

Using Wordwebs to Inculcate Higher Order Thinking Skills in Professional UG Classes – A Case study

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Abstract

The present paper explores the efficacy of a simple word activity known as “wordwebs” in inculcating higher order thinking skills in professional UG classes. Generally used in classes as an icebreaker, this seemingly simple word activity can, if properly channelled, instill higher cognition skills in the students. For the present study, wordweb activity has been conducted to arrive at the findings and conclusions. The students are explained how to channel their thoughts so as to improve their higher order thinking skills before beginning the activity. At the first level, the class is given a few simple words and the wordwebs are created on the blackboard. At the second level the students are encouraged to come up with words which are related to the first level words. In the third level, the students are encouraged to identify problems and offer solutions centred on the words they have recollected. Based on these activities, the discussion is developed so as to study the influence of wordwebs in imparting higher order thinking skills in professional UG classes.

Keywords: Higher order thinking skills, wordwebs, influence of wordwebs, cognition skills

1. Introduction

A good teacher is always in pursuit of diverse education approaches to make teaching effective. Many academicians agree that a good teacher is capable of inculcating cognitive thinking in students [1]. It is a known fact that teachers are one of the main stakeholders of education and hence they should ensure that learners work on effective instruction material. To facilitate maximum accomplishment of learning outcomes, interactive learning methods should be introduced in a classroom setting.

Learning is a gradual, continuing, and organized task. Assimilation of cognitive and meta-cognitive strategies helps learning become effective [2]. Effective learning results when learning aims at a goal. Moreover, all new learning is linked with prior knowledge. The result of effective active learning is a self-reliant and confident learner in an unending quest for knowledge [3].

Active learning implies that students should involve in performing actions and thinking about various methods while performing and the consequences of these actions [4]. The main function of a teacher is to assist learners involve in active learning and utilize cognitive powers.

1.1 Introduction to higher order thinking skills

Higher order thinking skills entail critical, logical, reflective, metacognitive and creative thinking skills [5].

Much material has been generated on effective teaching yet it is complicated to clearly define the aspects of effective teaching [6]. Given the short time the academic year has and the constraints the teachers have due to their workload, it often becomes difficult to complete the syllabus in given time. This situation leaves the teachers dissatisfied as they feel that they could have done better if time permitted. Good teachers love not only to teach the subject but also to improve the creative and analyzing skills of their students [7]. Pedagogy also includes studying various methods to develop critical thinking skills in learners [8]. Critical thinking skills can also be developed in the beginning of the semester, when conducting icebreaking activities in the introductory classes. The point that is stressed in the class is that if the idea is functional, one should be able to apply it practically to other situations as well.

1.1.1 Introduction to wordwebs

In classrooms, where English is taught as a second language, wordwebs are introduced as icebreakers or word activities to generate student participation. Though some facilitators consider this activity only apt for high school, it has multiple uses when a logical approach is used for maximum utility. This seemingly simple word activity, if properly channelled, can instill higher cognition skills in the students as proved in the case study.

1.1.2 Problem statement/Objective

It was observed in several engineering colleges that many students lack professional approach towards academics. These students were found to be clueless regarding the objectivity and scope of their studies. The problems arise because the students lack higher order thinking skills.

The vast and frequent technical changes in the last decade prove that the young learners are remarkably quick but at the same time have short attention spans. Many a time, the present generation seems to circumvent a problem rather than trying to solve it.

Along with the curriculum, a few simple activities can also help in the process of inculcating higher order thinking skills like critical thinking and problem solving in the students. The study was carried out to develop higher level thinking skills and to inculcate a strong urge to utilize these skills in other areas in their life. This activity was chosen to target development of cognitive skills in learners and was introduced and practiced to demonstrate learners' ability at the end of the semester.

1.1.3 Methodology

For this purpose, wordwebs was introduced to the I year B. Tech Integrated Mechanical branch students where the author is working as an assistant professor. Three classes were utilized to explain the activity, how it can be utilized for high-end goals, what the facilitator is expecting from the class and some practice sessions. The aims and the learning objectives were clearly explained before the practice sessions. After the activity, feedback was given to the students and again learning objectives were clearly explained from one level to the next level.

In the first session, a simple word is written on the black board and the students are told to write as many words as possible connected to the base word. These words could be related to the base word or connected to the base word through memory recollection or past experience.

The activity was conducted involving all the 66 students to make the activity more interesting and to generate numerous ideas. The students were encouraged to come up with as many words as possible. Words like "soap," "rabbit," and "water" were given as the base words to generate wordwebs. The students were told to write words that they could connect with the given word. As the activity was easy, all the students participated enthusiastically which led to the generation of not only words but sociorelevant issues as well. The students were then encouraged to come up with solutions for these problems.

