

An Intervention to Improve Academic Literacies in a First Year University Biology Course

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Abstract

In South Africa there are many students, especially those from previously underrepresented groups at university, who successfully gain access to university but do not succeed in completing their degree either within the prescribed time or at all. One of the barriers to student success at university is the difficulty these students have in accessing the literacy practices of the disciplines. Therefore, within a first year biology course at a South African University, an intervention that focused on the academic literacy practices in biology was introduced. The intervention was designed around the assignment of writing a lab report. This paper describes this intervention and how it impacted on one student's journey from learning science at school to learning science at university. A literacy history interview and 'talk around text' interviews were used to assess the student's experience of the intervention. Comparison of the student's first and final drafts of the report revealed changes in the style and format of his writing. These changes in his report writing as well as in his attitude and motivation for writing the report were facilitated by a better understanding of the expectations of writing in university biology. This understanding was mediated largely through the modelling and deconstruction of the expected genre. This highlights not only the importance of providing first year students with examples of the genres they are expected to be writing but also the facilitation of their engagement with these new genres. Without these kinds of intervention many students are unlikely to gain access to disciplinary ways of learning and writing, which ultimately may lead to their exclusion from university.

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Introduction

In South Africa, as in many countries, there is a need for approaches that serve to widen participation and improve completion rates at university level. In South Africa in 2006, only 27% of first time students who entered university graduated in the regulation time (e.g., three years for a three-year degree) for their degree and only 48% of students graduated within 5 years. The statistics are even worse when focused on students from groups that were previously underrepresented, with only 20% and 24% of African and Coloured students respectively graduating within the regulation time for their degree compared to 44% of White students. A similar differential based on race is seen with fewer African (42%) and Coloured (43%) students than White (61%) students graduating within 5 years (Council on Higher Education, 2013). Degrees and diplomas in Science exhibit particularly low completion rates, with only 23% of students completing a BSc and 14% of students completing a diploma within the regulation time. Although there is an increase in graduation after 5 years, with 48% completing a BSc and 37% completing a diploma, the less than 50% completion rate in the face of the low overall participation rates seen in South Africa is a major cause of concern (Council on Higher Education, 2013).. This concern is reinforced by the racial disparity of completion rates for the BSc, where after 5 years White students have a 50% higher completion rate than African students (Council on Higher Education, 2013). One possible barrier to student success at university is the difficulty these students have in accessing the literacy practices of the disciplines.

Within a first year biology course at a South African University, we introduced an intervention that focused on the academic literacy practices involved in the writing of one laboratory report within the discipline of biology. This paper uses a case study to follow one student on a journey from learning science at school to learning science at university and to show how learning to read a scientific article might scaffold the writing of a laboratory report. In order to gain an in depth understanding of his experience we used ethnographic methods of the ‘literacy history interview’ and ‘talk around texts’ (Lillis & Scott, 2007) which are accepted research methods in the emerging field of academic literacies research, as well as the lecturer’s own experience of this semester long course.

Academic Literacies

Although there are many ways in which researchers have addressed student writing in higher education, the current paper is strongly influenced by much of the UKAcLits research field on student writing in higher education. Well-known researchers within this field, Mary Lea and Brian Street, conducted landmark research that showed three different ‘levels’ or ways of understanding approaches to student writing. First is a ‘study skills’ perspective, second is an ‘academic socialisation’ perspective and third is an ‘academic literacies’ perspective (Lea & Street, 1998).

The study skills perspective sees writing as a set of transferable skills which once learnt can be applied across the disciplines. It focuses on surface features such as grammar, syntax, punctuation and spelling. The academic socialisation perspective has been presented in two ways; previously, it was described as the induction of students into the norms and conventions of academic culture. One criticism of this description is that it sees the university as having one culture and that once students have been inducted appropriately they will have access to the entire academy (Lea & Street, 1998). This ignores the fact that each university is made up of many diverse cultures each with their own set of norms and conventions. More recently the academic socialisation perspective has been presented in a less problematic way as the induction of students into disciplinary or subject-based cultures and norms (Lea & Street, 2006). However this approach fails to acknowledge the dynamic nature of such disciplinary cultures and norms in that they are constantly being reshaped. An academic literacies perspective while encompassing both other perspectives, also addresses the dynamic nature of these cultures by viewing literacies as social practices. This perspective acknowledges the different ways in which knowing and identity influence student writing.

