Activity and Language in Advanced Graduate Study

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Abstract

Recent work integrating Cultural-Historical Activity Theory (CHAT) with Systemic Functional Linguistics (SFL) forms a basis for systematizing action research in higher education. This basis strengthens what are often otherwise its methodological weaknesses, namely, the disconnection between analysis and subsequent plans for action and the dearth of generalized results. Activity Theory provides the semiotic resources to identify essential elements of human activity and to characterize its processes of development. Systemic Functional Linguistics offers the semiotic resources to describe how language functions in the activity of education and of action research. The methods and units of analysis of CHAT and SFL are specific and cross multiple scales, making it possible to put what happens during relatively short episodes of learning in relation to the prolonged work of completing a degree program and to the still lengthier processes of organizational change. Situating action research in relation to theory helps to overcome the limitations of "local knowledge" internal to the study while, external to the study, contributing to the set of theoretical applications. To illustrate the usefulness of SFL and CHAT to analyze teaching teachers to conduct research, we describe our own action research in a Certificate of Advanced Graduate Study program. Beginning with the redesign of initially independent teacher research and thesis courses to function as one, we envision a more learner-centered program that engages our students, who are teachers and administrators, in transforming the conditions of their own schools.

Action research from the ground up

Educational action researchers in the U.S. intend to be transformative. Often in response to a problematic situation, the action research cycle of observing, reflecting and acting aims to change local practices (Glesne, 1999; Noffke & Stevenson, 1995; Stringer, 2004). Yet neither are action research methods well defined beyond a simple cycle nor are they based upon a strong theoretical foundation. With few exceptions, mostly from researchers in the cultural-historical tradition (e.g. Barowy & Jouper, 2004; Cole, 1996; Edwards, 2000; Gonzales, Moll, & Amanti, 2005; Wells, 1996, 1999) action research studies have not consistently connected published theoretical research either to their research designs or to the analysis of their observations. "Rather than dealing with the theoretical, action research allows practitioners to address those concerns that are closest to them, ones over which they can exhibit some influence and make change" (Ferrance, 2000). Instead of addressing theory, handbooks for action research tend to stress inductive qualitative data methods, focused primarily by the research questions (Creswell, 2003; Glesne, 1999; Hubbard, & Miller Power, 2003; Stringer, 2004).

But there are difficulties conducting research from the ground up when faced with the complexities of institutionalized education. For example, while the aforementioned action research cycle is crudely systematic, handbooks on action research have yet to include means for cohesively turning analysis into subsequent planning and action, especially beyond one's own classroom. To do so would require a theory of social or institutional change. We suggest that the underlying reason for this methodological gap, and perhaps others, in action research is that many action research studies are not situated in well established and practical theories of learning, teaching, communication, social organization, including how all these things can and do change. The point is that theory is not only descriptive, it is orientating -- it guides observation and subsequent analysis to particular dimensions of human activity. As faculty members who have taught hundreds of students, we have noted that when an action researcher does not belong to a community of inquiry he or she struggles with the following questions. In observing, what do I look for? How do I think about what I see? How do I act upon what I learn? We suspect this pattern, however, extends beyond our own students.

To understand the process that post master's degree students go through in developing action research and writing a thesis based on that research, we analyze the process that we engage in to guide students in broadening their perspective of conducting research. The analysis of our own research centers on a Certificate Program of Advanced Graduate Study (CAGS), called "Educational Specialist (Ed.S.) in Technology in Education". Our students are practicing teachers who come to the program in part to keep up with the rapid advances in digital technology, in part to learn the potential that technology holds for improving education and in part for promotions and/or the increase in wages that greater credentials bring. There is great diversity in their backgrounds, with many students having little prior experience with educational technology. Numerous students in this program struggle with achieving advanced mastery of the field, learning the technology and writing a scholarly thesis. Prior to our study, the action research and thesis courses were taught as independent courses. While the action research course intended to empower students to research and act to improve the conditions of their work, its short duration limited its effect. Similarly, the thesis course spanned one semester and demanded that students develop a proposal, collect data, analyze the data and write a scholarly thesis in one semester. This resulted in many students being stretched beyond their limits and denied a valuable learning experience.

