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ABSTRACT

This collaborative study centered around the development and implementation of an integrative module for science and language arts methods courses in a teacher education program. The study was conducted within an action research framework and was informed by perspectives on collaborative inquiry and the two instructors' personal practical knowledge. The instructors' purposes in the inquiry were to explore the concept of integration with each other and with students and to learn more about the nature of collaborative research within the university context. Transcripts of work-sessions, reflective letters, agendas, and other artifacts of the project were analyzed independently and together, tracing evolving thoughts and seeking meaningful patterns and connections in the data. Findings showed the transformation of understanding about subject area integration, the development and nature of the collaborative process, and the ways in which the university context influenced the research. Meaningful academic, personal, and professional links within the university context resulted in changes in research focus, in beliefs and practices in teacher education, and in the personal vision of roles as teachers and researchers. (Contains 18 references.) (Author/NAV)

AN INQUIRY INTO COLLABORATION AND SUBJECT AREA INTEGRATION IN TEACHER EDUCATION

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AN INQUIRY INTO COLLABORATION AND SUBJECT AREA INTEGRATION IN TEACHER EDUCATION[1]

Abstract

This collaborative study centered around the development and implementation of an integrative module for science and language arts methods courses in a teacher education program. The study was conducted within an action research framework and was informed by perspectives on collaborative inquiry and teacher personal practical knowledge. The purposes of the inquiry were to explore the concept of integration with each other and with our students and to learn more about the nature of collaborative research within the university context. Transcripts of work-sessions, reflective letters, agendas and other artifacts of the project were analyzed independently and together. Through this process, we traced our evolving thoughts and sought meaningful patterns and connections in the data. The findings of this study showed the transformation of our understanding about subject area integration, the development and nature of the collaborative process, and the ways in which the university context influenced our research.

> We sat at the meeting - strangers - frustrated - resentment growing as arguments consumed precious time reserved for instructors to explore connections among methods courses and to reduce student workload. Ultimately, we managed to exchange a few words. We connected. The few words we shared ignited a spark. Our collaboration had begun.

The snap shot presented above portrays the beginning of our collaborative journey. Little did we know then that we were embarking on a journey of professional zeal and satisfaction - a journey of challenge and struggle that would continue for three years. Over the course of this journey, we designed and taught an integrated module in our university science and language arts methods courses, we made conference presentations, and we wrote for publication. Our story has three intertwined strands, one of integration, one of collaboration, and one of university life. As we co-labored, our understandings about integration, collaboration, and research transformed the way in which we taught and conducted research within our university context.

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[1] Paper presented at the AERA Annual Meeting, San Francisco, April 18-22, 1995.

Throughout the first two years of our collaboration, we were members of the same instructional team in a teacher education program. We taught introductory methods courses to a common group of thirty, third-year education students who were planning to teach at the middle-years level (grades five to nine). Sandra taught language arts methods, and Penny taught science methods to these students. At the team meeting depicted in the opening vignette, we discovered a mutual interest in the integration of our subject areas. For some time, Sandra had been exploring forms of writing appropriate to school science. She was concerned that language arts instruction at the middle-years level traditionally focused on literature, to the exclusion of reading across the curriculum. At the same time, Penny was looking for ways to raise the profile of science in the middle school curriculum. She perceived that the preservice teachers in her classes felt more pressure to teach language arts than to engage pupils in science activities. Penny hoped that by modeling connections between the instruction of science and language arts, she could "piggyback" science instruction on her students' motivation to teach language arts. The interest we shared in the integration of science and language arts was a timely one. A new provincial middle level science curriculum guide (Saskatchewan Education, 1993) urged the integration of science with reading and writing as did our course textbooks (Carin, 1993; Irvin, 1990; Thompkins & McGee, 1993). As it turned out, the beginning-of-semester team meeting was the catalyst for our joint exploration of integration.

Over the course of our inquiry, we carried on our dialogue at formal and informal meetings, and we wrote reflective letters. Throughout, we kept extensive written records. This included agendas, notes, and transcripts of our meetings, as well as letters and faxes. After our initial period of working together, we formalized our inquiry within an action research framework (Carr & Kemmis, 1986; Elliot, 1991). Through this, we explored the narrative of our professional lives and sought to understand the evolution of our personal practical knowledge as we inquired into the meanings that subject-area integration and collaboration had for us in our university context (Clandinin, 1986; Connelly & Clandinin, 1988; Connelly & Clandinin, 1990).

