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CRITICAL ENGAGEMENT THROUGH WRITING (CEW)

USING WRITING TO PROMOTE CRITICAL THINKING IN LARGE CLASSES

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INTRODUCTION

Critical Engagement through Writing (CEW) is a South African adaption of Writing Intensive (WI) teaching, which means the foregrounding of critical thinking within a particular course and the finding of ways to help students learn to learn. In South Africa, such an approach means a radical rethinking of the relationship between language staff and disciplinary staff and, more importantly, the recognition and formalisation of a pedagogy that teaches students to think through writing within the discipline. Based on the premise that writing and thinking is specific to a subject discipline, writing thus becomes the means of delivering course content. A CEW approach is usually an adaptation and formalisation, rather than a completely new invention. Features of CEW are not necessarily unfamiliar or absent from existing courses. Rather the approach seeks to adapt existing courses and make explicit and enhance features that use writing (we include reading, summarising, talking, questioning, comparing, and other forms of active learning in the concept of writing) in order to attain the critical thinking skills that a particular course aims to teach.

BACKGROUND

The Writing Intensive (WI) approach developed from the Writing Across the Curriculum approach (WAC), which emerged during the 1970s, and the Writing in the Discipline (WID) approach of the 1980s. The common principle underlying all three is an inclusive pedagogy that promotes the practice of writing as learning and thinking within disciplines. Rather than viewing writing as simply a tool for recording and testing, it employs writing to learn techniques; writing for real communication; writing for different audiences and for different purposes; and writing as revising, so as to think further. WAC began with the work of James Britten and his colleagues at the London School of Economics from 1966 to 1976, and has since become a mainly American approach based on an understanding of the need to give students the opportunity to learn to use writing as a tool to teach themselves. WI teaching at American universities

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is a contemporary and widespread way of formalising the teaching of writing within disciplines (Bazerman & Russell 1994; Martin, D'Arcy, Newton & Parker 1976; Temple University Writing Center nd; University of Missouri (UM) Campus Writing Program nd).

In order to frame and develop this pedagogical approach for a South African university audience, it has been renamed Critical Engagement through Writing (CEW). The renaming was considered necessary to communicate the central ideas of the pedagogy and to overcome the fears of overworked lecturers that it would add further to their workload, as implied by the term 'writing intensive,' especially if they only understood writing as grammar and editing. Adapting the pedagogy to the South African context was also necessitated by the fact that tutors and students at South African institutions lack the cultural grounding in WAC that may be assumed at American universities. The South African context is characterised by large, competitive classes taught by a single (overworked) lecturer, few if any tutors, and a lot of material to cover. This chapter will argue that the CEW approach offers an effective response to the practical reality of large classes and that it can successfully engage all students and help them to develop the necessary skills to learn to enquire, think together, and learn to learn. Having said that, CEW is obviously not a pedagogy for large classes only. Our point is rather that it can be put to effective use in large-class contexts, enabling academic staff to deliver quality courses that encourage the development of responsible, critical students.

Dr Nichols will first discuss some of the challenges of introducing this approach at South African institutions, including negative assumptions about CEW and the challenge of accommodating it within existing institutional culture. Dr Brenner will then show how CEW developed from a collaboration between the University of the Witwatersrand (Wits) Writing Centre and School of Molecular and Cell Biology and how it proved a successful pedagogy for working with large science classes (180 to 500 students) and established itself as an attractive option for universities across the country. The paper so mirrors the collaboration between language and subject specialist: the language specialist introduces the principles and strategies; the subject specialist translates this approach and applies it to learning within the discipline and the specific teaching context (which is often the large lecture room); and finally, both language and discipline specialist work together towards formalising the intervention.

SHIFTING ASSUMPTIONS

The introduction of CEW necessitates the shifting of a number of assumptions. Foremost among these are assumptions about the nature of writing. CEW is based on the linked premises that writing is thinking, and that writing can be used to promote critical thinking. It jettisons the idea of writing as 'packaging' – the use of impressive-sounding sentences and an extensive vocabulary (Bean 2001:16) – in favour of understanding writing as logical, situated sense, communicated effectively to the intended audience. As the specific, situated language of the discipline is new to all students, a native English-speaking student may not necessarily have an advantage. A 'writing-as-packaging'

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approach, in contrast, would go straight to something like subject-verb agreement and trip up a novice and/or English as an Additional Language (EAL) student, so fetishising language at the expense of learning to make meaning. CEW recognises the need to rehearse and clarify thought, to practise reaching particular audiences before achieving proficiency. A CEW approach creates the opportunity for students to think, try, make mistakes, write multiple drafts, and think again – in other words to learn how to learn in the discipline. By virtue of being based on the assumption that writing is thinking, a CEW approach treats all students as novices on their way to mastery.

