

## A STUDY ON ASSESSMENT & EVALUATION OF ENGINEERING STUDENTS' LEARNING BY ESSAY TEST BASED ON THE COGNITIVE DOMAIN OF BLOOM'S

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### ABSTRACT

*This study is an outcome of assessment & evaluation system of engineering students learning at Islamic University of Technology (IUT) in Bangladesh. Commonly, the engineering students' evaluations have taken place with essay-type test in all around. Though the essay-type tests have been gaining popularities yet, they have some serious shortcomings in terms of students' true learning achievement. This study has addressed those problems. The objectives of the study were to identify the strengths, weaknesses of essay-type tests, and to identify the suggestions for constructing & scoring essay-type tests. 260 students' opinions were identified with structured questionnaires. The essay questions of IUT were evaluated in light of six-sub domain of cognitive domain of Bloom's. Five years (2001-2005) the total 30,720 questions were analyzed. The study revealed that essay-type tests are important to problem solving; however, they are not so important to build the creativity & ingenuity of engineering students. Based on the findings the study suggests how to construct & score essay-type test effectively. The study suggests giving more emphasis on higher order cognitive domain during preparing instructional objectives and maintaining the successive assessments to align instructional objectives, activities, & assessment.*

**KEYWORDS:** *Assessment & Evaluation, Essay-type questions, Bloom's cognitive domains of learning*

### I. INTRODUCTION

The Islamic University of Technology (IUT) in Bangladesh is basically an institution dealing with technical education and research. The main objective of the University is to help generally in human resources development in member states of the Organization of the Islamic Cooperation (OIC), particularly in different fields of engineering, technology and technical & vocational education. The essay type examination has survived the continued criticism of experts in educational measurement. There is no doubt that in spite of its limitations, the essay type examinations have come to stay and are being extensively used. It is, therefore, very essential that all possible efforts are to undertaken to improve them so that the desired results are achieved to get the maximum benefits.

Teachers are busy most of the time with teaching rather than student-learning. As a result the essay-type test items become teaching-based not the learning-based. Finally, the performance blames, adjectives 'good' or 'bad' goes on students'. In this respect some key questions address (i) what have you learned about your students' learning?, (ii) what are you going to do about what you have

learned?, (iii) when, where, and how are you going to do it? [36]. “It is pointless simply to “do assessment”; the results of assessment activities should come full circle to have a direct impact on teaching and learning and on the institution’s strategic plan to fulfil its mission...if the results of assessment are not used to improve student learning, assessment becomes at best a descriptive set of data about students and, at worse, a useless exercise” [23].

Assessment issues can be clarified if assessment is defined by its purpose [27]. The purpose of assessment should to find out what the students know about not to find what they didn’t know. The essay tests still popular at IUT though it has most serious limitations such as poor (limited) content sampling, especially in the extended response type. In general IUT followed essay tests to evaluate the students’ learning but essay test possesses relatively low validity and reliability, it contaminated by extraneous factors like spelling, good handwriting, colour-ink, neatness, grammar, length of the answer etc. Moreover, essay tests have the limitation of subjectivity of scoring or assessing. If non-comprehensive and ambiguous questions are set students interpret them differently. This leads to subjectivity in answering also. There is a common mistake followed in essay test that unclear, irrelevant and jargon wording of the questions. Various students may interpret them differently. This results in guessing and bluffing on the part of students. So, to know the construction of essay question effectively and scoring is necessary, this study is important in that sense, it focuses how to develop essay questions effectively and scores them accurately.

*Objectives of the study:* The general objective of the study was to assess the opinions of the students regarding the present examination system and to analyse the strength and weakness of essay-type questions of IUT. The specific objectives of the study were: (i) to identify the opinions of the students about the strengths of essay type test of IUT, (ii) to identify the opinions of the students about the weaknesses of essay type test of IUT, (iii) to identify the opinions of the students for constructing a good essay type test of IUT, (iv) to identify the opinions of the students for scoring essay type tests, and (iv) to analyse the essay questions of IUT in the light of six sub-domains of Bloom’s cognitive domain.