This paper has the following organization. First, it identifies key theoretical elements from Cultural Historical Activity Theory (CHAT) and Systemic Functional Linguistics (SFL) for systematizing action research and their corresponding observation and analysis methods. It describes the analysis units[1] of the School of Education, the Educational Specialist program, the Teacher Research and the Thesis courses and the corpus of linguistic data. We then describe our own action research to make the program more learner-centered, beginning with a zone of proximal development that spans the Teacher Research and the Thesis courses. Finally, we envision a more learner-centered program that better prepares our students, who are teachers and are preparing to be promoted as administrators, to improve the conditions of their own schools. Fulfilling this new vision

[1] To understand and describe the multi-scaled complexity of conducting action research in higher education, especially spanning across courses, we find it necessary to provide analysis of more than one unit.

will require collaborative work within the School of Education beyond the two courses and the two authors of this paper. Throughout this article we focus on concepts, relations and methods as *semiotic resources* that CHAT and SFL theory brings to systematizing, communicating, and expanding learning in action research, reflecting the central role that language plays when people collaborate to conduct research and learn from it.

Complementary Theories

Arguably most teaching and learning occurs by speaking, listening, writing, and reading. Indeed, Wells describes schooling as having an "almost total dependence on oral and written discourse" (Wells, 1996 p. 74). Several studies have shown that complementing Cultural Historical Activity Theory (CHAT) with Systemic Functional Linguistics (SFL), a social theory of discourse, yields unique insights into how humans interact with each other using language (Barowy & Elser-Smith, 2008; Wells, 1994, 1996). When applied to action research, the integration of SFL into CHAT offers insights into how theory in general can systematize research – through its functional semiotic resources. These include lexicon, grammatical structures and semantic structures (Martin, 2001) through which language mediates the way people order and explain their experiences. For example, Wignell, Martin & Eggins (1993) outline some of the particular semiotic resources writing brings to structuring the field of geography, e.g. nominalizations[2] and implication sequences[3]. Our own assertion above, "teaching and learning occurs by speaking, listening, writing, and reading" is an implication sequence, explaining the processes of schooling by way of communication. The phrase includes the nominalizations "teaching" and "learning" that classify the processes into two groups[4]. We will show later by applying a SFL analysis to an excerpt from Activity Theory that similar resources also appear in Activity Theory.

SFL provides resources to describe how language functions in human communication. Our study draws upon the notion of *text* as a "unit of language in use" (Halliday & Hasan,

[2] "…nominal group resources in English allow for the possibility of classification, qualification, and description, whereas verbal group resources do not" (Wignell, Martin & Evans, 1993 p.159).
[3] Implication sequences appear as clauses to explain processes. Their nominalization allows for processes and actions to be described and ordered, e.g. expansive learning.
[4] Activity Theory, however, categorizes teaching and learning as unified, i.e. teaching-and-learning.

p. 2). Texts can be books, electronic discussion threads, classroom discussions, and theses. People construct texts in a variety of social situations and there are often patterns relating the semiotic resources of texts to the situations for which they are created. Biber (1995) identified relationships among the purpose of English communication, its production circumstances and its linguistic features. For example, the high informational density of academic writing reflects its time consuming preparation, while the involved characteristics of oral conversation reflect its interpersonal and interactional production in real-time. The following concepts are useful for understanding these relationships. *Meaning potential* refers to a set of socially contextualized semiotic resources for communication, i.e. language as related to its situations of use (Halliday, 1975; 1978). *Register* is the restricted range of meaning potential that becomes active in a situation, i.e. actualized potential, with three elements termed *field*, *tenor*, and *mode*. *Field* conveys what people are doing, *tenor* characterizes what their relations are to each other, and *mode* describes the functional characteristics of language such as its informational density or personal expression.