The purpose of the present paper is to describe three aspects of our work, integration, collaboration and the university context. In this paper, we introduce the integration and collaboration sections with constructed vignettes which we hope will give readers a quick glimpse of the action of our inquiry. We follow these vignettes with explorations of our evolving ideas and with individual comments about the new understandings that emerged. In the last section of the paper, we explore the influence that the faculty of education and the larger academic context had on our work.

The Story of Integration

> We met. We mulled over course content and theoretical perspectives. We referred to each other's courses in our teaching We required students to integrate science, reading and writing. We were disappointed. Students' understanding seemed superficial.
>
> We reflected upon our experiences. We re-examined our understandings. We re-examined our teaching. We reposed our questions. "What do we really mean by integration?" "How can we live integration with our students rather than just talk about it?" Ideas flew

back and forth. Excitement grew. We presented inservice workshops to teachers in the field. We reflected. We revised extensively.

We presented the workshop to our students. We watched each other teach. We heard the noise. We felt the enthusiasm. We saw students huddled around tables pouring, weighing, measuring, questioning and predicting as they conducted scientific tests on competing brands of products. We saw them reading reference materials, recording results and preparing reports. We reflected upon our experience. We understood it in new ways.

We began by finding connections between our course assignments and at the same time trying to figure out how to model connections between our courses. It rapidly became apparent that this was more complex than we had anticipated. As we set about this task, however, we began to explore the theoretical foundations and the content of each other's courses. Through this, we tried to understand what integration actually meant from the perspective of each subject area. Eventually we agreed that there were strong connections between activity-based, inquiry science and a holistic approach to language arts. In practice, we agreed that integration of science and language arts meant to us that reading and writing would be used to make records and reports related to hands-on science activities. Science would play the primary role as the focus of activity, and reading and writing would play a secondary, instrumental role. Although we had discussed integration of science and language arts with our students and had referred to the content of each other's courses as we taught, many of the reading and writing activities our students attached to their science activity plans seemed contrived and superficial. They seemed to be activities added on for the sole purpose of meeting the requirements of the language arts class. We felt that we had made such strides in our thinking. We wondered why our students had not.

Our efforts to communicate what we meant by integration had not been interpreted by our students in a way that adequately supported their construction of integrated science-language arts activities at the level we expected. This revelation sparked our reflection on what we really meant by integration. We still agreed that science should play the primary role as the focus of activity and that reading and writing should play instrumental roles; however, we began to specify critical qualities of the integrative relationship. Implied within our concept of integration was the understanding that reading and writing activities should serve a functional role that was integral to the science activity. They should extend the inquiry cycle. They should not simply serve a nominal role.

In addition to changes in the way we understood the concept of integration, our deliberations also led to a change in the way we planned to present our ideas about integration to our students. As we reflected upon our first foray into integration, we realized that, while we had experienced integration by working with each other, our students had not. Belatedly, we recognized that we had used a transmission mode of instruction in that we had verbally referred to integration without giving any experiences. This realization prompted us to develop an experiential learning module. The heart of this module was a workshop in which students participated in hands-on experiences that integrated science, reading and writing.

Before we presented the workshop at the university, we piloted it with inservice teachers. We revised it and fine-tuned it until we felt it was ready to present to our students.

Each of us reserved three class periods for this experience. When these days arrived, we saw each other teach and we participated with our students as they engaged in the workshop activities. With this experience, our concept of integration changed again. As expected, we had seen the students heavily engaged in the use of scientific procedures . Also as expected, we had seen students using reading and writing to record and report on science activity. We were surprised, however, that we had seen students spending a considerable amount of time consulting sample documents and experimenting with different forms of recording and reporting. We realized that they were seeking and experimenting with functionally appropriate ways to communicate what they had discovered. Reading and writing had not been mere tools used in the recording and reporting of findings; they had become, in their own turn, the focus of learning.

