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Reflections on Process Writing

A B S T R A C T This paper reviews collaboration between a Communication lecturer and two Science lecturers to improve underprepared students' scientific writing, using a process writing approach. Findings suggest that undertaking process writing is worthwhile as part of a deep learning approach in higher education; however, such an endeavour requires careful planning and constant coordination within the constraints of highly structured, time-pressured academic programmes. The author concludes that increasing the quality and quantity of students' scientific writing requires commitment and active collaboration by those involved at all levels of study in the discipline. Only with sustained, explicit and appropriate guidance by all lecturers concerned are science students likely to develop and value the appropriate scientific discourse that will mark them as fully-fledged members of the scientific community.

Keywords: Process writing; academic writing; disciplinary discourse; situated learning; content and language integration

1. Introduction

This paper describes two attempts to improve science students' essay writing in a higher education context. The site of the study was the former Peninsula Technikon (now the Bellville campus of The Cape Peninsula University of Technology/CPUT). As a Communication lecturer in the Department of Physical Sciences in the Faculty of Science, I collaborated with two science lecturers, one from each of two departmental divisions, namely Chemical Engineering and Analytical Chemistry. I will begin by explaining how these collaborations came about.

2. Background

Many students from previously disadvantaged backgrounds at the former Peninsula Technikon are often underprepared for tertiary study. English, the medium of instruction, is usually their second, third or even fourth language. These students may struggle to express themselves clearly in English, particularly in writing. They may over-estimate their general English proficiency or not consider that their English ability affects their academic results. Starfield (1992) confirms that such misapprehensions are widespread.

In this context, many content lecturers have attributed students' academic difficulties solely to limited English proficiency and have resisted assuming a share of the responsibility for addressing students' literacy needs. Communication lecturers tend to shoulder this responsibility.

The Communication curriculum may vary from one faculty and department to another, depending on the academic needs and future workplace emphases of a discipline. In the former Department of Physical Sciences, I have developed much of the Communication curriculum. In the Chemical Engineering and Analytical Chemistry diploma courses, Communication runs over approximately 50 hours in semester one, year one. Broadly, the course attempts to develop various competencies, like general English proficiency and academic literacy in the context of science. Attention is also paid to life skills development and workplace communication.

Because of traditional disciplinary divisions, science students may perceive Communication as separate from their other subjects and so may not always strive to improve their competencies. This response is not unusual. Beall and Trimbur (1996: 2), in their research on writing in chemistry, note that "...students sometimes complain when they are assigned writing in chemistry classes ... implying that it is somehow unfair to require good, effective writing in science...."

In the first two years of Analytical Chemistry or Chemical Engineering, minimal writing is typically required. Then, in the third year (during students' industry practice) and in the fourth year (if students do a BTech degree), supervisors and lecturers expect well-written research reports. Those not meeting these expectations may fare poorly in such assessments.

In my experience, summative assessment of written tasks has been the norm in the former Department of Physical Sciences and elsewhere in our institution. Students submit a task for assessment by a due date; and the mark earned contributes a particular weight to the total subject assessment. In response to discussed concerns about science students' poor writing competency, some science colleagues have incorporated more writing in their curricula, but the typically low credit weight assigned to such tasks is unlikely to motivate students to pay more attention to improving their writing.

In May 2000, near the end of the Communication course, I was dissatisfied with the first year Chemical Engineers' essays. A Chemical Engineering lecturer was soon to begin a second semester programme (Chemical Process Industries II) with the same group of students. On learning of my concerns, he agreed to work with me to improve the students' writing competencies. We planned a joint essay assignment for the students, even though I would no longer officially be lecturing them. We adopted a 'process approach' to writing, details of which will be explained further on in this paper.

In the first semester of the following year (2001), I collaborated in a similar way with an Analytical Chemistry colleague whose programme ran concurrently with mine. He, too, was concerned about the students' poor writing competency.

This paper describes and evaluates these two collaborations.

I shall begin by providing a theoretical framework for the research. This includes the following: an overview of relevant developments in writing research, including those concerning process writing; written assessment as gatekeeper in some discourse communities; lecturer response to student writing; and the value of interdisciplinary collaboration in teaching writing. Thereafter, I describe our intervention and methodology. Finally, the findings are discussed.

3. Theoretical framework

3.1 Writing and process writing

In higher education and elsewhere, writing is considered an extremely valuable educational activity, interweaving language and concepts: "...no matter what the subject area, students assimilate new concepts largely through language" (Corson, 1990: 174). It is also claimed that writing clarifies thought and thereby facilitates learning (Cannon, 2000).

In many cases, assessment in higher education entails essay writing and the submission of one draft only. According to Entwistle (1993), assessment indicates to students what lecturers value. Thus, when students are required to write only one draft, they surely learn that writing is a once-off endeavour, with no chance to improve if they have made errors of any kind. They then may fail to appreciate the messiness of constructing knowledge and the work involved in writing.