In a complementary fashion, CHAT can expand the analysis of the SFL categories of field and tenor[5] (Wells, 1994; 1999) by identifying specific elements of object-oriented activity and integrating them into a unified system, i.e. *object*, *subject*, *artifacts*, *rules*, *community relations*, and a *division of labor* (Engeström, 1987). Third generation activity theory (Engeström, 1996) expands the analysis even further to multiple systems of activity, e.g. the university school of education and its students' places of work. The methodology of *expansive learning* involves delineating the systems of activity, identifying dialectical contradictions that spur transitions from one developmental phase to another, locating concepts and models shared in these systems through historical analysis, and identifying those concepts and models that are taken up in subsequent practice (Engeström, 1987). In activity theory, contradictions are instantiated through dilemmas, disturbances, tensions, and problems. They are potentials for systemic development, as they put people in the position of having to change the extant social organization in order to resolve the contradictions.

[5] Mode is elaborated by the characterization of semiotic resources that are linguistic – the lexicogrammar and semantics.

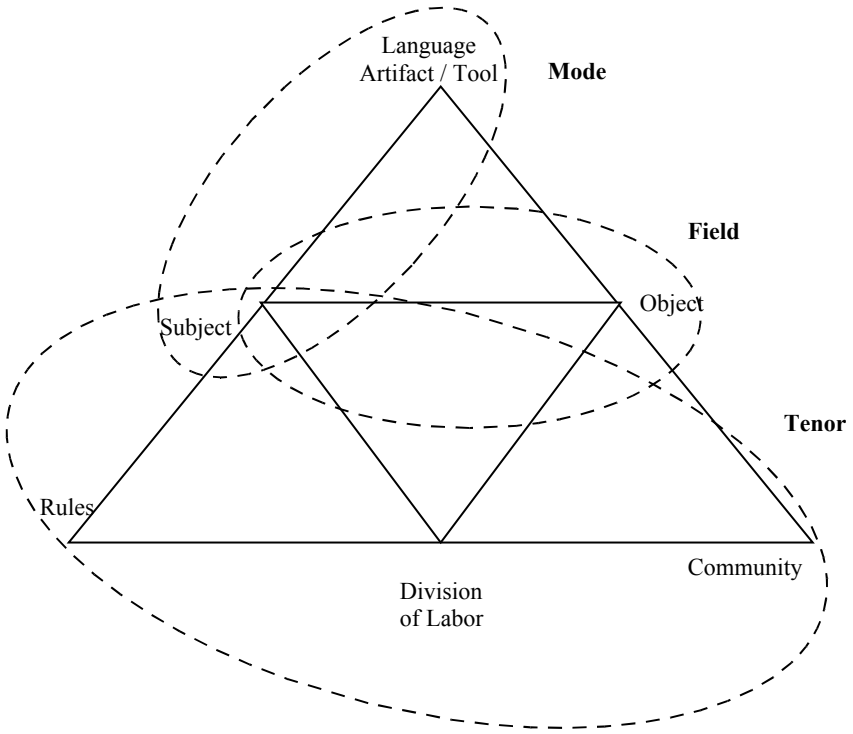

Figure 1. Pictured is a rudimentary visual mapping of the relationships between the components of register and the elements of an activity system. It is a slight misrepresentation in that multiple registers often function in any one activity system.

We will examine the possibility that Cultural Historical Activity Theory can systematize action research by explicit systemic use of the semiotic resources of *expansive learning*. In action research it is the subject of the activity system that is trying to understand the very system in which they work, not an outside observer. In expansive learning, the subject includes everyone in the system. Since language is central to the communication among people that makes their learning-as-a-system possible we will examine an excerpt characteristic of writing on Activity Theory to understand how its language resources may participate in this process.

Through lexicogrammar and semantics (mode), the nominalization "Activity System*"* functions to convey the systemic integration of its elements – the set of ecological relations between them that make them inseparable as a unit of analysis. It is this unit which serves to make analysis, and later, actions based upon analysis, systematic by

focusing on these elements and their relations. Frequently depicted as a cycle (Engeström, 1996), expansive learning can also be considered as a dialectic of theory and practice, not necessarily occurring in stages, but as a working out of the asynchronous pushes and pulls between enacting a practice and simultaneously researching it. Generally the process begins by questioning the practice (i.e. the *need state*) – the corresponding process in action research is developing the research question – which often emerges from a problem or challenge. It is often the case in action research that the question becomes refined, changed significantly, or subdivided as the investigators learn during the course of the research.

