Designing and validating e-learning module on Good Agricultural Practices for grapes

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ABSTRACT

The present study was aimed at designing an e-learning module on Good Agricultural Practices (GAP) for grapes. The study was conducted in Nashik and Sangli districts of Maharashtra. Total 70 farmers along with 19 scientists of Krishi Vigyan Kendras and ICAR-National Research Centre for Grapes, 30 line department staff and 20 exporters were selected as respondents. Based on the knowledge level, attitude and information need of the respondents on GAP for grapes an e-learning module was designed using content management software Course Lab 2.7 and validated. Validation of the module revealed overall means score of 4.09 indicating high preference of the farmers for the module. Content & design of the module (mean score 4.14) ranked first based on farmers' opinion while ease of understanding (mean score 4.13), utility (mean score 4.07) and ability to satisfy felt needs (mean score 4.02) ranked second, third and fourth, respectively. The stakeholders opined that the module created interest on GAP (mean score 3.96), could be used by extension personnel to disseminate information on GAP (mean score 4.11) and for training on GAP (mean score 3.13).

Key words: Good Agriculture Practices, grapes, e-learning module, stakeholders, validation.

INTRODUCTION

At present, it is essential to prepare our farmers as per the requirements of international food market in order to exploit emerging opportunities in the global economy. With rising importance on food safety and quality, consumers' willingness to pay for certified food in global market has been increasing day by day (Tranter *et al*., 10). One of the globally accepted control and compliance systems and standards for measures of food safety is Good Agricultural Practices (GAP). According to FAO (7), GAP addresses environmental, economic and social sustainability for on-farm processes and result in safe and quality food and non-food agricultural products. Asandhi *et al*. (3) reported that GAP checklist regarding fresh vegetables had significant role to play in promoting export status of Indian produces. Popularization of food safety measures, GAP and strengthening educational opportunities for the stakeholders are the immediate actions that need to be taken.

Now the question arises how to educate them in most efficient way in shortest possible time. E-learning is an alternative mode of education that uses computer and internet tools to deliver a broad array of solutions to enable learning and improve performance. According to Balakrishnan (4), at present, all the developed countries are linking learning to marketable skills for

agricultural purposes. Exploring this innovative tool for disseminating knowledge about GAP among the clientele can be effective.

On this note, present study was taken up to design an e-learning module on GAP for grapes. Grapes were chosen as the focus of the module since India has experienced a boom in export of grapes over past few years, which has increased from 54,049.87 tonnes during 2005-2006 to 192616.91 tonnes in 2013-2014 valuing Rs. 1,666.47 crores (APEDA, 2). However, the country occupies 15th position in global grapes export market with only 1.76 per cent of world share. Good Agriculture Practice is essential to meet the quality standards of the countries where grapes are exported in large quantity. Thus, designing e-module on GAP was found to be highly relevant in case of grape and growers.

MATERIALS AND METHODS

The study was conducted in two districts of purposively selected in Maharashtra, namely, Nashik and Sangli it is the largest producer (80%) as well as leading exporter of grapes (99%) in the country with the production of around 2,050 thousand MT (Anon, 1). With regard to grapes production and export, Nashik and Sangli districts are at forefront in the state, therefore, purposively selected. The exports from Nashik were 48,465 metric tonnes in 2013 contributing around 70 per cent of Maharashtra's total grapes export. Therefore, the stakeholders of this region were selected as the clientele of the study as they have higher needs to deal with GAP for grapes. A total of

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139 respondents were selected for the study. Simple Random Sampling technique was used for selection of seventy grapes growers from the two districts, with thirty five from each. Seven KVK scientists and fifteen officials from line departments from each district and twenty grape exporters in Maharashtra were selected. Five scientists from ICAR-National Research Centre for Grapes (NRCG), Pune were also selected randomly.

