



# Designing and Validation of *e-learning* Module on Indigenous Traditional Knowledge (ITK) for Sustainable Agriculture

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## ABSTRACT

e-learning module has been defined as an educational module designed by using e-learning methodology to educate and communicate the stakeholders regarding indigenous technical knowledge. An e-learning module was developed and prepared on Indigenous Traditional Knowledge (ITK) in tribal farming system of Himachal Pradesh. This module specifically focused on the ITKs of farming system prevalent in tribal areas of Himachal Pradesh. Validation was done based on four parameters namely content and design, ease of understanding, utility and ability to satisfy felt need by thirty scientists and experts.

**Keywords:** e-learning, Module, Validation, ITKs

## INTRODUCTION

Since the advent of green revolution in India, agricultural technologies have been developing at a very fast pace. These technological packages have increased the food grain production nearly more than five times since the 1950s, simultaneously, having treacherous effects on the environment. The scientists and policy makers have realized that consequences of modern agriculture, climate change and limited resources can be harsher in the future. This has led to an additional responsibility on agricultural research system to move from “green revolution” to the “evergreen revolution”. ‘Evergreen revolution’ is described as an increase in productivity, but in ways which are environmentally safe, economically viable and sociologically sustainable. The role of indigenous traditional knowledge (ITK) in sustainable agricultural production has already begun gaining recognition within scientific circles. Indigenous Knowledge is the participants’ knowledge of their temporal and social space. It refers not only to knowledge of indigenous peoples, but to that of any other defined community. The ITK system had been developed by the indigenous communities based on their experiences, continuous improvement through informal experimentation and transfer of such knowledge to next generations. The function of indigenous knowledge is to support and integrate access to global knowledge, and not

to relegate marginalised local realities. Indigenous knowledge systems are at a risk of becoming extinct and still it is not yet fully utilized in the development process. So, exploring this new innovative tool of *e-learning* for disseminating knowledge about ITKs among the stakeholders can be effective. Integrating indigenous knowledge with *e-learning* may help to bridge the gap between indigenous community and modern agriculture. The lack of documentation and predominant qualitative nature makes it difficult to validate the ITK. So, there is a need for identifying, documenting and validating the ITK scientifically at one place and communicate this knowledge among all the stakeholders facilitate with *e-learning*.

## MATERIALS AND METHODS

The study aimed at designing and validation of e-learning module on ITKs of tribal areas of Himachal Pradesh for information dissemination so that these valuable ITKs can be up scaled and out scaled after validation. The designing and validation of the module were carried out in following four phases:

### *Designing of module on ITK*

*Phase I:* Documentation of indigenous technical knowledge was carried out through primary as well as secondary sources. Semi-structured interview schedule, focused group

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discussion and transect walk was conducted to document the ITTKs.

*Phase II:* Graphics and videos were captured involving the respondents and secondary information were collected regarding Indigenous technical knowledge. Basic guidelines for developing e-learning module and storyboards were also developed.

### ***Development of basic guidelines and storyboard***

General guidelines are set of rules that provide the broad outline for designing e-learning module. Both the content and treatment of message were equally taken into consideration. Different principles of content structuring were used to design the general guidelines in order to facilitate the learning process and enhance the retention of knowledge and information gathered. The principles of designing basic guidelines are as follows:

*Chunking:* It is the process of designing blocks of content around the key theme of the message. Technical jargons were avoided and number of words in sentence were also kept limited. Care was taken not to overburden a frame with too much of information. Attempt was also taken to use active verbs as and when possible. English was selected as the language of representation considering its wide applicability. Care was taken to use as simple language as possible.

*Relevance:* Care was taken to make the content of the study relevant to present study through extensive review of literature

*Labeling:* Suitable title was given to the chunks in order to guide the learner in right direction. Short and simple titles were used.

*Sequencing:* The content was presented in proper sequence so that learner can continue with the module without confusion.

The principles of visual perception that were followed to enhance visual and emotional impact of design are as follows:

*Balance:* Balancing ascertains equilibrium of similar and contrasting forces and allots the elements in a harmonious manner.

