

Review

Another country not my own: Crossing disciplinary borders, forging alliances within the framework of a (communication across the curriculum) CAC initiative in the sciences

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This paper outlines within the framework of action research, the process of implementing a communication across the curriculum (CAC) programme in the Faculty of Pure and Applied Sciences. It highlights the link between institutional context and the dialectical implications of merging the skills, agenda and focus of multidisciplinary teams while maintaining a balance of power. It is suggested that these challenges may be met by forging effective alliances with those who are intrinsically motivated to achieve a common goal, adopting a context driven rather than a norm driven approach and applying creativity and resourcefulness within this context. Guidance for similar undertakings is offered and the direction of future work is outlined. "I soon realized that no journey carries one far, unless, as it extends into the world around us, it goes an equal distance into the world within"-Lillian Smith

Key words: Communication across the curriculum (CAC), writing fellow (WF), writing across the curriculum (WAC), inter-disciplinary.

INTRODUCTION

The implementation of a communication across the curriculum (CAC) project in the Faculty of Pure and Applied (FPAS) Sciences at the University of the West Indies (UWI) by the author of this article, a Writing Fellow (WF) from the English Language Section, constituted a direct response to the UWI Strategic Plan 2007 to 2012 which had as its primary aim, producing graduates with attributes which include critical and creative thinking and communicative competence.

It also represented an attempt to implement and expand on the 2006 to 2008 writing across the curriculum (WAC) Project which was also carried out in this Faculty by the author in her capacity as Writing Project Coordinator. The outcomes of this project, highlighted the need for writing proficiency to become an objective of all courses and for writing to be fully integrated into learning activities, if proficiency in this area on the part of students is to be achieved. Additionally, it was strongly suggested that competence in writing should be given due weighting in the assessment of course work and examinations.

Thus, the primary goal of this project was to design and implement a (CAC) programme within the (FPAS), which would help students move beyond "general academic writing or novice approximations of disciplinary writing to internalizing the communication-thinking practices of professionals in their field" (Bransford et al., 2001).

Beginning with the Departments of Chemistry and Life Sciences whose members had participated in the previous WAC project, the CAC implementation process was designed to involve the selection of four courses from each of these departments; two courses at Level 2 (2nd year) and two at Level 3 (3rd year). One course at each of these levels for each of these departments would be designated as writing intensive and the other as speech intensive. These courses should be ones which are currently so positioned within the curriculum that most students are required to take them and this would ensure the exposure of most students in these departments to a writing and speaking intensive course at levels 2 and 3.

Generally, the benefits of broadening the science

curriculum to include reading, writing, speaking and listening skills were seen as critical to enhancing academic achievement, attitude, confidence levels and self-images. In this way, students would be afforded the opportunity of becoming independent, life long learners by active participation in their own learning as opposed to being passive note takers. Furthermore, such an infusion was viewed as being entirely consistent with the growing recognition on the part of educators of the value of communication in all disciplines. Indeed, helping students meet the target competencies of professional practice, teaching them effective teamwork and collaboration and enhancing their ability to understand and argue with visual data are recognized as widespread needs, particularly in the field of science (Shuman et al., 2005).

Thus, it was strongly felt that the implementation process of an initiative as important as the CAC project merited a detailed reflection of the issues, procedures and challenges involved, which would serve to inform future undertakings of this type and give rise to and/or transform theoretical considerations related to similar endeavours. Furthermore, the very nature of these objectives as well as the proposed plan of action is appropriately situated within the paradigm of action research, more specifically education action research.

