

Enhancing Self Learning and Communication skills through “Review Paper” assignment

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Abstract: Self learning is a representation of instruction that focuses the responsibility of learning on learners. This article focuses on 'Assessment of student Assignment (making review paper)' and its effectiveness in learning. This makes students to engage themselves in higher order thinking. Subject like Non-traditional machining (NTM) (Mechanical Engineering) is a technological stuff that exists because of newly developed metals and non-metals having some special properties like High Strength, High Hardness and High Toughness. A material possessing the above mentioned properties is difficult to be machined by the conventional machining methods. There are various methods in NTM like USM, AJM, EDM, and CHM etc. Students opted this subject will be given with an 'Assignment' with particular topic and informed undergo 'Literature Survey', identify some important developments of particular topic and produce it as a 'Review Paper' for communication in journals. The Graduate Attribute successfully measured is GA10 'Communication' The outcome of this activity was very interesting, where student's involvement in understanding technical issues was drastically improved. Thus this paper can assure that alternative and best practice will help in improving teaching learning process.

Keywords: NTM, Review Papers, Graduate Attribute

1. Introduction

Teachers in professional fields desire their students not only to learn the theory and understand it, but also to check the reality at the present scenario (Clapton et al, 2006), Since they will be experiencing the real world after their graduation. The literature says that attempts can be made to overcome this problem by introducing a self learning in the course. Self learning shifts the focus from the teacher and put an effort with the material or assignment. The purpose of making 'review paper' is to concisely review recent progress in a particular course called 'Non Traditional Machining'. Overall, the paper summarizes the current state of knowledge of the topic. It creates an understanding of the topic for the students by discussing the findings presented in many recent research papers. This subject is alternatively being referred to as “unconventional machining system”. Much of this course is a refreshing material with the application in modern industries. Since it is a 'technological subject', it is essential that students keep updated with the latest information. There should be liaison between Assumption (theory) and Reality (practices). A 'Review Paper' is not a 'Term Paper' or 'Project Report'. It is not merely a report on some references of researcher. Instead, a review paper synthesizes the results from several primary literature papers to produce a 'Logical Agreement' about a topic or focused description of a field. A key aspect of a review paper is that it provides the evidence for a

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particular point of view in a field. Thus, a large focus of our student paper should be a description of the data that support or refute that point of view. In addition, students should be informed well the experimental techniques that were used to generate the data in prior. According to Shebib (2003), self learners need to have skills in areas like Relationship Building, Exploring or Probing, Empowering, Challenging and Proper Communication -Presentation. Following Table-1 highlights the content to be required for articulating the paper.

Problems Identified (In Conventional Teaching Process):

1. Students use to limit their study by using

Table 1: Key Activities

Section of the review paper	Contents
Introduction & Background	<ul style="list-style-type: none"> ▪ Make it brief (2-5 of the paper's total length). ▪ Capture the reader's interest while introducing the topic. ▪ Explain the "big picture" importance. ▪ Present the necessary background information.
Body of the Paper	<ul style="list-style-type: none"> ▪ Describe important results from recent primary literature articles and ▪ Explain how those results shape our current understanding of the topic. ▪ Mention the types of experiments and analysis done and their corresponding data ▪ Point out and address any controversies in the field. ▪ Use figures or tables to present your own synthesis of the original data or to show key data taken directly from the original papers.
Conclusion	<ul style="list-style-type: none"> ▪ Briefly summarize your major points. ▪ Point out the significance of these results. ▪ Discuss the questions that remain in the area. ▪ Keep it brief.
Bibliography	<ul style="list-style-type: none"> ▪ Your instructor will give you a minimum number of references that you must use and cite in your paper. ▪ Typically, at least 8 -10 references are required. ▪ Click here for how to handle citing sources.

textbooks

2. Student were not updated to upcoming technologies
3. Text book (only) learning declines substantially over a period

2.Objectives

During the course student should be able to:

1. Discuss the advanced technologies in manufacturing.
2. Realize operational capabilities of advanced mechanisms for material removal.
3. Discuss the importance of special purpose machines in manufacturing.
4. Summarize upcoming trends in Non Traditional Machining
5. Demonstration of issues through comprehensive study

Problem definition and title:

Integration of theory and reality in the course 'Non Traditional Machining' for students self learning

3. Literature Review

According to Boud et al. (1993), 'self learning'is involving students doing things and thinking about what they are doing. Some characteristics of self learning are: Involvement beyond class room listening, Transformation of development skills sets,

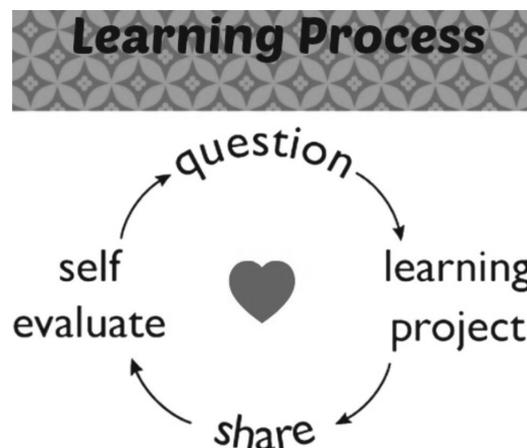


Figure 1: Self Learning

Source: Participative Learning. Englewood Cliffs, Prentice-Hall

Involvement in higher order thinking, proper presentation techniques (such as writing, reading, discussing, and observing) Meyers & Jones (1993) infer that the activities that allow students to clarify doubts, technical question, consolidate answers, and gaining appropriate new knowledge encourage their participation and confidence in their learning abilities. Students will quickly determine their contributions in subject as activities get continued as shown in Figure