This 'once-off' approach contrasts with a 'process writing approach', which is "... a teaching approach that focuses on the process that a writer engages in when constructing meaning" (Montague, 1995: 3). This approach generally includes "... pre-writing activities, such as defining the audience, using a variety of resources, planning the writing, as well as drafting and revising" (NCES, 1996: 1). Hyland (2003: 10) notes that "...the process approach to writing teaching emphasises the writer as an independent producer of text, but it goes further to address the issue of what teachers should do to help learners perform a writing task." A lecturer responds to multiple drafts of a student's writing, providing guidance on aspects such as content, organisation of information, language and referencing of sources, allowing students to improve on initial efforts. The approach may also include peer response, which is strongly advocated by several researchers (e.g. Kasanga, 2004; Hyland, 2003). Peer response will be briefly discussed later in this paper.

When one regards writing as a multi-stage, thoughtful process, one acknowledges that writing is non-linear, exploratory and recursive (Hyland, 2003). As Prior (2004: 171) points out:

> When we look closely at situated composing, we do not find a smooth easy activity. Writing moves forward (and backward) in fits and starts, with pauses and flurries, discontinuities and conflicts.

Process writing, like any good writing, is thus "complex", "messy", and comprises "many different activities that eventually result in [a] product" (Nightingale, 2000: 135).

Interest in process writing as a teaching approach grew out of developments related to the development of, particularly, L2 (second language) writing research. These are reviewed here.

3.2 Developments in L2 writing theory

Until a few decades ago, there was little L2 research, particularly in relation to the teaching of writing: it was believed that what applied in L1 (first language) learning also applied in L2 learning. The process approach to writing was therefore first used in and for the L1 classroom (Caudery, 1995). The overlapping stages of this L1 research that impacted on the teaching of writing to L2 speakers of English are recorded by Raimes (1991). Hyland (2003) provides a similar overview. Stage One focused on form (1966-), with arbitrary content choice. Stage Two (1976-) focused on the writer's personal composing process. Stage Three (1986-) focused on

content, apparently in reaction to the former stage. Mohan (1979) advocated L2 courses adjunct to content courses. Various English for academic purposes (EAP) and Writing across the curriculum (WAC) courses developed, with L2 curricula conforming to content curricula. By 1986, process writing had been termed 'traditional'. During Stage Four (1986-), EAP and WAC movements stressed the understandings that the reader be brought to the text. In concluding this review, Raimes (1991) stressed that writers need to learn different strategies for different purposes and audiences. She criticised those who regarded writing as either a process or a product, claiming like Bazerman and Prior (2004) and Lea (2005) later, that both process and product are important.

Since the late 1980s, many researchers have focused on the social contexts of writing. This has been in line with the work of the New Literacy Studies theorists who regard literacy as a social practice (e.g. Gee, 1990, 1992, 1998; Street, 1984, 1993, 1995, 1996; Baynham, 1995; Lea & Street, 1998, 1999; and Lillis, 2001). Their work advocated a 'social turn' from notions of teaching literacy merely as a matter of teaching language 'skills', towards an understanding of the social and cultural practices of, and influences on, literacy, According to them, literacy is contextual (Lave & Wenger, 1991). Common understandings of literacy – the ability to read and write in a particular way, for example – are based on social and cultural practices that have evolved within a particular context for particular purposes.

More recently, rhetorical studies have advocated a return to earlier concerns of language research, as these emphasise not only the situated, but the procedural nature of writing practices:

> To understand writing, we need to explore the practices that people engage in to produce texts as well as the ways that writing practices gain their meanings and functions as dynamic elements of specific cultural settings (Bazerman & Prior, 2004: 2).

My position in this paper in relation to the above theory, is that to develop students' academic writing effectively involves paying attention to all aspects of writing: form, the writer's process, content, the reader, culture, context and purpose.

I will now discuss the role of written assessment in relation to process writing.

3.3 Written assessment as gatekeeper

According to Gee (1990), the term 'language' refers to grammatical features; 'literacy' to the ability to read and write relevant texts of a discipline; and 'discourse' to both of the aforementioned, as well as to socialisation into the attitudes and accepted practices of a discourse community. Disciplinary discourse therefore refers to the particular language, attitudes and practices of a discipline, communicated tacitly or explicitly, within an academic context.

Any 'community of practice' (e.g. a discipline) sanctions what is acceptable knowledge for that community (Wenger, 1998). Initiates are accepted when they demonstrate mastery of the community discourse. In higher education, acceptance into a particular 'academic discourse community' is dependent on one's ability to think and write analytically in that discipline (Makoni, 2000). In the world of work, for example, chemists need to demonstrate that they can write effectively to be recognised as part of that community. As Beall and Trimbur (1996: 2) state: "...chemistry is not simply a body of knowledge. It is also a community of practising chemists who need to communicate with each other". Such writing implies adherence to the principles

of extreme precision expected in science. Beall and Trimbur (1996: 6) note that chemists are expected to write in a "particular voice", in a "...tone that is precise, concise and objective".

Because many of the students at CPUT are studying through the medium of English (their second, third or even fourth language), their acquisition of a particular discourse may be particularly challenging and gradual.

Writing tends to be the favoured means of assessment in higher education (Murray & Johansson, 1992). Competency in essay writing may be used as evidence of mastering the academic discourse and it therefore follows that essay assessment may act as a gatekeeper, powerfully excluding those who struggle to master this kind of writing. Assessment of essays is particularly complex, as it is often a subjective enterprise (Luckett & Sutherland, 2000).