This kind of research is typified by its context specific, problem focused and solution oriented approach and is normally founded on a research relationship in which those involved are participants in the change process (Hart and Bond, 1995). In support of this O'Brien (1998) contends that what separates this type of research from general professional practices, consulting or daily problem-solving is the emphasis on scientific study, which is to say the researcher studies the problem systematically and ensures the intervention is informed by theoretical considerations. Much of the researcher's time is spent on refining the methodological tools to suit the exigencies of the situation and on collecting, analyzing and presenting data on an ongoing cyclical basis. Other researchers (Lather, 1986; Morley, 1991) have posited that the research paradigm for action research is neither positivist (based on belief in objective reality/knowledge gained from sense data) nor interpretive that is a socially constructed, subjectively-based reality that is influenced by culture and history. Rather, it is situated within a paradigm of praxis which according to Aristotle is the art of acting upon the conditions which one faces in order to change them. Moreover, a distinction is made between 'praxis' and 'theoria' where knowledge for its own sake is valued. Notwithstanding, both are needed as knowledge is derived from practice and practice informed by knowledge, in an ongoing process- a cornerstone of action research. Action researchers are also not in support of researcher objectivity, understanding that the most active researcher is often one who has most at stake in resolving a problematic situation (O'Brien, 1998).

This latter view is somewhat consistent with the nature of the author's engagement in the implementation process of the CAC programme where dual roles were assumed- that of observer and that of participant. The role of observer demanded some amount of distance, in order to better objectify the process and in so doing critically analyze the situation. At the same time, active participation was unavoidable as there was the constant need to 'refine methodological tools' O'Brien (1998) and to actively seek solutions to issues affecting all those involved, including the researcher.

LITERATURE REVIEW

Communication, in particular writing, is undoubtedly a critical component of learning and assessment in all disciplines in higher education. In fact, Bean (2001) has contended that competence in writing enhances student learning and develops both their critical thinking and active problem-solving abilities and others such as Forsyth (2004) as well as Stowers and Barker (2003) have attested to good communication skills, being a critical component to success in ones personal and professional life. However, there continues to be a growing concern among academics about the writing competencies of students (Lillis and Turner, 2001; Ganobcsik-Williams, 2006 and Byrne, 2007) and particularly among science educators (Jerde and Taper, 2004; Moore, 1993; Samsa and Oddone, 1994).

The latter group contends that generally, undergraduate students have not learnt to write effectively in scientific formats and that the majority of scientific writing problems observed are related to documents' organization, tone, clarity and concision. For this reason, they have promoted a closer integration of writing with education in all disciplines, not only to improve writing skills but also to facilitate better understanding of subject matter (Bangert-Drowns et al., 2004).

This challenge has been met to a large extent by the writing across the curriculum (WAC) initiative which enables students' exposure to a variety of writing styles in multiple content fields (Cornell and Klooster, 1990) while giving them the tools to synthesize, analyze and apply course content in meaningful ways (Wiley et al., 1996).

It is important to note at this point that, two theoretical stands are considered integral to the WAC movement. The first, which is the learning to write concept, promotes a closer integration of writing with education in all disciplines not only to improve writing skills but also to facilitate a better understanding of subject matter (Bangert-Drowns et al., 2004). Other advocates of writing, such as Emig (1977), Kelly and Chen (1991) and Steglich (2000) have suggested that writing encourages learners to become more actively engaged in the material being studied as they personally interact and integrate

ideas into their ways of thinking. In a similar vein, Paul and Elder (2005) have suggested that writing is critical to the learning process.

The second theoretical component, WID (Writing in the Disciplines), constitutes a subsequent enhancement of the WAC approach, as in addition to focusing on improving writing skills, it stresses the immersion of students in their disciplinary community where they are enabled to master the academic and professional conventions of discourse, knowledge and thinking appropriate to this community.

In providing further clarification, Pemberton (1995) outlines the WID concept in the following; - "A WID program has professionalization as its focus, a desire to teach students what it means to write, talk and think as members of a particular discipline". The writing projects students undertake in these courses may be collaborative but they are also presumably longer, more complex and more centered in the activities of a discipline. Notwithstanding, the "strong text" theory implicitly endorsed by WAC/WID advocates, has been challenged by others (Ochsner and Fowler, 2004) who contend that this approach does not take into account variant modes of learning and well established differences in how people learn (Gardener, 1983; Grasha, 1996; Dunn, 2001).