An academic literacies perspective also acknowledges that there are many different academic literacies which students must negotiate within the academy or in the words of Lea and Street (1998: 159) it acknowledges ‘...the requirement to switch practices between one setting and another, to deploy a repertoire of linguistic practices appropriate to each setting, and to handle the social meanings and identities that each evokes’. This view of literacies as a social practice is supported by Lillis and Scott (2007: 11-12) who suggest that ‘specific instances of language use do not exist in isolation but are bound up with what people do in the material, social world’. In biology, literacy would be ‘bound up’ with laboratory practices as well as ‘ways of behaving, interacting, valuing, thinking, believing, speaking, and often

reading and writing ...' (Gee, 2008: 4), that is, the social practices constituting the Discourse of biology. According to Lea and Street (1998: 158), 'Academic literacy practices- reading and writing within disciplines- constitute central processes through which students learn new subjects and develop their knowledge about new areas of study'. Mirroring Gee (2008) in his description of acquisition of secondary Discourses (Discourses that we acquire later in life), it has been suggested that it is the amount of overlap between the literacy practices that the student is accustomed to and the literacy practices within the discipline they are trying to access that ultimately determines their success (McKenna, 2010). Since most students entering University have not had the opportunity to engage with and become familiar with the disciplinary literacy practices expected at university, it is imperative that any first year academic programme include such opportunities.

According to Gee any Discourse 'can only be mastered through acquisition, not through learning' (Gee, 2008: 144). Gee further claims that mastery in Discourse is attained through example, and support. Some lecturers are so immersed in scientific Discourse that the practices, ways of thinking, valuing, writing and talking become subconscious and implicit. It is only by making the Discourse explicit that we (as lecturers) can begin to model it and understand our students' difficulties in order to support them. Gee (2008: 140) also sees a place for learning and explicit teaching as it 'can facilitate metaknowledge', that allows us to locate the new Discourse with respect to those we already have and thus to critique and evaluate the new Discourse.

One way of making this metaknowledge explicit is through the use of genre teaching. An academic literacies perspective takes quite a specific approach to genre teaching. It is true that genre teaching can be used in relation to any of the three perspectives to writing outlined above; a study skills perspective would focus on surface features and form, an academic socialisation perspective would focus on 'the established disciplinary norms' (405) and an academic literacies perspective would view genre as a social practice (Russell, Lea, Parker, Street, & Donahue, 2009). A view of genre as a social practice tries to make visible the mismatches between student and lecturer expectations, to highlight 'the ways in which students are called upon—often implicitly—to switch between different genres and modes' and to identify 'the different interpretations and understandings of genres of the participants in any particular writing encounter within the university' (406).

Genres in University Science Education

At university level, there is currently a mismatch between the genre that science students (especially first years) are prescribed to read - the textbook genre - and that which they are required to produce - the lab report genre. This is perhaps not surprising since the style and format of writing in these genres is so different. In the textbook the author is writing for a more junior person and so knowledge is arranged as accepted facts in a cohesive and ordered fashion. This arrangement of knowledge is not compatible with the multi-voiced, tentative and sometimes contradictory nature of knowledge in the biology research field. By contrast, the lab report genre more closely follows that of the research article genre where the author of the research article is writing for his/her peers, and so tentative knowledge is presented and it is the reader who ultimately decides whether this new knowledge fits into the greater body of evidence (Jackson, Meyer, & Parkinson, 2006). We would add to this that both the lab report genre and the research article genre are much more closely linked to practice. There are certain elements of practice, for example the labelling of test tubes, that are taken for granted within the discipline as everyday practice and therefore could be omitted from a lab report or research article; however these basic instructions are often included in a textbook description of an experiment.

Another characteristic of the research article is intertextuality. The work of others is explicitly cited because according to Florence and Yore (2004: 640), 'Intertextuality reflects the interdependent structure of scientific knowledge that stresses conceptual networks rather than isolated concepts'. We would argue that this should also be present in the lab report genre, where possible. Since knowledge in textbooks, especially at a first year level, is often presented as accepted facts, the interdependent structure of knowledge in science is not always evident. In terms of format, the textbook genre can vary but it is usually organised by topic with some examples of individual experiments interspersed whereas both the lab report and the research article follow a specific format which includes the following sections; introduction, methods, results, discussion, conclusion. These differences in style and format between the genres that undergraduate students are expected to read and those that they are expected to write may create confusion for students. Furthermore, students are left without a model of the conventions of the discourse.