It seems sensible that reader response by those with a grasp of the disciplinary discourse would be helpful. However, research has shown that care is needed. I shall now discuss issues related to responding to student writing, including peer response.

3.4 Responding to student writing

Reader response to a student's writing is obviously significant in this paper, dealing as it does with guiding students through multiple drafts of essays. Such response provides writers with a sense of audience (Hyland, 2003).

According to Hyland (2003), lecturers use several forms of written feedback: comments at relevant points in the students' writing; rubrics; and correction codes (to encourage self-correction and reduce the amount of in-text marking). Each presents advantages and disadvantages that need to be considered (see Hyland, 2003: 180-183).

Irrespective of the form of response, the literature indicates that lecturers typically respond to content and, to differing degrees, to grammar, clarity and the use of the appropriate discourse (Hyland, 2003), although probably not all are given equal attention in a particular task.

Hyland and Hyland (2003) note the many inconclusive debates on writing research regarding feedback to L2 students' writing. The question is whether or not there should be error correction of language, although many L2 learners report valuing and even expecting this. Hyland (2003: 178) also discusses L1 research that has questioned whether, indeed, teacher feedback is effective: L1 students have criticised feedback as being "of poor quality", "vague and inconsistent" and difficult to understand. Nevertheless, feedback on early drafts of L2 writing apparently does help students to improve in subsequent drafts.

Negative comments on a draft may have a strong impact on a student's confidence (Hyland & Hyland, 2001) and may also affect the relationship between the lecturer and the student (Hyland, 2003). In general, many lecturers fear discouraging students by being too critical; yet a 'soft' approach may not direct the student properly (Hyland, 2003).

Peer response is worth pursuing, but with care. As part of the process, Hyland (2003: 198) describes peer response as "an important alternative to teacher-based forms of response in ESL contexts". However, Hyland (2003) also reports that students are less enthusiastic about it than lecturers. This may be because students "...may focus heavily on sentence level problems rather than ideas and organisation...(so) their comments may be vague and unhelpful" (Hyland, 2003:

198). Kasanga (2004: 86) confirms that students prefer lecturer response to peer response, perhaps because the lecturer is perceived as "the final arbiter". For this reason, students should be guided quite precisely regarding the process. For example, the purpose of peer response needs to be clarified, and rules for responding elicited from the class, with guidance by the lecturer. Hyland (2003) also recommends that, to be effective, peer response should be integral to a course rather than an isolated event.

The issue of lecturer and peer response to a student's writing is thus quite complex and needs to be carefully considered beforehand.

In the next section, I will briefly discuss interdisciplinary integration as a backdrop to our collaboration in adopting a process approach to improve student writing.

3.5 Crossing the disciplinary divide

Disciplinary expertise implies appropriate use of the discourse with others in a discipline (Hyland, 2000). However, this discourse is not usually made explicit (Bond, 1993), partly because professionals' understandings of their knowledge practices are often tacit (Schon, 1983; Eraut, 1994).

In higher education, Communication lecturers tend to teach writing, owing to their language and (often) educational background. However, they usually have a limited grasp of the disciplinary discourse and so may struggle to induct students into that discourse. The separation of the communication and content courses in most programmes has often meant that students are taught generic language competencies. This is insufficient, as these fail to take into account the particular literacy demands of a discipline. As Boughey (2005: 240) argues, epistemological access "...involves more than introducing students to a set of a-cultural, a-social skills and strategies to cope with academic learning and its products". Content lecturers are best placed to accomplish the task, but may resist the notion that they have discipline-specific literacy competencies that they can teach. Crandall (1998: 2), while understanding that content staff may lack confidence to teach writing, notes that they are best placed to do just that. Nonetheless, they may have only a tacit awareness of the literacy practices of their discipline and so struggle to share these with students. Optimally, therefore, content and language lecturers should collaborate to integrate the rhetorical and content aspects of a discipline. As Crandall (1994: 256) notes:

> Students cannot develop academic knowledge and skills without access to the language in which that knowledge is embedded, discussed, constructed, or evaluated. Nor can they acquire academic language skills in a context devoid of content.

Increasingly, researchers are working across disciplinary divides and are urging recognition of the value of doing so. Stoller and Jones (2005: 8) report on promising results of a pilot project involving collaborating chemists and linguists that aims to encourage students to value writing like chemists, and to "help move students towards becoming members of the discourse communities associated with their discipline". Rip (2002: 26) suggests that researchers "Forget about disciplines as traditionally defined ... and develop a patchwork of partially overlapping domains of knowledge production..."

I shall now describe the two collaborative interventions of 2000 and 2001 that represent our attempts to forge such "partially overlapping domain(s) of knowledge production.

4. Description of the educational interventions

In the second semester of 2000, a Chemical Engineering lecturer and I began our efforts to improve students' writing. The Shared Model, described by Fogarty and Stoehr (1991), best describes our approach. They (1991) describe ten levels on a continuum of integration, ranging from 'Fragmented', in which disciplines are entirely separate, to 'Networked', in which the learner plays a fully directive role in integrating resources. The Shared Model, falling midway in the continuum, involves disciplinary specialists planning and/or team teaching, and focuses on shared attitudes and skills. It should be noted that, whereas our integration was that of content and language domains in higher education, Fogarty and Stoehr's (1991) models refer to the integration of two content domains in secondary schools. An exploration of the significance of these differences is, unfortunately, beyond the scope of this paper.