In a similar vein, Langer and Applebee (1987) have asserted that if learning is to take place, writing is best coupled with other methods and that generally the more the methods used the better. In fact, Penrose and Sitko (1993) have contended that discussion, especially interaction with other students enhances the quality of writing. They have further posited that the teaching of writing has evolved over the past three decades to highlight the role of orality in improving writing, to include more collaborative work and to focus on the role of peers as an audience for student writing. Thus, we viewed the inclusion of speech in our proposed programme, as complementary to the WID approach and also consistent with the position of many others in the field as it represented a more comprehensive technique for enhancing science students' communicative competence.

ANALYSIS OF FINDINGS

The analysis of findings involves taking into account the extent to which projected outcomes have thus far been achieved. These outcomes were framed within the multi-phase context of the project. First and foremost was the need to develop an effective interdisciplinary collaborative model, which would ensure as far as possible, the successful establishment of a CAC programme in the science faculty.

The formulation of such a model has been reported by others such as Emerson et al. (2006) to involve multiple challenges, some of which include an imbalance of

power, difficulty in adequately integrating the skills of members of different disciplines and conflicting agendas. Added to these difficulties would be the socio-cultural dynamics of the institution itself, particularly in the context of compliance and a tradition of non-intra and inter-disciplinary collaboration. Moreover, another critical consideration for the Writing Fellow (WF) in forging of meaningful and working alliances outside the discipline of Humanities to which she belongs was the lack of explicit institutional endorsement of the CAC programme. In fact, although the project was supported in word and deed by the Dean of the science faculty, through the allocation of funds, there was no general mandate to the science teaching staff to infuse writing and speech into their courses.

The implications of this came to be viewed as a 'mixed blessing'. In one sense, the lack of explicit endorsement would possibly involve extra effort on the part of the WF in persuading the teaching staff, on the merit of a CAC programme and also in inducing them to infuse writing and speech into their courses. It also meant that the WF would be "crossing borders" without the "shield" of administrative support which would in turn limit the "reach" of implementation. Yet, in another sense, there were advantages to this "unsupported crossing", as given that the science staff generally would not be "forced" to incorporate speech and writing into their courses, there would perhaps be less resentment on their part as they would not feel that this initiative was being imposed on them. As a consequence, those staff members who participated would do so on a voluntary basis, being intrinsically motivated and committed to the cause of enhancing the communication skills of their students. Such was the case with some members of the Chemistry and Life Sciences Departments who had embraced WAC pedagogy and subsequently integrated these strategies into the learning activities of their courses.

As expected, members of these departments responded favourably to the CAC initiative and this receptiveness led to the foundation being laid for a working interdisciplinary alliance between the WF and science staff.

Inextricably linked to the laying of this collaborative foundation however, were subsequent negotiations related to actual implementation. Such negotiations centered around the selection of courses to be designated as writing and speech intensive, the role of the WF and science staff in the implementation of CAC, the revision of course outcomes and assessment to accommodate infusion, and, most importantly, the allocation of time and 'space' in the current syllabus of courses selected for infusion. These latter two considerations proved to be the most challenging and a distinct drawback of a lack of formal institutional endorsement, as in the first case, the revision of course outcomes and assessment had to be delayed as these were subject to administrative

approval. In the second case, it was left to the discretion of the lecturers involved to decide how much time would be allocated to the infusion process and where exactly in their course schedules such an infusion would occur. It soon became clear that CAC implementation would not be a "one-off" occurrence as originally envisaged but rather an evolving process, characterized by a series of gradual steps situated within a context of negotiation. This phase involved an at times, radical departure from pre-conceived notions on the part of the WF, as to what should ideally constitute speech and writing infusion into courses. Such notions had been informed to a large extent by the 'norms' related to the design of and criteria for Writing Intensive (WI) and Speech Intensive (SI) courses, outside of our context, at universities overseas.