Again at the end of the semester, two classes were devoted to the same activity but this time as it is expected that the students gain knowledge in the preceding semester, they were given two complicated words; one which deals with emotions and the other which deals with their subject matter. In this session, it was observed that the students participated more actively and as they were already aware of the teacher's expectations, they smoothly channeled their thought processes towards the desired end. It is observed that there is indeed an improvement in their perception skills.

Words which convey feelings like "anger," "joy," and "anxiety" were given in this session. The wordwebs for these words were thought provoking and led to discussions on topics concerning individual as related to the society. Subject related words like "engine," "motor," and "machine" were also given to generate interest in subject related area and to develop thinking skills in the subject area.

The objective is relating these words to the present day issues and analyzing and resolving the issues.

1.1.4 Findings and discussions on the basic words

According to Bloom's Revised Taxonomy, the progressive levels of a learner are as follows [8]:

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating

After each wordweb, the outcome was discussed with the students. For the word "rabbit," some of the words given by the students are "forest," "lab testing," and "hare and tortoise." The students' attention was drawn towards their thinking level which could only produce words immediately surrounding the root word. It was explained that the thinking at this level is the first stage towards developing higher order thinking skills.

The second level involves thinking beyond what immediately strikes one's mind or connecting the new word to another word. In this level, the students could identify issues like deforestation, which is related to "forest," ethical practices in labs related to "lab testing" and literature related to "hare and tortoise."

Forest → deforestation
Lab testing → ethical practices in labs
Hare and tortoise → literature → children's literature → Harry Potter series

The next level in this process is providing solutions for the identified issues. Students were encouraged to recommend a remedy for these issues. Some of the ideas they came up with for bringing down deforestation are as follows:

- Use negligible paper as the present generation is net savvy, especially in government organizations and educational institutes.
- Using fibre moulded and metal furniture
- Recycling paper
- Planting more trees

Some thoughts to encourage ethical lab practices are as follows:

- Using safe practices so as not to harm the animals as much as possible
- Curbing use of animal-tested products
- Encouraging use of alternate practices like Ayurveda for medical and cosmetic purposes.

Thoughts on children's literature led to the following:

- The success of Harry Potter's series.
- Dwindling interest in literature and lack of children's literature writers, especially in India.

When working on wordwebs, the basic level includes remembering and understanding. In this level the students can think of words they remember and understand. In the second level the students apply their cognition to acquire more words related to the words they have already recollected. The higher cognitive skills include applying, analyzing and evaluating. In this level, the students not only apply their previous knowledge but also try to analyze and evaluate the issue or situation as given in the first wordweb for the word "rabbit." In the third level, the students applied their knowledge to the word "forest" and analyzed the issue "deforestation" and evaluated "planting trees" and "recycled paper" as a remedy for the issues identified.

1.1.5 Findings and discussions on words which convey feelings and subject

For the purpose of the present study, we will limit the discussion to two base words, "anger" and "machine." "Anger" relates to emotions of a person whereas "machine" relates to their core subject. For "anger" the words given immediately are frustration, fight, non-cooperation, sadism, etc.

The next level connectives given for this word were "discussion, yoga, meditation, clear thinking, analyzing self and attending anger management classes, channelizing into sports, martial arts, Tai Chi etc.

One important result out of this activity was, for the base word "anger," the students gave a set of initial words like, "frustration, irritating, sadism" which immediately led them to a contentious topic, their Geometrical Drawing subject. The students find the subject difficult and also find it demanding in terms of efforts. Circumstances have reached a phase where the students were ready to accept failure even before writing the examination rather than put in some hard work. When the students were steered to the next level for the word "GD subject," they identified the words "hard work, more time to spend on the subject, splitting into parts to manage it in an effortless manner" immediately as the next level. When steered to the next level, they reluctantly zeroed in on "take the subject faculty's help." Eventually, in a manner which was neither sermonizing nor berating, a judicious agreement was reached, albeit reluctantly, to follow the GD faculty's directions.

Anger → frustration → Geometrical Drawing subject → Hard work, time and effort → take the subject faculty's help

For the word, "machine," the students came up with words like, "reduces manpower, tools, aeroplane engines, assembling etc." For the word "reduces manpower," the students came up with "unemployment" as a connective word. Here, for a long time, the class was stumped and could not go on to the next level where a solution could be arrived at to combat the problem "unemployment." After much debate, a student came forward with the answer that both man and machine can coexist as man is more intelligent and creative than a machine and can utilize the machine in such a way that it does not become an impediment to his progress.