*Delimitation of the Study:* IUT followed different types of test for evaluation the engineering students’ learning such as Oral-test, Performance-test, and Quiz-test etc. This study has considered only the essay-type test to assess and to evaluate the students’ learning. In IUT, the essay-type test are comprises by four quizzes one mid-term examination and one semester-final examination per semester per theoretical subject. This study has taken about only the essay type tests followed in mid-term and semester-final exam. This study only analysed the first-year and final-year essay questions of four departments of IUT (MCE, EEE, CIT and TVE) from academic year 2000-2001 to 2004-2005.

*Hypothesis:* ‘Only essay-type test is not enough or sufficient to identify the creativity or to analyse the potential which is mostly portrayed in assessments and evaluations system of the Engineering students learning.

*Research questions:* (i) what are the students’ opinions about the strengths of essay type test?; (ii) what are the students’ opinions about the weaknesses of essay type test?, (iii) what are the students’ suggestions for constructing a good essay type test?, (iv) what are the students’ suggestions for scoring the essay type test? (v) how are the essay questions distributed among the levels of questions in the text according to Bloom’s taxonomy: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation? (vi) how are the questions distributed depending on the factors which create the creativity of the engineering students’ learning?

The next sections of the article are stands to indicate some work done relevant with the topic focused by the research. The methodology, analysis, findings, discussions & conclusions and subsequently the suggestions for future work have also explicitly displayed.

## II. LITERATURE REVIEW

The several authors have been argued that there are a number of indispensable assessment concepts, principles, methods, and procedures that teachers and administrators need to know about [7] [8] [11] [12] [13] [16] [21] [22] [31] [32] [35]. However, there continues to be relatively little emphasis on assessment in the preparation of, or professional development of, teachers and administrators [34]. The study conducted on essay-test revealed that four significant functions of assessment that relates directly to student learning: (i) motivating learning, (ii) focusing learning, (iii) consolidating and structuring learning, and (iv) guiding and correcting learning [30]. Another study on essay-test

concludes that “any scholarship of assessment must therefore be predicated on the value that good assessment supports and positively influences student learning” [29].

A growing body of research concerns specific aspects of the process, including frequency of monitoring; intervention fidelity and intensity; effects in scaled-up models; longitudinal results; cost effectiveness; and maintenance of change over time. A recent study comparing the continuous progress monitoring procedures found that frequent, brief, timed assessments were no more useful in predicting success than assessments conducted two or three times per year [20]. Other study found that students in classrooms where teachers engaged in assessment discussions performed significantly higher on embedded assessments and post-tests [28].

Another study conducted on essay-type test revealed that assessment discussions were defined as a four-stage process in which (i) the teacher asks a question, (ii) the student responds, (iii) the teacher recognizes the response, and then (iv) uses the information collected for student learning [9]. Thus an effective teaching-learning should be two-ways communication process. Bloom identified six-levels within the cognitive domain, from the simple recall or recognition of facts, as the lowest level (Knowledge), through increasingly more complex and abstract mental levels, to the highest order which is classified as evaluation. Where, *Knowledge* - Remembering or recalling information; *Comprehension* - The ability to obtain meaning from information; *Application* - The ability to use information; *Analysis* - The ability to break information into parts to understand it better; *Synthesis* - The ability to put materials together to create something new; and *Evaluation* - The ability to check, judge, and critique materials [5] [37].

“Assessment to improve learning focuses on how well students are learning what we intend them to learn. By establishing learning objectives, assessment methods are used to measure selected learning outcomes to see whether or not the objectives have been met for the course or program” [15]. Some studies have showed that there have a fewer correlation between the input through teaching and the output of student’s learning. However, how well the students’ learn depends upon how well the teacher teaches. Thus, the learning goals should be prepared or rearranged based on the results of the students assessment. The learning opportunities should be providing based upon the learning goals. In fact this technique is helpful to resulting information to understand and improve student learning. The above assessment cycle has eight questions such as (i) where do we want to go? (ii) what are our broad goals? (iii) what should they achieve/learn? (iv) what did they achieve/learn? (v) how do we know they did? (vi) are some things not going well? (vii) what can we improve? (viii) are we aligned with where we want to go? [24]. Those questions are needed to promoting institutional effectiveness in terms of students’ learning.

