

Development and Validation of e-module on Creativity for Agricultural Students

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ABSTRACT

Creativity plays an important role in development of science and technology. The main purpose of the study was to develop and validate an e-learning module on creativity for agricultural students. Hence, the researcher developed an e-learning module by using content management software “Course Lab (version 2.4)”. Topics related to creativity of students were included in the e-learning module based on comprehensive review of the available literature in an online as well as offline mode and educationist’s suggestions. Data on seven validation parameters *viz.*, content, visual design, learning & support, motivation to learn, perceived utility and navigation, accessibility, interactivity were collected from agricultural students and analysed. Simple random sampling procedure was used for the selection of respondents. The results of the study showed that applicability of the e-learning module ranked first according to the students while learning and support, content, visual design, motivation to learn, perceived utility and navigation, accessibility, interactivity etc. ranked second, third, fourth, fifth, sixth and seventh respectively. The overall mean of 2.75 indicated moderately high liking/validity of the e-learning module by the students. Therefore, this study suggests that the developed e-module can be a useful tool for effective learning and enhances the knowledge and skills of the students.

Keywords: e-module and creativity, Development, Validation

INTRODUCTION

Present society is characterised by rapid change with greater acceleration in the field of technological advancement and education. Past society had never experienced such many changes occurred simultaneously and with greater speed over a spectrum of people activities. Fryer (1996) suggested that “to cope with the demands of the future, people will have to be quick, think, be flexible and imaginative”. Creative people are valuable resources in the rapid process of technological change, which has wrapped up this global world in recent years. Creativity is present in the person, in the process and the outcome within a specific area where interaction with inherited effects and surrounding climate of home, community, school and culture, gender and chance (Piirto, 2004). So, creativity is considered as vital human need to make something new. Furthermore, the development of the e-learning tools must be in the interests, knowledge, understanding, abilities, needs and experiences of students. These e-learning materials are very effective in providing quality education at higher level. Apart from

the textbook, the use of e-learning tools is crucial for expressive and meaningful teaching. Well-designed and tested e-learning tools can be very effective in training, which particularly requires lab activities and hands-on experience (Sung *et al.*, 2014). Additionally, current researches on instructional modules should focus on different e-learning contents in various disciplines of agriculture and their relationship with learning outcome. In the present world, e-learning is emerged as an effective, efficient and convenient option for lifelong learning. Burman *et al.* (2013) designed and validated a cyber extension model to disseminate technology information to the farmers for solving farm problems and augmenting overall agricultural development. Hence, learning through electronic medium may be considered as formal, informal or non-formal education (Mairescu, 2013). At present there are no e-learning modules for enhancing the creativity among students for higher education in agriculture. Therefore, it is pertinent to develop a e-learning module on creativity and validate developed module in the present context. Hence, this paper aimed to bring forth the

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development and validation of an e-learning module by considering seven important parameters.

MATERIALS AND METHODS

Development of the e-learning module on creativity requires a set of rules that provide the broad framework. To prepare the rules for development of e-learning module on creativity, different principles of content structuring and composition were used. These includes chunking, relevance, labeling, modularity, sequencing, hierarchy, balance, unity, repetition, variety, rhythm, emphasis, contrast and storyboarding. Descriptive research design was used for the study (Kerlinger, 1978). For validation of the e-learning module, instrument developed by Vijayaragavan *et al.* (2009) was modified, revalidated and used. The statements were designed so as to throw light on content and design, learning and support, interactivity, ease of understanding, motivation to learn, applicability and perceived utility of the e-learning module. The responses were recorded on a five-point continuum *viṣṭ*, strongly agree, agree, undecided, disagree and strongly disagree. Further, three-point continuum was formed *viṣṭ*, 'agree', 'neutral' and 'disagree' by combining 'strongly agree' and 'agree'; and 'disagree' and 'strongly disagree'. 'Undecided' respondents were kept under 'neutral'. The validation of e-learning module was done through evaluation of the e-learning module by the respondents on seven very important dimensions *viṣṭ*, content and design, learning and support, interactivity, ease of understanding, motivation to learn, applicability and perceived utility of the e-learning module. Forty students from ICAR-IARI, New Delhi constituted the sample size for this study. Simple random sampling procedure was used for this study.

