HELPING ENGINEERING EDUCATORS REFLECT ON AND ADAPT TO CHANGING CONTEXTS

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Abstract
The interaction session described below is based on a paper in which the author reports on a piece of action research that aimed at helping teachers uncover, question and subsequently change assumptions on which they base their teaching and supervision. Flannagan's critical incident technique was used as the main research method. The author coordinates pedagogical courses for staff Chalmers University of Technology, Gothenburg, Sweden. Some of the teachers come to the course with fairly fixed ideas about how one should teach and what one can expect from students. In many cases their views are fairly traditional. They often blame what they see as falling standards on the intake of larger numbers of less talented students. They tend to teach in a traditional way, using set lectures, tutorials, laboratory exercises and end-of-term closed book exams. Many have rarely questioned this method and can be suspicious of new teaching methods such as the CDIO initiative. This paper (and interactive workshop) focuses on how they are introduced to alternative ways of teaching that might be better suited to changing contexts, including a more diverse and demanding student body.

Keywords: critical incident technique, teaching and learning, analytical reflection

Background to the topic
Critical incident technique has been used to improve professional practice in a number of areas. It is especially strong in medicine and psychology but there are a number of studies in education that have also used the technique [1]. A very useful manual on how to apply the technique was developed by Paul Twelker in 2003. *The Critical Incident Technique: A Manual for Its Planning and Implementation* is available online and can be accessed at the following URL:
http://wvvw.tiu.edu/psychology/Twelker/critical_incident_technique.htm

The aims of this workshop are to:
1. Provide an analytical, critical, reflective tool for engineering educators with which they can improve their teaching.
2. Increase student centred, problem based teaching in a rapidly changing educational context.

The CDIO initiative is an effective way to engage students more actively in their learning. However, it is not easy to convince traditional engineering educators to adopt it.

The paper, on which this workshop is based, shows how critical incident technique can help teachers to uncover, question and subsequently change assumptions on which they ground their teaching.

In the abstract we mentioned that Chalmers staff take a number of pedagogical courses. In at three of them the engineering educators are instructed in the origins and use of critical incident technique [2] and get to apply it to their own situation as supervisors, teachers and action researchers intent on improving their practice. Flannagan defines a critical incident as 'any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person(s) performing the act'. In the workshop where the technique was introduced it was made clear that a critical incident need not be a dramatic event. Being able to recall the event makes it memorable enough. The incident becomes critical in the meaning of this research method when it is related or written down and then 'critiqued'. In this case teachers were asked to write down incidents from their own teaching or supervision where they felt they had taught or supervised particularly well or particularly badly. They were encouraged to focus on a specific moment in their teaching and identify the actors and the action that constituted the incident.

The incidents were collected and critiqued by both the authors of the incident and the researcher, who doubled as the course coordinator. The authors' analysis consisted of an individual written reflection that was then discussed in focus groups of five people. In these groups each person told their story and the others gave feedback as to the assumptions that they thought underlay the incident. In this way individuals were surprised to learn that others assumed differently. They were able to look at the incident with new eyes and started to see that there were many ways of interpreting what has happened. Results from both the individual and group reflections were included in a plenary discussion that took up the larger issue of preconceived notions and set ways of looking at things.

Individual teachers who had formerly rejected a more student focused view of teaching and learning conceded that activating student learning could lead to deeper knowledge of the subject and enable application of that knowledge in different contexts. Assumptions concerning the use of time or the coverage of the curriculum were also called into question during the discussions and the plenary. The incidents were classified into a range of different teacher/supervisor – student situations. Discussing the incidents helped develop the teachers' professional judgement but more importantly opened the way to future self analysis and reflection. Some teachers who would have rejected the idea of CDIO conceded that changing circumstances and contexts in engineering universities demand changed forms of teaching and learning. They also appreciated that being equipped with an analytical, reflective tool that will enable them to go on developing their professional judgement as teachers. If contexts continue to change at the rate they have over the last few decades it will be necessary to go on uncovering and changing one's assumptions about the most appropriate form of teaching and learning.

Key questions

The key questions that will be addressed during the interactive workshop will include the following:

- What is critical incident technique?
- How can it be employed within the CDIO initiative?
- What are some practical examples of its use in teaching and supervision?
- In what ways does it improve professional judgement and practice of teachers and supervisors?
- How does one facilitate a session in which critical incidents are used?
- Is it useful for both teachers and students?
- Can it be used in action research?

Interactions and activities

In the interactive session there will be a brief introduction to the history and theory of critical incident. This will be followed by an interactive session where participants think of and write down (if there is time) incidents of their own, which will be discussed in pairs or small groups followed by a brief plenary discussion on the technique and its usefulness in the CDIO context

References

[1] Christie, M. and Young, R., Critical incidents in vocational teaching, NTU Press, Darwin, 1995. See the bibliography for other studies.
[2]. Flannagan, J.C. 'The critical incident technique' in Psychological Bulletin, Vol. 51, 1954, pp 327-58

Biographical information

Professor Michael Christie is the Director of a pedagogical centre at Chalmers University of Technology. He has taught in education faculties in Australia but in 1999 moved to Sweden to take up a position there as a pedagogical consultant at Chalmers. He has written extensively on adult, vocational and higher education. In his pedagogical courses he introduces more student oriented teaching and learning methods such as problem based learning, case work and the CDIO initiative.

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