A second assumption that needs to change, particularly in South Africa, relates to authority and power relationships in the classroom. A CEW approach is radically different from the lecture transmission mode, which presumes that the lecturer always knows best, so students should just sit still, listen and try to write down what the lecturer is saying. Instead, it aims to create a buzz in the classroom to stimulate all students to look for answers and so promote multiple nodes of meaning-making within the classroom. A CEW approach typically involves working through problem-based assignments designed to help students discover course content themselves, rather than acquiring it directly from the lecturer, and short, open-ended questions posed to the class during contact periods or short in-class writing exercises that allow for multiple answers. Writing and class discussions are used as a means to identify, construct, compare and evaluate arguments. When students are trained to reason and adequately justify their claims, they also learn to write in an academic, thesis-governed way, avoiding what Bean (2001:21-23) refers to as “data dump”, “and then” or “all about everything” writing. CEW supports the principles of enquiry that are crucial to all disciplines, especially science. Learning the habits of skilled enquiry means learning to see problems that are not immediately obvious, form interesting questions, and scientifically, and often collaboratively, explore and construct answers. These critical thinking skills can only be acquired through a type of teaching that assumes that there is no single correct answer or authority in the classroom. CEW rather encourages students to work through multiple interpretations, discover and analyse sources of knowledge, and reason within a context of dissonance in order to arrive at an answer or claim for which they can convincingly argue. In short, CEW helps students to learn how to think like discipline specialists.

A third obstacle to the introduction of CEW is the notion that it always implies a complete change in a lecturer’s approach to teaching. This is not necessarily true, because lecturers who are attracted to CEW often already include CEW elements in their teaching, for example active learning, problem-based thinking, and an emphasis on the processes of thinking through the use of exploratory writing exercises that scaffold the thinking skills required by the course. Implementing a CEW approach may therefore simply involve including an additional CEW element in an existing course. For example, some lecturers might choose to just add a weekly exam journal requirement, meaning that students practice answering a possible exam question every week. No one feels that they are wasting their time; no irrelevant content has been

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added; and the students will gain through regularly writing and thinking about the questions and issues of their course. Another simple addition that produces excellent results is a requirement to write regular summaries or critiques of relevant readings. These small additions immediately contribute substantially to the critical engagement of students with the course content.

At a minimum, CEW involves a course design emphasis on assignments rather than lectures, and some combination of 'low-stakes' and 'high-stakes' writing (Elbow 2000). The latter refers to the inclusion of both short, informal writing assignments designed to promote exploration and further thought, and formal developed writing, such as essays and reports. Low-stakes writing typically forms part of the formative assessment component of a course, while high-stakes writing forms part of the summative assessments. In both cases, writing is both a product of critical thought and a way of measuring it.

CEW methods will resonate with lecturers who are interested in processes of thinking, and when these lecturers collaborate with likeminded colleagues, they can formalise the characteristics they deem most appropriate for their institution.

As mentioned previously, the American term for CEW courses, 'writing intensive', has disturbed South African lecturers, who tend to assume (correctly) that it means extra work and that writing should be taught by other people. In 2004, when WI principles were presented with documentation to a Senate Teaching and Learning committee, the main principle was completely misunderstood. Members of the committee, despite the international documentation in front of them, assumed that WI meant the teaching of writing *outside* of disciplines. Their inherited institutional and cultural knowledge (see Jansen 2009) meant that what was written in black and white was read as its opposite. 'Embedded knowledges' (*ibid*:178-179), habits, and perhaps a focus on who was speaking rather than what was being said, meant that the words and their meaning fell on contrary ears. Seven years later, using many of the same foundational documents, these ideas have been put into practice by subject lecturers at Wits and elsewhere in South Africa. Perhaps there was a need to introduce theory after practice. In many ways, sustaining such a new teaching method requires an evolution in the possibilities of institutional culture.

The authors of this paper believe that this evolution will happen once a significant number of subject lecturers – those working within the disciplines, and so within the core business of the university – have embraced the method. Change and development have to occur in the cultural domain, because new teaching theories often get lost in translation and the process of assimilation into existing habits, relationships and conditions (Boughey 2011; Nichols 2011; Thesen & Van Pletzen 2006).