From a science perspective, reading and writing that accompanied science activities made it possible for students to question, compare and evaluate the findings of scientific inquiry. These activities then provided compelling reasons to replicate tests, to mount new scientific inquiries, and to read and write. In other words, the written records had the potential to motivate and indefinitely extend the inquiry cycle. Inspired by Aoki (1991, 1993) we began to view integration of science and language arts as a dialectic between the subject areas in which each informed and enhanced the activity of the other.

Overall, we came to the understanding that integration could be a balanced, synergistic, reciprocal relationship in which each subject, in turn, played both a substantive role as the focus of inquiry and an instrumental role as motivator and facilitator of the other. The new understandings we had about integration not only added to what we knew about integration, but altered the way in which we thought not only about integration but about the way in which we teach.

Sandra: Before we began working together, I was concerned that by showing students how to teach middle-years pupils how to read and study science materials, I might be reinforcing the all-too-common practice of textbook-centered science teaching. The opportunity for linking reading and writing with inquiry science seemed like a golden opportunity to demonstrate to students ways in which they could experience and, in turn, plan for their students to experience reading and writing as functional tools. At first, I thought that reading and writing should play a rather minor role so that it wouldn't take up scarce science activity-time. Although reading and writing eventually did take up more time than we had originally planned, it paid off in terms of continued motivation. It drove home for me the tremendous power that can be generated by reconnecting school reading and writing to "real" reading and writing. It clearly showed me how powerful the learning experience can be when students have a compelling need to actually use reading and writing to accomplish personally important goals. After this experience, I am looking forward to exploring ways in which I can integrate my language arts classes with other subject areas.

Penny: My initial motivation for getting involved in this project could be characterized as "affirmative action" for science instruction in the middle school. My science methods course was the only one the students would likely take. I was haunted by the feeling that many "jumped through the hoops" of the course by preparing science activities which they would later set aside when it came to teaching in the classroom. Everyone knew that the "three "R's" were the meat and potatoes of the curriculum. How could I communicate the value of an inquiry approach to science convincingly?

Modeling integration with language arts seemed like a possible answer. To my surprise, my concept of inquiry science changed in the process. Initially, I held a strong image of ideal science instruction which focused almost entirely on students manipulating materials during investigations. This was perhaps a reaction against the traditional, pervasive didactic approaches. Experiencing the integrative workshop helped me to see this image as quite narrow. Recording observations, data, inferences and conclusions in formats such as journals, logs and reports enabled our students to understand science concepts in new and deeper ways. Reading and reporting on these along with the use of other reference materials, spurred students to raise further questions for inquiry. I still strongly believe in the importance of experience in science learning, but my concept of what might constitute that experience is expanding. In the future, I would like to continue to explore ways in which literacy can further elaborate inquiry science.

The Story of Collaboration

We planned. The air was charged. Each idea ignited a host of others. We asked new questions. We had new insights. We debated: What workshop topic should we use? What products should we have students compare in the workshop? We pressed forward toward common goals.

We presented. We were fearful. We were confident. We took turns. We orchestrated materials and activities. We consulted. We revised on the spot. We celebrated. We set new goals.

We wrote. We struggled with conference papers. We labored over a book chapter.. We took agonizing risks. We drafted and redrafted. We needed help. We gave help. We wrestled with issues: What should we write? How should we write? How should we share credit? We forged ahead.

Right from the beginning we clicked. We seemed to be in tune. Both of us were excited about the opportunity to "talk teaching" with an enthusiastic listener. Both of us were intensely interested in the quality of our own teaching and were in the habit of reflecting upon and revising it. As we initially worked to design joint assignments, our common interest in the concept of integration emerged. Somewhat later, as we critically analyzed our first foray into integration, we discovered a common belief in the educative power of experiential learning. As we became aware of the power of activities in one subject area to provide motivation for study of the other, our enthusiasm for our inquiry grew.

While common beliefs and interests provided the foundation for our collaboration, it was the way in which we communicated that nurtured and maintained the collaborative relationship. Our conversations, while focused on integration, were at the same time imbedded in a style of communication characterized by an overall balance of talking time, intense listening, and patience with each other's enthusiastic interruptions. While professional, it was also friendly and congenial. We did, however, keep a discrete professional distance in

that each of us focused mainly on our own subject area in our workshops and did not trespass uninvited onto the other's territory. Throughout our collaboration, we openly shared our positive feelings about such things as the profusion of ideas and goals our collaboration had spawned, and we shared negative feelings about such things as the outcome of our first attempt at integration. Customarily, however, we zeroed in on areas of agreement and shared goals and rarely spent time agonizing over areas of discontent or disappointment.

