

Learning: Student-Centred vs Teacher-Centred

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Abstract—The paper differentiates student centred learning from teacher centred learning, identifies the continuum of factors which contributes to these and provides a self evaluation questionnaire to enable one to judge the extent to which one is 'teacher-centred' or 'student-centred' in their approach to student learning.

Key words: Student Centred Learning, Engineering Education

INTRODUCTION

The RMIT Teaching and Learning Strategy states that RMIT has a commitment to a 'student centred' approach to teaching and learning. In the 'Policy on Accreditation of Professional Engineering Courses', several attributes which graduates from accredited courses are expected to have are listed. These include the ability to communicate effectively; the ability to undertake problem identification, formulation and solution; the ability to function effectively in multi-disciplinary and multi-cultural teams; a capacity to undertake life-long learning, and adaptability among others. These are also the skills employers expect of our graduates. Employers and employer organisations are not satisfied that, currently, these attributes of graduate engineers are being sufficiently developed.

It is difficult to imagine that such skills can be developed in students with the traditional teacher-centred learning style where the students passively receive information. Teacher centred activities such as lectures place the learner in a passive role and passive role is less efficient than active.

STUDENT CENTRED LEARNING

If students are to achieve critical thinking and other higher cognitive outcomes, it seems reasonable to assume that they should have an opportunity to practice application, think critically and receive feedback on the results. Student centred activities such as group discussions, provide an opportunity to do this. While computers and simulations may also be programmed to provide prompt and realistic feedback, a group discussion permits presentation of a variety of problems and enables a number of people to gain experience in integrating facts, formulating hypotheses, examining relevant evidence, and evaluating conclusions. In fact, the prompt feedback provided by the computer may actually be less effective, in some cases, than a method in which

students are encouraged to discover solutions for themselves with step-by-step guidance.

A wide variety of teaching methods is described by the labels 'Student Centred', 'Non-directive', 'Group Centred' or 'Democratic Discussion'. Proponents of these various methods have in common the desire to break away from the traditional lecturer dominated classroom and to encourage greater student participation and responsibility. With the teacher playing a less direct a role, the heavy burden falls on the group members in achieving the desired cognitive goals. Giving students opportunity to determine their own conditions of learning, to suffer the consequences of bad choices, and to learn from these consequences is an important way of teaching them to become responsible.

Another advantage of student centred learning is that of developing skills in group membership and leadership. Studies have shown that students who are taught by the 'Participative-action' method are significantly superior to students taught by traditional lecture method in role flexibility and self-insight.

A committed approach to student-centred learning will, apart from developing the attributes of students which are considered desirable by employers and hence make them more employable, result in positive feedback from graduates in, for example, surveys such as the 'Course Experience Questionnaire'. Faculties in which the learning experience of students is more likely to be student-centred (such as in the humanities), consistently tend to rate higher (than for example, in Engineering) in the good teaching criterion.

In general currently, most student learning occurs outside the class room. It is therefore important that attention is directed to stimulating and guiding student learning outside the class even more than preparing to give dazzling, theatrical and entertainment style classroom performance. Unless one has the gift of being able to enthral a group of students in class for an hour, the best course of action to pursue would be to involve students so that they are actively thinking and involved in discussing the subject matter.

The choice of teacher centred versus student centred learning depends on the goals of the teacher. The more highly one values outcomes going beyond knowledge acquisition, the more likely it is that student centred learning will be preferred.

Education should be guided by democratic philosophy. This

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has nothing to do with political-social doctrine, but simply that education is a cooperative enterprise that works best when students are allowed to contribute to it-i.e., when teachers listen and respond.

Student-centred learning, in short, has students' needs, aspirations and long term goals in the curriculum design and evaluation as the focus and is customer driven.

Anecdotal evidence suggests that engineering students are relatively weak in their divergent thinking, communication and interpersonal skills, perhaps because those who possess these skills, in general, tend to 'self-select' out of Engineering for various reasons. It therefore poses us a greater challenge and is of paramount importance that their learning is predominantly by means of student centred activities so as to enable them to develop such skills.

The personality of Engineering students as indicated by the MBTI (Myer-Briggs Type Indicator) test is different to other University students. Engineering students are more likely to be Introvert, Thinking and Judging types on the MBTI scale [Wankat and Oreovicz, 1993]. Hence it is of utmost importance that they are exposed to student-centred learning strategies to develop their inherent weaknesses in communication and interpersonal skills. Perhaps an attempt should also be made to change the mix of students entering Engineering, by means such as improved selection methods, modifying the prerequisites, changing the 'image' of Engineering etc.

Some researchers have tried to identify a list of characteristics (attributes, traits, personality factors) of an ideal teacher [Dowell and Neal, 1982; Feldman, 1989]. However any such list will necessarily be a compromise between the quest for a single set of principles which will apply to a wide range of teaching contexts and the recognition that such a set is unlikely to apply to all teachers in all contexts. Hart and Driver found [Hart and Driver, 1978] that teachers scoring high in Extraversion, Intuitiveness and Feeling on the MBTI scale tended to be seen as better teachers. Paradoxically, one who is rated by students as a 'good' teacher may be one who likes to 'perform' in front of a class, and may not necessarily be one who engages in student-centred teaching.