Identifying *contradictions* between the elements of an activity system reveals underlying developmental potentials for change in social organization and practice. The analysis of these contradictions leads to a *springboard* – a personal revelation – for re-conceptualizing a new, more advanced form of the activity. Implementing the new form, however, often results in new contradictions:

> When an **activity system** *adopts* a new **element** from the **outside** (for example, a new **technology** or a new **object**), it often *leads* to an **aggravated secondary contradiction** where some old **element** (for example, the **rules** or the **division of labor**) *collides* with the new **one**. Such **contradictions** *generate* **disturbances** and **conflicts**, but also **innovative attempts** to *change* the **activity**. (Engeström, 2001, p.137)

Considering that we wish to explore the language of activity theory as a means to systematize action research, we analyze the above passage to understand its linguistic features, in particular its lexicogrammar. The excerpt above is coded in bold for nouns and nominal groups and in italics for verbs. First note that there is a high ratio of nouns to verbs – this is also common in scientific writing (Halliday & Martin, 1993). The combination of the two (the amount of content words) is a measure of the density of information in the passage and is called *lexical density*. The passage displays a very high lexical density with several ordered implication sequences, e.g. "**contradictions** *generate* **disturbances"**. Studies of scientific and technical language (Halliday, 1993b; Wignell, Martin & Eggins, 1993) have shown these features to make passages difficult to read. Thus these features also make the language relatively exclusive of those not well indoctrinated into the theory. The reading difficulty is further exacerbated by polysemic nouns such as *activity*, *object*, and *contradiction* which have quite specific meanings in

Activity Theory that differ from their lay usage. We think a similar analysis may also be made of the lexicogrammar of Systemic Functional Linguistics.

Using CHAT and SFL for coordinating action research has an up-side, however, by actualizing a set of meaning potentials for systematizing observation, analysis, and action. Such features as nominalizations and implication sequences make it possible to turn actions and processes into things that can be categorized, thereby systematizing observation and analysis of them. We have shown that the language resources are indeed very powerful, providing abstractions in the form of nominalizations that can categorize relationships and providing explanatory power through implication clauses.

We identify these language resources because in expansive learning not only is it the activity system that is the prime unit of analysis but at the very heart of the theory is the idea that the entire system participate in learning from the research. However, using the lexicogrammar of Activity Theory, introducing the language into a growing community of researchers may aggravate a contradiction (anticipated by the above passage!) between the subject and the artifact, as people struggle with its new meanings. We raise this concern, a priori, as a problem we expect to face in attempting the processes of expansive learning for our own research, using the language resources of CHAT and SFL.

Nevertheless, the integration of the two fields brings together potent methods of analysis and semiotic resources for describing action in educational institutions (Barowy & Elser Smith, 2008; Wells, 1994; 1996; 1999; 2002; 2007). In particular, we apply several variants of *cohesion* (Barowy & Elser Smith, 2008) to describe our efforts in this study. *Intratextual cohesion* is an elaborate taxonomy of references (semiotic resources) for making meaning of a text by connecting one part of the text to another (Halliday and Hasan, 1976). Cohesion makes the text "hang together". Related to intertextuality (Lemke, 1985), *intertextual cohesion* generates meaning through references to other texts: prior, future, and concurrent. Intertextual cohesion extends meaning making across longer timescales, beyond that of the immediate text (Barowy & Elser Smith, 2008; Lemke, 2000). *Socio-cultural cohesion* is the set of semiotic resources for making social organization, e.g. activity systems (Engeström, 1987; 1991; 1993) and activity structures

(Lemke, 1990), hang together. The cohesion of an activity system is a direct reflection of its relational nature which: "integrates the subject, the object and the instruments (material tools as well as signs and symbols) into a unified whole" (Engeström, 1993, p. 67), where "subject" refers to a plurality. Adapted from the notion of synomorphy (Barker, 1968), *physical-cultural cohesion* is a set of semiotic resources that physical space, time and materiality brings to culture-specific meaning making processes. This includes spatial and temporal organization, when things are where they are, e.g. the arrangement of furniture in a classroom for either collaborative work or lecturing. The material and physical state of things also contributes, e.g. a book open to a particular page, or the presence of links on a web page. All four types of cohesion contribute to *contextual cohesion*.