Based on the information collected on existing level of knowledge, attitude and perceived information need of the stakeholders the e-learning module on GAP for grapes was designed using content management software "CourseLab (Version 2.7)". Besides, video editor software "Video cutter" and audio editor and recorder software "Audacity" were also used in order to enhance the quality of the module. Personal interview method was used to collect data from stakeholders regarding validation of the module.

RESULTS AND DISCUSSION

Process of developing a learning module is a successive process having clear association between its components (Moon, 9). The designing and validation of the module were carried out in four phases. In the first phase, content of the module was decided based on the existing level of knowledge and attitude of the farmers and their perceived information need. Besides the primary data, secondary sources of information like related research papers, websites and experts were also consulted to decide upon the content of the module. In the second phase, collected information was sequentially arranged in number of interlinked chapters. Clark (6) had identified six principles of effective e-learning such as multimedia principle, contiguity principle, modality principle, redundancy principle, coherence principle and personalization principle. Throughout the process of designing the module, these guidelines and principles were consulted as and when needed in order to improve the quality of the module.

Principles of visual perception were also considered while designing the module. Care was taken about use of graphics, balance, font type, colour and size, background colour, contrast *etc*. The entire module was divided into number of chapters, which were again subdivided into several topics. Images, audio and video clips were used to support text in different chapters (Figs. 1 & 2).

In order to avoid monotony soothing background music was fused with the frames which could be turned off as per the preference of learner and back ground voice was also recorded and was synchronized with the text of the module. The chapters and topics were hyperlinked with each other and care was taken so that learner could move along the module as per learner's own wish. Links of related websites

Fig. 1. e-module frame describing use of bio-regulators along with video clips.
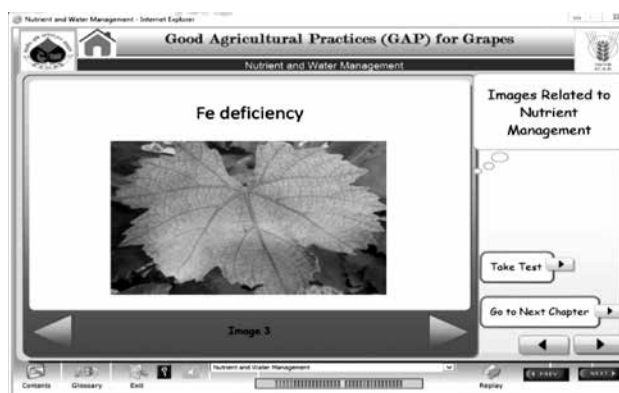

Fig. 2. e-module frame showing images related to Nutrient deficiency syndromes in grapes.

and study material in the form of pdf files were also provided as and when needed. At the end of each chapter short tests were also provided so that learner could assess learning (Fig. 3).

Proper guidelines were also given at the beginning of the module to make it easy for the learner (Fig. 4). Every attempt was taken to make the module as user friendly as possible.

The content of the module included aspects on food safety, basic principles of GAP, package of practices of grapes production as per GAP guidelines, post-harvest practices, procedure of exporting and certification, information on related institutes and contacts. In the third phase, the module was published in CD-ROM format. Finally in the fourth phase the module was validated through the sample group of farmer and other stakeholders. Validation was made based on four major parameters, namely, content and design, ease of understanding, utility and satisfaction of felt needs as perceived by the respondents. The instrument
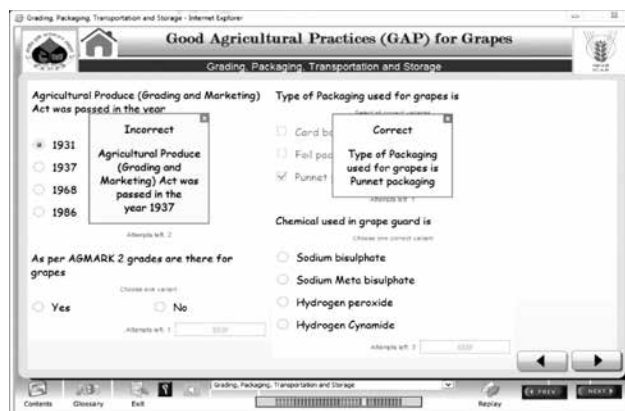
Fig. 3. e-module frame showing questions along with their respective answers.
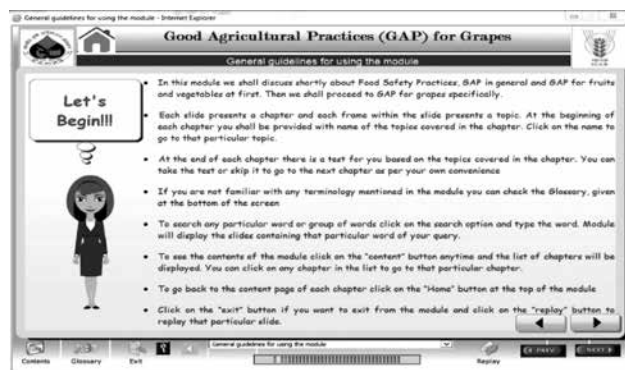

