) for Grades 9 to 12 have been introduced. NSQF is a nationally integrated education and competency-based framework that enables persons to acquire desired competency levels. The NSQF organises qualifications according to a series of levels of knowledge, skills and aptitude. To promote vocational education in schools, the learning outcome-based curricula for vocational subjects are aligned with the requirements of the NSQF.

Haryana introduced agriculture as a vocational subject in higher secondary schools from Grades 9-12 as an additional or elective subject under the revised Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education in 2012-13. Himachal Pradesh introduced vocational subjects under the revised scheme in 2013-14. The role of vocational teachers in teaching agriculture as a subject is to provide students with the necessary technical and professional knowledge, while also facilitating problem-solving skills and using a variety of teaching methods to promote effective learning. Teaching method, which refers to the general principles, pedagogy and management strategies for instruction, is an important aspect in teaching-learning in agriculture vocational subjects. In choosing a method of teaching, a teacher must consider the age, subject and prior knowledge, style of learning and the type of learners. A professional teacher should be able to select and use the method or methods most appropriate for teaching his subject and more specifically the topic, as he/she needs to achieve the learning outcomes in competency-based education and training.

Although much research has been done on the evaluation or effectiveness of using teaching methods in academic subjects, there is little research focusing on teaching methods for vocational education in agricultural education. The purpose of the present study was to find out the perception of vocational teachers towards the extent of use and effectiveness of teaching methods in agriculture in the schools of Haryana and Himachal Pradesh. The research is important as there are limited studies on this topic globally and none in India. It can provide valuable insights for vocational teachers, researchers, and other stakeholders in vocational education and training to understand the relationship between teacher perception and the effectiveness of teaching methods in agriculture. Additionally, this study can help vocational teachers to choose appropriate teaching methods for dealing effectively with topics in agriculture, especially in the absence of a comprehensive training manual for vocational teachers, imparting in agriculture.

## Review of Literature

Agriculture as a vocational subject is a vital tool in preparing people for a new phase of rural development (Nzomo *et al.*, 2020). Effective teaching and learning of agriculture subject are being done through use of different methods of teaching. Effectiveness of these methods depends, to a great extent, on the attitude towards them (Thoron and Burleson, 2014).

Effective teaching and learning take place when the teacher knows which method to use in a particular situation to meet specific goals (Auwal, 2013). Effective teaching is now understood to involve a process of facilitating learning rather than being the simple transmission of knowledge from the teacher to the learner. Teachers should generate the greatest opportunity for students to learn and technically manage instruction by using teaching methods that allow students to explore the world, discover knowledge, reflect and think critically with careful monitoring and guidance (Nzomo *et al.*, 2020).

Learning happens through three domains: cognitive, affective and psychomotor. The pedagogical approaches to vocationalisation of education should be more learner-centric so as to connect learners to real-life situations and workplace requirements and to emphasize understanding and critical thinking rather than on memorization or rote learning. Interactive lecturing, simulations, role-playing, small group work, discussion, problem-solving, modelling, project work, and a host of other teaching practices that reverberates the constructivist approach to teaching-learning (Mehrotra, 2014) can be adopted by vocational teachers.

Martin (1991) stated that agricultural education is based on three critical components: technical agriculture, experiential learning, and human development. The purpose of teaching agricultural knowledge and skills is to prepare students to use that knowledge and skills in meaningful ways in their lives. He claimed that one of the best ways of ensuring student understanding is through the use of experiential learning, both in and out of school.

The poor performance by majority of the students in various subject areas is basically linked to the applications of ineffective teaching methods by teachers to impart knowledge to learners, and therefore, teachers need to be conversant with numerous teaching strategies (Adunola, 2011). Thus, the effectiveness of teaching method, which refers to the general principles, pedagogy and management strategies used for instruction, generally depends on the teacher. For example, the teacher should know the purpose and application of the teaching method for engaging students in learning and achieving learning outcomes. The methods selected and used by a teacher will depend on the skills or vary with the information the teacher would like to convey to their students. For a teacher, the selection of a teaching method depends on a variety of elements. Such elements include age and developmental level of students, prior knowledge or what students already know and need to know for achieving success with the lesson, the objectives of the lesson, the subject-matter content, the available people, time, space and material resources, the knowledge and skill of the teacher about teaching methods, learning theories, the physical setting, students' background knowledge, learning environment, and learning goals (Ramsden, 2003).