CONCLUSION

There is general agreement that all student centred teachers:

- make students think, help them understand the evaluation of evidence to make conclusions
- interact positively with students, they have a commitment to TQM approach to education
- believe that students are partners in the process of mutual education
- develop in students those attributes considered desirable by employers

Several questionnaires have been designed for student evaluation of teaching [Lally and Myhill, 1994; Eley and Thomson, 1993]. The following self evaluation questionnaire has been designed with the aim of giving an indication of the extent to which one is 'teacher-centred' [mostly D or SD] or 'student-

centred' [mostly A or SA] in their approach to education of student engineers. The questionnaire also gives an indication of the approach we should be taking, if we are to become more student-centred in our approach to learning.

Other initiatives we could pursue in an attempt to provide a more student-centred learning environment include:

- staff need to be made aware of the importance of student-centred approach to education, in fact their own survival may depend on it
- flexible learning resources must be provided to students so that class time is used for activities which develop problem solving and other generic skills, rather than for information transmission
- students need to be made aware, early in their course, of the importance of developing the skills considered desirable by employers.

SELF EVALUATION QUESTIONNAIRE

SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly Disagree

1. The subjects are designed so that they can be successfully completed regardless of students' entry characteristics (eg ability, motivation, prior learning etc)

SA A N D SD

2. In student evaluations, they often comment that 'they were made to think' in class

3. In student evaluations they often comment that 'they were actively involved in discussions in class'

4. Group interaction is actively encouraged where appropriate

5. Students are actively involved in the selection of subject topics, assessment methods, class activities etc

6. The onus on learning is placed on students in all subjects

7. Self learning is encouraged and various learning styles of students are catered for by the provision of flexible learning materials

8. A major part of the class time is spent in activities (discussion of a question, solving a problem, developing questions, brainstorming, working in a group, developing a structured flow-sheet of knowledge, role plays etc)

9. Activities in and out of class and assessment tasks are designed to encourage cooperation (for eg teaching each other, discussions) rather than competition among students

10. Students interact with each other with Teacher acting as a Facilitator during major part of the class time

11. None or very little class time is spent by students copying information on overheads

12. Students are invited to think about open ended questions [such as 'What happens if', 'Why do you think', 'Can you find a way to', 'What else may be the reason for', 'How are they similar/How do they differ' etc] in the class

13. Students are offered suggestions, not prescriptions

14. Students who do not preview the material that will be discussed in class do not usually show up because they will

gain very little from attending

15. Students are given ways to help them answer their questions themselves

16. All students are encouraged to participate in class discussions

17. Students are encouraged to discuss one another's ideas

18. Students are made to feel their points of view are valued and constructive criticism is encouraged

19. I encourage students to discuss the thinking behind incorrect or apparently irrelevant answers.

20. I try to find out about the difficulties students have with their coursework by means of formal and informal feedback.

21. When I am planning discussion sessions I think about questions which will encourage students to share and evaluate their ideas about key concepts.

22. Students in the class frequently volunteer their own opinions

23. Students in this course are free to disagree, express themselves openly and ask questions

24. Teacher-student and particularly student-student discussion is actively encouraged

25. Students are given an opportunity to develop a greater sense of personal responsibility and confidence

26. Students are given an opportunity to value new viewpoints and to develop leadership skills

27. Students share responsibility for formative and summative evaluations

28. Student participation rather than teacher participation is maximised in the classroom

29. The type of assessment used reflects 'real-world' problem solving (for example through 'open book' exams, work in syndicates etc.)

30. I do not feel threatened by the questions and challenges posed by aggressive and/or intelligent students

31. I am not uncomfortable about admitting that I do not have all the answers

32. Students are involved in decisions about assignments, examinations, due dates and other matters of classroom procedure.

33. I consistently try to apply the Total Quality Management approach to education (customer focus, commitment to continuous improvement etc.)

34. Students are expected to demonstrate respect for others and work cooperatively with peers.

35. Students are given the opportunity to set goals, use problem solving skills, participate in decision making and honestly evaluate progress against high standards.

36. Students are expected to provide rationale for their decisions and are held accountable for the decisions made.

37. Students are provided with choices as much as possible in assessment tasks and in criteria for evaluation etc.

38. The student learning strategies in the subject are designed with the intention of developing the skills employers expect of graduate engineers

39. I endeavour to seek an appropriate balance in meeting the short term needs and long term goals of students in the curriculum design

40. The curriculum is designed with the understanding that knowledge acquired by students may become irrelevant to their career and hence emphasis is on developing 'generic' or transferable skills

41. Curriculum design involves a thorough evaluation of the relevance (in terms of a cost-benefit analysis to students) of the topic areas and assessment tasks

REFERENCES

Dowell, D. A. and Neal, J. A., "A Selective Review of the Validity of Student Ratings of Teaching," *Journal of Higher Education*, **53**(1), 51 (1982).

Eley, M. and Thomson, M., "A System for Student Evaluation of Teaching," Australian Government Publishing Service, Canberra (1993).

Feldman, K. A., "Instructional Effectiveness of College Teachers as Judged by Teachers Themselves, Current and Former Students, Colleagues, Administrators and External Observers," *Research in Higher Education*, **30**(2), 137 (1989).

Hart, J. and Driver, J., "Teacher Evaluation as a Function of Student and Instructor Personality," *Teaching of Psychology*, **5**, 198 (1978).

Lally, M. and Myhill, M., "Teaching Quality," Australian Government Publishing Service, Canberra (1994).

Wankat, P. C. and Oreovicz, F. S., "Teaching Engineering," McGraw Hill, NY, 244 (1993).