Although our tendency was to focus on positives, we did not shy away from addressing difficult issues. Throughout our collaboration, we seem to have used a rather time-consuming, negotiative process to resolve significant differences. A revealing instance of this occurred when we struggled to agree on whether or not to focus the integrative workshop on the topic "Consumer Product Testing" and whether or not to use disposable diapers as the products to be tested. Both of us held strong positions. Penny argued from a pragmatic position that the topic was perfect for inquiry science and that disposable diapers were inexpensive, easily tested and readily available. Sandra argued from a values position that this topic would convey the questionable message that consumerism is a worthy social practice. She also felt that using disposable diapers as the test product would convey the message that we were not aware of environmental issues surrounding disposable products. Rather than becoming confrontational, we worked our way to a mutual agreement by engaging in long discussions of a myriad of alternatives. Through these extended discussions, we realized the potential that the topic Consumer Product Testing had to stimulate extensive and intensive critical response. Because critical reading and writing tied into another part of Sandra's language arts course, she became not only convinced that we should use the consumer product testing unit, but she became an enthusiastic supporter of the idea. We compromised . We did indeed use disposable diapers, however, Sandra included articles on the environmental effects of using these with the other print materials provided in the workshop.

While negotiating our way around problems helped us avoid serious confrontation during planning, discussing potentially problematic issues before presentations helped us avoid other types of difficulties. For example, before presentations we carefully negotiated with each other about what each of us would say and how long each of us would speak. Then, knowing that both of us liked to be on center stage, we would pledge to abide by our plan. Before our presentations, we always made concerted efforts to help each other stay calm. Thus, for example, when a van was loaded with workshop materials and would not start less than an hour before a presentation, both of us remained calm. We focused on what we could actually do rather than on the impending catastrophe. We promptly loaded the materials into our two cars and managed to begin our presentation on time. Advance planning and conscious avoidance of negative behaviors enabled us to avoid inadvertently putting unnecessary stress on the relationship.

As we learned to write together, we encountered a whole new set of challenges. We explored ways of responding to each other's progressive drafts. We gave feedback both orally and in print. We tried to find ways to be sensitive to each other's feelings while at the same time making critical comments that suggested such things as restructuring, adding substantive ideas and deleting favored, but useless, bits. We also explored ways of writing about our collaborative experience. At first, we tried to use the conventional way in which first-authors of collaborative pieces refer to themselves as "I" and then proceed to speak of the other person by name. This convention was not acceptable. It set up an image of an hierarchical relationship between the person speaking and the person being spoken about -- something we did not feel reflected our particular working relationship. We experimented with various ways

to overcome this problem. Finally, we began speaking with a collaborative voice - "we" which we felt conveyed a realistic image of our collaboration and which we felt reflected our agreement on many of the ideas we expressed in our writing.

Although much of our communication was wide-ranging and was characterized by exploring and negotiating around issues, direct conversations about key issues were also important. For example, in a somewhat awkward conversation when we first began making conference presentations, we exchanged ideas about ownership. Eventually we agreed that the data belonged to both of us, as did the workshops and the writing that would grow out of our collaboration. After a similar conversation that occurred somewhat later, we agreed that we would alternate first-author status when we put in equal amounts of work. We also agreed that we would give first-author status to the one who put in the most work when contributions were not balanced. Such direct exchanges about important issues probably prevented rancor that could have seriously damaged the collaborative relationship.

Right from the beginning, there seemed to be an assumption of equality as we explored our ideas, constructed joint assignments, and designed the integrated module. This sense of balanced power seemed to be derived from two main sources. First, each of us held half of the knowledge we needed in order to inquire into the integration of our subject areas. Probably just as importantly, both of us have strong personalities and assertive participatory styles that are fairly evenly matched. At first, the sense of equality seemed to be implicit; later, it became explicit as we openly divided up presentation talk-time and as we agreed on joint-ownership and division of credit for presentations and writing.