*Unity:* Attempt was made to create unity by maintaining synchronization among the elements. Arrangements were made so that all elements could support each other.

*Repetition:* Repetition was created to emphasize on the desired elements and to develop a pattern in order to improve learning

*Variety:* Variety was incorporated by using multiple colours, illustrations, sound, graphics, etc.

*Rhythm:* It refers to the visual path that eye takes while moving through the layout. Care was taken so that eye can move smoothly, quickly and desirably along the frames.

*Emphasis:* Certain elements were emphasized by highlighting them with colours, shapes and other visual elements.

*Contrast:* Contrast gives liveliness and dynamism to the composition. Attempt was taken to generate contrast by differences in colours, font size, etc.

*Multimedia interface:* Video clips were captured by using Nikon D3300 during the documentation. Software called 'Window Movie Maker' was used to make video clips. They were added at appropriate places to enhance the learning. Appropriate subtitles were also added to translate the local dialect into English language for easy understanding by the learner.

*Storyboarding:* Storyboard is a plan that gives outline the ideas and material needed to build a module. It can be regarded as the blueprint of module. Storyboarding refers to the process of dividing the content into various groups and subgroups and positioning them along with the visual elements appropriately. Great deal of care was taken to develop effective storyboard.

*Phase III:* e-learning module was developed by using Microsoft Office PowerPoint 2010. The module was published in CD-ROM format.

*Phase IV:* The module was validated through the sample group of scientists as respondents using validation instrument developed by Vijayragavan and Singh (2009) modified for the purpose of the study. The instrument contained number of positive and negative statements on the pre-decided parameters. The responses were recorded on a five-point continuum *viz.* strongly agree, undecided, agree, undecided, disagree and strongly disagree with the scores of 5,4,3,2 and 1 respectively for each positive statement and their reverse order for negative statement. Module was modified accordingly based on the result of validation. Validation was made based on the following parameters:

- *Content design:* Includes aspects like presentation style, user interactivity, structure and sequence of content, readability of text, image quality, audio and video interactivity of the module as perceived by the respondents.
- *Ease of understanding:* Includes vocabulary, terminology, language, comprehensibility of language, length of module, etc. as perceived by the respondents.
- *Utility:* Includes creation of interest, stimulation of learning, gain in information, increased motivation, etc. through the modules as perceived by the respondents.
- *Satisfaction:* Includes credibility, exhaustiveness and usefulness of information given in the module and satisfaction of information needed by the content of module as perceived by the respondents

The individual opinion of each respondent was subjected to categorization to ‘very good,’ ‘good,’ ‘average’ and ‘poor’ groups. Categorization was done based on mean score and standard deviation of the item scores. Frequency distribution was done to find out how much percentage

of the respondents rated the module in which category on various parameters stated above.

For validation of the module, instrument developed by Vijayaragavan and Singh (2009) was modified and used. The statements were designed so as to throw light on content and design, ease of understanding, utility and ability to satisfy felt need of the module. The instrument contained number of positive and negative statements on the pre-decided parameters. The responses were recorded on a five-point continuum. Module was modified accordingly based on the result of validation.

### RESULTS AND DISCUSSION

Table 1, 2, 3 and 4 showed mean score of statements as well as ranking of the statements in the schedule. It was evident that relatively high mean score of almost all statements points towards general acceptability of the module by the experts.

Table 1 depicted statement wise analysis about content and design of *e-learning* module. Out of 21 statements, all statements had mean score above 4 except for 3 statements.