In the second semester of 2000, the Chemical Engineering lecturer and I planned an assignment (see Appendix A). We discussed aspects such as mark allocation and stages of the process. Then, during a joint lecture, we distributed the written assignment instructions. I reminded students about academic literacy aspects covered in the first semester Communication course: note-taking techniques, brainstorming; mind mapping; research skills; and referencing of sources. The content lecturer discussed the focus areas of the assignment and discussed assessment criteria and mark allocation. Students were to submit a first draft to which both lecturers would respond; we would return that draft; thereafter, students would submit a final draft. For the remainder of the lecture, student groups brainstormed their task. A plenary session followed, allowing for queries and in-depth discussion.

Owing to work pressures, I was the first to respond to the initial draft. I used editing symbols, correction codes and comments (see Hyland, 2003). Then my colleague responded to the same draft, using comments and correction codes. We both commented on essay structure (organisation), but with different emphases: I focused on the introduction, providing internal coherence through linking cues, and the conclusion; the content lecturer focused on content logic and relevance. I also guided students regarding language usage and referencing. The drafts were then returned to students for improvements before they re-submitted their final efforts.

This final draft was assessed, the content lecturer allocating content/structure marks, while I awarded language and presentation marks. We used level descriptors to assign marks for each of the assessment criteria (see example, Appendix B).

In the first semester of 2001, I collaborated in a similar way with an Analytical Chemistry lecturer on an essay assignment (see Appendix C). In response to perceived weaknesses in the 2000 process, we made some changes, namely:

1. The content lecturer responded first to the initial draft; students revised the content; then they submitted a second draft to me. We had discovered that, if I responded first, my comments were ignored if the student had to revise content substantially in response to the content lecturer's comments.
2. Students wrote a third draft for a peer response session, during which groups of students commented on other students' drafts. We thought that reading other students' responses to the same topic might provide students with better insight into their own comparative efforts, and improve audience awareness. We did not research the practice, however, merely provided

students with basic guidelines and asked group members to read and respond to at least three other students' essays (see Appendix D).

Thereafter, students submitted a fourth and final draft. The mark allocation was adjusted to accommodate peer response (see Appendix C).

5. Research methodology

In 2000, for the purposes of this research, we compared the marks of those students who had submitted a first and final draft (see Appendix E). We did not include referencing, as students' referencing ability was limited at that stage. Plagiarism is a complex issue and beyond the scope of this paper.

In 2000, we assigned categories of language marks to facilitate comparisons between first and final drafts: a 'Weak' language mark was one of between 7 and 9 out of 20 (35-45%); a 'Medium' mark between 9 and 13 (45-65%); and a 'Good' mark between 13 and 17 (65-85%). After the collaboration of 2001, we converted the three categories of marks into four categories because, with a pass mark of 50%, this new division would indicate two fail and two pass categories (see Appendix F).

Subsequently, to establish students' impressions of the multi-draft process, students completed a questionnaire during a lecture period, so that all responses were retrieved (see Appendix G). In addition, the Chemical Engineering lecturer invited a colleague to conduct a focus group interview (see Appendix H) with representatives of the three groups.

In 2001, we compared the marks of the students' first and final drafts, again omitting referencing marks. Four categories of marks were used (see Appendix F). Following assessment, students completed a questionnaire, again during a lecture (see Appendix G). This was followed by a focus group interview led by a colleague of the Analytical Chemistry lecturer (see Appendix H).

A serious shortcoming in our methodology concerns the focus group interviews. These were not audio-recorded in either 2000 or 2001, nor the results written up formally. At the time, we were not planning to publish a paper, and we were constrained by competing time pressures at the end of each semester.

6. Findings and discussion

6.1 Comparison of marks on the first and final drafts

In 2000, using a t-test, we found a significant, albeit fairly small, increase in the majority of students' language marks across two drafts. There was a more marked increase in the students' content marks (see Appendix E). Interestingly, there was a greater improvement in both the content and language marks of students whose initial marks were low, while there was little or no change in the marks of stronger students. This supports Zamel's (1983) and the NCES's (1996) findings that skilled writers tend to spend time on revising and pre-writing activities, irrespective of the draft. One implication of this is that, if the quality of a first draft is acceptable, perhaps further drafts should be optional.

Strikingly, in 2000, the stronger students wrote both drafts, compared with only about a quarter of the weakest students. Perhaps the latter fared poorly precisely because they did not try to

improve in response to the lecturers' guidance. As Hyland (2003) reports from research into L1 students' responses to written feedback, lecturer feedback is not always supported. From one of the focus group comments, this was true of at least one of our students. Students might also have misunderstood or gone off the topic while writing. Perhaps others rushed through the task. Nightingale (1988: 278), for example, notes that "...many students still subscribe to a simplistic notion of the writing task ... which focuses on the final product and neglects the process of getting there". In a study on the impact of process writing in an EAP programme, Baijnath (1992: 69) reports that early in the writing process many students adopted "...shortcut strategies..." and lacked commitment (1992: 75). Another of our concerns was that students with queries did not always consult lecturers.

