Taxonomies: A Tool to Further Educational Outcomes and Design Learning Activities Consistently

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Abstract

The aim of the present study is to examine three models of education taxonomy which complement each other. The need to evaluate English language learning as a second language is very profound within the basic premises of higher education. Taxonomies, or classifications, organise the different approaches of learning as knowledge is multi-layered. Taxonomies help to classify the different types, complexities and positions of learning taxonomies that guide in helping students reach greater depth or complexity of understanding.

Keywords: taxonomy, English, learning, student, Bloom, Fink, Solo.

Introduction

In spite of the evident widespread awareness that English enjoys a global language status, our insight of English language learning at the higher education level has been explored to a relatively limited extent. The poor English language skills among the undergraduates and graduates is a recurring issue confronted by the English language teachers' in India. An effective framework for learning, teaching, and assessing English language at the Engineering education needs to be pursued coherently.

The main goal of teaching English at the college level is to facilitate English language skills and empower their pursuit of, higher education and global employment. In spite of putting in several years of studying English at the non- English medium schools in India, most of the students complete their schooling with exceptionally limited English language skills. This primarily adds on to the responsibilities and difficulties of the English teachers at the university level.

In India, English language policies carry a complex status riddled with larger issues of political, social, and practical contexts. The language education policymakers face the difficult task of planning goals and strategies that are ultimately linked to teachers and learners who are effectively not involved in the process of developing the policies. The teachers however are not actively involved in policy making process though they are primarily accountable for the implementation of the guidelines. They are to follow the curriculum and textbooks without relevant training and facilities. Teachers can see the usefulness and weakness of any given curriculum for they know what is actually happening in the classroom and can perceive what policy-makers cannot. (*Educational Action Research, 19*, 417). The

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teachers' practical experience and students' capabilities should be looked into with much more focus to ensure better credibility to the learning system.

The numerous theories of second language learning and teaching do not work in all contexts unless they are adapted and applied effectively. The teachers and learners who the primary the participants need to be understood comprehensively to implement any specific language teaching approach. The use of the communicative approach to English language teaching (CLT) is very popular around the globe. But identifying practices that could be applied appropriately for the local classrooms in India is as much important to ensure that the goals of language programs are met.

Language learning involves various styles and approaches to learning. Nunan (1986) claims that there exists a clear mismatch between teachers' and learners' perception in the current teaching method. It also a widely accepted fact that there is no best method in English language teaching (ELT). Learning and acquisition are terms debated actively in the second language learning forums. Krashen declares that there are several ways in which the classroom can promote language acquisition and that intake is easily reached by means of substantial communicative activities supplied by the teacher. (Krashen,2002). Profound impact on the basic premises of a pedagogy gives rise to a quest for educational methodologies that can meet society's demands for learning and teaching of English. Though the role of the learner has changed from the teaching perspective and dramatic changes have taken place in the way languages are taught. The need to evaluate English language learning as a second language is very profound within the basic premises of higher education.

In India an under graduate program is anticipated to develop the student's thinking and decision-making ability. In order to ensure and achieve this perceived position the objectives of this program are framed overtly. Based on the direction of the National Bureau of Accreditation (NBA) and other experts, the buzz word for all Engineering Institutions and Universities in India is "Outcome Based Education and Accreditation". NBA insists that institutions should practice the three learning domains of the teaching learning process viz., cognitive, psychomotor and affective domains so that the students can advance their knowledge, skill and outlook progressively. Though the technical subjects are framed on objectives guided within Bloom's taxonomy it is the English language learning that remains unkempt in the engineering course framework. This language is an important part of educational development. English as an international language is a high-demand subject of learning which continues to experience growth across the country and world. In an increasingly globalized economical world and in interacting across cultures like never before, the importance of learning English has turned out to be undisputable. Taxonomies have been established to help classify the different types, complexities and positions of learning taxonomies that guide in helping students reach greater depth or complexity of understanding. Taxonomies, or classifications, organise the different approaches of learning as knowledge is multi-layered. this paper reviewed theoretically three popular learning cognitive taxonomies which complement each other in their utility and validity in furthering educational outcomes.