In light of the challenges described above, the authors of this paper felt compelled to rename and reframe WI for a South African audience so as to remove the personal and institutional reservations of lecturers and institutional decision makers. We therefore

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coined the acronym CEW in order to clearly frame this pedagogy as a method for transmitting the key concepts and habits of thinking required by a particular course. CEW will not suit all lecturers, but for many it can be a revelation about how to engage students and re-engage themselves with what constitutes good thinking and writing in their discipline. For many lecturers, CEW can result in renewed enthusiasm for teaching.

Eventually, there will be a need to look at ways of providing institutional and financial support for such teaching, including teaching remission for CEW lecturers; increasing the number of trained and monitored discipline tutors; forming faculty-owned committees to define and recognise, and evaluate and monitor CEW courses; and running formalised workshops or retreats where existing courses may be adapted (see Fulwiler 1984; Rutz 2006; Temple University Writing Center nd; UM Campus Writing Program nd).

CEW IN LARGE SECOND-YEAR BASIC MOLECULAR BIOSCIENCES CLASSES AT WITS**Background**

The initial development and subsequent evolution of the CEW model, as a South African version of WI, was the product of a collaboration between Dr Nichols of the Wits Writing Centre (WWC) and Dr Brenner of the Wits School of Molecular and Cell Biology (MCB). In 2004 – the same year that the Senate Teaching and Learning committee misunderstood and refused the idea of WI courses – Dr Brenner approached Dr Nichols to help improve the writing of the 210 students enrolled in the second-year Basic Molecular Biosciences (BMB II) course, at that time a co-requisite for all the major courses offered at the school. The motivation for including some scaffolded writing tasks into the BMB II curriculum centred around the premise that, while scientists need to communicate their findings in peer-reviewed journal articles, it is often the case that students who choose to study science are not particularly interested in writing or lacked writing ability at school. Although writing is obviously a requirement in terms of the exit outcomes of a science degree, it generally does not feature in the earlier years of the curriculum, as lecturers are reluctant to increase their already excessive workloads. The thinking was that it would not be sufficient to simply set a number of writing assignments for the class in the hope that this would somehow result in writing competency in the discipline, but that the students should be explicitly taught to write within the context of the discipline, rather than being taught to write as an ‘add-on’ to the course.

In response, Dr Nichols suggested that they go even further, changing the writing focus of the course to incorporate the principles of WAC, WID, and WI. This resulted in an immediate paradigm shift, from simply trying to teach students to learn to write, to using writing to learn (Emig 1977). Consequently, the course as a whole was reconsidered so as to use writing to deliver course content, while assignments and exercises were designed to teach the critical thinking skills demanded by the discipline.

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Of course, once the course was rewritten, there remained the challenge of delivering it to large classes ...

Strategies

The first challenge was that a WI approach requires institutional support; the second, that it presupposes that either class sizes will be manageable, or if not, that they will be assigned a large number of selected, trained and appropriately supported tutors. Townsend suggests that the instructor-student ratio should be no less than one to fifteen or twenty – as do most American WI programmes (Marty Townsend 2002; MU Writing Program nd; Temple University Writing Center nd) – but also emphasises the need to respond to the exigencies of the institution. However, given the large size of the class where the WI approach was to be introduced, and the fact that there was absolutely no school or faculty support, or even a reduced workload for the lecturer concerned to facilitate the implementation of the formal writing aspect of the course, it was necessary to adapt the principles of a WI approach into a South African model that would be viable within the given circumstances.

The first strategy was to create a cohort of selected, trained and subject-specific CEW tutors.

CEW tutors

During the first year, the MCB lecturer was supported by the WWC director and writing consultants. Plans were put in place for each consultant to be assigned a group of ten to fifteen students, so that she/he would mark and provide feedback on each assignment, and track the development of each student in the group throughout the year. This was deemed the most sensible way of achieving the low staff-to-student ratio advocated by Townsend, particularly since the writing consultants were familiar with the principles of argumentation that would form a strong focus of the formal, high-stakes writing assignments.