### III. METHODOLOGY

This study is a descriptive case study type research. *Population*: the undergraduate and post-graduate students of Mechanical and Chemical Engineering (MCE), Computer science and Information Technology (CIT), Technical and Vocational Education (TVE) and the Department of Electrical and Electronic Engineering (EEE) of Islamic University of Technology. *Size of population*: the total numbers of current students of different Departments (MCE, CIT, TVE, EEE) of IUT are approximately 650. Thus the total size of the population for this study is 650.

*Sample of the study*: The size of the population is not very large. For this study, the number of sample students was limited to 40% of the population i.e., the size of sample was 260. From each Department the students were selected randomly. *Tool of the study*: The structured questionnaire for the students was constructed. The questionnaire has some close-ended questions as well as few open-ended questions. The close-ended questions were on strength, weakness, how to construct and score of the essay test. It was constructed by followed Likert-Scale by five responses such as 5(Strongly Agree)=SA, 4(Agree)=A, 3(Undecided)=U, 2(Disagree)=D, and 1(Strongly Disagree)=SD. About 260 students responded to the questionnaire. Thus the rate of return was 100%. *Techniques of data analysis*: The quantitative data of the study were tabulated in the form of percentage (%) and weighted averages (WA). The Weighted Average has computed for each item of the questionnaire using the following formula [14].

$$WA = \frac{N_1 + 2N_2 + 3N_3 + 4N_4 + 5N_5}{N_1 + N_2 + N_3 + N_4 + N_5} \dots\dots\dots (i)$$

Where,  $WA \geq 4.5$  is Strongly Agree (SA);  $4.5 > WA \geq 3$  is Agree (A);  $3.5 > WA \geq 2.5$  is Undecided (U);  $2.5 > WA \geq 1$  is Disagree (D); and  $1.5 > WA$  is Strongly Disagree (SD). *Analysis of the essay questions of IUT:* The analysis of essay questions has taken for mid-term and semester-final essay questions from the university library. The first year and final year (from 2001 to 2005) essay questions of four Departments were analyzed with respect to six sub-domain of cognitive domain such as: (1) Knowledge or Remembering, (2) Comprehension or Understanding, (3) Application or Applying, (4) Analysis or Analyzing, (5) Synthesis or Evaluating, and (6.) Evaluation or Creating. One academic year of IUT has divided by two semesters i.e., Winter-semester (12 questions) and Summer-semester. (12 questions) Also each semester has been consisted of two types of examination i.e., Mid-term examination and Semester-final examination. Thus, the total analyzed one-year question papers for one Department were 24 questions and for 5 years it was 120. For the four Departments it was  $120 \times 4 = 480$ . So, the total analyzed questions paper both first year and final year was  $480 + 480 = 960$ . Thus, the total analyzed questions were almost  $12 + 20 = 32$ ;  $32 \times 960 = 30,720$ .

#### IV. ANALYSIS AND INTERPRETATIONS

**Table 1.** Strengths of essay type test (Students' opinions, N= 260)

Statement	SA-5	A-4	U-3	D-2	SD-1	WA
Test covered a large area of subject matter by inclusion of short-answer questions	158 61%	40 15%	21 8%	29 11%	12 5%	4.16
Essay test have a very little scope for the influence of handwriting, spelling etc. on marking	147 57%	27 10%	39 15%	36 14%	11 4%	4.01
The test are more effective for the students' to solve a particular problem by using a general concept	166 64%	30 12%	12 5%	23 9%	29 11%	4.16
Essay test are very helpful for examiners to analyze the specific learning outcomes of the students	71 30%	92 38%	31 13%	20 8%	27 11%	3.66
Essay test have the power of creating something new by combining different ideas.	29 11%	67 26%	21 8%	105 40%	38 15%	2.78

**Table 2.** Weaknesses of essay type test (Students' opinions, N= 260)

Statement	SA-5	A-4	U-3	D-2	SD-1	WA
Essay type test generally stress the lengthy enumeration of memorized facts	56 22%	14 5%	21 8%	120 46%	49 19%	2.65
Essay type test are difficult to score objectively because examinees have wide freedom of expression	79 31%	60 24%	55 22%	21 8%	38 15%	3.48
Essay type test have the lack of consistency in judgments even among competent examiners	177 68%	33 13%	18 7%	11 4%	21 8%	4.28
Essay type test may not provide a true picture of the comprehension level of the examinee	56 22%	40 15%	88 34%	42 16%	34 13%	3.16
The speed of writing the essay type answer may influence the performance of the students.	66 25%	37 14%	31 12%	104 40%	22 9%	3.08