Duckett and Tartarkowski (2005) propose that while planning teaching and learning sessions, the following processes need to be included: specifying the aims and objectives or outcomes for the session, review of the previous session, explanation of the links to current and next sessions, identification of the appropriate content, learning experiences, activities, and strategies which will help the learners to learn, identifying assessment strategies by which learners will be assessed, selection of resources, media and materials that will support learning and finally, to plan how a summary at the end of the session will help to recap the lesson.

Vocational pedagogy, which is the sum total of the many decisions which vocational teachers take as they teach, adjusting their approaches to meet the needs of learners and to match the context in which they find themselves (Lucas, 2014) is an important aspect of vocational education. It is likely to be improved by greater collaboration between teachers, support from specialist development agencies, active involvement of local management and

continuous professional development (CPD) of teachers to develop teaching skills, for example, in modelling and coaching (CEDEFOP, 2015).

Darko (2015) investigated the challenges in teaching and learning of Agricultural Science in Cape Coast Metropolis using a questionnaire on a sample of 78 respondents, involving 60 agricultural science students and 18 agricultural science teachers. This study indicated that the challenges that teachers face in teaching and learning of Agricultural Science are mainly due to the following three factors: frequent use of lecture method in teaching, large class size and poor compensation to teachers.

Daluba (2013) investigated the effect of demonstration method of teaching on students' attainment in agricultural science in a secondary school. The findings of the study revealed that as compared to the conventional lecture method, the demonstration method had a significant effect on students' attainment.

There has been a paradigm shift in the curriculum of agriculture, from farming to inclusion of advanced digital technologies in agriculture sector, which made it imperative for teachers to determine suitable teaching methods for dissemination of knowledge and developing relevant skills in students. Choice of teaching method or instruction is important because it helps to develop students' abilities and interest. Furthermore, teachers' self-perception of their knowledge have an impact on work and shape their classroom practices (Borg, 2001). The research gap which emerged from the review of related literature indicated that there has been negligible attempt in India to explore perception of vocational teachers and students towards the extent of use and effectiveness of teaching methods in agriculture at school level. This evoked the question 'which teaching methods do the vocational teachers perceive to be effective and use in teaching of agriculture?'

## **Research Methodology**

**Research Method:** For the present study quantitative research using a descriptive survey method was used to collect the data to assess the perception of the vocational teachers with regard to the effectiveness and use of teaching methods in agriculture.

**Population and Sample:** The general population of the study was the vocational teachers and students at the government senior secondary schools of Haryana and Himachal Pradesh offering vocational subjects in Agriculture from Grades 9-12 under the centrally sponsored scheme of secondary and higher secondary education 2012. From the total population, 100 schools i.e. 50 government schools each from Haryana and Himachal Pradesh, were randomly selected as sample for the study. In total, 100 vocational teachers and 500 students from both states formed part of the sample.

**Research Questions:** The research questions included the following: Firstly, which teaching methods are primarily used by the vocational teachers of agriculture in the government schools of Haryana and Himachal Pradesh? Secondly, which teaching methods are considered effective by the vocational teachers of agriculture in the government schools of Haryana and Himachal Pradesh?

Questionnaires were developed to collect data on students liking for teaching methods and the perception of vocational teachers on the effectiveness of teaching methods and the use of teaching methods for vocational subjects of agriculture in schools of Haryana and Himachal Pradesh. The questionnaires were administered to the students and vocational teachers at schools in Haryana and Himachal Pradesh during 2018-19.

