Evaluating student performance based on bloom’s taxonomy levels

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Abstract : Knowing the performance of the student in online classes is very difficult. Staff are taking online classes and conducting objective type examinations. It is very difficult to know at which level student is performing better and which is not. Bloom's taxonomy is a technique developed by Dr. Benjamin Bloom in the year of 1956. Understudy appraisal is a critical bit of educating and is done through the procedure of examinations and readiness of test question papers has reliably involved scheme. Bloom's taxonomy is a lot of three progressive models used to group instructive learning goals into dimensions of multifaceted nature and explicitness. The cognitive domain list has been the primary focus of most traditional education and is frequently used to structure curriculum learning objectives, assessments and activities. Bloom's taxonomy is a device that can help human services educators expand the profundity of their students' learning.[3] The test with the taxonomy is creating assessments that measure every one of the six levels. There are 19 sorts of psychological procedures that can be grouped into six noteworthy classifications: recall, comprehend, apply, break down, assess, and make. There are four noteworthy classifications of learning: verifiable, applied, procedural, and meta cognitive. Instances of computer based appraisals of critical thinking are given dependent on the subjective outcomes of youngsters' cooperation in an after-school computer club. In this paper, an objective question paper have been given using six levels of Bloom's taxonomy and asked students to write the test using online and evaluates the results of student performance[1].

1.0 INTRODUCTION

In a conventional study hall, when the instructor makes an inquiry, just a single understudy can reply. The educator does not know whether every one of different understudies in the class comprehends the idea except if the person in question effectively communicates with every one of those understudies also. At the point when an inquiry is presented on the web, every understudy will react before he/she pushes ahead through the course.

In this covid 19 time, conducting online classes for KG to PG is only solution to engage the students. It has made it possible to offer classes worldwide through a single Internet connection. It has several advantages over traditional education. At the same time, the Online instruction still has its drawbacks, including limited communal synergies. The two types of online classes both...
synchronous and asynchronous. Synchronous eLearning is when the learners and the instructor interact with each other in real time, from different locations. The three tools that Support Synchronous Learning are Webinar, Web Conferencing App and Instant Messaging with integrated whiteboard Tools.

Asynchronous eLearning: Initially, e-learning mainly relied on asynchronous. A key component of flexible e-learning, asynchronous e-learning is based on the idea that the participants and teachers can’t be online at the same time. It is when learners complete self-paced online training. In this case, the learner and the instructor are not online at the same time. Asynchronous eLearning is commonly facilitated by media such as web, e-mail, and discussion boards.

Computer-helped guidance is changing the instructive scene as an expanding number of understudies are looking for online education. Schools and colleges are currently promoting the efficiencies of Web-based education and are quickly executing online classes to address understudy issues around the world. One investigation revealed "increments in the quantity of online courses given by colleges have been very emotional throughout the most recent few years". Research organizations are likewise dispersing insights on Web-based guidance. "In 2010, the Sloan Consortium found a 17% expansion in online understudies from the prior years, beating the 12% increment from the earlier year".

Bloom's Taxonomy was made by Benjamin Bloom amid the 1950s and is an approach to order the levels of reasoning skills required in classroom situations. There are six levels in the taxonomy, each requiring a more elevated amount of abstraction from the students. As an educator, you should endeavor to move students up the taxonomy as they progress in their insight. Tests that are composed solely to assess learning are tragically exceptionally normal. Be that as it may, to make thinkers as opposed to students who simply review data, we must join the more elevated amounts into lesson plans and tests.[2]

2.0 LITERATURE COLLECTION

2.1 Knowledge Level: In the knowledge level of Bloom's Taxonomy, questions are asked exclusively to test whether an understudy has expanded explicit information from the exercise. For instance, have they reviewed the dates for a specific war or do they know the presidents that served amidst express occasions in American History. Question action words: Define, list, state, distinguish, name, name, who? when? where? what?

2.2 Comprehension Level: The comprehension level of Bloom's Taxonomy has understudies go past essentially inspecting realities and rather makes them comprehend the information. With this level, they will more likely than not interpret the realities. Rather than essentially having the ability to name the different sorts of mists, for example, the understudies would in all likelihood
comprehend why each cloud has formed in that capacity. Question action words: Explain, foresee, decipher, gather, sum up, convert, interpret, give model, represent, rework x?