Systems, structures and texts

To relate what happens during relatively short episodes of learning to the prolonged work of completing a degree program and to the still lengthier processes of organizational change, it is necessary to apply methods and units of analysis that cross these scales. The first unit of analysis, our School of Education, we model as an *activity system*[6] . We model our Thesis, Teacher Research courses, and Educational Specialist Program, which occur repeatedly with specific beginnings and endings and with recurring social organization and discourses, as *activity structures*[7] (Lemke, 1993; 1995). Texts, beginning with the most significant, include the theses, wiki entries, course syllabi, electronic discussion boards and student-professor conferences both in person and over Internet telephony. Most of these texts are recorded to form a corpus of linguistic data.

Lesley University School of Education

Founded in 1909 as a teacher training institute, Lesley University is accredited by the New England Association of Schools and Colleges, Inc. The School of Education at Lesley University is one of the largest providers of Master's degree education to working classroom teachers across the U.S., serving classroom teachers with its main campus in

[6] "Activity systems evolve over lengthy periods of socio-historical time, often taking the form of institutions and organizations" (Daniels, 2001, p. 86).

[7] Activity structures depict completable, patterned, repeatable discourse and social organization. They are instantiated by "socially recognizable sequences of actions" (Lemke, 1990, p.198) and may also be called "action genres".

Cambridge and at more than 150 sites across 23 states, as well as online, hybrid (site-based and online) offerings. The School of Education is affiliated with the Teacher Education Accreditation Council and the American Association of Colleges for Teacher Education. It offers doctoral level degrees on campus and more recently in a hybrid model. As a system of activity, the School of Education's division of labor is hierarchical, encompassing many programs of study that may also be modeled as activity systems with their own objects, division of labor, etc., but that we will leave in the background of our analysis. The programs mostly offering master's degrees are called Collaborative Internships, Curriculum and Instruction, Early Childhood Education, Educational Leadership, Elementary Education, High School Education, Mathematics, Middle School Education, Reading Specialist, Science in Education (Online), Special Education, Science, Technology, Engineering, and Mathematics, Teaching English to Speakers of Other Languages and Bilingual Programs, and Technology in Education.

Educational specialist in technology in education

While the Education Specialist program is officially embedded within the Technology in Education (TIE) program, its instructors are selected from the broader base of the School of Education. This program is designed for experienced educators with a Master's degree and background in computers who wish to develop and expand their skills in the varied uses of technology in education. The program includes courses to support administrators, curriculum directors, and regular and special education classroom teachers. In addition to courses and other experiences directly related to mastery of the use of technology in education, students are required to take courses that address key issues in the field of education, such as research, assessment, organizational change, and special education, all in the context of technology use in education. As well as coursework, the student is required to submit a thesis project. Most courses are conducted in the weekend cohort model. An instructor travels to a site local to a cohort of students (often a school with a computer lab) and provides 21 contact hours of instruction during each of two weekends. Courses last two months and one weekend of instruction occurs per month. Other courses, such as the Thesis course, are offered online using a content management system with an electronic discussion board over the period of 13 weeks. All students in a cohort

complete the program together in approximately two years. The entire program consists of 12 courses or 36 credits.

Teacher research in technology in education

This course engages students in teacher research leading to the development of an appropriate intervention, often using technology. Student research projects include the development of meaningful research questions, a cultural-historical analysis of context, an appropriate research design, and the application of qualitative methods for data collection and analysis. The course is offered in the weekend format. During the first weekend students plan the design of their research project with the guidance of the instructor. During the 4 weeks in between the first and second weekends, the students conduct their data collection, write journals, and begin interpreting their data. During the second weekend students present their data and the class, as a whole, discusses possible interpretations. With the instructor's guidance the students draw implications from their study for possible changes in practice. During the final 4 weeks each of the students concludes her work by writing a research paper. This is the first draft of her thesis.