They contained a three-point Likert-type rating scale on the liking of various teaching methods. The students, as respondents, were asked to write the number of responses :1 (Not Liked), 2 (Sometimes Liked), 3 (Mostly Liked) in the column with the teaching methods given on the side of the 10 selected topics in agriculture. The questionnaire for vocational teachers contained a five-point Likert scale with 10 topics on the use of teaching methods made up of the following responses: 1- Not used, 2- Rarely used, 3- Sometimes used, 4- Frequently used, 5- Mostly used. The questionnaire also contained a five-point Likert scale with 10 topics on vocational teacher's perception about the effectiveness of the teaching methods having the following responses: 1- Not effective, 2- Of little effectiveness, 3- Somewhat effective, 4-Effective, 5-Very effective. The statements were bilingual: English and Hindi. The 10 topics were selected from the syllabus of agriculture vocational subject [Job Role: Floriculturist (Open Cultivation)] namely: Introduction to Agriculture/Horticulture, Soil Management, Agricultural Practices, Sowing/Planting, Inter-cultural Operations, Pest and Disease Management, Harvesting of Crops, Post-harvesting, Marketing, and Occupational Health and Safety, on which items were developed and the perception/application of teaching methods were sought from students and vocational teachers. The following eight teaching methods - lecture method, presentation method, practical training method, demonstration method, field visit method, discussion method, use of multimedia, and role-play were given as a choice. The teaching methods were selected based on the related studies on the teaching of Agriculture.

**Data Analysis:** The data related to the student's preference of teaching methods and vocational teachers' perception towards the application and use of teaching methods obtained through the questionnaire's responses from vocational teachers and students for Haryana and Himachal Pradesh, was analysed for measures of central tendency and rank.

## **Results and Discussions**

Although the present study focuses on the perception of the vocational teachers on the use and effectiveness of teaching methods in agriculture as a vocational subject at higher secondary schools of Haryana and Himachal Pradesh, students' preference for teaching methods used for teaching the selected 10 topics from their syllabus have also been included as students' perception are more predictive of their learning outcomes than teachers' own perception of their teaching behaviour (Maulana *et al.* 2017). Wittrock (1986) suggested that research on students' thinking and perception functions as a mirror that can be used by both teachers and students to reflect upon their learning and teaching, hence enhancing their understanding of teaching and increasing its outcome. Students are at the receiving end of teaching and the thrust on providing effective teaching is primarily for their overall development and making them competent to deal with real-life challenges. Therefore, students' feedback can provide valuable input on teaching strategies, which if implemented, can raise the quality of teaching.

Sample tables (8-27) have been laid out in this section with reference to three topics: Introduction to Agriculture/Horticulture, Agricultural Practices, and Occupational Health and Safety for both states to exemplify the results and findings. Each of the topics is mapped to the three domains of learning – knowledge, skills, and attitude, respectively.

### **Perception of Students for Teaching Methods**

The findings of the study revealed that in Haryana students mostly preferred practical training, lecture method, field visits, and presentation for learning the selected topics (Tables 8-10).

**Table 8: Haryana: Mean, Sum, and Rank computed on the basis of students' liking for teaching methods used for teaching the topic “Introduction to Agriculture/Horticulture”**

<b>N=250</b>	<b>Lecture Method</b>	<b>Presentation Method</b>	<b>Practical Training Method</b>	<b>Demonstration Method</b>	<b>Field Visit</b>	<b>Discussion Method</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	1.9440	1.7320	1.9720	1.8080	1.8480	1.6880	1.7960	1.6200
Sum	486.00	433.00	493.00	452.00	462.00	422.00	449.00	405.00
Rank	<b>II</b>	VI	<b>I</b>	IV	<b>III</b>	VII	V	VIII

From table 8, it can be noted that students of Haryana prefer work-centred education over lectures for knowledge-based topics. So, we need to bring this change in the system that even for knowledge-based topics, it is imperative that we first expose them to experiences through field visits followed by lectures or demonstrations.

**Table 9: Haryana: Mean, Sum and Rank computed on the basis of students' liking for teaching methods used for the topic “Agricultural Practices”**

<b>N=250</b>	<b>Lecture Method</b>	<b>Presentation Method</b>	<b>Practical Training Method</b>	<b>Demonstration Method</b>	<b>Field Visit</b>	<b>Discussion Method</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	1.7751	1.6800	1.8440	1.6720	1.8800	1.6320	1.5480	1.5120
Sum	442	420	461	418	470	408	387	418
Rank	<b>III</b>	IV	<b>II</b>	V	<b>I</b>	VI	VII	VIII

As expected, for skill-based topics, students prefer field visits over classroom sessions of lectures and discussion, which is exemplified in table 9.