The mismatch between reading and writing tasks assigned to first year students prompted us to provide students in this course with a research article as a model of the conventions of the discourse. It was hoped that this research article would serve as a better

model for students in writing their lab reports. There are pros and cons to using a research article as a model for writing a lab report. The lab report could be seen as the pedagogical version of the research article genre; however this suggests that they are two different genres. In fact, as science students progress through their academic careers, from high school through university and perhaps into postgraduate degrees, the type of lab report expected begins to look more like a research article, with some students producing publishable work as early as their fourth year of studies. Therefore, in a sense the research article is the benchmark of academic writing for these students.

There are however some major differences between the research article and the lab report. Key among these is the motivation for writing them. For scientists and researchers there is much symbolic and economic capital (Bourdieu & Wacquant, 1992) attached to the publication of journal articles. Therefore, both the evidence and the argument of the research article must be solid and convincing enough to be accepted for publication in the first place. As a student progresses through a science degree their reports would be expected to approach these standards; however at a first year level clear and correct presentation of evidence and a discussion of the evidence in context is usually sufficient. From the students' point of view, the lab report is written for the marker (in this case postgraduate tutors) and so the main aim is to meet the expectations of the marker in order to gain marks. It is true that completing one's degree with good marks can also lead to symbolic and economic capital but this is not as 'immediate' as for the research article and it is often not easy for students to see this bigger picture.

Another difference between these two genres is the type of experiments that underlie them. In 'real' biology research labs, although scientists have evidence to suggest that they will get a certain result, experiments are carried out to test a new hypothesis and so it is always possible that a different result could be obtained. This can lead to one of the best and worst feelings that scientists experience, a sense of anticipation and excitement while waiting for the results. The use of 'canned experiments', such as "an experiment to test whether yeast produces carbon dioxide during fermentation", in undergraduate biology, with results that can be gleaned from the literature or even the textbook, removes this anticipation and excitement even for a well-prepared student who arrives at the practical already understanding the principles underlying it. This difference in motivation and excitement may lead to very different outputs as students may not see the need to present a strong argument for already accepted knowledge. Despite these differences we still felt that the research article provided a

good model of the genre expected in a lab report and provided a guide to the benchmark expected in science.

The research article genre can, according to Swales (2004), be subdivided into theory pieces, review articles, short communications and experimental papers. The research article we used as a model was an experimental paper as we considered it closest to what the students had to produce in their lab reports. The lab report or experimental paper is not a genre that comes naturally as it is abstract and ‘attempt[s] to objectify the world’ and as such is one of the genres most distant from speech (Cope & Kalantzis, 1993a; Cope & Kalantzis, 1993b). It therefore needs to be taught explicitly for students to have access to it and to be empowered to join the realm of the scientist (Cope & Kalantzis, 1993a). A genre-based approach to teaching literacy is relevant here as it enables students to produce texts effectively and critically and aims to include students who find themselves on the margins of the dominant culture, as a result of their cultural and linguistic backgrounds (Bawarshi & Reiff, 2010).

Using the experimental paper as a model for the lab report genre

Genre has been defined as ‘staged, goal-oriented social processes through which social subjects in a given culture live their lives’ (Martin, 1997: 43). These processes are ‘dynamic interaction[s] of social participants and appropriate generic resources’ that produce text types (Callaghan, Knapp, & Noble, 1993: 192). This model of genre and its emphasis on how social purposes are linked to text structures was used to develop the ‘teaching-learning cycle’, a pedagogy that has become synonymous with a genre approach to teaching writing. The cycle consists of three phases: modelling/deconstruction, joint negotiation of text and independent construction of text (Bawarshi & Reiff, 2010; Cope & Kalantzis, 1993a) and our intervention incorporated all three of these phases.

