

Counterworking Male Takeover during Class Room Activities in Superior Technical Education

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Abstract— An increase in student activity is the goal of various pedagogic approaches and highly valued in most teaching situations. The benefits of student activation are widely discussed in literature (Fox, 1983), but possible drawbacks of such techniques need to be identified and compensations need to be found.

This paper discusses a case study concerning one particular course moment, a seminar, held over a two-year period in a program with a strong underrepresentation of female students. The study shows how changes in the pedagogic approach can lead to an increased student activity, although accompanied by a total male takeover of the class room activity. It seems like traditional social structures tend to take over the class room activities, determining the roles that different gender groups may play (Parker, 1996; Olevard, 1997). At the same time, seminars are an important factor in the socialization of students, affecting the following cultural and structural development in the academia. “Hence, besides the content of the course, students attending seminars learn social structures as well, determining who may or may not speak” (Gunnarsson, 1995). The tools presented in this paper are applicable in any LTH classroom and also in future work places.

To counterwork male takeover, without suppressing the overall student activity, is the topic of this paper. Different pedagogic measures are analyzed in this context and discussed in the paper.

Index Terms—student activation, gender, feminism

I. INTRODUCTION

STUDENT participation in class room activities is an important part of the learning process (Biggs, 2004). In addition to this, class room activities such as group problem

solving, laboratory work, and active participation in discussions and seminars, may be held to prepare students for their upcoming working life, where self confidence and social skills are central merits for a successful career.² In this context, the successive pacification of initially active female students in male dominant technical universities is all the more troubling, since the repression of female students, already at an early stage in their education³ may be held to create a gender gap in possible academic self-views, which might lead to a preservation of the current male dominance in technological workplaces (Lips, 2004).

By focusing on rhetorical tools and rhetorical knowledge as technology we may resist conventional views of technology as oppressive or liberating, thus opening up “fresh possibilities for future scholarship and action” for women in technological arenas (Aschauer, 1999).

This paper will focus on various tools with which to counter work male takeover in class room activities, with the aim of improving the academic environment for female students in superior technical education. By counter working male takeover in group discussions, laboratory work, and seminars we hope to enhance the active participation of female students in class room activities, something which may not only lead to a better learning process, but also help improve the academic self-views of female students and their self-confidence with respect to career possibilities. By providing female university students in technological areas with constructive self-views, we may also be working against the preservation of dominant male structures in technological domains.

¹ Seminars could be seen as an especially important factor in the academic socialisation of students, since the culture enacted in seminars often has an affect also on later academic culture. Hence, besides the content of the course, students attending seminars learn social structures as well, determining who may or may not speak (Gunnarsson, 1995).

³ As recognised by Dederichs in a fire safety engineering course for fire engineer students, an issue which will be further dealt with shortly.

II. THE PEDAGOGIC SITUATION

Women's increasing enrolment in scientific studies has still not led to an equivalent representation in graduate training and scientific careers (Erwin et al., 1998), albeit there have been a number of attempts to counterwork the unequal participation of women in science (Parker et al. 1996). A number of gender studies have investigated a possible correlation between gender and the three factors of science, background preparation, and achievement, but the result is inconclusive and even contradictory (Parker et al. 1996). Studies have shown that independent of their scientific performance, women consistently express lower confidence in science and mathematic skills and are thus more likely to question their ability (Parker, 1996). Several studies, mentioned in *Gender, Science, and Mathematics: shortening the shadow*, prove that the masculine bias in science contributes to women's feelings of exclusion, and that women's reduced self-esteem further contributes to a decline in their academic studies as well as their career aspirations (Parker, 1996).

A. Case study

The case study discussed in this paper is based on a course moment in a program with 20% female students. This course moment - seminars - is one of four moments in the course and requires compulsory attendance. Two out of five exercises should be prepared by the students and they are expected to present and discuss their solutions in front of the class. The case study focuses on two different pedagogic techniques used in connection with the seminars over a two-year period.