Machine → reduces manpower → unemployment → co-existence of man and machine

According to Mary Grösser, “to foster effective and meaningful learning, teachers need to emphasise the cognitive and metacognitive functions and processes that go beyond remembering and also assist learners in acquiring these” [3].

1.1.6 Conclusion

In this session, it was clear that the students readily identified the second level or problem areas compared to the first session. Also, it was obvious that only a few students could reach the third level easily whereas the others have to put in extra work to develop higher cognition skills. Lack of time is the main reason the class could not practice more on this exercise. Nevertheless, the students understood the motive behind these exercises and many of them developed the capacity to apply these skills to other areas as well as evidenced by the resolution of the Geometrical Drawing issue.

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Figure 1 depicting the requirements of cognition skills:

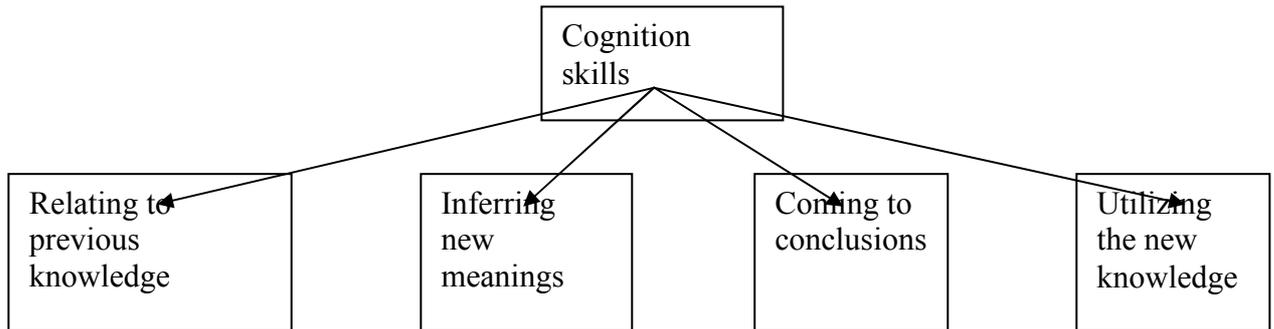
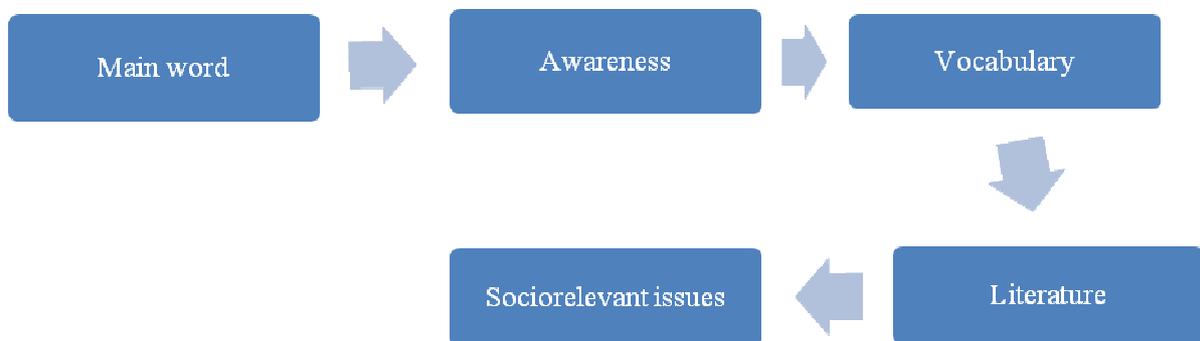


Figure 2 depicting application and implementation of higher order thinking skills:

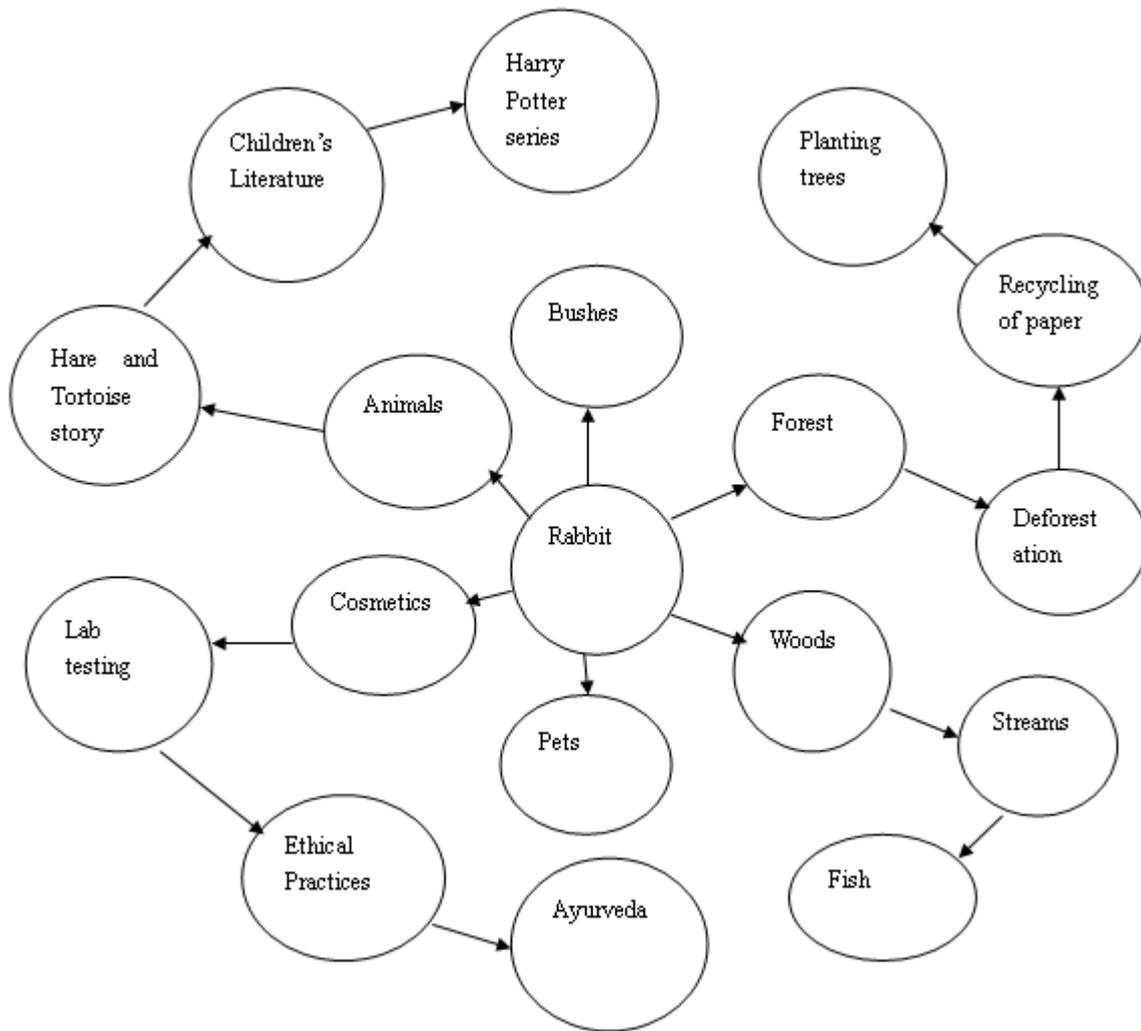


Applying higher order thinking skills for the word 'Rabbit:'