RESULTS AND DISCUSSION

Validation was done through evaluation of the e-module by the respondents on seven very specific dimensions *viṣṭ*, content and design, learning and support, interactivity, ease of understanding, motivation to learn, applicability and perceived utility.

The significance of the content of the e-learning module was studied on the basis of four factors, presented in Table 1. Eighty per cent of the respondents 'agreed' that the vocabulary and terminology used in e-learning module are suitable for the learner and 20 per cent of them were 'neutral' with the statement. Similarly, more than one third of the respondents (77.50%) were of the view that the abstract concepts (principles, rules, etc.) were illustrated with concrete, specific examples followed by 15 per cent of the respondents who were 'neutral' with the statement. Majority of the respondents (82.50 %) 'agreed' that the content of the module was comprehensive and easily understandable to the learners followed by 17.50 per cent of the respondents who were 'neutral' with the statement. Eighty per cent of the respondents 'agreed' that the content was related to specific topic *i.e.* creativity and systematically presented, followed by 17.50 per cent of the respondents who were 'neutral' with the statement. An average mean score of 2.78 obtained for the content of e-learning module shows a general acceptability of the content of the module by all the respondents. The findings reported by Rowena *et al.* (2015) reflected that respondents perceived the contents of the modules are enough and relevant to the needs of the students. Topics covered in the e-module on personality development and public relations were attractive to the interest of the learners. Also,

Table 1: Statement wise analysis of the respondents' opinions about content of e-learning module (n= 40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
Vocabulary and terminology used are appropriate for the learner	32	80.00	8	20.00	0	0	2.80	II
Abstract concepts (principles, rules, etc.) are illustrated with concrete, specific examples	31	77.50	6	15.00	3	7.50	2.70	IV
Contents are comprehensive and easily understood	33	82.50	7	17.50	0	0	2.83	I
Contents are related to concerned topic and systematically presented	32	80.00	7	17.50	1	2.50	2.78	III
Average Mean Score	2.78							

information provided was adequate and enhance by the activities/exercises incorporated in each e-learning module (Rowena 2015).

The significance of the learning and support of the module was studied on the basis of four parameters, presented in Table 2. Eighty per cent of the respondents ‘agreed’ that the e-learning module offers tools (taking notes from module, references available, etc.) that support learning and 15 per cent of them were ‘neutral’ with the statement. Similarly, majority (90%) of the respondents were of the view that the module allows an individual student to learn on his own followed by 10 per cent of the respondents who were ‘neutral’ with the statement. Majority of the respondents (90 %) ‘agreed’ that the learning objectives of the e-learning module were clearly written followed by 7.50 per cent of the respondents who ‘disagreed’ with the statement. About 82 per cent of the respondents ‘agreed’ that the e-learning module had systematically presented the ideas which help interactive learning followed by 12.50 per cent of the respondents who were ‘neutral’ with the statement. An average mean score of 2.82 obtained for the module shows a general acceptability of the module by all the respondents with respect to learning and support provided to the students.

The significance of the visual design of the module was studied on the basis of four parameters, presented in Table 3. Ninety per cent of the respondents ‘agreed’ that the fonts (style, colour, saturation and contrast) used in e-learning module are easy to read and 10 per cent of them ‘disagreed’ with the statement. Similarly, majority (85%) of the respondents were of the view that the design was aesthetically appealing followed by 12.50 per cent of the respondents who ‘disagreed’ with the statement. Majority of the respondents (80 %) ‘agreed’ that the eye is immediately drawn to the most important informational or functional area of the page followed by 17.50 per cent of the respondents who ‘disagreed’ with the statement. Ninety per cent of the respondents ‘agreed’ that the content on each page was well organized and placed. Five per cent of the respondents were ‘neutral’ and ‘disagreed’ each with the statement. An average mean score of 2.75 out of 3, obtained for the module in terms of the visual design shows that content is well arranged in the e-learning module. Auditor and Naval (2014) reported that developed modules on Physics were found acceptable for the 10th grade physics students and there was no statistically significant difference between the evaluation of the students, peers, and experts on the module’s acceptability.