**Table 3.** Suggestion for constructing a good essay type test (N= 260)

Statement	SA-5	A-4	U-3	D-2	SD-1	WA
Questions should require reasonable command over knowledge of subject matter being evaluated	96 44%	78 35%	12 5%	26 12%	8 4%	4.03
Questions should be so worded that all the examinees interpret them in same as examiner wants	122 67%	36 20%	23 13%	-	-	4.55

Questions should be very explicit so that the examinee may know the asking to give the answer	39 20%	23 11%	119 58%	23 11%	-	3.38
Examiner should clearly indicate the weight of each part of the question	111 45%	67 27%	33 14%	17 7%	19 7%	3.98
Examinations should be so timed that the students are usefully engaged for the whole durations	-	25 15%	-	145 85%	-	2.29
Intended answer should be thought first and then an appropriate question formed	78 54%	54 38%	12 8%	-	-	4.45
Questions should not picked up exactly from the textbook	34 13%	167 66%	33 13%	20 8%	-	3.85

Table 4. Scoring essay type test (N= 260)

Statement	SA-5	A-4	U-3	D-2	SD-1	WA
No weightage should be given to handwriting, spelling and better language than language ones	30 13%	50 21%	15 6%	140 60%	-	2.87
It should be clearly indicated in the paper if any weightage is given to any aspect in a language paper	100 40%	38 15%	26 10%	50 20%	38 15%	3.44
To avoid fatigue, only a reasonable number of answer books should be marked in one setting	167 65%	37 14%	54 21%	-	-	4.44
There should be consistency in assessment.	177 68%	60 23%	23 9%	-	-	4.59

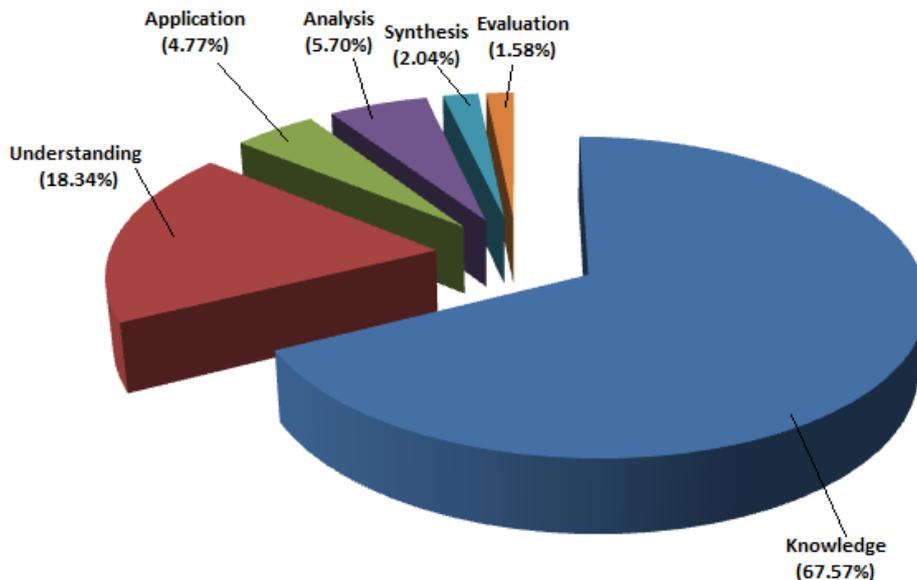


Figure 1. Six sub-domain of cognitive domain (%) present in essay questions

Almost 64% engineering students have agreed over the *strength* that “essay test are more effective for the students to solve a particular problem by using a general concept” (WA=4.16). On the other hand 40% students have disagreed about ‘essay test have the power of creating something new by combining different ideas” (WA=2.78). 68% students have agreed over the *weakness* of “Essay type test have the lack of consistency in judgments even among competent examiners” (WA=4.28). On the other hand 46% students have disagree about “essay test generally stress the lengthy enumeration of memorize facts” (WA=2.65). 40% students have disagreed that “the speed of writing the essay type answer may influence the performance of the students” (WA=3.08).