There were, however, some practical problems with this arrangement. The most crucial was the fact that the writing consultants, who for the most part had degrees in the humanities, were not familiar with the scientific content. This was soon discovered by the students, who quickly learned to write reasonably well-constructed assignments with fabricated content, which meant that assignments were not contributing to their learning in the discipline. In order to address this shortcoming, in subsequent years selected postgraduate MCB students have been trained by the WWC to act as 'writing fellows', while at the same time being able to assist students with problems they might encounter with conceptual understanding in the discipline. Even more recently, students in their honours (4th) year of study have also been trained to become writing fellows. This has served a dual purpose, because the writing fellows report that their own writing and critical thinking skills improve during the process of assisting with the course and evaluating the formal writing assignments of first- and second-year students. With regard to marking and assessing assignments from large numbers of students, writing

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workshops, lasting about three hours each, have been instituted, so that the honours and post-graduate student assessors can be guided by the lecturer who has set the assignment. This arrangement has also served the dual purpose of teaching them how to critically evaluate the writing of others and creating an opportunity for them to consult with their peers. Peer group discussion also assists in norming the marking and highlighting the features of particularly strong or weak assignments.

As may be seen from the above, CEW tutors not only need to be carefully selected and trained, they also need support in the form of regular feedback and reflection. For this reason alone we believe that lecturers teaching a CEW course should, at a minimum, be credited with teaching two courses. (In fact, a separate class could even be created for CEW tutors, where they could attend a parallel seminar that reflects and sustains and develops the main course, in the process developing the tutors as both writers and future lecturers.)

Time

Another challenge was finding the time to introduce the principles of CEW to large groups of students simultaneously and initiate them into thinking critically within the discipline. A couple of practical periods, each allocated three hours of contact time, were set aside at the beginning of the year for large-class writing workshops, and a number of lecture contact periods were also set aside for feedback and preliminary writing sessions. A problem with the feedback sessions – one that has dissuaded other South African academics from following a purely WI approach, as implemented at the University of Missouri (MU Writing Program nd) – is that most science courses have a large amount of content to cover, which means that the time allocated purely to assignment feedback during lecture content periods could potentially compromise the lecturer's ability to adequately teach the content. CEW tutors, working with small groups of students in workshops, offer a way to provide immediate and multiple feedback. (Also, it will be noted below that the feedback need not be extensive or time-consuming.)

CEW tutors and formative development and assessment in workshops

The undergraduate workshop scenario has worked extremely well. During the course of an afternoon, the lecturer is able to introduce conceptual and broader issues to the class in general, after which the honours or postgraduate students (who act as teaching assistants) lead small breakaway group discussions. This strategy affords the undergraduate students the opportunity of actively participating in tasks in small groups and in a safe environment, where they receive input from their peers as well as immediate feedback from the teaching assistant who has been assigned to the group.

The activities for the afternoon have to be very well planned. Another lesson learned is that the teaching assistants have to be well prepared and well trained in both small-group teaching and the basic tenets of the CEW pedagogy, so that, rather than trying to get their own points of view across, they provide the students with opportunities to

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think and explore ideas and encourage them to do so (Murray 1979). The success of the workshop approach has also been due, in large part, to the close collaboration between the writing and subject specialists during the preparation stage. While the writing specialists are able to suggest and guide some of the writing teaching strategies, it is the subject specialists who are able to model and teach their way of thinking in the scientific discipline to the undergraduate students.

The key to the success of the writing workshops therefore seems to be the combination of relevant, practical formative assessment writing tasks, assistance provided by senior student monitoring, opportunity for discussion, and immediate feedback provided by the student assistants and/or the lecturer on each of the writing and evaluation tasks. As these tasks could, in writing theory terminology, be considered as low-stakes writing (or informal and exploratory writing) (Elbow 2000; Bean 2001), they are non-threatening, while the relaxed environment allows for maximum participation and learning. In addition, the provision of immediate feedback means that the assessment of each task is meaningful to each student (Gibbs & Lucas 1997) and does not require hours of marking time from a lecturer. Moreover, the workshop format has been shown to work successfully in very large classes (up to 350 students).

This workshop scenario is familiar to lecturers who work with large classes and tutors. As mentioned, CEW is about the adaptation and enhancement of an existing teaching strategy, rather than a completely different alternative. These workshops are integrated into a CEW-designed course in order to allow time for practice and to provide feedback on tasks that require the specific critical thinking skills desired in that part of the course. They are a familiar supplement to traditional lectures and are organically integrated into a course that uses writing to teach critical thinking within the discipline. Students are not being told what to think, but learning how to think, with the participation and guidance of their CEW tutors. Authority is not imposed from above, but disseminated and developed in each group of students working with their tutor.