However, the WF was compelled to adopt a context-driven rather than a norm-driven approach which called for flexibility and the surrender of control in many areas, to the science staff. For example, the original plan to designate two courses at Level 2 and two at Level 3 in each department (Chemistry and Life Sciences) for writing and speech infusion at each level had to be modified. In the case of Chemistry, only two courses were selected, one at Level 2 as WI and one at Level 3 as SI, for the Analytical Chemistry Major. The lecturers thought that these courses were the ones which would benefit most from infusion and additionally would capture the majority of students pursuing chemistry courses. In the case of Life Sciences, the lecturers thought that students in Level 3 courses, the majority of whom were in their final year of study, should be the benefactors of two SI courses and one WI course. Thus, no SI course would be implemented at Level 2 and only one was designated as WI at this level. The rationale was that those at Level 3 who were about to embark on professions would be better prepared at the point of leaving by the infusion of writing and speech into their courses.

Speech instruction as originally planned would be delivered by a Speech Specialist who would prepare students in both chemistry and life sciences, for the oral delivery of a project report at the end of the semester. For both departments, the time allocated for speech infusion which had originally been recommended for at least 2 ½ h per week over ten weeks was now limited to 1 h per week over a seven week period for Chemistry and a six week period for Life Sciences. Moreover, in the case of Chemistry, speech instruction would be 'squeezed' into 4 h lab sessions as it was not possible to schedule a separate time for this undertaking. Similarly, speech sessions in Life Sciences were fitted into 2 h tutorials.

As a result, the Speech Specialist would have some difficulty in achieving the recommended "15 minutes of graded oral communication assignments, a total that might include interpersonal, group, and/or oral presentational activities" (<http://www.yosu.edu/ger/OrallIntensive/Course.doc>).ⁱ Moreover, the components

for the original schedule of speech instruction had to be either compressed or omitted to facilitate these time constraints. It was decided that students would gain access to these omitted components, via the online system where these components would be uploaded to a special container. Furthermore, in spite of the changes in the SI schedule of activities, there was some level of conformity to criteria (<http://www.yosu.edu/ger/OrallIntensive/Course.doc>)ⁱⁱ which included "the demonstration of oral communication as an integral part of the course and the reinforcement of appropriate interpersonal, group and/or presentational competencies". Additionally, the modifications thus far have led to a focused approach to content as well as an effective and efficient use of time.

Another instance of departure from the considered "norm" of an SI course was encountered in the area of the recommended weighting for oral communication assignments in proportion to course grades. The recommendation is that, at least 30% of the course grade be assigned to a variety of oral communication assignments (<http://www.yosu.edu/ger/OrallIntensive/Course.doci>).

However, the time allocated to speech sessions did not allow for effective evaluation of in-class presentations and additionally, the designated Chemistry SI course had only allocated 5% to the oral delivery component of the terminal project report and another 5% to the content of the report. The lecturers in the Chemistry Department were reluctant to implement drastic changes to the current status as this would involve not only undergoing the formal process of gaining approval from a number of boards at the faculty and university level but also engaging in extended discussions with colleagues. We subsequently, arrived at a 'hard won' compromise for the current initiative where an additional 5% would be allocated to the oral component 3% for attendance and participation and 2% from the content component which would now be worth 3%, resulting in 10% being given to the final oral presentation. The lecturers nonetheless have since committed to undertaking the required procedures to raising this weighting to at least 15% in the coming year and revising course outcomes to reflect speech infusion.

A similar situation was encountered in Life Sciences where adjustments had to be made to the weighting for the oral component, this time by changing the current allocated 10 to 15%. The implementation of writing intensive courses in both Chemistry and Life Sciences also represented an appreciable departure from the recommendations of those situated in another context. For instance, guidelines/criteria for this endeavour as suggested by Bridwell-Bowles et al. (1994) include, regularly scheduled class time being designated for writing instruction and at least 50% of course grade being based on student writing.