Modelling or deconstruction of the text implies that students are given a text or texts belonging to a certain genre. In our case this was a published experimental paper on a similar topic to what they had to write about in their lab reports. During this phase students were given the opportunity to read the paper. The lecturer then guided students in discussion of the text’s function or social purpose, how it is organised and what the relevant language features and conventions are (Cope & Kalantzis, 1993a; Rivera, 2012). As Bawarshi & Reiff (2010:

34) put it, this phase moves from ‘discussion of context and social purpose to a description/analysis of register and language’ in the genre.

Joint negotiation of the text prepares the student to construct a new text in the same genre, with the guidance of the lecturer. It takes the form of students gathering and organising information needed in the construction of the text by observing, researching, taking notes, role-playing, discussing and rehearsing (Cope & Kalantzis, 1993a). The more the students become familiar with the genre, the less the lecturer’s assistance is needed. In our intervention, this phase was represented in the students discussing how they would use the data generated when conducting the experiment, combined with what they had learnt about genre conventions during the modelling phase, to write their lab reports.

Independent construction of text is where students draft their reports independently, edit it based on lecturer and peer feedback and prepare it for submission (Cope & Kalantzis, 1993a). The lecturer and students rely on a common understanding of purpose, schematic structure and language features acquired during the modelling and joint negotiation phases, to discuss problems encountered during independent construction (Callaghan et al., 1993). In our example, independent construction took place after the article review sessions of week two when students had to work on their lab reports in their own time. This phase was supported by the lecturer feedback that students received on their first drafts, as well as engaging in peer-review and reciprocal feedback during the session in week four. During the peer-review session students had to implement what they had learned about the genre and its structure, purpose and language conventions during the modelling phase. They then had the opportunity to incorporate the comments of the lecturer and their peers in editing their drafts before final submission. The wheel shape of the ‘teaching-learning cycle’ suggests that one can enter it at any phase and return to the various phases according to the students’ needs. It is thus a flexible model for teaching writing that allows students at different stages of language development to master a new genre.

Methodology

The Laboratory Report Intervention

The intervention described in this paper was focused on the development of academic and quantitative literacies in a number of different activities and it used an experimental paper as

a tool for introducing first year students to the conventions of the discipline. The intervention (described in Table 1 on the top of the next page) was designed and facilitated in conjunction with our colleague from the Numeracy Centre at the University of Cape Town. One week after completing a set of laboratory experiments and carrying out manual data analysis, students repeated the data analysis using Microsoft Excel in a guided quantitative literacy support session. This was done within a computer lab so that support was available for any student that required it. The first draft of the report, which contained only the introduction, methods and results sections, was submitted one week after this session. The students received some general feedback from the lecturer at this point.

Next, students read an experimental article with guidance. This activity was based on guidelines for constructing a research paper by Swales and Feak (2004). To facilitate student understanding, a glossary of new terms found within the article was provided and lecturers were present to answer questions as they came up. This was followed by a second quantitative literacy support session which focused on the difference between description of results and discussion of results.

Finally, the week before the report was due, a peer review session was held where, in groups of four, the students reviewed each other's lab reports and gave reciprocal feedback. In this session students were guided in their reviews by a set of questions. There was some explicit teaching with regard to the data analysis but most of the other activities were participatory and student-led, where the students were encouraged to actively engage in doing the experiments, interpreting data, reading an experimental paper and reviewing its structure, and acting as peer reviewers. The final draft was submitted following the completion of all learning activities.

Table 1: Sequence and duration of learning activities used to improve academic literacies in a first year biology course

Week	Learning Activities	Duration	Timing of drafts analysed
1	Laboratory experiment	3 hr.	
2	Tutorial: Tabulating data and drawing graphs in excel	2hr	draft 1
2	Review of an experimental paper (focusing on structure and language)	3 x 1 hr. sessions	
3	Tutorial: Interpreting results	2 hr.	
4	Peer review session	2.5 hr.	
5			draft 2

The case study

This paper looks at how this intervention impacted on one student's journey from learning science at school to learning science at University. Focusing on one student allowed for an in-depth context-dependent view of the student's experience using many sources of information, and laid the groundwork for future similar studies. In order to gain insight into how this student had coped with the new teaching and learning interventions and to reflect on them, we followed an ethnographic approach, referred to in the academic literacies research literature as 'literacy history' and 'talk around text' interviews (Lillis, 2008). The student focused on in this study is a black first year science student at a South African University. He shall be referred to as Mahlasedi from here on.