**Table 1: Statement wise analysis about content and design of *e-learning* module (n = 30)**

S.No.	Statements	Mean score	Rank
1.	Style of presentation is easily comprehensible	4.35	VII
2.	Higher level of user interactivity is provided	3.95	XIII
3.	Overall design is appropriate to enhance learning experience	4.45	V
4.	Learning experience is enjoyable and interesting	4.35	VII
5.	Content has been presented systematically	4.40	VI
6.	User is allowed to leave the module as per convenience	4.25	IX
7.	Amount of content in each frame is understandable	4.55	IV
8.	Content in each frame is well designed	4.60	III
9.	Text is easy to read	4.65	II
10.	Font type and size are appropriate	4.55	IV
11.	Use of font and background color are soothing to eye	4.60	III
12.	Layout of module is aesthetically appealing	4.05	XII
13.	User always know where he or she is in the module and can see the progress	3.80	XV
14.	Link between images and text is clear	4.45	V
15.	Images are clearly visible	4.70	I
16.	Sound of audio is clear	4.15	XI
17.	Picture quality of video is good	4.30	VIII
18.	Downloading time for audio and video files is not convenient	3.90	XIV
19.	Audio, video and images offer added value to learning	4.20	X
20.	Content is well structured	4.45	V
21.	Sequencing of content is appropriate	4.30	VIII

The statements “images are clearly visible” and “text is easy to read” were ranked first and second respectively. Third rank was found for two statements “Content in each frame is well designed” and “Use of font colour and background color are soothing to the eye”. The least liked statement was “User always knows where he or she is in the module and can see the progress”. Bishnoi *et al.* (2019) in their study depicted that contents that are comprehensive and easily understood by the respondents about the e-learning module with 2.83 mean score and ranked first. Information provided was adequate and enhanced by the activities/exercises incorporated in each e-learning module (Rowena *et al.*, 2015).

Table 2 showed statement wise analysis about ease of understanding of *e-learning* module. Highest mean score was found in case of the statement “Content has relevance to ITK of north-western Himalayas” and “Content is comprehensible” while the least liked statement was

“Module is lengthy”. The findings reported by Rowena *et al.* (2015) reflected that respondents perceived the contents of the modules were enough and relevant to the needs.

Table 3 depicted the analysis of the statements on utility of the *e-learning* module. Mean score of above 4 was found in all the statements except one. Highest mean score was found in case of the statement “It can be used as a tool for distance education as *e-learning* material” and “It can be used as teaching aid by lecturers” while the least liked statement was “It stimulated further enquiry regarding ITK”. Varga *et al.* (2013) in their study stated that e-learning module can be also used as a training material which are important for thriving organizations.

Table 4 illustrated statement wise analysis about ability of *e-learning* module to satisfy felt need. The statements like “Information given is credible” was ranked first and statements like “I found the information given as useful”

**Table 2: Statement wise analysis about ease of understanding of *e-learning* module (n = 30)**

S.No.	Statement	Mean score	Rank
1.	Content is clearly understood	4.45	III
2.	Vocabulary and terminology used are difficult	4.10	VI
3.	Language used is simple	4.30	IV
4.	Introduction to subject matter is appropriate	4.15	V
5.	Content is comprehensible	4.55	II
6.	Module is lengthy	3.95	VII
7.	Content is focused and specific	4.10	VI
8.	Content has relevance to Indigenous Technical Knowledge of north-western Himalayas	4.60	I

**Table 3: Statement wise analysis about utility of *e-learning* module (n = 30)**

S.No.	Statements	Mean Score	Rank
1.	Module is able to sensitize about ITKs of tribal areas	4.35	IV
2.	Module can be suggested as ready reference material for ITKs of Himachal Pradesh	4.25	VI
3.	Interest on ITK is created by the module	4.35	IV
4.	Learning took place after completion of the module	4.45	III
5.	No new concept was gathered through the module	4.25	VI
6.	It increased motivation regarding ITKs	4.20	VII
7.	It stimulated further enquiry regarding ITK	3.95	IX
8.	It created clear understanding about ITK of Himachal Pradesh	4.20	VII
9.	It can be used as a tool for distance education as <i>e-learning</i> material	4.65	I
10.	It can be used as an instructional aid for training on ITKs of North-western Himalaya	4.30	V
11.	It is useful to help extension persons to disseminate knowledge on ITKs of tribal areas of Himachal Pradesh	4.10	VIII
12.	It can be used as teaching aid by lecturers	4.60	II

**Table 4: Statement wise analysis about ability of e-learning module to satisfy felt need (n = 30)**

S.No.	Statement	Mean Score	Rank
1.	Content covers most of information need regarding ITKs of tribal areas of Himachal Pradesh	4.15	III
2.	Information given is credible	4.35	I
3.	Information given is complete	4.05	IV
4.	Given information is upto date	4.00	V
5.	New information was gathered through the module	4.25	II
6.	Information given is useful	4.25	II

and “New information was gathered through the module” were both ranked second. Auditor and Naval (2014) reported that developed modules were found acceptable by the students and there was no statistically significant difference between the evaluation of the students, peers and experts on the module’s acceptability.