In the case of *suggestion for constructing* a good essay-type test, almost 67% students have strongly agreed that “essay questions should be so worded that all the examinees interpret them in the same as

the examiner wants" (WA=4.55). However, 85% students have disagreed that "the time allowed for the test should be carefully considered i.e., the examinations should be so timed that the students are usefully engaged for the whole durations" (WA=2.29). 54% students have agreed that "the intended answer should be thought first and then an appropriate question formed" (WA=4.45). In the case of *scoring essay type test*, 60% students have undecided (unsure) that "no weightage should be given to handwriting, spelling and better language in papers other than language ones" (WA=2.87); 68% students have strongly agreed that "there should be consistency in assessment" (WA=4.59). And, 65% students have agreed that "to avoid fatigue, only a reasonable number of answer books should be marked in one setting by an examiner" (WA=4.44).

The above Pie chart (the figure-1) has prepared after analyzed the total questions (first year and final year) from 2001 to 2005 of all Departments at IUT in light of six sub-domains of cognitive domain. It shows that the knowledge sub-domain was present maximum in comparison to other domain i.e., 67.57% in average for all the essay questions of four Departments at IUT. The understanding level questions were 18.34%; the applications levels were 4.77%; the analyses levels were 5.70%; syntheses level were 2.04%; and evaluations level were 1.58%.

## V. DISCUSSIONS & CONCLUSIONS

*Discussions:* The study revealed, the main strength of essay-type test is to solve particular problems. It is an effective and an important test for assessing the engineering students learning. Moreover, if the students want to express their concepts, ideas, etc., there have no exception of essay-type test. Only the essay-type tests can able to identify the comprehensive power of the students on the particular topic or subject matter. In that sense it is an effective test. However, according to the research findings "only essay type test is not enough to influence students' creativity." In the field of engineering, the teacher should provide the instructions in such a way that the students get the chance to show their own creativity. Thus, the students should have some psychomotor learning objectives beside the cognitive level.

The true fact is that it is very difficult to maintain the consistency in judgments the essay-type test even among competent examiners. That is the shortcoming of this test. However, this shortcoming can be reduced. This study revealed as most of the students disagreed "Essay type test generally stress the lengthy enumeration of memorized facts". It is true; the students can cite the answer of the essay questions if they have only some concepts except memorizations. Most of the engineering examinations are based on problem solving. This study revealed students have disagreed that speed of writing the essay type answer may influence the performance.

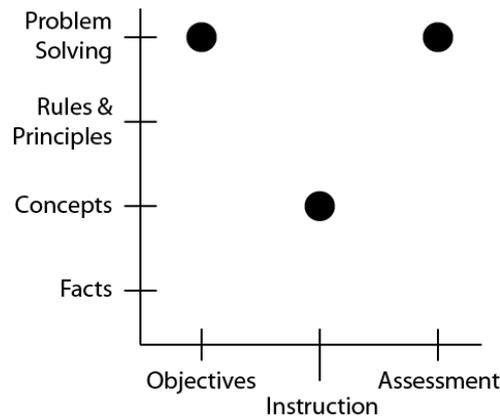
To constructing a good essay question is very imperative. If it is poor type, it may have the poor results in the students' assessment. Though, the essay-type questions have taken less time to prepare yet, they may contain a lot of ambiguity in the question formations. And so, the different students may have different meaning for the same question. That is the bad-effect of construction of essay questions. Thus, the common and simple language should be used to construct questions; so that the expressed questions could have the same meaning for all the examinees interpreted them in the same ways. The time is important factor for any exam however, it is not necessary that the students have to engage for whole durations.

Another, ruthless and common problems happened to construct essay questions are that most of the tester does not know the proper or definite answer of the questions. The answers of the essay questions are usually expressive type. Thus, many students would like to express it in own ways. This problem can be reduced by constructing the explicit question by address the particular answer of it. Scoring essay type test is as difficult and time consuming. Thus the proper attention should be taken to maintain its consistency. Essay-type test have '*halo effect*' which implies that the examiner's judgment in evaluating one characteristic is influenced by another characteristic as a result a well behaved student on account of his behavior may get more marks; (the students name and ID should not see while scoring the scripts) ; Essay type test have '*question to question carry effect*' i.e., a student who gives the best answer in the beginning of the answer book is likely to get more marks in the subsequent question and vice versa; (to reduce this effect, the examiner should score the same answer to all the students in the same question in same time, after that to move on the subsequent answer...); Essay type test have '*examinee to examinee carry effect*' which means that a particular

student may get marks not only on the basis of what he was written but also on the basis of the answer of the previous student; (to avoid this effect, the examiner should have his/her own answer or the level of expectation so that s/he may calibrate the students answer with it). The Pie-chart indicates the relative degree of emphasis of the sub-domains under cognitive domain, given in the question papers of IUT. For degree level less emphasis should be given on remembering and more on applying, analyzing, evaluating and creating level. The value of understanding level comprised 18.34% in average for all the essay questions of four Departments that was very less than even remembering sub domain.