Table 2: Statement wise analysis of the respondents’ opinions about learning and support of e-learning module (n= 40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
The module offers tools (taking notes, resources, etc.) that support learning	32	80.00	6	15.00	2	5.00	2.75	IV
The module allows an individual to learn on his own	36	90.00	4	10.00	0	0	2.90	I
Learning objectives are clearly written	36	90.00	1	2.50	3	7.50	2.83	II
Systematic presentation of ideas in interactive learning style	33	82.50	5	12.50	2	5.00	2.78	III
Average Mean Score	2.82							

Table 3: Statement wise analysis of the respondents’ opinions about visual design of e-learning module (n= 40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
Fonts (Style, colour, saturation, contrast) are easy to read	36	90.00	0	0.00	4	10.00	2.80	II
The design is aesthetically appealing	34	85.00	1	2.50	5	12.50	2.73	III
Your eye is immediately drawn to the most important informational or functional area of the page	32	80.00	1	2.50	7	17.50	2.63	IV
The content on each page is well organized and placed	36	90.00	2	5.00	2	5.00	2.85	I
Average Mean Score	2.75							

The significance of the navigation, accessibility, interactivity, self-assessment and learnability of the module was also studied and the results are presented in Table 4. More than half (60 %) of the respondents 'agreed' with the statement that the learner always knows where he/she is in the e-learning module followed by 22.50 per cent of the respondents who were 'neutral'. Around 17 per cent of the respondents 'disagreed' with the statement. Similarly, majority (70 %) of the respondents were of the view that the module allows the learner to leave whenever desired, but easily return to the closest logical point in the module. Fifteen per cent of the respondents were 'neutral' and 15 per cent 'disagreed' with this statement. The respondents were asked about their response on the statement that the e-learning module is free from technical problems like hyperlink errors, programming errors, etc. and it was found that 90 per cent of the respondents 'agreed' and another 10 per cent of them were 'neutral'. Around 72

per cent of the respondents 'agreed' that the module uses elements that gain attention and maintain motivation of the learner followed by 12.50 per cent of them who were 'neutral' with the statement. Eighty per cent of the respondents 'agreed' that the e-learning module can start successfully by learner, learn the things, complete the entire course and test what he/she learned using only given instructions followed by 12.50 per cent of the respondents who were 'neutral' with the statement. Only 7.50 per cent of the respondents 'disagreed' with the statement. An average mean score of 2.64 was obtained for the module in terms of the navigation, accessibility, interactivity, self-assessment and learnability dimensions. The findings are in line with Murai (2015).

The significance of the motivation to learning dimension of the e-learning module was also studied and the results are presented in Table 5. Around 72 per cent

Table 4: Statement wise analysis of the respondents' opinions about navigation, accessibility, interactivity, self-assessment and learnability of e-learning module (n= 40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
Learner always knows where he is in the module	24	60.00	9	22.50	7	17.50	2.43	V
The module allows the learner to leave whenever desired, but easily return to the closest logical point in the module	28	70.00	6	15.00	6	15.00	2.60	III
The module is free from technical problems (hyperlink errors, programming errors, etc.)	36	90.00	4	10.00	0	0	2.90	I
The module uses elements that gain attention and maintain motivation of the learner	29	72.50	5	12.50	6	15.00	2.56	IV
Learner can successfully start, learn, complete the entire course and test what he learned using only given instructions	32	80.00	5	12.50	3	7.50	2.73	II
Average Mean Score	2.64							