Fig. 4. e-module frame showing guidelines to use the module.

contained number of positive and negative statements on the pre-decided parameters. The responses were recorded on a five point continuum scale.

The result of validation revealed general acceptability of the module by the farmers as majority of the statements had mean score above 4 (Table 1). The high mean score values of 4.73 and 4.54 for the statements "content is clearly understood" and "module is specific and focused", respectively further strengthened this claim. Consistent results were found in case of other stakeholders as well. High mean scores of 4.24 and 4.13 were obtained for the statements like "Content has been presented systematically" and "Use of font colour and background colour are soothing to eye" which supported the assertion of general acceptability of the module by the non-farmer stakeholders as well. Table 2 contained three statements with highest mean scores in each parameter. Overall mean scores of 4.09 and 3.91 indicated high preference of the farmers and the stakeholders for the module, respectively. The module was perceived as a potential medium to disseminate information on GAP and to build positive attitude towards it. High degree of agreement with the statements like "It can be used by lecturers as teaching aid" (mean score 4.05), "It can be used as an instructional aid for training on GAP" (mean score 4.14) and "It is useful to help extension persons to disseminate knowledge on GAP" (mean score 4.11) clearly implied potential for future applicability of the module. The mean scores of each parameter along with their ranks were depicted in Table 3.

Table 1. Statement wise analysis of the farmers' opinions about e-learning module.

Statement	Mean score	Standard deviation	Rank
Design and content of the module			
User is allowed to leave the module as per convenience	4.42	(24.69)	I
Style of presentation is easily comprehensible	4.37	(24.09)	II
Amount of content in each frame is understandable	4.36	(24.38)	III
Ease of understanding of the module			
Content is clearly understood	4.73	(25.28)	I
Content is focused and specific	4.54	(25.88)	II
Content is comprehensible	4.42	(23.63)	III
Utility of e-learning module			
Module is able to sensitize concerns regarding GAP	4.40	(22.13)	I
It increased motivation regarding GAP for grapes	4.27	(23.79)	II
Interest on GAP is created by the module	4.21	(23.49)	III
Ability of e-learning module to satisfy felt needs			
Content covers most of my information need regarding GAP	4.31	(24.23)	I
Information given is credible	4.29	(24.08)	II
I found the information given as useful	4.22	(23.33)	III

*Minimum and maximum possible mean scores are 1 and 5%, respectively.

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Table 2. Statement wise analysis of the stakeholders' opinions about e-learning module.

Item	Mean score	Standard deviation	Rank
Content and Design			
Content has been presented systematically	4.24	(13.08)	I
Use of font color and background color are soothing	4.13	(13.54)	II
Learning experience is enjoyable and interesting	4.10	(10.53)	III
Ease of understanding of the e-learning module			
Content has relevance to GAP for grapes	4.15	(9.60)	I
Introduction to subject matter is appropriate	4.14	(13.53)	II
Content is comprehensible	4.10	(9.42)	III
Utility of the e-learning module			
Module is able to sensitize concerns regarding GAP	4.21	(9.42)	I
It can be used as a tool for distance education	4.15	(9.71)	II
It can be used as an instructional aid for training on GAP	4.14	(9.12)	III
Ability of the e-learning module to satisfy felt needs			
I found the information given as useful	4.12	(8.81)	I
Information given is credible	4.09	(8.52)	II
Content covers most of my information need on GAP	4.04	(8.55)	III

*Minimum and maximum possible mean scores are 1 and 5%, respectively.