Bloom's Taxonomy

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An educational psychologist Benjamin Bloom (1956), working at the University of Chicago developed his taxonomy of Educational Objectives. His taxonomy of learning objectives has since become a vital instrument in organizing and understanding the learning process. This study deliberated three taxonomies before adopting one for framing the questionnaire. Later in the 1990's, a former student of Bloom, Lorin Anderson with David Krathwohl, revised Bloom's Taxonomy and published Bloom's Revised Taxonomy in 2001. Bloom's Taxonomy of Educational Objectives involves of three domains namely Cognitive Domain, Affective Domain and Psychomotor Domain. All the three domains involve a multi-tiered, hierarchical structure for organising learning in the increasing levels of complexity. The taxonomy naturally leads to classifications of lower- and higher-order learning. In Bloom's Taxonomy "synthesis, evaluation, and analysis" level is categorised as higher-order thinking (HOTS), whereas "knowledge and comprehension" is lower order thinking.

The following are the definitions of Bloom's Taxonomy levels according to Bloom himself and other researchers:

Knowledge: Knowledge represents the lowest level of learning outcomes in the cognitive domain. This includes recalling a wide collection of material, from precise facts to complete theories. Though, all that is required is remembering the appropriate information

Comprehension: Bloom (1956) defined comprehension as the facility to understand the meaning of materials. This domain involves awareness of the literal message contained in communication and being able to grasp the relationships between each of these elements. (Truschel & Deming, 2007).

Application: Bloom (1956) defined application as the ability to use learned material in new and real situations. This domain may consist of applying rules, methods, concepts, principles, laws, and theories.(Truschel & Deming, 2007).

Analysis: (Bloom, 1956) defined analysis as the ability to break down materials into constituent parts to understand its structural organisation. Analysis distinguishes facts and inferences and decides how the parts relate to one another and to a complete structure. (Truschel & Deming, 2007).

Synthesis: Bloom (1956) defined synthesis as the capability to fit parts together to form a new idea. Truschel & Deming (2007) defined Synthesis as the fifth domain and refer it to the ability to make judgments based on criteria or standards or to combine parts to form a new concept or idea.

Evaluation: Bloom (1956) defined evaluation as the ability to judge the value of materials (statement, novel, poem, and research report) for a given purpose. This domain is the highest in the cognitive hierarchy because it contains elements of all the other categories as well as conscious value judgments based on clearly defined criteria.

Revised Bloom's Taxonomy

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In the 1990s, Lorin Anderson revised Bloom's taxonomy as it reflects different forms of thinking, which is an active process that requires more accurate verbs. The subcategories of the six major categories were replaced by verbs, and several subcategories were reorganized. The revised Bloom's Cognitive domain has a hierarchy of categories that capture the process of learning, from simply remembering information to creating something new: Remember Understand Apply Analyse Evaluate Create.

Denise Tarlinto (2003) defined Lorin Anderson's taxonomy levels as follows:

1- Remembering: the ability to recall, restate, and remember learned information
2- Understanding: the ability to grasp the meaning of information by interpreting and translating what has been learned
3- Applying: the ability to make use of information in a context different from that in which it was learned.
4- Analysing: the ability to break learned information into parts to understand said information.
5- Evaluating: the ability to make decisions based on in-depth reflections, criticisms, and assessments.
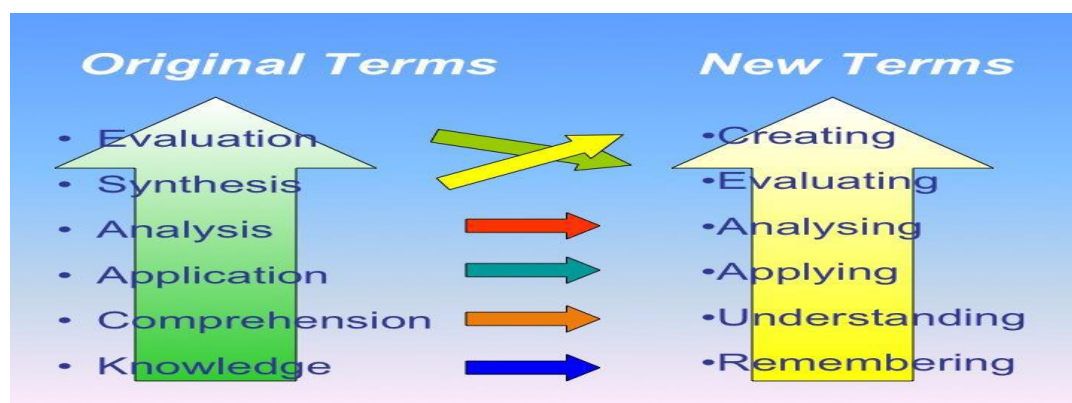6- Creating: the ability to create new ideas and information using what was previously learned.