Another important feature of our evolving understanding of collaboration has been the evolution of trust within the relationship. At the outset, we had the taken-for-granted trust that faculty often have for one another. This facilitated the early stages of our collaboration, but it could not have sustained us over the more demanding stages that followed. It seems that several factors working together made it possible for us to meet the many challenges we encountered. Clear communication, equality and the maintenance of mutually acceptable standards deepened our trust in ourselves and in each other. We were confident that each of us would pull her own weight and that each of us would reap a fair reward. This made it possible for us to take increasingly difficult risks as we began to present and write together.

Over the course of our work together, our understanding of collaboration underwent radical changes. We began with simple, unelaborated views of what collaboration meant. We were not consciously aware of its critical features and the processes that maintained and nurtured it. As we explored our own story of collaboration, however, we came to understand our collaborative relationship as very complex and incredibly dynamic. We also came to understand that not only was it grounded in shared beliefs and interests, but it was directed by mutually shared goals. Additionally, we found that it was characterized by equality and trust, and that t was sustained by effective communication and problem solving processes. This new understanding altered the way in which we viewed our professional lives.

Sandra: Our collaboration was serendipitous. The opportunity to work together presented itself at just the right time for me. I was already intending to expand the topic of reading and writing across the curriculum in my language arts course. At the same time, I was feeling the need to connect with my colleagues. I had experienced successive, heavy teaching loads and was currently isolating myself in order to complete a major research project. Working together presented a welcome

opportunity. I found the experience of ideas flying back and forth and of ideas sparking each other intellectually exciting. Our collaboration turned out to be an unexpected source of growth for me. It gave me a partner with whom I could play with emergent ideas, explore, expand and extend them. It also gave me a renewed sense of personal connection and indeed, friendship. Experiencing collaboration convinced me that working collaboratively can generate energy, power and personal satisfaction. Knowing this, I now see collaboration as an attractive, viable alternative to working independently.

Penny: Our collaboration has been very important to me professionally and personally. As a new member of faculty, I was delighted to find an experienced colleague to talk to -- about teaching a methods course, educational philosophy, and not least, survival at the university. Our conversations left me feeling full of thought, hope and ability to act. It was some time before I realized that our discussions held the same rewards for both of us. I was surprised at this because of the difference in our status on faculty. I suppose that I initially expected our relationship to be one of mentorship. Instead, it was a collaboration of equals. I think this was because we think of ourselves as learning together. Our collaboration has called upon each of us to gi.. the best of herself to mutual endeavors. I am aware of both the power and the uniqueness of our collaboration. This makes me hopeful about participating in future collaborations with others, yet careful in my expectations as to how fruitful these projects might be.

Integration and Collaboration within the University Context

The larger academic context within which we worked played a critical role in the life of our inquiry. While this larger context posed barriers to our collaborative study of integration, it also provided the support we needed to confront those barriers. Within this context, institutional and academic conventions threatened to short-circuit our thinking and to discourage our conducting research on our own teaching. At the same time, local institutional values along with emerging ideas in the larger educational research context encouraged and supported us as we pushed the boundaries of conventional teaching and research practice.

When we began our collaboration, we automatically observed university conventions that anticipated that instructors would teach different courses in different classrooms at different times. It was not until we were reflecting upon our first foray into integration that we recognized that these teaching conventions had presented barriers to our thinking, and that they had, in fact, precluded a full exploration of meaningful ways to integrate our courses. Gradually, however, our image of how we might provide our students with integrated, hands-on experiences challenged these barriers and prompted us to seek intellectual space beyond the university in which we could experiment with our new ideas.

An education conference provided us with the timely opportunity to transform our ideas into an integrated workshop and to pilot it with inservice teachers without the strictures of the university's timetable and room allocations. When the workshop clearly provided meaningful experience for inservice teachers, we confidently proceeded with trying to create a similar experience for our students. To accomplish this, we re-arranged our crowded course outlines

to accommodate content and activities from each other's courses, and we adjusted our schedules so that we could teach together for three class periods. Finally, when we taught the integrative module to our students, our teaching crossed taken-for-granted institutional boundaries that had long separated course content into discrete, subject-specific academic territory and that had reinforced this separation through timetabling and room allocation practices.

