Language in Engineering and the Built Environment: examining student problems and impacts.

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Context

In South Africa increased language diversity in English medium higher education institutions, initially a result of the end of apartheid, is today linked to attempts by the government to structure and augment social transformation. In a recent keynote address, the Minister of Higher Education and Training Dr Blade Nzimande (2010: 4) stated that university enrolments in South Africa are set to expand, and that universities need to improve throughput rates with a particular emphasis on 'underprivileged, mainly black, students', many of whom in the South African context speak English as a second or additional language.

Language policy for higher education institutions has to respond to both local and global demands. As Moore & Lewis (2004: 39) describe:

> South Africa's policies reflect two broad imperatives: a response to developments in the global economy and the changing role of higher education internationally, and a local concern for economic development, social reconstruction and equity. Higher education is seen as a means of helping to integrate South Africa into the global economy on the one hand, and as a vehicle for correcting the social and economic imbalances inherited from apartheid on the other.

The implication in Moore & Lewis is that these two imperatives are contradictory. In relation to language this contradiction holds: on the one hand English provides access to the global economy, yet on the other local language speakers need to be taken into account if we are focused on equity. The UCT in its position as a leading African university strongly focuses on producing graduates who can operate in the global economy; in this context, English is currently crucial. Furthermore in the academy itself, English is arguably the most important language for dissemination of research in peer-reviewed journals. English as the medium of education is therefore unlikely to change at UCT, which continues to impact on the experiences of English as Second Language (ESL) or English as Additional Language (EAL) students.

Through survey data, this study seeks to unpack the perceptions of a group of engineering students regarding language and its impact on their study, with a particular focus on ESL/ EAL students. A secondary consideration in this paper is the data which has been emerging from a new series of tests, the National Benchmark Tests (NBTs), which are currently being developed as additional entry criteria for HE institutions, due to their apparent ability to better predict success than the National Senior Certificate. The NBTs consist of three tests: Mathematics, Quantitative Literacy (QL), and Academic Literacy (AL). This research focuses on the AL test, which is designed to test higher education-level English literacy. The NBT AL data is used to underscore arguments developed from the perception survey data. It must be noted that the NBT data available at the time of writing this report was a partial sample of the full Engineering and Built Environment cohort, and for this reason the concerns raised herein regarding the tests are only intended to inform future applications of the NBT tests, and are not claimed to be conclusive.

Scholarly/ theoretical or conceptual framework for the work

The socio-cultural learning theory of Lev Vygotsky informs this paper. Vygotsky (1978) was interested in the relationship between culture and learning and argued that culture impacts on an individual's development, including language development. In his work, children acquire both their knowledge and the process of thinking through the lens of their culture; in other words, culture determines what they think and how they think. Language in Vygotsky is an aspect of the shared knowledge of the culture. This has similarities to Bourdieu's (1986) conceptualization of cultural capital. In Bourdieu's work, individuals have access to various forms of capital, and he acknowledges both cultural and linguistic capital, where linguistic capital is a subset of cultural capital. Individuals will be able to operate successfully in fields that value the types of capital that they bring. However, not having the 'right'

kinds of capital can adversely impact on the success of someone in a given field. In relation to education and language, a student with access to academic literacy or academic 'discourse' in their family background will be able to operate relatively fluently in the field of academia. Conversely, a student with different forms of capital that are not valued in the institution, for example a first generation university student with an African language, will have to obtain academic literacy and discourse in order to succeed (Bourdieu 1988). The reason Vygotsky is useful here is because he provides us with clues to the types of interventions that can be used to support English as Additional Language (EAL) and English as Second Language (ESL) students. Vygotsky focuses on language dialogue and speech as the medium through which knowledge and culture are transmitted – and therefore interventions based on his work focus on dialogue and interaction using the academic language forms that students are trying to obtain. Also, in Vygotsky acquisition involves a process of internalisation, where a student will use his or her own language to interpret and internalize the culture of the (academic) environment (Rogoff, 1990). This implies that working closely with students in 'apprenticeship' roles and helping students to internalise key conceptual aspects of specific disciplines can be successful methods of supporting EAL and ESL students.