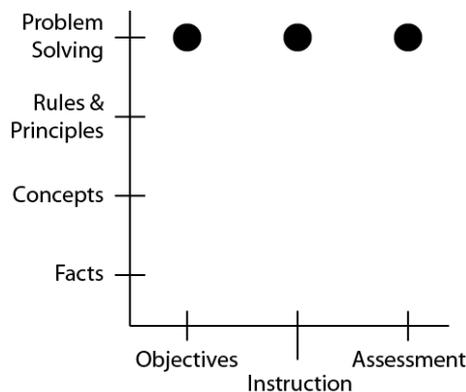
On the basis of findings this study suggests: (i) the essay questions should clearly indicate the scope of the answer. Explicitly state and qualify the problem so that all students will interpret it in the same manner; (ii) to avoid fatigue, only a reasonable number of answer scripts should be assessed in one seating by an examiner; (iii) set the extended response type questions because this type of question makes the greatest contribution at the level of synthesis and evaluation of writing skills; (iv) to set restricted response type questions which can reduce the sampling of subject-matter (content). It has also the greatest value for measuring learning outcomes at the comprehension, application and analysis levels; (v) when the answer is scored, to maintain the consistency in assessment it is recommended to prepare a scoring-key or scoring-guide for subjective and objective judgment and completeness.

On the basis of the study findings the researchers suggest the following: (1) the true assessment and evaluation of the students learning should be based on the 3 - (i) Cognitive domain: (development of intellectual abilities and skills), (ii) Affective domain (development of attitudes, beliefs, and values), and (iii) Psychomotor domain (coordination of physical movements and performance). Also, the learning or behavioral objectives should be SMART one (S = Specific, M = Measurable, A = Achievable, R = Realistic, and T = Time bound). Then the '*action verbs*' should be used to make the objectives specific one as the action verbs are explicit and describe observable actions or actions that lead to observable products. The '*vague verbs*' tasks are not specific. Usually, they should not use to write the learning objectives. (2) Sometimes six hierarchies or levels are grouped into three categories: Level-1. (Recall) – Knowledge and Comprehension; Level-2. (Interpretation) – Application and Analysis; Level-3. (Problem-Solving) – Synthesis and Evaluation. Thus, the Level-3 should be applied for engineering students learning. The problem-solving skills test the highest level of learning and involve construction and assessment of knowledge; (3) the rules ABCDs should be followed of writing instructional/learning objectives: A= Audience - Who? Who is this aimed at?; B= Behavior - What? What do you expect them to be able to do? This should be an overt, observable behavior, even if the actual behavior is covert or mental in nature. If it can't see, hear, touch, taste, or smell, it can't be sure the audience really learned it; C= Condition - How? Under what circumstances will the learning occur? What will the student be given or already be expected to know to accomplish the learning? D= Degree - How much? Must a specific set of criteria be met? Do you want total mastery (100%)? Do you want them to respond correctly 80% of the time? A common (and totally non-scientific) setting is 80% of the time. Finally, aligning instructional objectives, activities, and assessment i.e., a well-written objective will assist in aligning the objective to activities and assessment. The figure-2 below shows a mismatch of the objectives, instruction and assessment [10]. In this case: objectives were set to problem-solving, the students were assessed with problem-solving. However, only lower levels of learning, such as concepts, were presented to students. Because of these students who have not been exposed to problem-solving techniques related to the course will more than likely have low-achievement when working on problem-solving assignments or problem-solving questions on an exam.



**Figure 2.** Instructional objectives, activities, and assessment are not aligning

In contrast, the figure-3 below shows that matching the objectives with instruction [10]. Set the objectives to teach problem-solving. Design the instruction and learning activities to teach or demonstrate problem-solving. Assess the students at the problem-solving level. In that case the students will have the good learning achievement.