**Table 10: Haryana: Mean, Sum and Rank computed on the basis of student's liking for teaching methods used for the topic “Occupational Health and Safety”**

<b>N=250</b>	<b>Lecture Method</b>	<b>Presentation Method</b>	<b>Practical Training Method</b>	<b>Demonstration Method</b>	<b>Field Visit</b>	<b>Discussion Method</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	1.8920	1.8160	1.7960	1.6880	1.7280	1.8720	1.7480	1.6840
Sum	473	454	449	422	470	408	437	421
Rank	<b>I</b>	<b>III</b>	IV	VIII	VI	<b>II</b>	V	VII

Occupational hygiene and safety attitudes are generally represented by attentiveness, alertness, carefulness, and seriousness, which help in reinforcing the use of personal protective equipment and safety procedures. As for a behaviour or attitude-based topic, it is seen from table 10 that students of Haryana prefer lecture and discussion method over others. While awareness regarding occupational health and safety can be generated through lectures and discussions, students need to participate in on-the-job training, peer-to-peer training and work site demonstrations for identifying and controlling hazards.

**Table 11: Himachal Pradesh: Mean, Sum and Rank computed on the basis of Student liking for teaching method on Introduction to Agriculture/Horticulture**

<b>N=250</b>	<b>Lecture Method</b>	<b>Presentation Method</b>	<b>Practical Training Method</b>	<b>Demonstration Method</b>	<b>Field Visit</b>	<b>Discussion Method</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	1.8680	1.7880	1.9280	1.7560	1.9080	1.7920	1.6240	1.6400
Sum	467	447	482	439	477	448	406	410
Rank	<b>III</b>	V	<b>I</b>	VI	<b>II</b>	IV	VIII	VII

In Himachal Pradesh, students mostly preferred field visits, practical training, demonstration and lecture methods for knowledge-based topics (tables 11-13). However, it is suggested that teachers must take students out to the fields rather than begin with classroom lectures.



**Table 12: Himachal Pradesh: Mean, Sum and Rank computed on the basis of Student's liking for teaching method on Agricultural Practices.**

N=250	Lecture Method	Presentation Method	Practical Training Method	Demonstration Method	Field Visit	Discussion Method	Use of Multimedia	Role Play
Mean	.0571	1.8000	1.8320	1.9000	1.7080	1.8960	1.7680	1.6840
Sum	414	450	458	475	427	474	442	421
Rank	VIII	IV	<b>I</b>	<b>III</b>	VI	<b>II</b>	V	VII

It is observed from table 12 that for skill-based topics, the students of Himachal Pradesh prefer other methods over field visits. The reason could possibly be attributed to the geographical limitations and the risks and costs involved in transportation. Herein, it is suggested that necessary arrangements need to be made by the authorities to ensure that field visits are made feasible to enable a more work education teaching-learning.

**Table 13: Himachal Pradesh: Mean, Sum and Rank computed on the basis of Student's liking for teaching method on Occupational Health and Safety.**

N=250	Lecture Method	Presentation Method	Practical Training Method	Demonstration Method	Field Visit	Discussion Method	Use of Multimedia	Role Play
Mean	1.8680	1.8640	1.9000	1.7800	1.7840	1.8400	1.7640	1.7400
Sum	467	466	475	445	446	460	441	435
Rank	<b>II</b>	<b>III</b>	<b>I</b>	VI	V	IV	VII	VIII

### Perception of Teachers on Effectiveness of Teaching Methods

In so far as the perception of effectiveness of teaching methods of vocational teachers are concerned, the findings revealed that the majority of vocational teachers in Haryana considered practical training and lecture methods as most effective in the teaching of agriculture (tables 14-16). However, in practice, majority of them used lecture methods for teaching most of the topics in agriculture/horticulture, besides practical training and presentation.