In *technique A* the initiative for presenting a problem to the class was taken by the teacher, who also picked out one student for each problem. At the same time the teacher was attentive of gender distribution being representative for the course as a whole. The effect of this initiative was that the discussions were short. According to a study by Einarsson and Hultman (1984) already in school girls only get and take 1/3 speaking time while boys fill 2/3. This number does not change with smaller classes. Unless the teacher applies gender conscious teaching this number can not be expected to change even when applying knowledge transfer.

Technique B was tested as an attempt to move the teaching method from transfer to growing (Fox, 1983). The goal for the teacher was to be more of a coach and to increase the activity of the students. The teacher presented the seminars as "student classes" stressing that the students were to present problems, even if they did not succeed in solving them, and to present several solutions as well as discuss them. The teacher explicitly took the role of a coordinator, sitting in the class

room with the students. The result was a surprisingly active class. Many students presented their problems and solutions, with productive feedback from the rest of the class. The only draw back was a male takeover of the class room activities and the female students, who initially were as active as the male, turned more and more passive. As a result the students, both male and female, were accustomed to seeing and listening only to male performers, putting female students in a passive and observing position.

The most obvious question to the situation explained is perhaps whether this kind of teaching supports already existing gender structures in society. The question we need to ask is whether there are other setups more suitable for achieving equality and for keeping up the overall student activity. Are there perhaps further pedagogic measures which can be taken to counterwork male takeover during class room activities?

It is also important to ask if this is a gender issue at all or if it's just a question of different individuals – male as well as female – taking on different roles in classroom activities.⁴ Personal qualities, just as well as class room specific characteristics, might be a part of the problem. However, numerous studies on women in higher education all point in the same direction, i.e. that gender matters and that it is an issue to be taken seriously (see e.g. Clinchy, 1990; Zuga, 1999, 2004; Hayes, 2001; Lips, 2004).

B. Analysis of the problem

To be able to explore different methods for enhanced and improved technological education in classroom activities for all students, and particularly to counter work female silence, we have to understand what causes this increased lack of participation in an LTH classroom. One starting point may be that technological education is dominated by masculine structures, which is a result of a male view on technology in general and of specific social structures in society (Zuga, 1995, 1999; Clinchy, 1990). Thus, dominating views and power structures in society are reproduced in the classroom (Zuga, 1995; Bierema, 2001). To explain classroom behavior as a result of societal structures, rather than as dependent on differences between women and men, is one possibility often found in liberal feminism. Cultural feminism makes instead a difference between female and male culture, since women are constituted as "the other", formed by historical and social factors (Zuga, 1999; Hayes, 2001).

⁴ Explicitly, different personal qualities not related to sex.

The idea that a majority of women learn in a different way than most men might be to simplistic. There is also a risk of developing stereotypes, like all women learn better in groups, or, no women are independent, competitive and self-directed (Hayes, 2001). But to only take the context into account, in this case superior technological education, is too simplistic as well. Society is constantly changing and so is the subculture within a technical university faculty. Women's (and men's) ways of learning are neither static nor uniform processes. Thus, it might be more constructive to look at the learning process as part of the context where it occurs, as Elisabeth Hayes suggests (2001). That is, to understand women's ways of acting in a classroom as both affected by societal and cultural structures. In other words, classroom behavior is a gender issue. What and how we learn is determined by the society we live in, by its certain norms and traditions.

III. PEDAGOGIC MEASURES FOR GOAL ACHIEVEMENT

Even though the number of women in technology education has increased over the last decades, a decrease of women applying to technical universities has recently been detected. A reliance on the "add women and stir" approach has evidently not changed the existing hierarchies (Zuga, 1999). Socializing women into existing technological education is not the answer. We rather need to rethink the content and teaching methods to give voice to underrepresented groups in technology education, states Zuga (1999).

Examples of some pedagogic measures to support gender equality in teaching (e.g. Bondestam, 2004, Olevard, 1997) will be briefly described in the following sections, and are termed: *Gender conscious teaching and learning*, *Single gender groups* and *Problem-based learning*. Gender conscious teaching and learning could be seen as an over-all strategy, applicable to any kind of pedagogic situation, whereas single gender groups and problem-based learning are rather two separate tactics.