In the first semester of the following year, 2001, the Analytical Chemistry-Communication assignment was written in the first few months of the students' first year in higher education. Although some students' language marks improved from the first to the final draft, the increase was not statistically significant (see Appendix I). These language results therefore contrasted with those of 2000. A possible explanation is that, by August 2000 in the previous year, the students had completed the Communication course and studied for a further few months, so their English proficiency and writing had perhaps improved. By contrast, the 2001 students had only recently begun their tertiary studies. Another consideration arises out of the difficulties I experienced in assigning a language mark to either the first or second draft in some cases: because of the highly technical nature of the scientific language, at times I found it extremely difficult to assess whether the text that I was reading was paraphrased or plagiarised. In such cases, I gave the student the benefit of the doubt and assigned 50% for the language mark.

The content marks in 2001 were significantly better in the final draft (see Appendix I). The improvement was particularly noticeable among the group whose content marks were weak in the first draft, suggesting that lecturer and peer response had been helpful.

6.2 Students' comments and suggestions

Student responses to the questionnaire (see Appendix G) and focus group interview (see Appendix H) were gathered. These responses had to be considered in the light of the moderator's comments (to follow).

These are the key findings for 2000:

1. In response to the questionnaire (see Appendix G), students indicated that the lecturers' responses helped them to understand the content better and improved their writing ability. Some commented on their improved marks. However, they suggested reducing the length of the process.
2. In the focus group interview (see Appendix H), students reported that process writing had affected them positively, including:
   - 2.1 Improved language proficiency.
   - 2.2 Recognition of the importance of effective communication skills in the science workplace.
   - 2.3 Improvement in their writing generally, attributed to brainstorming, mind mapping and revisiting essays.
   - 2.4 A better understanding of writing techniques to guide the reader: using headings and subheadings; capturing the reader's interest in the introduction; and using a thesis statement to prepare the reader for the content to follow.

2.5 Improved content knowledge: the content lecturer's comments often necessitated a return to source material, resulting in deeper knowledge.

A negative comment by one student was that he had not always understood the comments made by lecturers on his essay. This echoes Hyland's (2003) comments that students report that they do not always understand lecturer feedback. Another negative comment concerned the time involved in the process as this affected time available for completion of other work.

These are the key findings for 2001:

1. The questionnaire generated similar points to those in 2000: the process had been beneficial, their writing and understanding had improved; and their marks had mostly improved. However, students expressed the same concerns about the number of drafts and their workload.
2. In the focus group interview (see Appendix H), students were generally positive:
   2.1 Peer response (not used in 2000) received favourable comment. Students confirmed that this had been helpful as they were able to interact with other students about their writing.
   2.2 Regarding their ability to find and use information, students said that because their lecturers had guided and encouraged them, they had improved their ability to access and use less obvious sources of information, such as further references and industry sources. After this, their marks had improved dramatically.

Students' negative comments were similar to those of 2000. In particular, the even greater number of drafts was a major concern.

6.3 A moderator's observations

In 2000, the essays were not moderated. In 2001, the moderator for Communication commented on comparisons between the first and final drafts. In the latter, she noted that content had "...more detail and depth than the first draft ... more examples and is generally 'richer' and more thoughtful". Despite no statistically significant language improvements in terms of marks, the moderator considered that there was more evidence of students trying to improve their grammar in the final draft. Students were self-correcting in response to editing symbols; and there were fewer "...concord, tense and other common second-language errors" in the final draft than the first: "...probably the most dramatic area of improvement". She noted, though, that students had a limited general vocabulary, resulting in long, awkward sentences. She also noted some 'fossilised' students who had not apparently responded to guidance. In spite of the positive aspects, students' mastery of the formal, scientific discourse had not apparently improved, even though their technical vocabulary was adequate. She expressed the view that this indicated an area requiring guidance by the science lecturer.

The moderator's comments regarding language improvements for 2001 contradict the overall findings. This is difficult to explain. The moderator responded to approximately one-third of the total scripts. It is possible that she examined and compared the first and last drafts more closely than I and noted areas of improvement that I failed to notice when assigning marks for language.

Also, in my experience, language assessment is fairly subjective, even though two assessors may work from the same level descriptors.

6.4 Our reflections

From what we learned about responding to student writing, there are a few points worth highlighting:

1. The sequence and nature of response

Firstly, as mentioned earlier, only the content lecturer should respond to the first draft. Once the content is acceptable, the language lecturer responds. As Zamel (1983) notes, ideas and meaning must be revised first; editing can occur later.

Secondly, lecturers should agree on the form of their response to student writing, such as the use of correction codes, comments and tone (Hyland, 2003). Correction codes need to be discussed with students, preferably before the drafting begins. Perhaps from a desire not to interfere in each other's pattern of responding to writing, my colleagues and I did not discuss this. Consequently, in 2000 we probably confused students when we both wrote 'C' in the margin. We did not immediately discover that we had done this. For me, 'C' indicated 'Concord error'; for my colleague, it indicated 'Condense'.

The depth of comment should also be considered (Hyland, 2003). Detailed comment requires much time and patience. In retrospect, our comments were possibly too brief, terse or uninformative. For example, a content lecturer wrote, "You haven't responded to the topic!", or I wrote, "Totally unclear". Instead, "Have you responded fully to all aspects of the topic?" and "Is this clear?" would certainly be more motivational. Throughout an essay, lecturers' questions should direct and motivate students to reflect on their efforts, and revise them.