Fig.1(Pohl, 2000, Learning to Think, Thinking to Learn, pp. 7-8)

Krathwohl (2000), argued that both versions old and revised Bloom's taxonomy are essentially alike. He explained that it was a matter of verb vs. noun. He recommended that the revised version gives better placement of the levels to teachers' usage. He observed that synthesis and evaluation were exchanged. The revision represents a tangential proposition. David Krathwohl, one of the editors of the original taxonomy, worked in partnership with seven other educators to produce the revised Bloom's Taxonomy.

Biggs SOLO Taxonomy
The Structure of the Observed Learning Outcome (SOLO) Taxonomy was devised by Biggs & Collis (1982) distinguishes the complex levels of understanding to describe and assess student learning. The SOLO model classifies students' learning outcomes from any activity, unit or classroom programme. It can be used to easily sort learning outcomes into three levels of knowledge: • surface

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knowledge • deep knowledge • conceptual (or constructed) knowledge. Biggs suggests the levels in SOLO with appropriate verbs describing activities learners cannot do yet as well as those they can do to indicate the level of demand for outcomes of learning. In evolving SOLO, Biggs and Collis scrutinized the effect of student learning, such as: students' prior knowledge and errors, intentions and goals about education, and their learning approaches.

Atherton (2005) provides an overview of the five levels that make up the SOLO taxonomy:

1. Pre-structural: At this level student is simply acquiring bits of unconnected information, that has no organization nor do they make any sense.
2. Unistructural: On this level simple and obvious connections are made, but their significance is not grasped by the student. Simple and noticeable connections aremade but broader significance is not understood. The associated learning verbs are: identify, memorise, do simple procedure.
3. Multi-structural: Though a number of connections may be made on this level, the meta-connections between ideas and concepts around an issue are disorganised and overlooked, as their meaning for the whole is lacking. The related learning verbs are: enumerate, classify, describe, list, and combine.
4. Relational level: When the student reaches this level is able to appreciate the import of the parts in relation to the whole. The related learning verbs are: compare/contrast, explain causes, integrate, analyse, relate, and apply.
5. Extended Abstract: Herein student makes connections not only within the given subject area, but also beyond it. Understanding is transferable and generalizable to different areas. The related learning verbs are: theorise, generalise, hypothesise, reflect and generate.
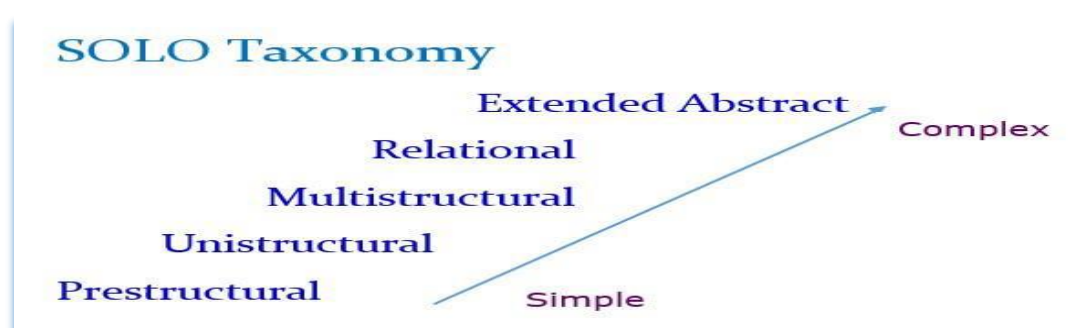

Fig 2. Biggs, (1982). *The SOLO taxonomy*.

Fink's Taxonomy of Significant Learning

Fink's Taxonomy of Significant Learning (2003) was drawn-out on Bloom's taxonomy to support and evaluate meaningful learning experiences or significant learning. Fink's (2003) Taxonomy of Significant Learning is not hierarchical and is similar to Anderson's taxonomy (2001) that gives prominence to metacognition i.e. learning to learn.

There are six categories of significant learning in Fink's circular taxonomy:

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(1) Foundational knowledge comprises of the essential or basic information and concepts taught in the course. It is necessary for any further learning about the subject.