Table 5: Statement wise analysis of the respondents' opinions about motivation to learning from e-module (n= 40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
The module incorporates novel characteristics	29	72.50	7	17.50	4	10.00	2.63	III
The module stimulates further inquiry	26	65.00	11	27.50	3	7.50	2.56	V
It is enjoyable and interesting	26	65.00	12	30.00	2	5.00	2.60	IV
It provides learner with frequent and varied learning activities that increase learning success	31	77.50	7	17.50	2	5.00	2.73	II
Module is user friendly	39	97.50	1	2.50	0	0	2.95	I
Average Mean Score	2.70							

of the respondents 'agreed' with the statement that the e-learning module incorporates novel characteristics followed by 27.50 per cent of the respondents who were 'neutral'. The respondents were asked about their response on the statement that the e-learning module stimulates further inquiry on the subject and it was found that 65 per cent of the respondents 'agreed' and another 27.50 per cent of them were 'neutral'. Similarly, majority (65 %) of the respondents were of the view that the module is enjoyable and interesting followed by 30 per cent of the respondents who were 'neutral'. Around 78 per cent of the respondents 'agreed' that the module provides frequent and varied learning activities that increase learning success in learner followed by 17.50 per cent of them who were 'neutral' with the statement. Around 98 per cent of the respondents 'agreed' that the e-learning module was user friendly. An average mean score of 2.70 was obtained for the module in terms of the motivation to learning. The similar type of findings was reported by Rohit (2016).

The significance of the applicability of the e-learning module was studied and the results are presented in Table 6. Eighty per cent of the respondents 'agreed' with the

statement that the e-learning module helps in understanding about the concept of creativity followed by 15 per cent of the respondents who were 'neutral'. The respondents were asked about their response on the statement that the e-learning module is helpful in enhancing the creative potential of the students and it was found that 80 per cent of the respondents 'agreed' and another 17.50 per cent of them were 'neutral'. Similarly, majority (95 %) of the respondents were of the view that the module can also be used as resource material followed by 5 per cent of the respondents who were 'neutral'. Around 78 per cent of the respondents 'agreed' that the module was also helpful for trainers followed by 7.50 per cent of them who were 'neutral' with the statement. An average mean score of 2.86 was obtained in terms of the applicability of the e-learning module under different situations by all the respondents.

The importance of the perceived utility of the e-learning module was also assessed and the results are presented in Table 7. Sixty-five per cent of the respondents 'agreed' with the statement of the e-learning module as a tool to sensitize the academicians, educationists, teachers

Table 6: Statement wise analysis of the students' opinions about applicability of the e-learning module (n=40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
This module helps in your understanding about the concept of creativity	32	80.00	6	15.00	2	5.00	2.76	IV
This module is helpful in enhancing your creative potential	32	80.00	7	17.50	1	2.50	2.78	III
The module can also be used as resource material	38	95.00	2	5.00	0	0.00	2.95	I
This module is also helpful for trainers	37	92.50	3	7.50	0	0.00	2.93	II
Average Mean Score	2.86							

Table 7: Distribution of respondents on their opinions about perceived utility of the e-learning module (n=40)

Statements	Agree		Neutral		Disagree		Mean Score (out of 3)	Rank
	Freq.	%	Freq.	%	Freq.	%		
As a tool to sensitize the academicians, educationists, teachers etc. about the creativity level of students	26	65.00	6	15.00	8	20.00	2.45	IV
As a ready reference to material to refresh and enhance the knowledge on the subject	33	82.50	7	17.50	0	0	2.83	I
As a training tool to enhance the learner participation	28	70.00	8	20.00	4	10.00	2.60	III
As an ideal instructional aid for imparting knowledge about creativity	33	82.50	5	12.50	2	5.00	2.78	II
Average Mean Score	2.67							

etc. about the creativity level of students while 20 per cent of the respondents 'disagreed'. The respondents were asked about their response on the statement regarding the e-learning module as a ready-made reference material to refresh and enhance the knowledge on the subject and it was found that 82.50 per cent of the respondents 'agreed' and another 17.50 per cent of them were 'neutral'. Similarly, majority (70 %) of the respondents were of the view that the module is used as a training tool to enhance the learner participation followed by 20 per cent of the respondents who were 'neutral'. Around 83 per cent of the respondents 'agreed' that the module can be used as an ideal instructional aid for imparting knowledge about creativity followed by 12.50 per cent of them who were 'neutral' with the statement. An average means score of 2.67 obtained shows that the e-learning module had practical utility for the different stakeholders. The e-learning module can be also used as a training material and trainings are important aspects of thriving organizations (Varga *et al.*, 2013).