Thirdly, if peer response is to be helpful, this should not be a once-off occurrence, as in our case, but part of an ongoing practice (Hyland, 2003). It should also only be used after fully briefing students about the practice and reaching agreement about how it should be implemented.

2. Time constraints

Responding to multiple drafts is time-consuming and yet cannot be condensed unreasonably. In addition to the reader response time required, Pastoll (1992) has indicated that students require time to reflect on comments. They may also need consultation time. The lengthy process has raised concerns among lecturers. Large student numbers, the time required to write detailed responses, time for moderation and due dates for marks compound the pressures. Collaborative planning and ongoing coordination are also time-consuming.

The following suggestions may address some of these concerns:

1. Reduce the total number of major assignments; include shorter, formative activities so that students practise writing to express and clarify ideas. These tasks need not all be formally assessed.
2. Use a numbered statement bank or response sheet, comprising detailed comments. This would limit the time required to write comments on the assignment. It could also be used by the student ahead of submitting a draft. De la Harpe and Radloff (1996) report positive results from such a system: students rated the sheets as highly helpful; and lecturers' concerns that multiple drafts would increase their marking load were dispelled.
3. Use writing tutors to provide formative feedback on aspects such as structure, language and referencing of sources.

7. Conclusions

The deadline- and results-driven atmosphere that pervades much of higher education today seems to militate against the role of writing in the development of students' critical faculties

and their identities as members of a discourse community. Henning and Van Rensburg (2002: 82), who draw on Ivanic's (1998) work on the role of writing in developing academic identity, criticise the 'pragmatic and functional curricula' that dominate in our universities. In such a situation, lecturers tend to see under prepared students as 'unable'. In response, students merely comply with demands for academic writing out of necessity, seeing writing as a barrier to their success.

Process writing offers a response to this situation. In our attempts to improve students' academic writing, we endeavoured to focus not only on form, but on the process, the content, the audience, the context and the purpose. By providing students with opportunities to revisit and improve upon their earlier writing, we tried to diminish the impact of the gate keeping role of essay writing. Through our intervention, we have learned that a collaborative form of process writing at first-year level offers underprepared students in particular, and all students generally, the opportunity to deepen their understanding of the discipline that they are studying, while writing multiple drafts provides them with practice in the complexities of intertwining the language and concepts of their discipline.

Our study indicates that content may improve more readily than language aspects. However, marking is a highly subjective enterprise, so there are uncertainties involved in comparing results across drafts. Influences on results are also uncertain: the nature of lecturer response may play an enormous role, as may the students' motivation level and pattern of responding to assignments. Most importantly, perhaps, the level of a student's English proficiency may influence not only what a student understands, but also the expression of that understanding in a written task. As Hyland (2003: xiii) reminds us, "Learning how to write in a second language is one of the most challenging aspects of second-language learning".

Implementing a process approach to improve student writing may involve challenges and disappointments, yet the choice of whether writing becomes what Shay, Bond and Hughes (1994: 20) term 'a bridge' or 'a gate' to success, both in the academy and beyond, depends on how we, as content and language academics, work together to address this challenge.

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APPENDIX A: 2000 Chemical Engineering Assignment, including Assessment Criteria

Peninsula Technikon
Department of Physical Sciences
Chemical Process Industries II

PROJECT 1: SO_2 CONVERTER DESIGN

Date: 29 August 2000

TOPIC
Write an essay in which you fully discuss, describe and illustrate the ways in which the problems related to chemistry and physical conditions are overcome in the design of an actual SO_2 converter used in sulphuric acid synthesis.

SOURCES TO BE CONSULTED
You are required to consult (and refer to within and at the end of your essay) at least one journal article and one other source, excluding the notes that you have taken in class.

LENGTH
Excluding illustrations, your essay should be approximately three pages long.

DUE DATES
This essay will be written in two stages. The first draft is due at 11:05 on 5 September. Your lecturers will have this draft for one week and return it on 12 September. The final draft is due at 11:05 on 19 September.

EVALUATION
This project counts 8% towards the total mark for the course.

The mark allocation will be as follows:

First draft:	5
Content:	50*
Language:	20
Structure:	10
Referencing:	10
Presentation:	5
TOTAL:	**100**

MARK BREAKDOWN

* Notes on Content

- Students are required to cover adequately all the factors mentioned in the accompanying lecture
- Particular problems should be related to their particular solutions, e.g. "The fact that the reaction is exothermic would necessitate the use of ..."
- Students should demonstrate understanding of the material covered.

APPENDIX B: Assessment criteria with level descriptors used for content assessment

Mark awarded	Content
75-100 %	Accurate, detailed, no errors, excellent, original, insight shown
70-74 %	Very good, interesting, subject well-covered, a few points left out
60-69 %	Fairly accurate and detailed, few errors, material/ subject well covered, but not remarkable
50-59 %	More accurate than inaccurate, acceptable but superficial; only obvious points present/
40-49 %	More inaccurate than accurate, unacceptable, thin, insufficient material/ information, unconvincing
30-39 %	Did not understand the topic, many inaccuracies
0-29 %	Totally unacceptable, little or no relevant content

Source:
Adapted from: Wright, J. (2000) *An Integrated Course: Communication Skills and Chemical Engineering.* Bellville: Peninsula Technikon, pp. 5-8.

