

Smile Nicely, Make The Tea—But Will I Ever Be Taken Seriously? Engineering Students' Experiences of Vacation Work*

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This study investigates the vacation work experiences of a group of final-year civil and chemical engineering students at the University of Cape Town in South Africa. Situated cognition theory, with its conceptualization of learning as induction into a community of practice through the activity of legitimate peripheral participation, was used to analyze focus group and interview data. Issues of race and gender appeared prominently and spontaneously in students' accounts of their experiences. Access to legitimate peripheral participation was associated with positive identity formation in the role of engineer-to-be, while denial of this access severely affected learning and feelings of self-worth.

INTRODUCTION

THE DEMOCRATIZATION of the South African political landscape in the last decade of the twentieth century saw a dramatic change in the student intake at historically white universities such as the University of Cape Town (UCT). The proportion of black¹ engineering students at UCT changed from 23% to 65% between 1988 and 2000. Over a similar period there has been an associated but more limited increase in the participation of female students in engineering from 5% to 19%. The engineering workplace however is currently still a largely white male domain. One indicator in this regard is the list of persons currently registered with the Engineering Council of South Africa, of whom 10% are black and 2.5% are women [1].

In previous research projects we have investigated the reasons given by students for choosing engineering [2] and have explored the career choice processes of suitably qualified female students who chose not to do engineering [3]. Both of these projects were initially intended to focus on gender, but it soon became clear that, in the South African context, gender issues could not be investigated in isolation from issues of race and racism.

The vacation work experience, commonly conducted in the vacation prior to the final year of study, presented an opportunity to explore students' experience of the workplace. For many students this is their first experience of engineering

work. It therefore offers an opportunity to view how students deal with the transition from being an engineering student to being a working engineer. In this paper we consider the vacation work experiences of a group of final-year civil and chemical engineering students.

ENGINEERING VACATION WORK

Vacation work, a common requirement in engineering programmes around the world, aims to ensure that university engineering students gain some experience of working in the engineering industry and learn some of the practical skills that employers require them to have. Of all the curriculum requirements that students have to meet, this one is often the most poorly formulated and frequently is not formally assessed. At UCT the requirements for vacation work vary from one department to the next. In Civil Engineering, students have been required to work for three periods of six weeks at the end of their first, second and third years of study. Students are expected to find employment for themselves. In Chemical Engineering, students have been required to do one six-week period of vacation work at the end of their third year and the department helps them find relevant employment. In general, companies tend to provide vacation work opportunities for their own bursary students, often at the end of each academic year, regardless of whether it is required by the department or not.

Except for some minimal guidelines from the department, employers determine what students do during their vacation work. There is no formal assessment or evaluation of vacation work by the engineering departments at UCT.

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¹ Black is used here to refer to people previously classified in South Africa as 'coloured' (mixed race), Indian or (ethnically) African. We recognize that the use of racial classification is problematic, but find it necessary when exploring issues of discrimination and disadvantage in this context.

However, the civil engineering department requires a brief report written by the employer while the chemical engineering department asks for a more substantive report and journal written by the student and endorsed by the employer.

SITUATED COGNITION THEORY

'Learning is not merely a matter of acquiring knowledge, it is a matter of deciding what kind of person you are and want to be and engaging in those activities that make one a part of the relevant communities' [4].

Situated cognition theory recognizes that learning is fundamentally about developing new identities as a person. This identity formation takes place during the process of 'legitimate peripheral participation', when newcomers enter a 'community of practice' [5]. Lave and Wenger describe identities as 'long-term, living relations between persons and their place and participation in communities of practice' (p. 53). Learning involves increasing participation by the newcomers in communities of practice.

Although not a central concern of Lave and Wenger, there are serious implications for contexts where society is structured such that not all participants experience similar forms of participation. They do note the centrality of the issue of access, and discuss possibilities where 'structural constraints in work organizations may curtail or extinguish apprentices' access to the full range of activities of the job, and hence to possibilities for learning what they need to know to master a trade' (p. 86). As regards formal education, they are of the opinion that problems with schooling (or university education) are not fundamentally pedagogical but are far more related to the ways in which the community of adults reproduces itself, and with whether newcomers are able to find places in which to take part in legitimate peripheral participation. Brickhouse notes that 'The decision to disengage, resist, and ignore is the important other side of engagement and learning' [4].