Methodology

This paper discusses some recent research undertaken in the Faculty of EBE at UCT, exploring the impact of language on our students. The data comes from two main sources: a survey conducted across the faculty asking students for their opinions on how language has impacted on their studies; and recent data from the National Benchmark Tests Academic Literacy test. The survey data elicited information on students' language practices at university and uncovered common language-related problems that students experience. The data from the NBTs was available for the first time this year for the EBE entry cohort, and an analysis was conducted mid-year of the pass rates of students who scored basic or lower intermediate on the Academic Literacy test. The combination of qualitative and quantitative data attempted to understand both perceptions by students of language effects, and the actual impact of language on success in the faculty.

For the survey data, a total of 357 students responded to the questionnaire from throughout the faculty. The following figure shows the percentages of respondents who spoke each of the official languages of South Africa.

Figure 1: First language of respondents
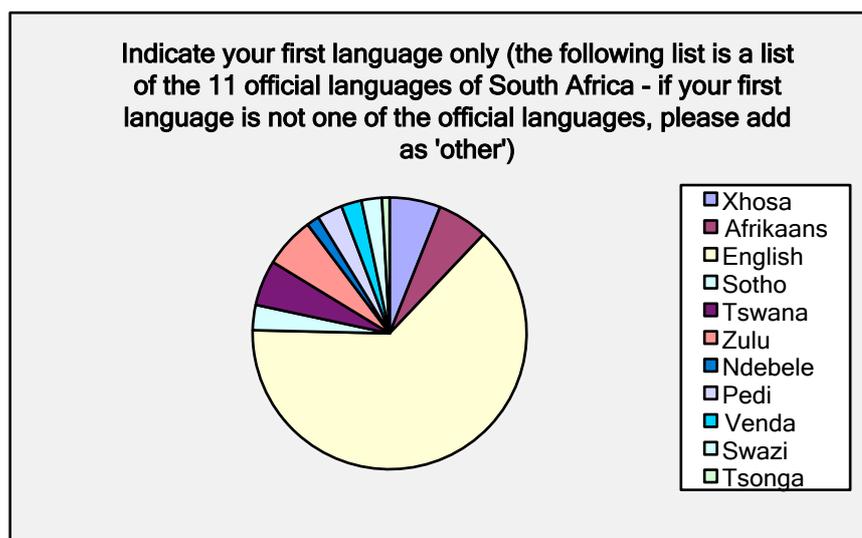
As the figure shows, the majority of students self-reported English as their first language. 86 respondents in total answered yes to the question of whether language had been a problem at any point during their time at UCT. When asked to report their level of English the majority of students reported 'good' or 'expert'. However a key group of 13 students reported 'poor' and 'basic' English levels (see figure 2 below).

Figure 2 Respondents' levels of English

	Poor	Basic	Medium	Good	Expert	Rating Average	Response Count
1. Indicate your level of English on a scale of 1 to 5 (poor to expert)							
English level	0.3% (1)	3.5% (12)	14.8% (51)	**51.2% (176)**	30.2% (104)	4.08	344
						answered question	344
						skipped question	14

A cross-tabulation with first language of this small group revealed that 11 out of the 13 were African first language speakers[1]. The following analysis will consider the full response set to identify trends and themes around language in the faculty, as well as focusing on some of the specific comments from the small group of African students who admit that English is having an impact on their studies.

Analysis of data

> I feel the university takes it for granted that all students should have a good command of the English language, but this notion to me is a very ignorant one because we live in a country that is multicultural and multilingual. So that assumption prejudices quite a lots of students who were brilliant in their high schools and they have brilliant minds but that brilliance is judged solely on the basis of their knowledge of the English language.