APPENDIX C: 2001 Analytical Chemistry essay

FACULTY OF SCIENCE
ANALYTICAL CHEMISTRY & COMMUNICATION SKILLS

ESSAY TOPICS 2001

CORE READINGS:

1. Any General Chemistry textbook.
2. Any textbook on Introductory Analytical Chemistry, e.g. prescribed text by Skoog, West and Holler, 7th edition.
3. Any Encyclopaedia e.g. World Book.

MARK ALLOCATION:

Content	50%
Language	20%
Referencing	10%
First draft and essay outline	10%
Peer editing	5%
Presentation	5%
Total:	**100%**

TOPICS: Write an essay of between 500 and 600 words on ONE of these topics:

1. Describe the role that analytical chemistry plays in one or more of the following areas / fields or industries:
   (a) agriculture
   (b) the food industry
   (c) the mining industry
   (d) the energy or power industry
   (e) the pharmaceutical industry
   (f) a medical field
2. Acid rain has been a subject of considerable controversy over the past two decades. Discuss this pollution problem and its effects on our environment.
3. Since the mid-1970s, chemists and atmospheric scientists have extensively studied the depletion of ozone in the stratosphere. Discuss the effect of global ozone depletion and explain why it is of major concern to both chemistry and health science communities.
4. Mercury and its compounds have many useful applications. However, its toxicological effects have been known for many years. Discuss this unique metal, highlighting its advantages and disadvantages.

PRESENTATION: Follow the guidelines given to you. There must be a cover page.

FIRST DRAFT AND OUTLINE: You will be expected to hand in a first draft so that your lecturer can give you advice on how to improve your essay. You will be awarded marks for this draft.

PEER EDITING: Note well: Your essay should show evidence (changes on pages, editors' signatures, legible names and the date of editing) that it has been edited by AT LEAST THREE peers (class mates) BEFORE you make final changes to it. You have to hand in this edited essay WITH your final essay (no late edited essays will be accepted). You will receive a mark for correct evidence of peer editing.

DUE DATE: You will be given due dates for the first draft and the final draft in class.

APPENDIX D: Peer assessment guidelines and criteria (2001)

PEER FEEDBACK ON DRAFT

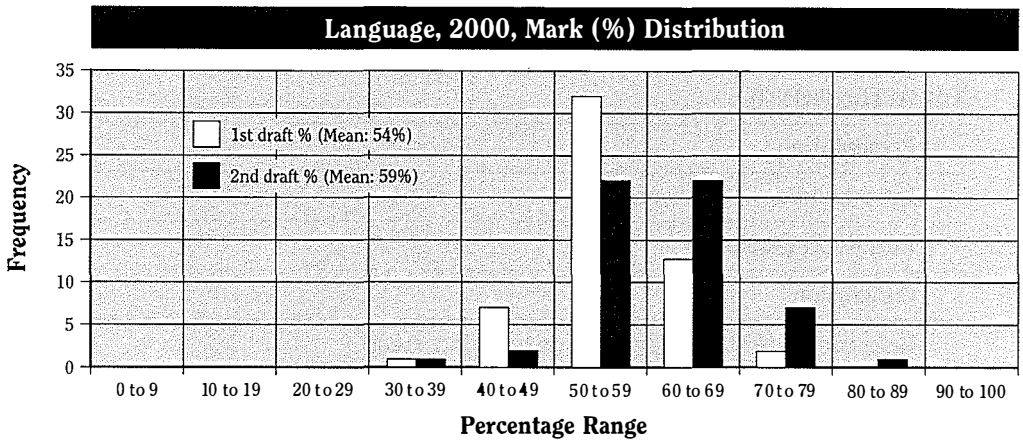
1. PRESENTATION, STRUCTURE and REFERENCING

PAY ATTENTION TO:	✓
Presentation	
Introduction	
Purpose statement	
Conclusion	
Referencing (In text/end of text missing/incorrect)	
Referencing must be on separate page at back, before article	

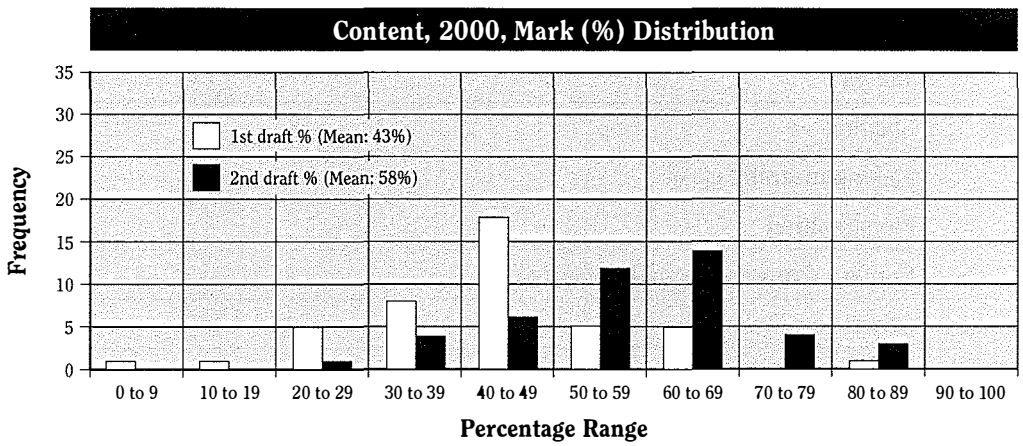
2. MEANING AND CORRECTNESS

PAY ATTENTION TO:	✓
Tenses	
Spelling	
Making meaning clear	
Paragraphing	
Content – more information needed	
Other:	