Audience awareness, revision and regular practice

It is of crucial importance that learning to write in the discipline involve opportunities for revision, regular practice and audience awareness, so that writing comes to be understood as thinking clearly in order to get a particular message across to a particular audience. One of the writing workshops designed for second-year students focused on addressing the concept of writing for different audiences. In this context, they were required to free write about a given topic for themselves first and a friend next, and then for an evaluator (see Nichols 2009). In this way, the students were introduced to the effect of writing to different audiences on the generation of thought; the concept of producing multiple drafts before a final copy is submitted for assessment; and the importance of reading their written pieces aloud to a peer as a revision strategy.

Inculcating the practice of writing multiple drafts and self-correction in students is of particular value, because unless this idea is made explicit early on in a course,

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lecturers generally receive the first (and only) draft of a piece of written work to assess. Given the proper continuous instruction, students can learn to assess, improve and develop their own writing. In order to facilitate self-evaluation of their writing, the BMB II students were taught a quick way of evaluating proficiency in texts during the first workshop of the year. The criteria for judgement were ‘audience’ – whether the text reached its target audience or not; ‘argument’ – whether the text contained a clear thesis and made a convincing case for this thesis or not; ‘evidence’ – whether the argument was substantiated by convincing evidence or not; and lastly ‘mechanics’ – whether the language used impeded or facilitated meaning. (This component was introduced by Dr Nichols, the director of the WWC, which again emphasises the value of collaboration in the development of the CEW model.)

In order to get students to write and think further outside of contact periods, they were encouraged to write to one another on the WebCT (the learning management tool used at Wits) discussion forum. Since this was obviously low-stakes writing, students were advised to concentrate on expressing their thoughts and interacting with one another on this forum, and not bother about using perfect English. Students were assigned marks for participation and for being able to explain both what they understood and which concepts they found difficult. Many students used ‘SMS-speak’ and colloquial language, but as this writing was supposed to be aimed at an audience of their peers, rather than the lecturer, they were not penalised for this. The object of the exercise was for students to engage in discussion with their peers in order to reach clarity, so that, at a later stage in their thinking, they could reframe their thoughts for a more formal audience.

The teaching of argument

Being able to identify the argument or thesis in a piece of writing is crucial to critical reading and writing in the discipline. This skill was developed through in-class exercises. During the very first week of the university year, the students were introduced to the necessity of recognising and evaluating argument or claim, as well as supporting reasons and evidence, in a published article (Booth, Colomb & Williams 2003). They were then asked to examine different and varied pieces of scientific writing and to write down the main claims in their own words, firstly as if writing for themselves, then for a friend, and finally using more formal language, using the audience exercise described above (with which they were by now familiar). Students were then asked to read their statements to the person sitting next to them, and then to the group for discussion. This exercise helped them gain confidence in summarising the central theme(s) of an article in their own words, rather than changing the original words one sentence at a time. As such, it was also invaluable in helping them to circumvent plagiarism.

The recognition and evaluation of argument is also a vital aid to memory. The idea that every text or discourse contains a claim or thesis was consolidated in a study skills exercise that required students to recall the main theme and sub-themes (without trying to fill in any details) of every lecture immediately after the contact period. They were

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also made aware that when taking notes during lecture sessions, they should try to identify these elements and make meaning of what is being taught, rather than attempt to write down every word a lecturer utters.

Features of scientific writing

Scientific writing has some specific features for students to learn. For example, students often struggle to differentiate between the task words 'describe' and 'discuss' in formal assessments (Brenner 2009), yet, it is essential that science students be able to make this distinction when reporting and discussing scientific findings. One strategy that proved very effective for showing students how to differentiate between the two concepts, was to ask students to first describe a very distinctive hairstyle, and then discuss it. This simple exercise yielded very positive feedback from students. In keeping with the principles of CEW, students were asked to volunteer to read their descriptions and discussions to the class. In responding to the discussions, the lecturer was able to point out the characteristic features of and differences between a description and a discussion, and to emphasise those points that should be included in a discussion in any writing task, for example, explanations and opinions, etc. For science students, this exercise can be extended by asking them to convert what they have written into what they feel would be good scientific language. Their responses can then be used to demonstrate that the scientific writing genre should be clear, unambiguous and succinct, and, while having a distinctive style, need not be full of unnecessary jargon.