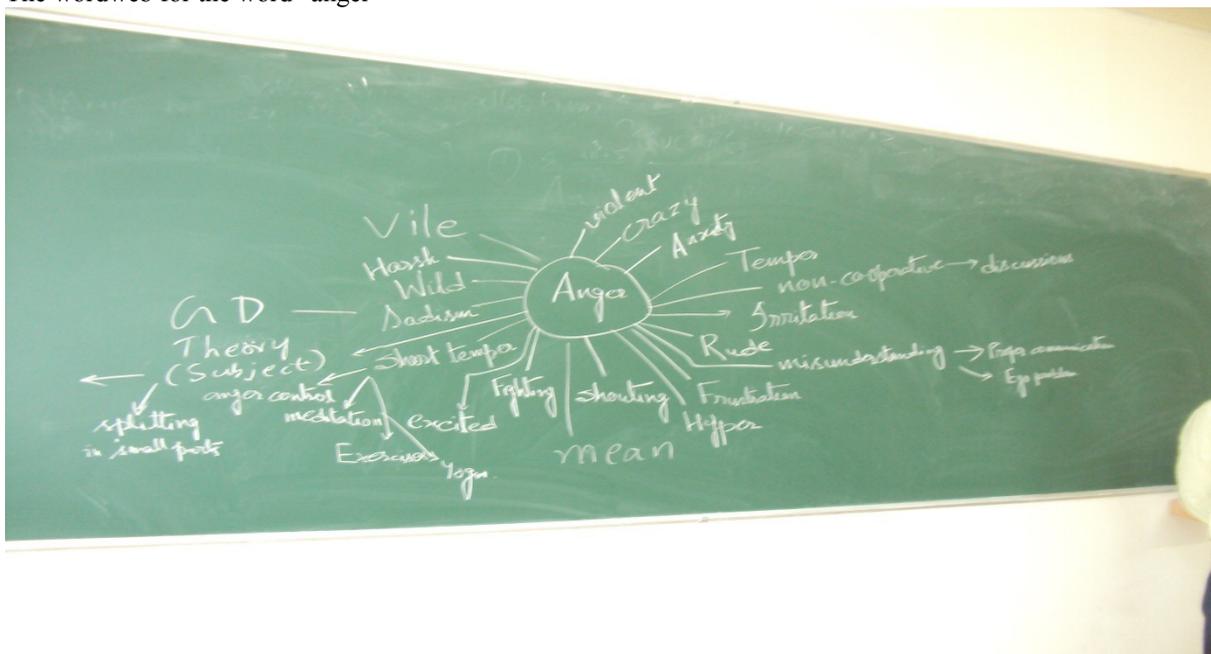


Figure 3 shows the progress of wordweb from the immediate issues to identification of the problems and offering solutions.

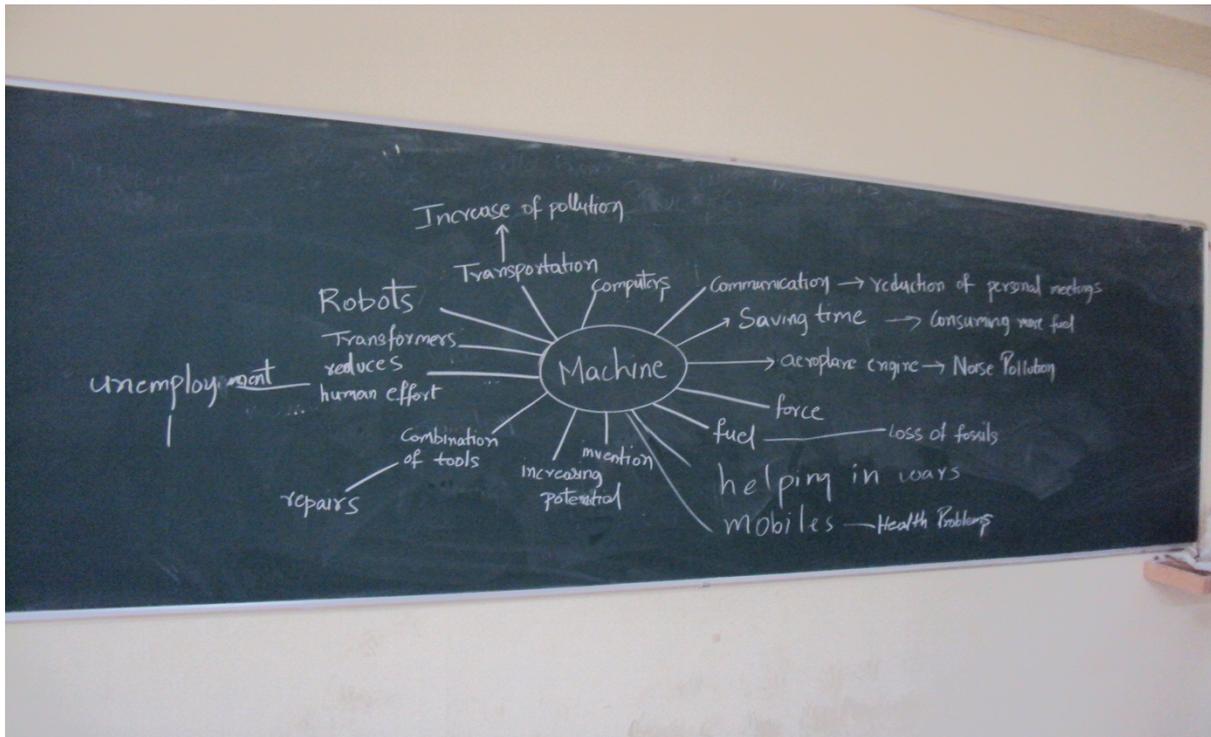
Figure 4 depicting the wordweb for the word “rabbit”



The wordweb for the word “anger”



The wordweb for the word “machine”



The author and the I year B. Tech Mechanical Engineering class at work:



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