APPENDIX E: 2000 Language and content comparisons across drafts: Chemical Engineering



A t-test shows that the increase in the mean is significant



A t-test shows that the increase in the mean is significant

APPENDIX F: 2000 and 2001: Groupings for comparison of drafts

1. 0-30%
2. 31-50%
3. 51-65%
4. > 65%

APPENDIX G: Questionnaire on the writing process

Respond to each of the following statements by circling a number after it.

1 – Strongly disagree
2 – Disagree but there are exceptions
3 – Undecided
4 – Agree but there are exceptions
5 – Strongly agree

1. Handing in more than one draft was helpful/beneficial to me

   1 2 3 4 5

2. Handing in more than one draft led to better marks for my final draft.

   1 2 3 4 5

3. The entire process takes too long.

   1 2 3 4 5

4. The feedback on the draft given by the Communication Skills lecturer was helpful.

   1 2 3 4 5

5. The process approach to writing improved my writing ability.

   1 2 3 4 5

6. The process approach to writing led to my understanding the course content better.

   1 2 3 4 5

7. Handing in more than one draft is a waste of time.

   1 2 3 4 5

8. The feedback time of several weeks is appropriate.

   1 2 3 4 5

9. I understand what the benefits of the process approach to writing are.

   1 2 3 4 5

10. Three drafts before the final draft are necessary.

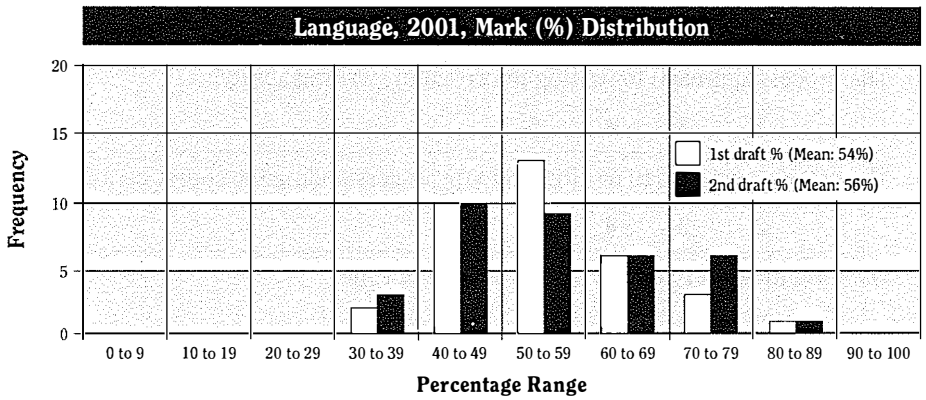
    1 2 3 4 5

Are there any further comments on the process approach to writing as used in this course?

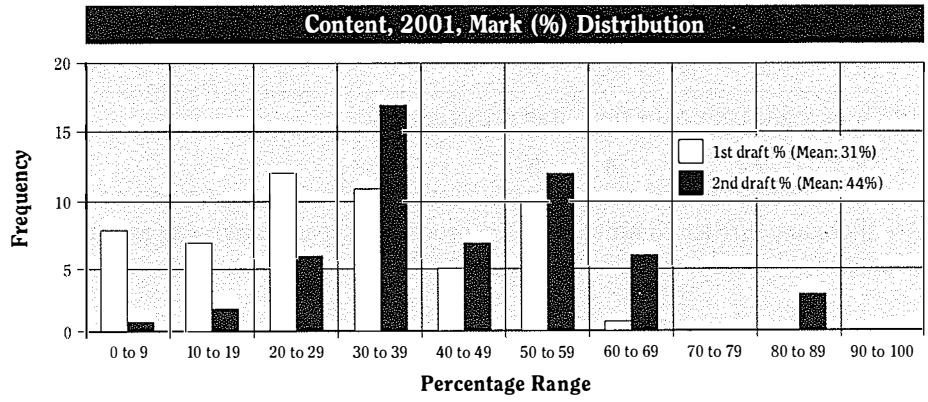
APPENDIX H: Planned focus group interview questions

1. Did you find that having the opportunity to hand in more than one draft of the assignment helped you? Why?
1. Were you satisfied with your marks in the final draft?
2. Could you comment on the amount of time that the whole process took, from first to final draft?
3. What did you like about the feedback that you received from the two lecturers? What did you not like?
4. Do you think that your writing ability has improved through the process approach? Why?
5. Do you think that your understanding of the content improved as a result of the feedback that you received? What did you do to improve the content in the final draft?
6. Are there any other comments?

APPENDIX I: 2001 Language and content comparisons across drafts: Analytical Chemistry



A t-test shows that the increase in the mean is not significant



A t-test shows that the increase in the mean is significant