4. Methodology

Method used in Cultivation of self learning in NTM Course:

1. Awareness: The purpose of the making 'Review Paper' is to give the student an opportunity to create an atmosphere of self learning. Students are

Table 2: Performance Measures

Attribute 10: Communication:	
Attribute 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	
Competency	Indicators
10.1 Demonstrate an ability to comprehend technical literature and document project work	10.1.1 Read, understand and interpret technical and non-technical information
	10.1.2 Produce clear, well - constructed, and well- supported written engineering documents
	10.1.3 Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
10.2 Demonstrate competence in listening, speaking and presentation	10.2.1 Listen to and comprehend information, instructions, and viewpoints of others
	10.2.2 Deliver effective oral presentations to technical and non - technical audiences
10.3 Demonstrate an ability to integrate different modes of communication	10.3.1 Create engineering - standard figures, reports and drawings to complement writing and presentations
	10.3.2 Use a variety of media effectively to convey a message in a document or a presentation

initially educated about the activity and what is expected towards the end of the course completion.

2. Grouping: It is expected that each member of the team contribute his/her technical knowledge and skills to have a winning team. It was ensured that each batch consists students of all levels.
3. Display of schedule: Beginning of the activity was done by putting the schedule for the task to be completed. Opportunities given to students to discuss the issues with the available material collected when it is required.
4. Assessment method: The regular review was conducted to check the performance and correlate the theory with observation was made by a staff member
5. Instruments and Measures: Assessment Rubrics were used to focus on program outcomes
6. Feedback: Assessment results are used to provide feedback by students addressing positive and negative issues of this activity.

Table-2 and 3 gives more clarity about what to be measured and how it can be measured-1

5. Observation and Discussions:

Table 3: Measuring Activities

Competency	Activities
10.1	Students were informed to collect the material related to the topic, learn and practice the art of making review paper. # Measurement 10.1.1, 10.1.2, 10.1.3 was done with help of rubrics
10.2	During the regular classes, last 10 minutes was kept for students discussions. Many times students' justification for particular technical matter was found superior than textbook statements. # Measurement 10.2.1, 10.2.2 was done regularly.
10.3	Open ended questions were answered. For example "Suggest any attachment/device how ductile materials are cut using A/JM successfully"

There was a surprise improvement in student's answers during CIE and SEE examination. Where student were found more comfortable in answering 'L3 and L4' level answers (Blooms Taxonomy). Below are the few questions which are at the level of

'Openness' and there is no direct answers or solutions available in the mentioned textbooks or journals.(Refer Table-4)

Students were able to answer comfortably because

Table 4: Unusual Questions

1.	Conventional head machining is not suitable for tough metals and alloys' identify the short comes in existing methods and propose the new technological machining process for the modern industry
2.	Research says that "AJM technique when a plied to ductile materials, leads to a low rate of metal removal", Suggest any special feature (with neat sketch) required in the equipment to overcome this problem
3.	Modern manufacturing units use dual gas plasma system rather than single system' discuss the need of new modified approach (with neat sketch) in industries
4.	One of the limitations of USM is that cutting rate is not so competitive. Based on latest studies , Present how to overcome this situation in this process

of information mining processes during 'Review Paper' making. Thus students here successfully gained the updated knowledge and learning happens successfully. To counter check these students were asked to give the feedback about the activity. Using 5 point Liker scale questionnaire was prepared and allowed them to fill it. Data collected was used to find the correlations amongst the factors which made them successful. It is quite interesting that 'Genuine Information –GI' was much appreciated and 'Analyses Method'- AM was least bothered by the students at this stage. (Refer Table-5)

Table 5: Karl Pearson's Correlation Analysis for student's feedback

	TI	ST	AM	VI	GI	TC	SP
TI	1	*	*	*	*	*	*
ST	.362**	1	*	*	*	*	*
AM	.560**	.396**	1	*	*	*	*
VI	.357**	.390**	.362**	1	*	*	*
GI	.376**	.181	.312**	.389**	1	*	*
TC	.225*	.365**	.127	.195	.473*	1	*
SP	.372**	.283**	.165	.309**	.590*	.544**	1

** . Correlation is significant at the 0.01 level

TI=Topic Interest, ST=Survey technique, GI=Genuine Information, TC= Topic Clarity, AM=Analyses Method, VI=Validity Issues, SP= Student Performance

Students were evaluated for each of the indicators of three competencies for graduate attributes number 10-communication. Finally it can be noticed that students at 'Graduation Level' can focus more on documentation skills (10.1) then other competences. But based on the type of course there is a scope for improvement for other competencies (10.2, 10.3) when there is an integration of this issue with capstone project and its related publications.

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