(2) Application involves learning how to carry out and complete new tasks. This refers to the abilities and critical thinking needed in student learning to manage complex tasks.

(3) Integration comprises the ability to relate between ideas and the individual domains of everyday life and expand intellectual power.

(4) Human dimension involves students' learning more about themselves and others and how this interface might occur more effectively.

(5) Caring incorporates a change in student attitude, feelings, interests, or values associated with concerns and interest about others, issues, or concepts either about themselves or what they are learning.

(6) Learning how to learn takes place when skills that students learn help them to continue learning beyond the classroom; i.e. encourages Life Long Learning (Fink,2003). According to Dr.Fink (2003) when a course or learning experience is able to promote all six kinds of learning, one has had a learning experience that can truly be deemed "significant."

One important feature of this particular taxonomy is that each kind of learning is interactive, as illustrated in Figure 3.
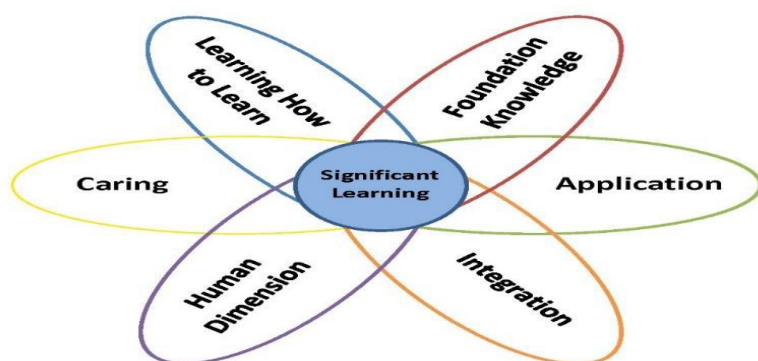
Fig 3. (*L. Dee. Fink 2013, Creating Significant Learning Experiences***)**

Conclusion
Students should be clearly involved in building their own knowledge is a common and essential belief of the Bloom's and SOLO classifications or taxonomies of learning. Bloom's taxonomy is not supplemented by measures for judging the conclusion of the activity (Ennis, 1985), however SOLO is openly useful for judging the outcomes. Bloom's taxonomy presumes that there is a basic relationship between the questions asked and the answers drawn, whereas in the SOLO taxonomy both the questions and the answers can be at differing ranks (Hattie, 2009). The limitations of the SOLO

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taxonomy is in spotting the more elusive dissimilarities of the learning outcomes over the extensive setup of a university.

Bloom's levels of remembering, understanding, and applying are approximately corresponded by Fink in his foundational knowledge and application. Fink's integration can be seen at the upper three levels as in Bloom's higher order of thinking -HOTS. However, the next three dimensions of Fink's namely, human dimension, caring and learning how to learn are not arranged in any order, but are rather transitive. In determining the outcome to represent the significant learning in caring, the human dimension, and learning how to learn is more challenging as each teacher could perceive these levels differently. Whereas Bloom's taxonomy (hierarchy) of cognitive learning skills allows teachers to evaluate students learning very systematically. In contrast to the hierarchical process in Bloom's taxonomy Fink contended that learning is bidirectional and improvement in one taxon benefits students to develop in every other taxon. The subsequent development to be assessed and understood from the teacher's end would involve diversity and no uniformity in outlook.

SOLO taxonomy is a hierarchic taxonomy whereas Bloom's Taxonomy of learning domains can map the learning levels noticeably. Fink's taxonomy involves caring and human dimension which cannot be easily measured simultaneously it does not include the analysis component. Cognitive level of assessments can be deliberated engaging one of these taxonomies. The taxonomies are useful in giving a clear multi-layered answer on the question why they should be used in educational objectives, compilations and assessments.

Taxonomies make provision for the educators to think about learning in a systematic way. However, no taxonomy is universal as diverse context of learning finds instructors inclined to different taxonomies. It is only when the higher levels of thinking are gauged that students' real relationship with learning and the world around them is implicit according to Bloom (1956) and Anderson and Krathwohl (2001). It is this mapping of the higher levels of thinking that can be applied within this taxonomy and thus generate resourceful learning. The appropriateness of a learning method lies in the evaluation of the prevalent methodologies of English language teaching in an education taxonomy framework.

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