2.3 Application: Application questions are those where understudies need to really apply, or use, the information they have learned. They might be approached to comprehend an issue with the information they have gotten in class being important to make a reasonable arrangement. For example, an understudy might be asked to understand a genuine inquiry in an Indian Government class utilizing the Constitution and its corrections. Question action words: How could x be used to y? By what method may you show up, use, change, outline, light up, or apply x to conditions y?

2.4 Analysis: In the analysis level, understudies will be required to go past data and application and truly observe designs that they can use to separate an issue. For example, an English educator may ask what the intentions were behind the hero's activities in the midst of a novel. This expects understudies to separate the character and arrive at a resolution dependent on this analysis. Question action words: Differentiate, look at/differentiate, recognize x from y, how does x influence or identify with y? why? how? What bit of x is missing/required?

2.5 Synthesis: With synthesis, understudies are required to use the offered surenesses to make new speculations or make gauges. They may need to pull in gaining from various subjects and incorporate this information before coming to an end result. For example, if an understudy is approached to envision another thing or diversion they are being approached to incorporate. Question action words: Design, build, create, detail, envision, make, change, compose a short story and name the accompanying components.

2.6 Evaluation: The top element of Bloom's Taxonomy is evaluation. Here understudies are relied on to evaluate data and land at an end, for example, its regard or the inclination behind it. For example, if an understudy is completing a DBQ (Document Based Question) for an Indian History course, they are depended upon to survey the inclination behind any basic or auxiliary sources in order to perceive how that impacts the focuses that the speaker is making. Question action words: Justify, survey, evaluate, judge x according to given models. Which decision would be better/attractive over social occasion y?

We need to know at which level, student is performing well. Automatic evaluation technique allows us to do faster.

3.0 Objective
1. To prepare an online question paper with questions and which meet program objectives.
2. To cover all aspects of the bloom’s taxonomy and
3. To know the level of student based on bloom’s taxonomy.
4.0 METHODOLOGY

In this paper, we are proposing an evaluation method for software testing course and the study group is fourth semester Master of Computer Applications (MCA) students. The info information to this system is aggregate score of the considerable number of Units learnt. The question papers are set to test the basic reasoning of the students and scores for every model are separately assigned for the tests directed. The five criteria cover six levels of Bloom’s taxonomy and considered to be essential in upgrading skills of students as given in Table I.

4.1 INPUTS OF THE PROPOSED MODEL

In this case, a Software Engineering Subject is considered a model, to evaluate the student performance. This examination was conducted after the completion of their semester class work. A Set of 30 questions were prepared to know the level of student. The six levels of Bloom’s taxonomy is considered. On Each level, staff prepares 5 questions. So, the number of questions will be 30. There is criteria will be followed to give the ranking to students. A Google Form is used in preparation of questions.

Table I: Bloom’s Taxonomy Levels and Values

| Input Variable Factor | Unsatisfactory | Satisfactory | Good | Very Good | Excellent |
|-----------------------|----------------|--------------|------|-----------|-----------|
| Knowledge             | 0              | 1            | 2    | 3         | 4-5       |
| Comprehension         | 0              | 1-2          | 3    | 4         | 5         |
| Application           | 0-1            | 2            | 3    | 4         | 5         |
| Analysis              | 0              | 1            | 2    | 3         | 4-5       |
| Synthesis             | 0              | 1            | 2    | 3         | 4-5       |
| Evaluation            | 0-1            | 2            | 3    | 4         | 5         |

5.0 RESULTS

We have tested the proposed method of evaluation on 50 students for Software Engineering course. Bloom’s Taxonomy levels for each student are displayed. This method helps in identifying strengths and weaknesses of each student at every stage of learning. There are few students whose performance is excellent at first two levels, average at third level and poor at fourth, fifth and sixth levels. These students need to work on their weaknesses to improve their overall performance. The results are tabulated as shown in Table II.

The numbers of questions taken at each level are 5. The total numbers of questions are 30. The time given to complete the test is 20 minutes.

The roll number 10 performed excellent at all levels except knowledge level.

6.0 RECOMMENDATIONS
A pursuit of the World Wide Web will yield clear confirmation that Bloom's Taxonomy has been related with a grouping of circumstances. Current outcomes meld a broad range of uses spoke to by articles and websites depicting everything from erosion preparing to helpful preparation. In practically all conditions when an educator wants to move a get-together of understudies through a learning procedure utilizing a sifted through framework, Bloom's Taxonomy can show steady.