The quote above is taken from the survey of students' experiences of language in the higher education context, and highlights a gap between school and university. In the data this gap emerged in two main ways. Firstly, it emerged that proficiency in English language impacts on a student's perception of their ability to cope, which has serious affective implications for our African language students, particularly those coming from rural schools where the medium of instruction is a language other than English.

> English is difficult especially for us who went to school in the rural areas where we hardly spoke it.

> The thing that kills us as black people is that at school we were taught in our home language, like me when I was at high school my teachers were always explaining everything in my home language. Even my English teacher when we are doing the novel she will explain the novel in my language. So I think the problem starts at school which is where you have to get your basic English.

One of the major impacts on second language speakers appears to be the additional time taken to understand and respond to a problem, whether in the classroom, an assignment, or in a test or exam. A number of respondents said their lecturers spoke too fast, while others mentioned that it takes longer for them to read texts. One student confessed:

> Hey like in my first year it took me a month to understand the lectures. Even now I have to repeat the notes maybe three times before I understand what is going on, which is the same thing with the exams because I have to read the question more than two times in order to understand what is being required from me which leads to not finishing the exams. Because without lying since I came to UCT I haven't finished any exam paper, not because I don't know what to write.

The student goes on to qualify that it is not because of a lack of knowledge that s/he does not finish the questions:

> I will be able to answer when I arrive in my room after the exam which means that the language is the main problem that leads to my failure.

The way the question is posed also gave students problems in terms of meeting time limits:

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[1] The other two were international students.

> Sometimes it's difficult to understand what the question requires, you have to waste time reading the same thing again and again so you can understand the information given to you, not that you struggle with the concept.

This links to the second key gap between school and university language: students find the terminology, or 'discourse' (in the narrow sense) of the engineering programmes to be a bar to understanding, particularly in the first year. A number of second language respondents mentioned that complicated vocabulary means they take more time to focus on the meaning when they're simultaneously trying to translate. This also appears to relate to the expectations from lecturers of the level of English that their students command. A number of comments reflected a sense from the students that lecturers were pitching their English, whether in lectures or in exam questions, for a student who is fluent in academic discourse:

> I would find it helpful if questions for tests and exams were put forward in a more simple and direct way

> English in examinations should be made very simple and precise so as to cater for the 2nd language English speakers.

> Sometimes higher order language is used in tests and course work when the same thing can be said in plain simple English. Making a question ambiguous and hard to understand does not test a person's knowledge of a subject.

> Lecturers should be more aware of possible ambiguity in assignment and test questions that can lead to answers other than the expected answers.

The assumptions from lecturers about the English or academic literacy of their students appears to be one of the main reasons for second/ additional language students feeling disadvantaged. A direct comment relating to lecturers' assumptions about their students came from one respondent:

> Lecturers should understand that we all have a different level of speaking and understanding English.

Students come to university with varying levels of prior knowledge about the professions or disciplines that they study. Aside from terminology, discourse can also relate to the way that a field (in Bourdieu's terms) is discussed and understood; and people approach a field with differentiated levels of cultural (including linguistic) capital. One respondent described this poignantly:

> I don't know but it is funny how things are very simple but happen to be difficult because of what you have or know.

When asked whether additional support would be useful the majority of respondents said no but those who self-reported basic or poor English literacy said that additional support would have been helpful. These students provided suggestions for interventions that would help them with both aspects. Many thought that additional time would be useful both in the curriculum and in exams more specifically: at present second language English is not a sufficient motivation for extra time in exams or tests. They also suggested vocabulary classes, academic writing classes and English classes. A number of students requested vocabulary lists (which would presumably be discipline-specific). As lecturers we need to think hard about terminology, conceptualization, and possible guides for African language speakers in key terminology in our disciplines.

Some specific quotes reflecting suggested interventions for language development follow:

> I believe a second year course which assesses and assists in English writing would be beneficial.

> If the faculty gave us the option of having a course devoted to critical thinking, which includes English literature. This would be progressive in terms of being able to get across/sell ideas and be able to solve problems audibly.