**Table 14: Haryana: Mean, Sum and Rank computed on the basis of perception of teachers on effectiveness of methods used for teaching the topic “Introduction to Agriculture/Horticulture”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.38	4.20	4.40	4.10	4.18	3.72	3.98	3.46
Sum	219	210	220	205	209	186	199	173
Rank	<b>II</b>	<b>III</b>	<b>I</b>	V	IV	VII	VI	VIII

**Table 15: Haryana: Mean, Sum and Rank computed on the basis of perception of teachers on effectiveness of methods used for teaching the topic “Agricultural Practices”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.56	4.38	4.50	4.06	4.24	3.94	4.00	3.82
Sum	228	219	225	203	212	197	200	191
Rank	<b>I</b>	<b>III</b>	<b>II</b>	V	IV	VII	VI	VIII

**Table 16: Haryana: Mean, Sum and Rank computed on the basis of perception of teachers on effectiveness of methods used for teaching the topic “Occupational Health and Safety”**

<b>N=250</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.32	4.34	4.40	4.36	4.28	4.08	4.36	3.84

Sum	216	217	220	218	214	204	218	192
Rank	IV	<b>III</b>	<b>I</b>	<b>II</b>	V	VI	<b>II</b>	VII

In Himachal Pradesh, lecture method, practical training and demonstration were considered most effective for teaching agriculture (tables 17-19).

**Table 17: Himachal Pradesh: Mean, Sum and Rank computed on the basis of perception of teachers on effectiveness of methods used for teaching the topic “Introduction to Agriculture/Horticulture”**

N=50	Lecture	Presentation	Practical Training	Demonstration	Field Visit	Discussion	Use of Multimedia	Role Play
Mean	4.70	4.54	4.68	4.62	4.60	4.48	4.38	4.26
Sum	235	227	234	231	230	224	219	213
Rank	<b>I</b>	V	<b>II</b>	<b>III</b>	IV	VI	VII	VIII

**Table 18: Himachal Pradesh: Mean, Sum and Rank computed on the basis of perception of teachers on effectiveness of methods used for teaching the topic “Agricultural Practices”**

N=50	Lecture	Presentation	Practical Training	Demonstration	Field Visit	Discussion	Use of Multimedia	Role Play
Mean	4.74	4.72	4.82	4.34	4.54	4.36	4.26	4.22
Sum	237	236	241	217	227	218	213	211
Rank	<b>II</b>	<b>III</b>	<b>I</b>	VI	IV	V	VII	VIII

In Table 18, teachers perceived practical training to be more effective than other methods.

**Table 19: Himachal Pradesh: Mean, Sum and Rank computed on the basis of perception of teachers on effectiveness of methods used for teaching the topic “Occupational Health and Safety”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.80	4.74	4.78	4.74	4.60	4.48	4.36	4.30
Sum	240	237	239	237	230	224	218	215
Rank	<b>I</b>	<b>III</b>	<b>II</b>	<b>III</b>	IV	V	VI	VII

Teachers perceived lecture method to be more effective than other methods (table 19). This can be understood in terms of geographical limitations of the region which may disallow field visits.

### **Perception of Use of Teaching Methods by Vocational Teachers**

In so far as the perception on the use of teaching methods by vocational teachers is concerned, the findings revealed that in both the states, use of multimedia and role-play method were considered as least effective by majority of the vocational teachers in teaching agriculture. The tables 20-25 exemplify these findings. In Haryana, while lecture and discussion were perceived to be more useful for knowledge-based topics, practical training and presentation were mostly perceived as useful for skills training. For attitudinal development, lecture, presentation, and field visit were perceived as more useful. In both States, however, while teaching the selected topics majority of the vocational teachers used the lecture method.

**Table 20:- Haryana: Mean, Sum and Rank computed on the use of teaching methods by teachers for teaching the topic “Introduction to Agriculture/Horticulture”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.54	4.00	4.04	3.76	4.12	4.28	2.58	3.08

Sum	227	200	202	188	206	214	129	154
Rank	<b>I</b>	V	IV	VI	<b>III</b>	<b>II</b>	VIII	VII

In Table 20, teachers in Haryana, although they perceived practical training to be more effective (see table 14), in reality they used the lecture method more than any of the other methods.