This exercise was also incorporated into workshops specifically designed for the 500 first-year students registered for Introductory Life Sciences (ILS) at MCB in 2010 and, due to its success, has been retained and used every year since. In another of these workshops, students are shown the importance of enquiry in the scientific method, and the value of formulating good questions and discovering how one might attempt to answer them. The focus of this particular workshop is on 'asking and answering questions', with reference to the scientific method (research questions leading to a hypothesis) and types of arguments (deductive and inductive). Students are also shown how to apply Biggs' SOLO taxonomy (Biggs & Collis 1982), in order to make them aware of the value of higher order thinking in writing extended responses to questions.

Discovering the rules of the discipline

Students are also taught how the report form works, rather than simply accepting it as a given. One second-year workshop was designed to teach students to write scientific reports by letting them discover from published scientific papers the different sections that comprise a scientific report, what is required in each section, what language is used in each, and how results are reported and discussed. This includes showing them how to write legends for figures, how to reference, and how to write an abstract. Once again, in order to accommodate the large number of students, this workshop used the same format as the ones described previously, where much of the discussion occurred in breakaway groups led by trained teaching assistants.

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This principle of discovery rather than instruction was extended to experimental design. Students were presented with an obviously badly designed experiment and asked to complete a written tutorial in breakaway groups during class. The tutorial required them to identify the problems inherent in the experimental design and suggest ways to improve it. This was followed by a panel discussion on their findings, chaired by the lecturer, to sum up the various group discussions and conclusions. The panel consisted of a selected spokesperson from several randomly selected groups, and comments were encouraged from the floor. Interestingly, after this particular contact session, students continued their discussions on the learning management system for more than three weeks. This emphasised the students' level of engagement and critical thinking, which was probably far greater than it would have been had they just been given pointers during a traditional formal lecture on the proper design of scientific experiments.

In another example, which would work really well for what has been termed 'procedural knowledge' (Shavelson, Li, Ruiz-Primo & Ayala 2002) in a number of disciplines, students were asked to write a set of rules for how to solve a particular problem. They were then asked to swap these with a person sitting near them. A second, similar problem was then put to the class and students were asked to solve it following only the rules given to them. Each student then gave feedback to the person who had written the rules. During these exercises, they were assuming the role of teacher and researcher with increasing confidence. This role-play became even more powerful through the inquiry teaching technique described below.

Encouraging curiosity and independent learning

As part of the CEW model, one of the formal writing assignments given to second-year students (from the second block onwards) over the past few years uses 'inquiry' (McMasters University nd) as a pedagogical mechanism to deliver content and teach critical thinking. For example, when the class studies metabolism, the students are asked to work in pre-assigned groups to form an opinion on which of two diets they would recommend to someone needing to lose weight, having considered both in terms of their impact on metabolism. Each group is required to prepare a PowerPoint presentation consisting of a maximum of seven slides, which a randomly selected member must then present to the rest of the class. Since the presenter is only chosen a day before the presentation, all students are involved with the research and preparation, and groups may be observed coaching all their members, so that whoever is selected will represent them well. The students are also required to write individual reports detailing the route taken to arrive at an answer and including comments on the dynamics within their group, their personal learning style preferences, and a critical evaluation of the diet selected. This approach encourages independence, engagement with the content, peer-group teaching and learning, and time management, while at the same time promoting writing, presentation and critical thinking skills. The change this has made to the way students approach their learning of difficult sections of content has been

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remarkable. Whereas previously they have felt that these demanding sections of the curriculum are challenging, but sometimes irrelevant to their field of interest, they are now, almost without exception, engaged and excited about discovering the details of these aspects of the course content. Moreover, they are able to put them into context.

The CEW model teaches students to learn outside of the classroom or lecture theatre. A major assignment type – which supports the CEW model and has proved successful when allocated later in the year to students who have worked together in the earlier parts of the course – is one in which students are given a number of scientific papers on content that is not formally taught in lectures, but which forms part of the curriculum. They are required to write an individual essay that answers a question which, on a taxonomic scale (Bloom, Engelhart, Furst, Hill & Krathwohl 1956), would be classified as requiring higher order cognition. Working in the same groups as for their laboratory sessions and earlier group work assignments, they are then required to use the individual essays to compile and develop a group essay on the subject. In all instances where they are given formal writing assignments, students are given explicit assessment criteria to guide their writing and encourage self-evaluation. In this instance, one of the criteria is whether the writing has developed from the individual essays; another is the extent to which the final submission is an improvement on the first draft of the group essay. The exercise thus delivers content and, at the same time, encourages critical thinking, metacognition, self-evaluation, and revised collaborative writing.