Technology in education thesis project

The thesis project course is designed to assist students in developing and implementing a project that will contribute to the field of education. The project also helps to demonstrate that at the end of the CAGS program, students have learned how to conduct research, plan a major initiative, synthesize information and present the work to an appropriate and critical audience. The course occurs online in its entirety.

Problems with activity and language

Prior to our study, the teacher research and thesis courses were taught as independent units. The diversity in our students' backgrounds with respect to their technological skills and understandings, scholarly writing abilities, and research knowledge is a source of difficulty for both students and instructors for many courses offered in the educational specialist program. There have been several attempts to address these difficulties but they have not yet been addressed in a programmatic and systematic way. Consequently, the second author observed these problems to peak with the thesis course in which all three

of these academic dimensions come to play. We will show that these problems are the surface features of several underlying contradictions.

The teacher research course aims to empower students to research and act to improve the conditions of their work. As taught by the first author, Bill, the design of the course is inspired by the notion of *local contentious practice* – the working out of relations between personal-historical and historically institutionalized struggles (Holland and Lave, 2000). A prior student's action research project precipitated this design. Her personal-historical struggles lead her to become a special education teacher – a result of demeaning "mistreatment by the school" when she herself was misdiagnosed as a special education student. Later in life, her workplace undervalued the Individualized Education Programs (IEP) developed for special education students. Out of 45 scheduled IEP meetings one year, only 2 were attended by general education teachers. Her local contentious practice – the zone where her personal commitment met failing school practices – became her action research project on increasing participation from the general staff.

Local contentious practice is enduring. Consequently it offers an opportunity to create a sustainable zone of proximal development if made the focus of the students' action research, if made an explicit problematic situation to study. To actualize this possibility, the teacher research course tasks students to describe their own biographies and workplaces in order to uncover these struggles as the basis for creating their research questions. The instructor specifically looks for these struggles as the basis for robust research projects and guides students toward researching them. Taught in the weekend format however, the short duration of the course limits its effect – taking on the enduring struggles of local contentious practice aggravates a contradiction between the subject and the rules of the system, e.g. the students' ongoing development and the constraints of a weekend format in a two month long course.

Before this study began, the thesis course spanned one semester and expected students to develop a thesis proposal, collect data, analyze the data and write a scholarly thesis in one semester. The workload necessary to develop and complete a thesis had been vastly

underestimated in the initial design of the CAGS program. Indeed, learning to read research literature and write a research paper alone is notoriously difficult. Why so? Biber conducted a multidimensional study of register variation across 17 written and 6 spoken registers (Biber, 1995, Biber & Conrad, 2001). He has shown that academic writing is at nearly the opposite extreme of oral conversation along functional dimensions in which key semiotic resources vary. Academic writing is a register of careful, time-consuming preparation of texts that display an "extreme characterization of informational density, elaboration, and precision" (Biber, 1995, p239). In contrast, oral conversation is produced under conditions of interactiveness, involvement and real-time constraints with features such as contractions, personal pronouns, and fewer nouns. About academic texts Biber writes:

> "…nouns, prepositional phrases, and attributive adjectives all function to convey densely packed information, and the higher type-token ratio and longer words reflect a precise and often specialized choice of words. Such densely informational and precise text is nearly impossible to produce without time for planning and revision." (Biber, 1995, p239)

Our collaborative action research project began when Joan, the second author, encountered students who struggled to complete their thesis when she was teaching the thesis class. She also observed that many students were not interested in reading published research – it often seemed inapplicable to their situations. Underlying this set of problems was the contradiction between the ensemble of artifacts and the subject, e.g. the design of the CAGS program, the design of its courses, the language of the research, vs. the developmental level of the students. In the division of labor in the school of education, many faculty members are *course mentors* who oversee the academic integrity of individual courses. As the thesis course mentor Joan oversees the design of the thesis course, but these problems were of a greater systemic nature.

