

Evaluation and Enhancement of Cognitive Skills of E-Learners

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ABSTRACT

Proper assessment of e-learners is extremely important in this modern age of online learning to ensure enhancement of cognitive skills. This paper is focused on the development of evaluation process of E-Learning system. Only very few guidelines ensuring valid assessment are available. Some different evaluation techniques for e-learning are identified and presented in this paper.

Keywords–Cognitive Skill, e-learning, Practical Evaluation, Theoretical Evaluation

I. INTRODUCTION

Online Teaching has become an integral part of education in modern days. Content making being an important aspect in online teaching, much emphasize is given and improvement is made, but evaluation of e-learners still needs to be addressed. Poor internet connectivity, lack of non verbal communications, acts as added hindrance in this process. Traditional evaluation techniques may not be fruitful in e-learning environment [1]. To enhance the cognitive skills of e-learners through proper evaluation method for theory as well as laboratory examination some approach is suggested in this paper.

II. OBSTACLES IN ONLINE EVALUATION

Traditional assessment requires written class test, assignment in written format, face to face viva-voce for laboratory examination and written semester examination. Also, these papers are needed to be scrutinized properly [2]. Application of these traditional methods for online learners may not be effective. As the e-learners are not in examination room in class test and semester examination, so proper monitoring is not possible. This leads to lack of cognitive skills development. Moreover, in laboratory examination students need to access the hardware setups, which is not possible in online mode.

III. MODULE DIVISION:

At the beginning of the semester syllabus of each subject need to be divided in small modules. Walvoord (2010) offers the definition “Assessment is the systematic collection of information about student learning, using the time, knowledge, expertise, and resources available, in order to inform decisions that affect student learning” [3]. So Syllabus need to divide to small modules by proper authority, so that students can be evaluated based on the performance on each module.

IV. THEORETICAL EVALUATION:

After the completion of the module on any particular topic students can be assessed in the following manners:

- Each learner may prepare a power point presentation on the topic and present it through any virtual mode to the teacher as well as the rest of the students and attempt to answer the question that arises in the forum.
- Students can develop a mini project based on the application of the topic and demonstrate it through a video and upload online.
- Each student can prepare an audio clip describing the summary of the module.
- E-learners may prepare a survey report on the current industrial application of the topic as an assignment and submit it online.
- Students may creatively prepare an assignment, stating the future scope on the application of the last module discussed. Which application fields needs to be explored and what are the probable challenges should be mentioned in the assignment.
- During discussion with the students Faculty members can also arrange quizzes based on the topic [4].

Faculty members need to keep the record of the response of the students and judge them on the basis of cognitive skills gathered. The Faculty members should make sure, that students should achieve the learning outcomes. [5]

V. PRACTICAL EVALUATION:

Evaluating students for their laboratory experiment is more complex than for theory paper, as hardware laboratory activities cannot be implemented online. But still as laboratory experiments are integral part of the course, proper evaluation in this respect is required. Some of the processes that may be implemented in this regard are discussed:

- Different Virtual laboratory are designed to conduct the hardware experiments, those can be utilized for performing laboratory experiments during evaluation.
- Assigning small projects related to laboratory experiments.
- Asking students to implement the circuit in software, and based on the result prepare an assignment pointing out the difference with hardware setup.
- Making a video related to laboratory experiment application in industrial field.

For laboratory experiments also respective faculty members need to record the response of each and individual and judge them on the basis of cognitive skills gathered.

VI. ASSESSMENT BASED ON COGNITIVE SKILLS THROUGH MACHINE LEARNING

First step to evaluate a student based on the cognitive skills requires identifying the features of evaluation. After that, based on the performance in each module a student can be judged on a scale of 1(poor) to 5(excellent) against each evaluating feature. Two sample tables one for theory and another for lab are shown below.

Table1: Evaluating Table for Theory Papers

Sl No:	Features of Evaluation	Score Obtained				
		Excellent(5)	Very Good(4)	Good(3)	Average(2)	Poor(1)
1	Ability to explain The module discussed					
2	Recognize the application of the topic					
3	Ability to analyze the inner depth of the module					

Table2: Evaluating Table for Laboratory Experiments

Sl No:	Features of Evaluation	Score Obtained				
		Excellent(5)	Very Good(4)	Good(3)	Average(2)	Poor(1)
1	Ability to Identify Proper instruments for performing Laboratory experiments					
2	Ability to note down activity in digital platform					
3	Ability to analyze application of laboratory experiments					

After assessing a student for different modules for different subjects, both theory and laboratory, the different results may used to train a machine learning algorithm (ML) to judge a student. Based on the ML output the cognitive skills of the student can be mapped with his overall performance in the range of 1(poor) to 5(excellent).

VII. CONCLUSION

There are different methods for evaluation and enhancement of cognitive skills of a student in traditional class room environment. But to assess a student based on cognitive skills gathered is a completely new and challenging task, as there is no direct interaction between teachers and students. In this paper an honest attempt has been made to properly assess a student based on the cognitive skills. Student feedback regarding new evaluation process is needed to be considered with utmost importance [6]. That will only ensure the smooth and successful transition of evaluation process [7].

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