Again as in the case of speech infusion, time

constraints did not allow for extended time periods being allocated nor was the current system of grade allocation conducive to conformity with this latter recommendation. Once more, a compromise position had to be arrived at. In this case, it was agreed that 3 1h writing workshops in areas such as planning, revision and organization would be delivered throughout the semester. It was also agreed that the current 90:10 ratio of weighting of content and what was referred to as 'quality of writing' would be revisited (in the future) with a view to increasing the weighting of the latter to 20-25. Lecturers were also not willing to commit to requiring students to produce the recommended five written pages per week. On the other hand, lecturers were more amenable to fulfilling the recommendations (Bridwell-Bowles et al., 1994) that students be given the opportunity to produce multiple drafts of writing for which feedback should be given and that writing should be integrated into courses.

In summary, the Writing Fellow found that although the 'crossing of disciplinary borders' involved many challenges, these were mitigated to a large extent by the support of those with whom alliances had been forged. Additionally, in applying a context based approach to the implementation of the CAC programme, our team was better able to counter challenges and overcome the many hurdles resulting from the lack of institutional endorsement and support. Experiences gained from this initial phase of the project will serve to inform its expansion into other departments in the science faculty and eventually to the entire campus and also build on theoretical considerations as they relate to programme implementation.

Contribution to knowledge

The action research described in this paper has offered much, regarding the formulation of an effective inter-disciplinary collaborative model and relatedly, the implementation process of an academic programme. The model outlined is based on a 'bottom up' approach where, in the absence of institutional endorsement ('top down'), mid/lower level academics take the initiative to implement and sustain programmes, which enhance the quality of the student body.

Furthermore, since this approach makes relatively more demands on the initiative and creativity of those involved than does the top-down approach, it is more likely to succeed if it is guided by the context in which implementation occurs rather than by the stated norms of what should obtain. For this reason, participants involved in a 'bottom-up' approach need to be fully committed to achieving a common goal and willing to make concessions as required. At the same time, they also need to be prepared to view the process as an 'evolving' work in progress' rather than a 'one-off' finite activity. It is

anticipated that these views will provide guidance to those who intend to embark on a similar undertaking.

CONCLUSION

In conclusion, this action research has clearly indicated that the way in which effective inter-disciplinary alliances are formed to enable the successful implementation of a programme, depends on critical factors such as institutional involvement/endorsement, the culture of collaboration, compliance and the successful merging of mutual interests and agendas.

It also requires the willingness and flexibility of those involved in finding a common ground for compromise in key areas. This, as has been demonstrated, requires a delicate balancing act which may involve in some instances the partial surrender of control by one party to the other, as well as the adoption of a practical and realistic approach to what is possible in the current context while not losing sight of the overarching ideal of what and how 'it should be'.

Future work

At the macro level, future work will involve the expansion of the CAC Programme to the Departments of Mathematics and Computer Studies, Physics and eventually to the entire campus.

At the micro level, our work will focus on the evaluation and analysis of outcomes of implementation in Chemistry and Life Sciences. The method of analyzing these outcomes will involve the use of both quantitative and qualitative analytical procedures which will be applied as follows:

Quantitative

1. Survey instruments administered in the initial stages to gain information on students' perception of and attitude to writing and speech and re-administered at the end of the relevant courses to determine if there has been any significant change in perception.
2. Comparison between current performance in WI [writing intensive] and SI [speech intensive] courses and previous performance in these courses before writing and speech infusion .
3. Comparison between students' performance in WI and SI courses and performance as it relates to writing and oral presentations in other courses at similar levels.

Qualitative

1. Interviews with focus groups, comprising teaching staff

and students will be.

2. Documentation of each stage of the implementation process via video recordings, taped discussions, observation of WI / SI classes. It is being anticipated that the publication of research emanating from this project will constitute seminal work in science education, which will gain attention and recognition from researchers regionally and internationally.

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ⁱOral communication intensive requirements, <http://www.yosu.edu/ger/OralIntensive/CourseDoc>. Retrieved February, 12, 2010

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