A. *Gender conscious teaching and learning*

One general pedagogic measure to support gender equality in classroom activities is gender conscious teaching and learning. Bondestam describes how teaching with a gender-focus affects both teacher and students (Bondestam, 2004). According to Bondestam (2004) it is crucial to decide at what moment in a course to introduce the gender aspect. Generally one should aim at presenting the gender aspect in a moment where it has relevance and where it reaches the individual student. Lewis recommends catching and identifying a moment of gender from the course, such as parts of the course

literature, a question from a student, or even certain events, like the male-takeover mentioned in our case study (Lewis, 1990). The goal is to generate an awareness of the situation.

In our context this could mean that the teacher interrupts the seminar as soon as she/he detects a male takeover. A break could be taken to discuss the problem and its consequences for further studies and to ask the female students to be more initiative.

B. *Single gender groups*

A perhaps more extreme measure is to use single gender groups to counterwork segregation. Olevard observed beneficial effects of this technique when studying the effect of teaching seminars in single, compared to mixed, gender groups (Olevard, 1997). The case study of Olevard (1997) shows that the activity of the female students was 38% lower in the mixed gender group than in the single gender group. In the single gender group, the activity of female students was about as high as the activity of male students in the mixed gender group.

C. *PBL, problem-based learning*

Problem based learning (Biggs, 2004, Schmidt, 1989) is one technique which results in high student activity, where the teacher acts more as a facilitator of student learning and less as a transmitter of knowledge (Cross, 1987).⁵ This approach has the benefit to activate women, since women tend to value connected learning and knowing, in contrast to men who may feel more comfortable with separate learning (Reynolds, 2003).

IV. DISCUSSION

Our overall aim in this paper was to present a number of pedagogic methods with which to counter work male takeover in class room activities. A second concern was to improve the academic environment for female students in superior technical education. The common feature of the three measures presented in this text is a focus on the qualitative aspect of the learning process and of connected knowing: Two ways of acquiring knowledge that we in this paper have found especially suitable for women. For the specific case, the three methods discussed may of course be more or less appropriate. We do not, however, want to stress one method over the other, but simply discuss some of their pros and cons.

⁵ Just as in aforementioned Technique B, where the attempt was to move the teaching method from transfer to growing.

One advantage of gender conscious teaching and learning is that it does not need to be planned in advance, whereas the tactics of single gender groups and PBL need to be prepared before the course starts. Following this, the preparation of single gender groups can not be used to “fix the problem” of male takeover in classroom activity as it occurs, where as gender conscious teaching and learning can be used instantly, as soon as male students take over classroom activities.

Another advantage with gender conscious teaching and learning is that it may be used in a mixed gender context. If the applications of gender conscious teaching and learning is successful, male and female students learn that presenting, discussing, solving problems and defending solutions, are gender-independent practices. Gender conscious teaching and learning, i.e. *technique A*, was further used in the case study of this paper and the result was an increased activity on behalf of the female students.

Correspondingly, one of the drawbacks of single gender groups is that male students do not get a chance to listen to female students since the method does not stimulate gender independent coexistence and collaboration. Despite this, Olevard (1997) has, as we discussed earlier, observed beneficial effects of this technique. The question whether segregation can, or even should be, used as a tool for counterworking segregation will therefore remain unanswered.

PBL is a technique that requires extensive preparation. According to the structure of PBL, the class needs to be divided into groups and there needs to be one teacher per group to help guide students if necessary. A question that has to be taken into account is if there is enough time and money to spend on having one teacher per group in the course moment discussed. In addition to this, it is crucial that teachers are gender conscious also in PBL, since male takeover may occur in this context as well as any other (Einarsson and Hultman, 1984).

V. CONCLUSIONS

With the help of the measures presented in this paper we hope to raise a round table discussion on how to increase women’s influence and career opportunities in technological workplaces without women having to assume male attributes, take on stereotyped roles, or undermine female self-identity (Bierema, 2001). Or, as the 2004 Nobel Laureate Linda B. Buck stated in a televised round table discussion: Changing the conditions for women in academy is about awareness.

Awareness among students and teachers about gender issues in education.

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