Mahlasedi was selected as the focus of this paper, because of his noted active engagement with each of the interventions. As Mahlasedi's biology lecturer, one of the authors is an insider to the literacy practices of biology and was present during all the activities outlined above, however she is an outsider to the practices that Mahlasedi brings with him. Therefore, to get further insight into Mahlasedi's literacy background, and the literacy practices he brought with him to University, a literacy history interview was conducted. The literacy history interview, as previously used by Barton & Hamilton (1998),

seeks to understand the relationships that people have with literacy. These relationships are shaped by their past experiences of literacy and the availability or perceived usefulness of literacy resources in their environment. More specifically, the literacy history interview here sought to understand the broad literacy history of the student but also the student's history with literacy in science as well as the scientific genres that he was familiar with.

According to Lillis (2002) 'talk around text' interviews or conversations can focus on different elements including; 'tutor-directive dialogue aimed at talking the student-writer into essayist literacy practice', where essayist literacy practice refers to the overarching literacy practices in higher education; collaborative dialogue aimed at 'populating the student-writer's text with his/her own intentions'; tutor-directive dialogue aimed at making language visible; and dialogue which facilitates student 'talkback' as part of 'long conversations' (Lillis, 2002: 132-133). Participation in this study was voluntary and consent was obtained prior to all interviews. The first conversation around texts with Mahlasedi occurred after the first draft of the introduction, methods and results sections of the report. In two further interviews, various points of interest identified during the course of the intervention and comparison of drafts were the main focus of the conversation. Since the first draft did not contain a discussion section, comparison of this section was not possible. Each interview tried to encompass three of the four elements of talk around text interviews outlined above, however 'talk back' was only included in a final meeting with Mahlasedi as 'talk back' focuses on issues that were noted when analysing our previous interviews.

Mahlasedi's Story

Literacy History

Prior to University, Mahlasedi studied at poorly resourced schools in rural Limpopo. His home language is Sepedi and he studied English as his first additional language. He has a background in science from high school, studying Life Sciences, Physical Sciences and Agricultural Sciences to matric level. He hopes to major in biology and chemistry but also currently studies physics and maths.

According to Mahlasedi, there were very few writing tasks assigned to them in high school. The most common type of writing task was the essay, which was mainly assigned in English and Sepedi classes. In Life Sciences both essays and lab reports were assigned. Lab reports were assigned more frequently and one report was submitted per group of 5-6

students. Since Mahlasedi was a top student in Life Sciences and enjoyed writing in English, the task of writing this report usually fell to him. This experience should have served him well in meeting the University's demands of writing reports, however there were gaps in his understanding of the purpose and structure of each section. Like those at University level, practical reports in high school had to include introduction, methods, results and discussion sections. However, he admitted that they did not really know 'how to put them, so we just put everything'. The only thing they knew was how to write the methods and they 'would just write up everything' for the introduction. Furthermore, a lack of resources in the high school meant that he rarely got to perform or witness experiments.

...you know in rural schools you don't have access to much of let's say, apparatus and everything... so you are just like ok, I am going to write it up with my knowledge because I don't know much about this... We don't have this, and we have to do it.

Thus to write a lab report the student had to rely on imagined experiences and predicted results based on what he read in the textbook. He outlined how he would go about doing this;

First thing I would, you know, just, go to the textbook. I hated studying but then, I would just because I knew it was just for marks and I had to do it. Then, I would just go through and just try, you know to go through the practical in the book because it would be in the book and then just try to go through it and understand it. If it was related to one of the topics in the book I would study the topic and try to transfer what I know about it to the prac.

Mahlasedi seemed to use all the resources he had to hand, not just focusing on the practical itself but researching around the topic as well. His results section would normally include predictions instead of results. This became evident when he was asked how he wrote this section without having done the experiment;

That was the funny part, because you just guessed; like right now, let's say for example when we were doing the yeast practical you just knew that actually CO₂ evolves. You just have to come up with a guessing, an assumption, that this is going to happen.

The yeast practical the student refers to is one that was done as part of his first year undergraduate studies, where the students had to design an experiment to determine whether

or not the gas evolving from fermenting yeast was CO₂. The fact that the student ‘knew’ the result before he even did the experiment is characteristic of most first year biology practicals.