Table 3. Ranking of validation parameters of e-module by farmers and other stakeholders.

Parameter	Farmers (n = 70)		Other stakeholders (n = 69)	
	Mean	Rank	Mean	Rank
1. Content & design	4.14	I	3.94	II
2. Ease of understanding	4.13	II	3.84	IV
3. Utility	4.07	III	3.99	I
4. Ability to satisfy felt need	4.02	IV	3.87	III
Overall mean	4.09		3.91	

In order to compare mean scores of parameters for the two groups of respondents (farmers and other stakeholders) Wilcoxon signed rank test was conducted with 0.05 per cent level of significance (Table 4). The result showed that no significant difference existed between the mean scores for the two groups. Thus, we could conclude that mean scores of the module on several parameters were quite similar for two categories of respondents. Further, coefficient of concordance was also calculated (Kendall's w) to find out if significant correlation existed between ranking of the parameters by farmers and other stakeholders (Table 5). The test result at 0.05 per cent level of significance depicted no significant agreement between two groups regarding ranking of parameters. Thus, it was concluded that there was difference in preferences of the two respondent categories about various aspects of the module.

Individual opinion of each respondent was also subjected to categorization to 'very good', 'good',

Table 4. Statistical significance of difference between mean scores of e-module.

Category	Value
Sign	2
Signed rank	5
df	3
p value	0.1250
Asymp. Sig. (2-tailed)	0.025

Table 5. Statistical significance of concordance among respondents.

Category	Value
Coefficient of concordance (w)	0.5
Chi square (χ^2)	3
df	3
p value	0.3916
Asymp. Sig. (2-tailed)	0.025

Table 6. Quality of the module as perceived by different stakeholders presented through frequency and percentage.

Stakeholders	Overall quality of the module			
	Very Good	Good	Average	Poor
Farmer (n = 70)	12 (17.14%)	39 (55.71%)	10 (14.29%)	9 (12.86%)
Scientist (n = 19)	3 (15.79%)	10 (52.63%)	5 (26.32%)	1 (5.26%)
Exporter (n = 20)	2 (10.00%)	6 (30.00%)	9 (45.00%)	3 (15.00%)
Line Dept. staff (n = 30)	8 (26.67%)	16 (53.33%)	5 (16.67%)	1 (3.33%)
Total (n = 139)	25 (17.99%)	71 (51.08%)	29 (20.86%)	14 (10.07%)

'average' and 'poor' groups. Table 6 presented data on how much percentage of respondents from each stakeholder group rated the module in which category. It clearly revealed that most of the farmers, scientists and line department staff rated the module to be good while majority of the exporters rated the module to be 'average'. On the whole majority of the respondents found the module to be of 'good' quality. Similar results were found by Bhaurao (5) who reported e-learning modules to be effective means to provide training to extension personnel and promote new concepts, create interest regarding climate change. King (8) also stated that e-learning was useful to increase decision making capability, knowledge and ability to use and retrieve information of the target clientele.

Satisfactory level of acceptability of the module among stakeholders implied progressive way of thinking of the farmers and their acceptance of modern extension education approaches. We could conclude that farmers were ready to absorb new instructional technology and therefore more experiments and interventions in this area of extension are needed. The e-learning module designed and validated in the study can be effectively used not only to enhance knowledge level of the farmers but also for extension personnel and related institutes for educating target client about GAP for grapes. It can also help researchers and policy planners to devise promotional strategy to create awareness about GAP through e-learning modules in future.

REFERENCES