Another issue raised by situated cognition theory which is useful to consider from a race and gender perspective is that there is an inherent conflict resulting from newcomers ultimately themselves becoming the old-timers, thereby displacing those that were initially their superiors. Furthermore, the involvement of newcomers fundamentally influences the character of the community of practice as it reproduces itself for the next generation. Lave and Wenger write that 'Granting legitimate peripheral participation to newcomers with their own viewpoints introduces into any community of practice all the tensions of the continuity-displacement contradiction. These may be muted, though not extinguished, by the differences of power between old-timers and newcomers' [5].

THE PRESENT STUDY

The chief aim of this research was to explore students' experiences of vacation work with respect to issues of race and gender. At the same time, we wished to establish the applicability of the theory of situated cognition to this context. Therefore, in our analysis of the data, we formulated the following key research questions:

- How did the student experience and interact with the 'community of practice'?
- Can what the student did in the workplace be described as 'legitimate peripheral participation'?
- How did the student respond to the community of practice when denied access to legitimate peripheral participation?
- How was the student's identity as an engineer-to-be developed by the situated learning experience?

Students were approached to volunteer for this study by means of a questionnaire administered during class. Two focus group discussions were held with a total of 16 chemical engineering students. Logistical difficulties did not enable us to arrange such group discussions in civil engineering, and we had to opt for three in-depth interviews with individual students. The total sample comprised black and white female students, but only black male students. (Only one white male chemical engineering student had volunteered to participate in the study, and he was unable to attend either session.)

RESEARCH FINDINGS

The findings of this research project are reported in more detail in another paper [6]. In the present paper we have selected four cases which we briefly discuss below. These illustrate some of the major findings of the study, particularly in that two cases, that of Zama and Phumzi, demonstrate the tremendous positive potential for personal and learning development during vacation work, while the other two, Karen and Siphso, show some of the destructive processes that can take place when legitimate peripheral participation is denied.

Zama

Zama was a black male chemical engineering student who had done several periods of vacation work with his bursary company. He described two different vacation work projects that he had had, which illustrate well the importance of legitimate peripheral participation. In the one project, he felt dissatisfied with the level of intellectual challenge:

Even my mentor, like the project that he was given [to allocate to his student], he told me 'you don't need a degree to do this, it's just common sense'. And then coming from varsity where things are challenging, I

don't exactly want to go back to the mines. My brain just shrunk there.

However, with reference to a project he did at a later period, he found it tremendously satisfying to do something that actually mattered to the company, especially when it appeared that his recommendations could be implemented and might save the company money. Describing this experience he said that:

while I was doing those presentations I realized that the project that I'm doing is actually very important to the company, they're willing to invest money in it. So I had to go back and really take those readings correctly, and then so . . . one time when I was presenting I told them that I thought one of the [drums] needed insulation because of this, this and this. How much money could we save, insulation costs this much . . . So . . . then . . . one of the top guys told me that before I leave the drum should be insulated. . . . [Before starting vacation work] I thought I'm just going to do this so I need the report, and they're going to throw it away. But you know it was actually something serious.

Karen

To accomplish the tasks that they are set to do, students often needed the help of the technicians or operators, and these frequently appeared to be the most problematic relationships in terms of race and gender issues. Karen, a white female chemical engineering student, described the experience of being the one who was sent to the technicians in order to get something done, being told to 'smile nicely', and in one case being told to dress in attractive clothes. Strikingly, in the other focus group another female student described exactly the same kind of experience at a different company. What unnerved both of them most was that this tactic actually worked, and Karen commented that this made her wonder whether she would ever be taken seriously:

And every time something broke, my boss would come to me and he'd go 'Okay Karen, it will take us 48 hours to get this fixed if any of us asked and so you go to the technician, and you smile nicely at him, and like get that fixed.' And like it worked! You know, I could get, you know, just me being a female, I could go and smile at them and get them to do it in two hours whereas it would take 48. But it's kind of, at the end you kind of like, is anybody taking me seriously here? I would say that was my major problem [with vacation work], you know you sort of, nothing gets done unless you smile nicely and say act as you're stupid sometimes.

Phumzi

Phumzi, a black female civil engineering student, had done two periods of vacation work for a major construction company, working on a project in her hometown in rural South Africa. Her manager was a white male engineer who she described as open-minded and very supportive of women and welcoming discussions on issues of race. Even though he was very busy and didn't often seem

to have time to engage with her, she repeatedly mentioned how much she valued his encouragement. This relationship appeared to be the major catalyst for Phumzi's extremely positive experience in the community of practice, and her emerging identity as a black female engineer, as someone who is familiar and comfortable working in a rural context, and concerned for people and community. In this she felt she had a definite advantage over her white peers, and noted that:

Another thing with civil engineering is that as I said back inland it is more community, and more township. . . . So I think if a lot of people in my class had to go there, they would be really shocked . . . as to what civil engineering is all about. . . . [Here at UCT] we do a lot of urban engineering and . . . it is more about . . . money solutions . . . get it over and done with and the people are neglected and who cares what the people think.