Writing a Lab Report: What comes where?

As highlighted above, despite having written reports in high school Mahlasedi was unsure of the conventional structure of such reports, or in his words ‘what came where’. This brings to light the fact that there is a need for modelling and deconstructing the form of a research article. This was further reinforced by the content of his first draft of the lab report where it was noted that instead of an introduction which encompassed some background, and a hypothesis and/or an aim, the student included a separate hypothesis and aim only. This separation was highlighted in his first draft of the report by their placement on separate lines. The student also placed a heading for each on the left side of the page possibly highlighting the importance that Mahlasedi attributes to these elements.

Excerpt 1: Introduction from draft 1 (font size and style are included as produced by the student)

HYPOTHESIS: ENZYMES LOWER THE ACTIVATION ENERGY AND ACCELERATE REACTIONS IN BIOLOGICAL SYSTEMS.

AIM: THE AIM OF THIS EXPERIMENT IS TO INVESTIGATE THE EFFECT OF ENZYMES ON THE ACTIVATION ENERGY OF BIOLOGICAL SYSTEMS

However, between the two drafts the student removed these separate headings and replaced this section with an introduction which encompassed the hypothesis and aim as well as some background information.

Excerpt 2: Draft 2 of introduction as written by the student.

(The aim is highlighted in bold text (emphasis added by author) and the rest of the text constitutes the background).

Enzymes are substances that accelerate the chemical reactions of biological molecules by lowering their activation energy barrier. Alkaline phosphatase is an enzyme which catalysis the hydrolysis of phosphate bonds in complex organic molecules by

releasing inorganic phosphate groups. Alkaline phosphate is isolated from the intestine of chickens and it occurs in the gut functioning in an alkaline environment. Catalysing the chemical reaction of p-nitrophenyl phosphate (PNPP) results two products namely p-nitrophenyl (PNP) and the inorganic phosphate (P) which are yellow and colourless respectively. The yellow colour of PNP can be measured as absorbance values of the products which can be converted to draw a calibration curve for determining the concentration of PNP in the solutions. **The aim of this experiment was to assess the effect of inorganic phosphate on the activity of alkaline phosphatase.** Inorganic phosphate affects the activity of alkaline phosphatase in biological reactions.

Both of these excerpts emphasise a mismatch between the expectations of the lecturer and those of the student. At the beginning of first year biology, students are taught the importance of a good hypothesis and in many of the pre-practical questions (questions the students must complete before the practical) they are asked to create a hypothesis for the experiment. This emphasis in their course work by those who will ultimately assess the work (lecturers, demonstrators) could have been the source of Mahlasedi's concern to foreground the hypothesis in his first draft.

Although both hypotheses and aims are used in biology, an aim was not expected in this report since it was never discussed in this course. Therefore, prior to the talk around texts interview we thought that it may have been a remnant of the student's high school experience of writing reports and what was valued by his teachers. However, according to the student, *the aim* is used more in physics and chemistry. This highlights a contradiction in values between the different disciplinary literacy practices (at least at the pedagogic level) that the student is exposed to as a first year Science major. Discovering these contradictions will allow them to be made explicit in future versions of this intervention.

The new introduction (Excerpt 2) more closely reflects the lab report genre in that it is now a cohesive paragraph that incorporates a background to the topic with the aim. When asked what made him realise that the aim and hypothesis should be incorporated into an introduction, the student replied;

I just thought, the first time when I was writing I just thought that they should be separately, that's what I thought but then, when I came to about, after we went

through the sessions, I was like, ok, then this is how it should be done, the introduction should include the aim and should include the hypothesis.

On further probing the student stated that *'it was after we went through the review journal sessions'* that he realised this. It would seem from other sections of the interview data that the modelling and deconstruction of the experimental article helped the student mostly with identification of the structure and language that should be used in his report. This suggests that components of what could be considered the 'study skills' perspective, such as a focus on form, need to be taught with the teaching of genre. It would also seem that the student found reading an actual experimental paper, as an example of a lab report, gave more clarity to the guidelines that they had been given earlier in the year.