**Figure 3.** Aligning instructional objectives, activities, and assessment

*Conclusions:* The assessment is the purposeful process in the classroom to collect data, both qualitative and quantitative; in the classroom, assessment considers students performances on tasks in a variety of settings and contexts. However, the reliability and content validity of assessment is the major concern. Since teachers, parents and school districts make decisions about students based on assessments (such as grades, promotions, and graduation), the validity inferred from the assessments essential, even more crucial than the reliability. Also, if a test is valid, it is almost always reliable [19]. The study suggests aligning instructional objectives, activities, and assessment. There have a question: are less complex behaviors easier to teach? Whether a behavior is easier or more difficult to teach also will always depend on the learning needs and subjects' matter of the students. In the case of engineering, even the less complex behaviors are difficult to teach if the teachers have poor knowledge about the learning objectives. The learning domains are intertwined with each other. It is not possible to think without having some feeling about what we are thinking or to feel something without thinking, which means the 'affective' and 'cognitive' domains are intertwined. Similarly, legible handwriting requires neuromuscular coordination, timing, and control while the students are thinking about what they are writing. Thus it means the 'cognitive', 'affective' and 'psychomotor' behaviors are not mutually exclusive as they overlap with each other.

Some teachers pride themselves on preparing objectives almost exclusively at the higher levels of cognitive complexity. But objectives at lower levels of complexity often represent the knowledge base on which students build more complex behaviors. When the task-relevant prior knowledge or skills necessary for acquiring more complex behaviors have not been taught, students may demonstrate high error rates and less active engagement in the learning process at the higher levels of behavioral complexity. One of the most important uses of the taxonomies of behavior which was studied is to

provide a menu of behaviors at different levels of complexity. As with any good diet, variety and proper proportion are the keys to good results.

## VI. FUTURE WORK

There is evidence that teachers are more likely to “teach to the test” when assessments are perceived as having high stakes. As a result, there have been few efforts to develop valid measures of teachers’ teaching and assessment practices [18] and missed opportunities to provide teachers with formative feedback on their own performance and to reinforce innovative practices. This research suggests classroom-based “formative assessment” as it is increasingly essential to improve both teaching and learning of engineering students. Formative assessment refers to the frequent, interactive assessment of student progress to identify learning needs and shape teaching [26]. Teachers would then use the assessment results to provide feedback to students on gaps between their performance and the “mastery” level, and to adjust their own teaching to better meet identified learning needs [1]. The crucial distinction is that the assessment is formative if and only if it shapes subsequent learning [4] [38].

The researchers also suggest another important approach to improve engineering learning which is the sufficient feedback in class teaching. It is another kind of formative approach. A medium-cycle formative assessment occurs within and between teaching units (three days to four weeks), and a short-cycle formative assessment occurs within and between lessons (five seconds to two days). Some studies refer to the rapid feedback based on exchanges between teachers and students, or between peers as “on-the-fly” formative assessment [33]. Also note progress in the development of “standards-based appraisals” of teaching practice and structured performance assessments of teachers [2]. It also involves collection of evidence, such as lesson plans and samples of student work, and frequent observations of classroom practice. The use of such appraisal systems in some US school districts has been linked to improvements in teacher effectiveness and student achievement gains [2]. The adequate number of formative assessment should initiate to improve the quality of students learning. In fact, the quality of formative assessment rests, in part, on strategies teachers use to elicit evidence of student learning related to goals, with the appropriate level of detail to shape subsequent instruction [3] [17] [18]. But it is much more typical to find that teachers emphasize rote learning, develop only superficial questions to probe student learning, and provide only general feedback. Teachers may have difficulty in interpreting student responses or in formulating next steps for instruction [18]. The study suggests the further research in “formative assessment” for improving essay-type test of engineering students’.

The Swedish schools inspectorate found that teachers’ scoring of national assessments does not meet criteria for reliability suggesting that teachers’ grading/scoring of students’ classroom performance is also highly variable [25]. However, training helps to increase reliability of scores [6]. Thus, based on the results of recent study, this research suggests the future work on to design the engineering teachers’ training program on grading or scoring the students’ performance effectively.

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