Bloom's scientific classification is by no means whatsoever, a firm rulebook that should be sought after perfectly; it's a theoretical build that can be deciphered from various perspectives to fit individual indicating styles, courses, and exercise plans. Some trust that it is legitimate for the lower levels of learning, and that it neglects to address later improvements in mental brain science, remembering the limit with regards to understudies to make data for their own personalities all through the learning procedure. Some likewise dislike the likelihood that understudies must beginning at the most reduced measurement and work their way up before participating in a significant trade about realities, which isn't in every case fundamentally the case.

Similarly as with any develop, there's consistently chance to show signs of improvement and further improvement. With Bloom's scientific categorization, the 21st-century update exhibited there was in making basic modifications that helped the framework remain relevant for future decades. Adhering to the design without examining the explanations for it can incite an over-reliance of the demanding interpretation of Bloom's scientific categorization. Because an understudy is prepared to monitor a situation, for example, doesn't mean they're doing as such in anything over a shallow way. Likewise, the ability to come up with a bare essential course of action isn't affirm that the plan itself is the aftereffect of viable understanding and investigation. There's something different under the surface the eye to learning and guidance, yet utilizing Bloom's scientific classification as a manual for guarantee every one of the six levels are made sure about, in whichever way works best, can put you on the right method to progress.

CONCLUSION
A practical online teacher must find ways to deal with show that understudy learning has occurred. One kind of examination alone won't be sufficient to check most of the goals and results needed. For online examination to be fruitful, educators must expand the assessment estimates used all through the instructional transport of the online course. This paper discussed the execution of Blooms Taxonomy thought when in doubt in organizing reasonable assessment question paper. The outcomes from this structure can be used as rule by the academician (test question originator) to setup/change the test paper suitably. At last, the teacher will have the option to make investigation of the assessment results and instruct the understudies dependent on Bloom's Taxonomy. In analyzing this article it ended up being clear that there are numerous applications in various structures utilizing Bloom's Taxonomy. Blossoms Taxonomy can be used to urge a consideration regarding how to measure progressively raised sum thinking capacities. As educators, we are having to persistently
evaluate how well our understudy is progressing to choose when the opportunity has arrived to continue ahead or when stronghold is required. Whether or not it is a related teacher making arrangements for a test, an understudy expecting to research a more prominent measure of the mountain condition, a part in a professional program endeavoring to pro the theory substance or yourself choosing whether you are set up for your next component of experience, utilizing the scientific categorization is a compelling and shown strategy to choose proficiencies.

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## RESULTS (TABLE II)

| Roll Number | Knowledge Level | Comprehension Level | Application Level | Analysis Level | Synthesis Level | Evaluation Level |
|-------------|-----------------|---------------------|-------------------|----------------|----------------|-----------------|
| 1           | E 5             | S 4                 | VG 4              | E 4            | E 4            | VG 4            |
| 2           | E 4             | G 5                 | E 5              | E 2            | G 4            | VG 4            |
| 3           | E 4             | VG 4                | VG 2             | G 2            | G 4            | VG 4            |
| 4           | E 5             | E 4                 | VG 1             | S 2            | G 5            | E              |
| 5           | E 4             | VG 4                | VG 0             | US 2           | G 5            | E              |
| 6           | E 2             | S 2                 | S 1              | S 2            | G 4            | VG 4            |
| 7           | E 4             | VG 4                | VG 1             | S 4            | E 4            | VG 4            |
| 8           | E 2             | S 2                 | S 1              | S 2            | G 5            | E 10 US         |
| 9           | E 4             | VG 2                | S 2              | E 5            | E 5            | E 5             |
| 10          | E 5             | E 5                 | E 5              | E 3            | E 5            | E 5             |
| 11          | G 5             | E 4                 | VG 5             | E 5            | E 5            | E 2             |
| 12          | US 0            | E 0                 | US 4             | E 5            | E 2            | S              |
| 13          | US 5            | E 0                 | US 4             | E 5            | E 2            | S              |
| 14          | S 4             | VG 2                | S 4              | E 4            | E 2            | S              |
| 15          | S 4             | VG 0                | US 2             | G 4            | E 1            | E              |
Performance at the of Students in the Subject: SOFTWARE ENGINEERING

**KNOWLEDGE LEVEL**

- Excellent: 10
- Very Good: 0
- Good: 1
- Satisfactory: 2
- Unsatisfactory: 2

**COMPREHENSION LEVEL**

- Excellent: 5
- Very Good: 6
- Good: 1
- Satisfactory: 3
- Unsatisfactory: 0
SYNTHESIS LEVEL

EVALUATION LEVEL