...they [organisers of previous practicals in first year] gave us a format on how to write pracs but then we actually just looked at the thing and think; oh this is how, but we never actually got a chance to go through a scientific journal somehow. But then when they went through them with us, then it was like, oh this is how it is. Then it was that time that we started realising that oh this is how they put things. This is how they interpret the results. Because on the results we just thought that everything you get you just put it down. Then it showed you that no, on the results you just have to interpret what you got and then goes on the discussion. It did help because even when we started realising oh, the language should be like this. So you just don't have to put everything.

It is clear that deconstruction of the text helped the student to identify what goes in the different sections of the report and the kind of language that is used. It is interesting that the student says that they had not had the chance to go through a journal article previously since a journal article was *suggested* as reading for a practical earlier in the year. The student may have considered that the previous reading was meant as background reading rather than as a model of the expected genre. This stresses the importance of making the purpose of readings explicit to students so that there is alignment between the expectations of students and lecturers. In this intervention, the purpose of the reading was not only made explicit but the students were guided through the reading using modelling and deconstruction. Reading within a discipline is a social practice and so explicitly going through the text and highlighting purpose, structure and language features is something that students need to be guided in and which one cannot assume will happen if they are left to read a paper on their own.

It is interesting that even when asked about some of the other sessions Mahlasedi kept coming back to what he learnt while reviewing the experimental paper during the modelling phase. When describing the tutorial on interpreting results, he says;

It was funny because we had a clue on how to interpret results but we didn't mostly know how to, because we would just put down raw datas and raw data that need not to be there. So when we were taught to interpret the results, then that was when we started seeing oh, this is how we interpret it and even when you would go through and we would start looking back on what we did during the sessions, that we were going through the journal, then we started seeing, oh, this is how they put the things. Then even for us we started saying oh then I'm going to put it this way.

However the tutorial on interpreting results also served a critical purpose in highlighting what the results section should consist of as well as where and why.

It did help because at one extent we had that idea that putting everything was just like drawing. We would see figures for the tables but we weren't too sure if you just put them, was it just for the interest of putting them up or putting them down. The figure legends for tables and everything, so we didn't know the difference between it. So then when they went through it with us it was just like this is how it's done.

Many students submit reports with nothing but graphs in the results section. This may be a remnant of school practice or having not actually done the experiments in high school or it may just be that students have no prior experience to go on. It is clear from the above extract that this student is now aware that these graphs need to be supported by figure legends and that not every bit of data obtained is included in the results section.

When asked about the peer review session Mahlasedi seemed quite animated when talking about giving feedback, however embarrassment was evident at the end of the passage when he spoke about his turn to get feedback.

...it was fun because I was the first one to give feedback. Your prac is still put aside and I was the first one to give feedback and when I was giving feedback I was like I'm not going to laugh about it, so whatever it is I am just gonna put it straightforward but not in a way that is rude. But then you put it forward and it helps them. The most interesting part was that I even looked at the grammar. So it was fun because we would even look at the grammar and then tried to underline everything and tried to

give it to them. Then when it came to mine because I was the last one {cringes}. But it helped, because they were like you didn't do this, you didn't do this, you didn't do this... Then I had to go back and put everything down and do the whole write up.

It was hoped that the students would use what they had learnt during the modelling phase of the teaching- learning cycle to critique each other's work. It was unclear from Mahlasedi's comments whether he managed to do this. His comment about looking at the grammar is slightly worrying because it may suggest that instead of focusing on the structure, purpose and language conventions of the genre he had focused on generic grammar. However, it may be that he is simply referring to some of what he learnt during the modelling phase as a sort of specialised 'grammar'. It is clear from his response that he went on to implement some of the feedback that he received during the peer review session.

Applying the textbook genre incorrectly to the lab report genre

The hypothesis that Mahlasedi gave in his first draft (Excerpt 1) is very similar to the definition of an enzyme in a biology textbook but does not reflect what was actually done in the laboratory. Since activation energy was not measured in this experiment the student may not have actually understood what he was writing. Mahlasedi also copied the technical terminology from the textbook to describe the aim but also did so incorrectly. This is worrying since Paxton (2007: 111) warns that when students 'borrow too closely from the textbook they block out their prior discourses and thus fail to integrate the new knowledge into existing knowledge structures'. Perhaps the student felt that he would impress the marker by using technical terminology from an authoritative discourse (Bakhtin, 1981 cited in Paxton, 2007) such as the textbook. Although, in writing a biology lab report at University level, the use of technical language is valued it must convey an appropriate message in order to be rewarded. Interestingly, by the final draft, the hypothesis (Excerpt 2) that sounded like a definition had been moulded into a very appropriate definition of enzymes that fitted in well as an introduction.