Validation may refer to checking whether a system meets its specification and proposed purpose. In the present work, it is the evaluation of the e-module on ITK to determine its suitability, usefulness and utility for sensitization and increasing knowledge level of the stakeholders.

Table 5 showed the mean scores and ranking of major aspects of major parameters of the module based on the responses given by the stakeholders. Content and design of the module ranked highest based on stakeholders’ opinion for the module while the utility, ease of understanding and ability to satisfy felt need were found to rank second, third and fourth, respectively.

However, overall mean of 4.27 indicated high preference of stakeholders for the module. Gagarin (2003) also found that e-modules proved to be effective tool in

**Table 5: Rankings of validation parameters of e-module by scientists (n = 30)**

S.No.	Parameters	Mean Score	Rank
1.	Content and design	4.33	I
2.	Ease of understanding	4.28	III
3.	Utility	4.30	II
4.	Ability to satisfy felt need	4.17	IV
<b>Overall mean</b>		<b>4.27</b>	

teaching. Fartyal and Amardeep (2016) also depicts that the overall instruction effectiveness of online courses as fairly effective.

### ***Design and validation of e-learning module on ITK***

Under the content and design, “images are clearly visible” was ranked high as the module consists of ITK explained with the help of digital photographs captured with the high quality camera. As the colour combination of text and background was complementary, it was ranked second by the experts. Each frame of the module was very well designed with the photographic background to keep the interest of the learner. Due to this, it was ranked third by the respondents for the validation of the learning module.

The experts also opined that the module was very much relevant to north-western Himalayas. They also opined that it has been comprehensively written. High rating of this statement ensured the reliability of ITKs prevalent in the tribal farming system of H.P. Also, the content was so organized that it was easily comprehensible by the learners and was very clearly understood. The language used was very simple and the photographs and videos attached to a particular slide represented the ITKs in a better way to create more understanding among the learners.

Respondents found the module as useful as can be seen from the utility parameters of the validation of the modules. It can be used as a tool for distance education on ITKs. It can be used as a teaching aid by lecturers and also as an instructional aid for training. This shows that module consists of many things to learn, which can be useful for a wide variety of learners.

During the documentation of ITKs, care was taken to collect credible information. Hence, the credible information related to ITKs has been ranked high under the satisfy the felt need parameter of the validation of the module. Also, the documentation was targeted to cover the new information on ITK, which can be useful to different stakeholders. Care was also taken to cover the content related to information need regarding ITKs of tribal farming system of Himachal Pradesh. The overall high mean indicated moderately high liking of the stakeholders for the module on an average.

High mean score of more than 4 for all the parameters clearly implied potential for future applicability of the module. Thus, it could be concluded that there was

satisfactory level of acceptability of the module among all the stakeholders, which implied their progressive way of thinking and acceptance of modern extension education approaches. The study implied that different stakeholders were ready to absorb new instructional technology; therefore, more experiments in this area of extension are needed.

### CONCLUSION

The module was very much relevant to north-western Himalayas. High rating of the statements ensured the reliability of ITKs prevalent in the tribal farming system of H.P. It can be used as a tool for distance education on ITKs. There was satisfactory level of acceptability of the module among all the stakeholders, which implied their progressive way of thinking and acceptance of modern extension education approaches. The study implied that different stakeholders were ready to absorb new instructional technology; therefore, more experiments in this area of extension are needed. To increase the sustainability of ecosystem, the government should initiate action or policy measures for promoting such vanishing ITKs. As indigenous knowledge possesses potential for sustainability, they must be promoted after establishing their scientific rationality. In the changing agricultural scenario, it will help scientists, extension workers to understand a practice prevalent in a society so that it can be up scaled or out scaled further.

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