Encouraging authority

Practical sessions have also afforded many opportunities for developing writing skills, using writing to promote critical thinking (CEW), and turning students into writers and teachers themselves. For example, in one practical session, students worked in pairs to design a kit or game that could be used to teach DNA replication to first-year students. Each pair then evaluated the work of another pair according to predetermined criteria, which were given to them. The enthusiasm with which students participated in this exercise was noteworthy. Not only did they evaluate the stipulated kit or game, but they were keen to look at as many of the kits and play as many of the games as time would allow. This meant that not only had they used their creativity to design their own kit or game, but they also had to understand the process of replication really well before they could do so, and had to use higher order thinking to evaluate the kits or games of their fellow students. Incidentally, by virtue of the repetition involved in viewing (and playing with) everyone else's work, they also committed the process of replication to long-term memory.

Another strategy (suggested by Bean 2001) for using writing to promote thinking during practicals – and specifically learning to think like a scientist – is to ask students to keep a log and fill in the relevant spaces in tables with columns headed 'What I observed' and 'What I thought'. This recommendation was implemented in both first- and second-year practicals in 2010 and, having proved successful, has been used ever since.

CHAPTER 7 • CRITICAL ENGAGEMENT THROUGH WRITING (CEW) – USING WRITING TO PROMOTE ...**THE SUSTAINABILITY OF CEW**

Although the South African CEW model was initially developed and evolved as a collaboration between Dr Nichols and Dr Brenner aimed at improving the writing skills of second-year BMB students, the model has subsequently been successfully implemented by other Wits lecturers. For example, in 2010, the BMB II course was absorbed into the two core courses (Molecular and Cell Biology IIA: Scientific Practice, and Molecular and Cell Biology IIB: Concepts) of the new second-year curriculum at MCB. The two BMB II workshops were retained and implemented in one of the new core courses, but were facilitated by a different lecturer, again with the support Dr Nichols and writing facilitators, who also trained the teaching assistants. This lecturer, who was initially overtly sceptical of using this approach in a large class, is now an advocate of CEW. As she so aptly put it:

I could not believe what a difference it made to my class when I implemented this method; it was like the students had been awakened from a long slumber. The students became far more interactive once they had been given an opportunity to think about the problem through writing and interaction with their fellow students. I am convinced that this method assists students in their learning.

(Sylvia Fanucchi, personal correspondence 2010)

So, proving the sceptics wrong, this pedagogy has once again been shown to be successful in engaging students and promoting critical thinking. A quote from a letter from one of the 2010 first-year class representatives (of a class with more than 500 registered students) confirms that it is possible to apply this pedagogy to large classes:

The lecturer is constantly asking questions to people and causing discussion in the class, which is most impressive, as in a class of over 200 people this is never out of control. The constant interaction with her keeps us focused and also aids us in getting a better understanding, as we are kept on our toes with Dr Brenner expecting us to come up with answers both individually and through brief group discussions in the class.

(Class representative, personal correspondence 2010)

A full study of the impact of CEW at MCB at Wits is necessary and remains to be done. It would have to find a way to understand the many extraneous factors in student learning, including interviews with graduates who were exposed to CEW and a control group. We are still only in the beginning stages now, with a few committed lecturers. As the group of CEW lecturers grows, the formalisation of the method, including an assessment of its impact, the monitoring of quality, and the development of capacity, should follow.

LOOKING FORWARD: ADAPTATION OF EXISTING COURSES

We believe that the use of CEW will grow, because it is relatively cheap to implement and very effective. As we have demonstrated in the preceding sections, CEW is about disseminating authority in the classroom and understanding writing as thinking.

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Furthermore, it should be viewed not as a gimmick or complete refashioning of teaching, but rather as an adaptation of an existing course, and certainly this can be the case for existing science courses.