'A different space and time' makes all the difference

The marked progress in genre acquisition the student made from one draft to the next was quite striking. The major textual changes included a more integrated introduction containing background information that had been omitted previously; less narrative writing style in the

methods section with unnecessary details omitted; greater tentativeness in the final conclusion; and a greater authorial distance compared to the first draft. When the student was explicitly asked what he thought had prompted these changes, he responded; '*A different space and time.*'

We were keen to learn what kind of space and time prompted these changes and as if anticipating the question the student continued:

There are just these times when you like, because I really enjoy writing but to some certain extent there are just these times when you are exhausted and you are like I just wanna get done with this. But then there are just these times when you are writing something and you are really enjoying it. When I wrote this draft in fact (pointing to the final draft), I enjoyed writing it, because then I had gathered more information and I had a lot of things. And I was like, ok, now I know what I am actually gonna do. Even though I didn't know much about it, but I had like more information. And then when you are writing something and you have gathered information you are just like. Oh, this is like this. Then everything just becomes clear. But then, there are just these times when, you are writing something and you have little information and when you are writing you get stuck and then you have to think about something a lot and your just like , I'm just going to put anything in.

The new space and time seem to consist of new 'head spaces' and better and worse times, the worse times being where you are exhausted and /or have little information and you 'just wanna get done', 'get stuck' and 'put anything down'. These phrases seem to suggest a lack of motivation at these times, whereas in the better times when you have gathered lots of information, you 'really enjoy it' and 'everything becomes clear'. The major change between the writing of the first and second draft was his enthusiasm for writing the report which seemed to be fuelled by how much information he had to work with. So what information had he gained between drafts? Although he may have gathered his own information from other sources, it becomes clear from the interview data that a lot of 'information' was gathered from reviewing the research article as an example of a lab report during the modelling phase of the teaching-learning cycle. These sessions seemed to rectify the mismatch between his expectations of the demands of the course and those of the lecturer.

Limitations of the methodology

‘Talk around text interviews’ should include two main types of talk; ‘talk aimed at teaching and learning how to write in the ways required by the academy’ and ‘talk to engage in an exploration of the students’ experiences of engaging in academic writing practices’ (Lillis, 2002: 9). While we feel that the interviews were quite useful in dealing with the latter, we feel that the timing of the interviews (the two main interviews were held after the final draft was due) did not allow the student to practice what he learnt from the interviews within this assignment. Furthermore, if the interviews had been held earlier (during the assignment) it would have become more difficult to determine whether the improvements were due to the classroom interventions or the ‘talk around text interviews’.

Conclusion

It is clear that there was a great improvement in the students writing from the first draft to the second. The student seems to have acquired knowledge about the structure, organisation and language that should be used to write an appropriate biology lab report. This knowledge has made a big difference to the format and style of his report writing as well as his attitude and motivation for writing the report. It is evident from the interviews with Mahlasedi that it was the modelling and deconstruction of the research article that had the greatest impact for him. Despite having previously been given a journal article to read, it was the facilitated reading and guided discussion that gave this student access to the knowledge he needed to improve his report. This highlights not only the importance of providing first year students with an example of the expected genre but also of facilitating their engagement with this new genre, by emphasising purpose, rhetorical structure and the use of appropriate language to create meaning. This intervention provides a model of genre teaching that can be used in undergraduate biology courses to make explicit the expectations and allow students to gain access to the Discourse.

Our observations of Mahlasedi’s writing development during this intervention confirm the importance of teaching through example and support, and modelling specific elements of the Discourse of university-level biology. Here, a genre approach to teaching successfully helped the student access one aspect of biology’s disciplinary or subject based cultures and norms: the writing of a lab report. It also helped to identify mismatches between the expectations of the lecturer and those of the student. This is an example, in the South

African context, of how viewing writing as a social practice can facilitate scaffolding and mutual understanding of student assignments.

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