> For me, speaking English every day has helped me think in English and I do not struggle understanding what is needed of me in test and assignments any more, I now understand most test and assignment questions.

Some students also reported improvements in their English through daily interaction in the language on campus:

> I am Venda but I prefer using English to better my speaking skills since I come from a disadvantaged background.

> I prefer to speak English with university friends in order to improve my English though my native language is Pedi.

A number of these suggestions and strategies reflect Vygotsky's emphasis on interaction and dialogue in addressing the needs of learners. Some existing courses were seen to fill the language gap to some extent. Professional communication sin particular was commended, although some students mentioned that it was focused on technical reports. HATA (History and Theory of Architecture) was cited as useful for reading but not for writing.

Even these courses that are provided appear to leave a crucial gap for some students:

> More could be done to improve the effectiveness and efficiency of the communication course in first year aspect, to really aid students whose English is not strong, because at the moment the course functions as a means of improving the English of those who are already good at English

In general, the data implied that while the majority of students do not feel excluded by the English language, and all recognise its importance, there is space for interventions targeting a small but key subgroup of the EBE student cohort. The following discussion will motivate for this need.

Discussion

While English as an Additional Language (EAL) students are fundamental to transformation in the faculty, questions arise as to whether it is better, even fairer, to exclude students whose level of English proficiency may impact on their success in the programmes; is it better not to waste their time and money if they are already at a disadvantage compared with students coming with a high level of English proficiency? On the other hand, these students are often coming from previously disadvantaged backgrounds and are therefore our target population for Academic Development initiatives. In this case, shouldn't we be providing additional support for these students, rather than simply excluding them due to their educational and language backgrounds?

The analysis of the NBT results sheds further light on these questions. It shows that a disproportionate number of students scoring in the lower two bands of 'basic' and 'lower intermediate' on the Academic Literacy test are black (88%). However, three-quarters of these students are currently passing their first year, with around a quarter of them passing with distinction at the end of the first semester 2010. This data suggests that the existing Academic Literacy NBT test is not predictive of success on the programmes. The NBT AL test appears to be only measuring the cultural and/or linguistic capital that students arrive with without taking into consideration either their first or home language or their access to academic discourse. Furthermore, considering the relatively unconvincing predictive capacity of the test in terms of success on EBE programmes, we should consider whether other skills (for example those measured by the Mathematics test and the Quantitative Literacy test) may be more critical in EBE.

The small number of students in the faculty who really struggle with HE-level English language are the key to this paper. Considering that these students have achieved high scores in core NSC subjects like mathematics and physics, additional support to address the problems self-identified by students in the survey data is surely more equitable than exclusion. The students at stake are currently impacted by a gap between school and university-level English, yet they are crucial to transformation and redress in post-apartheid South Africa.

Conclusions

Returning to the purpose of this study, there are no clear conclusions on the actual impact of language on success in the faculty: the AL test appears to measure linguistic capital, and many students who score poorly on the test seem to be succeeding despite any limitations connected to their first or home language. This leaves us to conclude that:

- We have no proof that language issues impact on success in the programmes
- Students who struggle with language would appreciate help, and believe it would improve their grades

Other ways we can be responsive to the needs of these students are, firstly to be careful about whom we exclude through new tests, and about what those tests measure. Secondly, as teachers we need to start to respond to these students in our teaching. Rather than teaching to an 'assumed' student, one

who has full command of the academic literacy skills implicit in the academy, we need to teach to diversity and begin to make our assumptions explicit. As one student requested:

> Simple straight terms will do no harm to us unless you want us to fail!

Considering the potential wider social benefits of higher education for students coming from rural or disadvantaged schools, and the cultural capital they accumulate being distributed through back-migration (imagining a possible scenario in which internal migrants send back what could be called 'academic literacy remittance' to their home communities), higher education in South Africa needs to seriously consider the benefits of being responsive to this small population of students who could, and should, be helped through the provision of language support.

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