She was also aware that companies like the one she was working for were looking to employ black engineers, and assumed this was due at least in part to their capacity to work with rural communities. The positive experience of this growing identity with relation to the workplace contrasted with her identity at university where she described feeling marginalized and undervalued.

Sipho

Sipho, a black male civil engineering student, had done vacation work for two different companies. He had a number of experiences on construction sites that had disturbed him. Sipho thought that he was quite capable of doing relevant work on the construction sites, yet felt that his superiors did not trust him. The tasks varied from site to site, but in no instances did they constitute legitimate peripheral participation. At one site he was not given anything 'concrete' to do and found himself walking around and eventually finding a place to sleep. On another occasion he was given a team of laborers and expected to do manual work with them while supervising them.

What he found to be the most distressing experience, something which he returned to at various points in the interview, was being told to make tea by one of his superiors and feeling that he had no alternative but to obey this order. Although the tea incident really distressed and humiliated him, and he knew that if he had reported this to the head office that something would have been done, he did not do so as he did not want to 'make the whole thing unpleasant'. He said that this was his usual response to such a situation, to just 'walk away' from it.

Sipho's vacation work experiences, particularly those at the construction sites, left him with a confused sense of identity. Right at the outset of the interview he said that 'I had to compromise a lot in terms of who I am and I was asked to do things which I don't imagine doing.' In particular, this seemed to be related to the orders to do menial work, experiences which made him think that his

superiors did not view him as a potential engineer but rather as some kind of laborer. Later on, Siphon poignantly summarised his situation as follows:

I think one of the greatest challenges, and I still haven't sorted this out, is actually seeing where I fit in in terms of me as a person and the skills that I have learnt and where they fit into the whole global picture.

DISCUSSION

The theory of situated cognition has provided a useful lens through which to analyze students' experiences of vacation work. The concept of induction into a community of practice through legitimate peripheral participation has illuminated the dynamics of the complex social interactions that occur in this context.

The communities of practice that these students encountered are strongly determined by the history of racial segregation and job reservation in South Africa. For many years the position of engineer was reserved exclusively for white graduates, of which almost all were male. It was therefore not surprising that the issues of race and gender were foregrounded in many students' experiences of the workplace. It is likely that the interviewer herself, being a black woman, might have more easily allowed for the raising of these issues. It is unfortunate that our data does not include the views of white male students, since so few of them volunteered for the study and none were able to attend the scheduled sessions.

That a student will feel a bit awkward and 'stuck in the middle' in their role as a vacation student is to be expected, since they are only in the employ of a company for a short time and often do not have clearly defined work to do. This situation, however, seems to be exacerbated in the South African context for students who are not white males, especially with regard to other employees, be they laborers, operators or technicians. Students perceive these groups of people to be particularly unhappy with the upsetting of the status quo represented by black and female engineers-to-be.

From the perspective of situated cognition, it is clear that access to legitimate peripheral participation is of vital importance to students' learning in

this environment (taking 'learning' in the broad sense to include the development of an identity as an engineer). It would appear that, depending on a student's race and gender, obtaining access to legitimate work can either be fairly seamless or almost unachievable. During vacation work conducted early on in their engineering studies students were quite happy to be mainly observing, but later on they had an expectation of being able to do something worthwhile. It is clear that relevant and meaningful work has the potential for significantly enhancing a student's sense of identity and self-worth, while the denial of the opportunity to do such work can force students to have doubts about themselves and their career choice.

The role of a mentoring engineer appears to be of central significance in facilitating access to legitimate activity. Firstly, the engineer is the key person who assigns, or doesn't assign, work. Furthermore, in many instances the engineer is in a position to be an advocate for the student's status as a legitimate participant in the work environment. The engineer's personal views on race and gender issues appear to play an important role in how they deal with vacation students, especially those who are not white and male.

CONCLUSION

The research presented in this paper has provided a picture of the experience of engineering students as they engage with vacation work in engineering companies in South Africa. It can be seen that black and female students experience particular difficulties as they enter a terrain in which the engineer is expected to be white and male. Seen through the lens of situated cognition theory, we can see how the denial of access to legitimate peripheral participation that is all too often the experience of these students can have negative consequences on their emerging identities as engineers and the quality of learning that this experience affords them. Conversely, situations where the community of practice accepted them as legitimate peripheral participants provided a powerful learning experience for these students and helped develop and re-affirm their identities as black and/or female engineers-to-be.

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