Confronting these institutional barriers was not easy. Although we weren't consciously aware of it throughout our inquiry, we later realized that the immediate context within which we worked had provided valuable support as we experimented with our teaching. It now seems unlikely that we would have pursued our inquiry had it not been for ideas and values embodied in the team structure within which we worked. The team structure brings together instructors and field supervisors who work with the same group of students. Instructional teams meet periodically to discuss course content and student workload and to monitor and evaluate students' academic and practical performance. The team structure signaled us that both the idea of connecting course content and the practice of working collaboratively were not only desirable but expected activities within the faculty. Although our inquiry took us well beyond the usual practice of our colleagues, the values inherent in the team structure supported and encouraged us by sanctioning both the integrative focus and the collaborative manner in which we taught. For the most part, we felt confident that what we were doing was recognized and valued within the faculty. We felt much less confident, however, that focusing our research on our own teaching would meet with the same acceptance in the larger academic reward system.

When we started working together we had not initially intended to make our teaching a focus of research. At that time, we, like many of our colleagues, saw our own teaching and research as essentially discrete activities. Nevertheless, the link between teaching and research was inadvertently being forged right from the beginning. When we began to work together, we proceeded, as was customary for both of us, in a very systematic, focused manner. To ensure that we would make time to work together, we planned formal meetings. To ensure that we wouldn't forget what we had discussed, we kept meeting agendas and notes. In addition to this, we exchanged reflective letters in which we recapped our discussions and shared afterthoughts and insights. The fact that we had kept detailed records of our early work turned out to be fortuitous. As we began reflecting upon our first attempt at integration, we realized that we were already deeply involved in an action research cycle that involved planning, acting, monitoring and reflecting (Kemmis & McTaggart, 1988). We also realized that the records we had kept over that first semester constituted a comprehensive array of already existing data. With these two insights, our work together evolved into a formal research project. Although we had some misgivings about the acceptability of focusing our research on our own teaching, we proceeded to make our integrative adventure the focus of our research.

The misgivings we faced about making teaching the focus of our research grew out of our understanding of conventionally accepted practices in education research. We realized that our research on teaching deviated from traditional practice in several ways. We were conducting our research collaboratively rather than independently; we were locating our research in our own classrooms rather than in those of others, and we were focusing on ourselves as the subjects of research rather than focusing on classroom teachers. Recognizing these differences was disconcerting. However, because we were aware of changes in the larger context of educational research over the last few years, we could see that the melding of university teaching and research was a defensible course of action.

Throughout the course of this inquiry we sought opportunities to learn about collaborative research and about other teachers who were researching their own practice. We conversed with colleagues who themselves were involved in collaborative research (Krentz, Kapuscinski, Browne, Cooper & Goulet, 1992); we read accounts of collaborative research (Biott & Nias, 1992; Cole & Knowles, 1993); and we attended conference sessions devoted to it. Through these experiences, we became convinced that the self-study of teaching had become an accepted focus of research. At the same time, we also became convinced that the practice of working collaboratively was not only gaining acceptance, it was being seen as an important avenue through which valuable insights and understandings about teaching could emerge. In addition to this, we became aware that collaborative research networks such as the Among Teachers Network (see for example, Clandinin, Cooper, Dhamborvum, Mason, Olson, Schroeder & Webb, 1994) existed for the purpose of communicating about research that focused on teachers' own practice. The changes that we perceived in the research context encouraged us to challenge conventional research practices and to continue investing our time and energy in a research project that we found both compelling and enlightening. Besides encouraging us, these changes convinced us that we could justify pursuing this type of inquiry to ourselves and to our administration.

Overall, our collaborative journey has been an enriching learning experience. Through integration of our methods courses, we connected academic content and generated new understandings for us and our students. Through collaboration we connected as colleagues and developed a strong relationship that enabled us to negotiate unanticipated institutional barriers. Ours has been a story of connection in which we have created meaningful academic, personal and professional links within a university context. These links have been critical to our making teaching the focus of our research, to our reflecting on beliefs and practices in teacher education, and to our revisioning our roles as teachers and researchers.

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