Sometimes, introducing CEW only requires a minor adjustment to one's normal teaching. For example, students may be asked to discuss what they know about a certain concept (either before or after it has been explained in a lecture), and then to come up with a one-line statement that captures its essence. CEW can also be used to probe the conceptual models held by the students. For example, the first-year ILS class was asked to come up with a metaphor for a cell, based on what they had learned about its structure in school. Most came up with metaphors along the lines of a 'bowl of jelly with bits suspended in it.' They were then shown a brief video clip emphasising the role of the cytoskeleton in the cell, and asked to capture in one sentence how their conceptual understanding had changed. The general description now changed to something like a 'railway station.' In this way, writing was used to explore the students' existing mental models. Vosniadou (1994) proposes that inasmuch as mental models are used in problem solving, and are retrieved and altered during this process and during cognitive functioning, they may constrain the knowledge acquisition process. This implies that it is important for teachers to understand the mental models held by their students if they are to bring about conceptual change and promote conceptual understanding. Other CEW principles can also be introduced with relatively little impact on the existing course design. For example, first-year ILS students were also asked to complete weekly tasks, many of which involved reading and answering questions on a short scientific article that supplemented the content covered during lecture periods. Recent review articles were also posted on the learning management system and referred to during lecture periods, and an article on 'tensegrity' was used during a lecture period to illustrate that there are different ways of examining the role of the cytoskeleton in the cell. Formal assignments can also be designed specifically to encourage critical thinking by requiring students to develop and support an argument.

As emphasised above, the basic difference between the CEW approach and the traditional lecture-centred one is that students are encouraged to be active and involved, to discuss problems posed during lecture periods in informal groups, to debate among themselves, and, in more formal settings, to construct arguments. Using this methodology, they are thus guided towards producing thesis-governed academic writing (Bean 2001) and understanding all writing as argument, which will help them to write and read generally. The redesign process mainly involves identifying critical thinking outcomes and then threading those skills back throughout the course. Courses designed in this way are assignment-centred, rather than lecture-based (MU Writing Program nd; Temple University Writing Center nd), and students are encouraged to engage and grapple with problems during contact periods. Moreover, in response to the oft-repeated excuse that a lecture-centred approach is the only one that can work in a particular course, because of the vast amount of content that needs to be covered, formal assignments and assessment tasks can be designed in such a way that

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they not only deliver content, but also guide students into actually using it and critically evaluating its premises. This supports constructivist epistemology, which posits that knowledge cannot be transmitted, but that students construct knowledge and learn when they are motivated, engaged and active.

That being said, it has been established that the most successful way to introduce and sustain CEW is a collaboration between the subject specialist and a writing centre or similar support unit. This collaboration should be seen as mutually beneficial and voluntary, but once there is interest and affinity, the support and input of the writing centre or similar unit helps the lecturer to take ownership of the pedagogy and make it discipline-specific.

CONCLUSION: INSTITUTIONAL EVOLUTION

A course held at the WWC for science lecturers wanting to adapt existing courses ended with a brief retreat to finish designing the re-vamped course. The retreat confirmed the opportunity CEW offers for lecturers to talk to one another across disciplines about their teaching. CEW works when lecturers start owning it, and that only happens after they have experienced it and a culture of CEW starts to develop within the institution. As mentioned earlier, this culture requires formalisation and institutional and financial support, and we hope that, with the investment of enough interested lecturers, this will happen soon.

Nationally, there appears to be an increasing number of lecturers who are attracted to the method. A panel discussion at the National Writing Centre Indaba at Wits University in February 2009 led to the invitation to present CEW staff workshops at various universities around the country. From 2009 to date, these workshops have been presented at Nelson Mandela Metropolitan University, Durban University of Technology, Stellenbosch University, Vaal University of Technology, the University of KwaZulu-Natal, the University of Fort Hare, Wits, and the University of Johannesburg, and some of these institutions have requested the workshop for several years running. The positive national response to the workshops supports the assertion that CEW is a transportable model that is not dependent on the attributes of a particular lecturer, but can be implemented by anyone who has the desire to teach in a student-centred way for maximum impact. It also suggests that there is a historical readiness now to work with the model.

These workshops have also offered a great opportunity to experience the different institutional cultures of universities in South Africa and interact with quite large numbers of academic development staff and staff from various disciplines around a shared interest in pedagogy. Good conversation creates the possibility for further conversation and the development of overlapping language. The CEW approach begins with listening: listening to the rhetorical purpose and setting of writing and learning. And as we listen, we learn about each other and how to develop mutual understanding, inspiration, confirmation and overlap. This engaged listening leads to

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engaged reading and writing, and so towards a much-missed ideal of the university as a place for interesting conversation, in texts and in the world.

Such conversations illustrate the transformative power of this type of teaching. It certainly makes sense as a strategy for helping students to be more successful in their studies. But another, perhaps unforeseen, advantage is that it allows for shared thinking about teaching between tutors, staff and students in different disciplines, and even between tutors and staff in different institutions. It gives our university culture a much needed interdisciplinary conversational space. Where else would a comparative literature scholar talk with a biochemist, who then both talk with an International Relations lecturer?