The ranking of validation parameters of e-learning module by the students are presented in Table 8. Mean scores of the seven dimensions of the validation was presented based on the responses of students. It was found that applicability of the e-learning module ranked first according to the students while learning & support, content, visual design, motivation to learn, perceived utility and navigation, accessibility, interactivity etc. ranked second, third, fourth, fifth, sixth and seventh respectively. The overall mean of 2.75 indicated moderately high liking/validity of the e-learning module by the students. The similar finding was reported by Som (2015). Gagarin (2003) also found that e-modules proved to be effective tool in teaching physics to the students. Fartyal and Amardeep (2016) also reported that the overall instruction effectiveness of online courses as fairly effective.

Table 8: Ranking of validation parameters of e-module

Parameters	Mean	Rank
Content	2.78	III
Learning and support	2.82	II
Visual design	2.75	IV
Navigation, accessibility, interactivity and self-assessment and learnability	2.64	VII
Motivation to learn	2.70	V
Applicability	2.86	I
Perceived utility	2.67	VI
Overall mean	2.75	

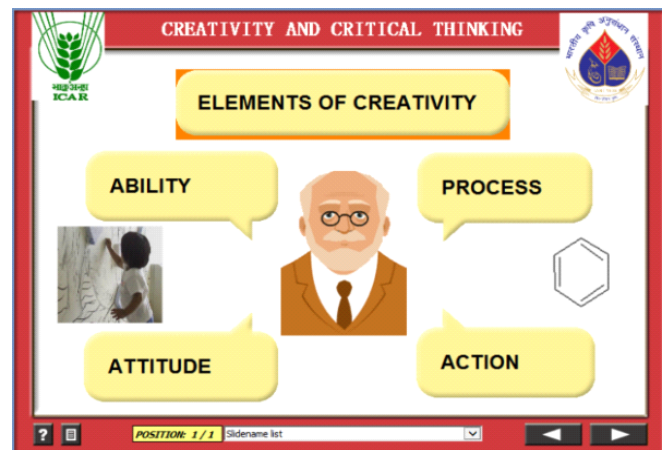
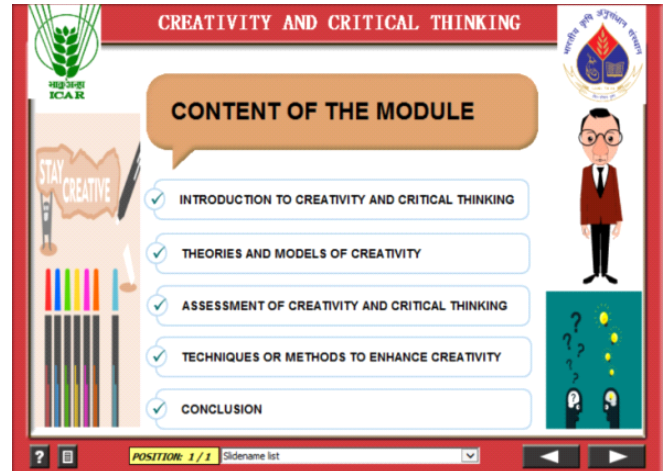


Figure 1: Glimpses of e-learning module on Creativity

CONCLUSION

It is concluded that e-learning module on creativity was highly accepted by the students. The respondents rated positively on the different parameters of validation of e-learning module on creativity. This showed that e-learning module found to be valid and acceptable among students. Therefore, the study recommends the use of e-module on creativity for teaching for higher education in agriculture. Developing and validating e-learning modules in other subjects or areas may enhance the knowledge and improve the skills of the stakeholders at different levels. Additionally, a similar type of this study with large sample size and conducted over a longer period of time could also reveal additional insight of the impact of the developed e-learning modules.

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