**Table 21: Haryana: Mean, Sum and Rank computed on the use of teaching methods by teachers for teaching the topic “Agricultural Practices”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.58	4.28	4.29	4.24	4.20	3.94	3.36	3.55
Sum	229	214	210	212	210	197	168	174
Rank	<b>I</b>	<b>III</b>	<b>II</b>	IV	V	VI	VIII	VII

For skill-based topic, as in table 21, again the teachers used lecture method over other methods, whereas use of field-based methods could have been more viable for achieving learning outcomes of work-based education.

**Table 22: Haryana: Mean, Sum and Rank computed on the basis of use of teaching methods by teachers for teaching the topic “Occupational Health and Safety”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.60	4.22	4.00	3.86	4.18	4.04	3.50	3.71
Sum	230	211	200	193	209	202	175	182
Rank	<b>I</b>	<b>II</b>	V	VI	<b>III</b>	IV	VIII	VII

Teachers in Haryana used lecture method more than other methods, although they perceived practical training to be more effective for teaching the topic of occupational health and safety. (table 22).

**Table 23: Himachal Pradesh: Mean, Sum and Rank computed on the basis of Use of Teaching Methods by Vocational Teachers for Teaching the Topic on Introduction to Agriculture/Horticulture**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.86	4.36	4.26	4.32	4.02	4.64	4.26	4.38
Sum	243	218	213	216	201	232	213	219
Rank	<b>I</b>	IV	VI	V	VII	<b>II</b>	VI	<b>III</b>

**Table 24: Himachal Pradesh: Mean, Sum and Rank computed on the basis of Use of Teaching Methods by Vocational Teachers for Teaching the Topic on “Agricultural Practices”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.82	4.28	4.70	4.32	4.28	4.62	4.26	4.30
Sum	241	214	235	216	214	231	213	215
Rank	<b>I</b>	VI	<b>II</b>	IV	VI	<b>III</b>	VII	V

**Table 25: Himachal Pradesh: Mean, Sum and Rank computed on the basis of Use of Teaching Methods by Vocational Teachers for Teaching the Topic on “Occupational Health and Safety”**

<b>N=50</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Practical Training</b>	<b>Demonstration</b>	<b>Field Visit</b>	<b>Discussion</b>	<b>Use of Multimedia</b>	<b>Role Play</b>
Mean	4.94	4.36	4.16	4.50	3.90	4.54	4.12	4.16
Sum	247	218	208	225	195	227	206	208
Rank	<b>I</b>	IV	V	<b>III</b>	VII	<b>II</b>	VI	V

From tables 23-25, it is clear that despite what the teachers perceived as the most effective methods of teaching, in reality, they used the lecture method more predominantly over the usage of other methods. Further, these findings matched with students' preference for teaching methods. It can be presumed that the role-play method, though a student-centred teaching method and could be applied to branches like agriculture economics, and marketing, was not applicable to the chosen topics and the lack of multimedia resources in schools prompted the students and vocational teachers to rate them as least used and less effective teaching methods. The findings of the study (table 26) revealed that in Haryana, students mostly preferred practical training, field visits, presentation, and lecture method for learning the selected topics. In Himachal Pradesh, students mostly preferred field visits, practical training, demonstration, and lecture method. It can be inferred that a student's preference is consistent with the nature of the topic of the vocational subject. This finding is in agreement with the findings of Daluba (2013), who observed that the demonstration method had a significant effect on students' achievement in agricultural science than those taught with the conventional lecture method.

**Table 26: Students' Preference for Teaching Methods based on Topics in Agriculture Vocational Subjects**

<b>S. No.</b>	<b>Topic</b>	<b>Teaching Method Most liked by Students for the Topic</b>	
		<b>Haryana</b>	<b>Himachal Pradesh</b>
01	Introduction of Agriculture/ Horticulture	Practical training	Practical training
02	Agricultural Practices	Field visit	Demonstration
03	Soil Management	Presentation	Field visit

04	Sowing/Planting	Practical training	Field visit
05	Inter-cultural Operations	Field visit	Practical training
06	Pest and Disease Management	Field visit	Field visit
07	Harvesting of Crops	Presentation	Field visit
08	Post-harvesting	Presentation	Field visit
09	Marketing	Lecture method	Lecture method
10	Occupational Health and Safety	Lecture method	Practical training

In so far as the perception of vocational teachers about the effectiveness of teaching methods are concerned, in Haryana as well as in Himachal Pradesh, practical training, lecture method, field visit and demonstration were considered most effective for teaching agriculture. Table 27 exemplifies the findings.

**Table 27: Perception of Vocational Teachers about Effectiveness of Teaching Methods based on Topics in Agriculture**

S. No.	Topic	Teaching Method perceived by Vocational Teachers as most effective	
		Haryana	Himachal Pradesh
01	Introduction of Agriculture/ Horticulture	Practical training	Lecture method
02	Agricultural Practices	Lecture method	Practical training
03	Soil Management	Practical training	Practical training
04	Sowing/Planting	Practical training	Practical training
05	Inter-cultural Operations	Practical training	Practical training
06	Pest and Disease Management	Lecture method	Field visit
07	Harvesting of Crops	Practical training	Field visit
08	Post-harvesting	Practical training	Lecture method
09	Marketing	Practical training	Lecture method
10	Occupational Health and Safety	Practical training	Demonstration



In Haryana as well as in Himachal Pradesh, practical training, lecture method, field visit, and demonstration were considered most effective for teaching agriculture. However, table 28 shows that while teaching the selected topics, most of the vocational teachers used the lecture method.

**Table 28: Use of Teaching Methods by Vocational Teachers for Teaching the Topics**

S. No.	Topic	Teaching Method perceived by Vocational Teachers as most effective	
		Haryana	Himachal Pradesh
01	Introduction of Agriculture/ Horticulture	Lecture method	Lecture method
02	Agricultural Practices	Lecture method	Lecture method
03	Soil Management	Lecture method	Lecture method
04	Sowing/Planting	Presentation	Lecture method
05	Inter-cultural Operations	Practical training	Lecture method
06	Pest and Disease Management	Practical training	Lecture method
07	Harvesting of Crops	Lecture method	Lecture method
08	Post-harvesting	Lecture method	Lecture method
09	Marketing	Lecture method	Lecture method
10	Occupational Health and Safety	Lecture method	Lecture method

The findings, as presented in tables 27 and 28, revealed that although the majority of vocational teachers in Haryana considered practical training and lecture method as most effective in teaching agriculture, in practice majority of them used lecture method for teaching most of the topics besides practical training and presentation.

It can be inferred that most of the vocational teachers used conventional lecture method in teaching of agriculture, which differed from their perception on effectiveness of teaching methods. The lecture method was perceived as the best and most effective because 'it is suitable for larger class size, more content can be covered in a shorter duration, saves time, and important points can be highlighted' in a larger group. However, the teachers should plan the sequence of teaching methods according to the topic and reinforce learning which would also require moving away from traditional methods of teaching to contemporary ways of teaching.

## Conclusion

The major recommendation that emerged from the findings of the study for vocational teachers of agriculture in Haryana and Himachal Pradesh is that they should use more of student-centric and work-based teaching methods, like demonstration, discussion, and practical training, so as to engage students in experiential learning. Lecture method must be resorted to after field visits and demonstration methods have been used to teach any topic in Agriculture. Attention is drawn particularly in the case of Himachal Pradesh, where it can be noticed that the region's topography poses geographical constraints and the expenses associated with field visits often make it impractical to use this method. Authorities should make special provisions for meeting additional costs for practical training and field visits so that the teaching methods used by vocational teachers can be aligned with the idea of work-based learning. They should select teaching methods considering the learning outcomes of the topics, expose students to a combination of learning methods, and more often consider using educational technology, such as digital resources simulations, virtual skill labs, etc., to enhance the quality of teaching-learning. Thus, the study revealed that vocational teachers need to use more of experiential teaching methods for purposefully engaging learners in practical experience and reflective learning. Moreover, capacity building of vocational teachers on the use of teaching and training methods through structured, and targeted training programmes that cater to the needs of diverse students, including girls, and students with learning disabilities is to be done to promote adequate gender and disability representation in formal vocational education programmes.

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