Extending students' zone of proximal development

We faced multiple contradictions in the system, but we also faced the reality that institutions often have "multiple mechanisms to muffle and buffer the contradictions" (Engeström, 1996, p. 136), essentially burying them inside their social organization. Unable to bring our concerns to an institutional level of awareness, we began by collaborating to redesign the two courses as one. Both contradictions would be addressed

in small part by (1) extending the study of one's contentious practice, and (2) a better elaborated zone of proximal development spanning the two courses. The zone we describe is necessarily subjective in that there is a dearth of research on the development of adult literacy regarding academic writing. This research is necessary to establish objective norms for maturing functions (Chaiklin, 2003). By relating the activity theoretical zone of proximal development to the semiotic notion of meaning potential (Barowy & Elser-Smith, 2008; Halliday, 1993a; Wells, 1999), however, we have been able to devise better ways for students to engage in meaningful learning through the resources, tasks, and communication shared across the two courses.

We agreed that the project a student took on for her teacher research would be the basis for her thesis. Bounded by several university constraints of teaching the two courses as separate wholes, with two different instructors, we re-conceptualized them as the first and second parts of the thesis project. Imagining an extended zone of proximal development based in experience with preceding students, we proleptically discussed and planned a progression of tasks and assignments that we deemed students would be able to complete with our guidance. We adjusted course objectives, redesigned and reassigned tasks according to this progression. For example, the teacher research course focused more upon the necessarily early work of designing and conducting a study of one's own contentious practice. Students write about their evolving research design in a wiki –a register of language in action – from which the instructor can provide guidance. The thesis course focused more upon learning to read published research, understanding how it is written, and relating it to one's own study. It supports a register tuned more to language in reflection.

Still facing the university constraint which allowed access to the online content management systems only to the instructor officially assigned to teach each course, we began to improve the two courses' intertextual cohesive relations, i.e. the relations between the otherwise separate communications of each course. The first step was to request physical access (permission) to each others online system (physical-cultural cohesion is a necessary base level for building intertextual cohesion in a material world). This allowed each instructor to observe the other's class as it unfolded, to read students'

writing as it progressed and to interact as the need or opportunity arose. We further improved the intertextual cohesion by sharing recorded oral comments we made to our students of their work, as well as sharing comments made over email, and as markup on the students' drafts of their theses.

An essential elaboration of the zone of proximal development is the one text on which the combined work of the professors and students center, i.e. the thesis. The changes we made above are in service of the student creating a personally relevant document whose academic linguistic characteristics, e.g. elaborated references, abstractions and explanations (inferences and implications) reflect production with care toward refined meanings. Through writing her thesis, the student comes to understand her situation better. By relating her personal research to the research literature, i.e. creating the intertextual cohesion between her thesis and published research, she re-contextualizes it in the broader perspective of these studies. The student does not do this work in isolation. In the teacher research class students post their work to a wiki where others may read it. In the thesis class the students post their writing to discussion boards upon which the professor and other students comment.

The production of the thesis begins in the teacher research course with entries in a wiki that first serve to build the research project, e.g. the personal biography, the context of the study, the research question, the data methods, data description, research literature, data interpretation, implications of the study and a plan of action. These entries will later contribute to major sections of the final paper for the course, which is the first draft of the thesis. The teacher research instructor comments directly on this draft in markup which is returned to the student. A copy is also sent to the thesis instructor. The intratextual cohesion of this draft is the major focus of the teacher research class – making the description of the study "hang together" with references linking data methods to the research question, inferences to the data and literature, implications to inferences, and action plan to implications. It is through preparing for and creating these semiotic resources that the student's study becomes systematic. The teacher research class is held in the weekend format with a register of verbal communication reflecting the personal

and highly flexible interactions necessary to coordinate the design of a research project in a very short time.

The student refines the production of her thesis during the thesis course, which is held entirely online. The communication is mostly written, and occurs across 13 weeks reflecting the register of careful academic text production. The students revise all the sections of their drafts in relation to comments from both the instructor and other students. The communication required for more immediate and personal interactions occurs both over a dedicated discussion board and Internet telephony.

Frequently students struggle with the organization of the text. The headings in the thesis specify categories that structure each student's study and students must come to learn what constitutes these categories. The instructor's guidance depends upon the register in which it is offered. For example, with the highly time-constrained verbal register of the teacher research course, the instructor often must be direct in telling the student exactly how their text is disorganized. This does not require the student to make these decisions on her own, however, which would evidence maturing functions in the zone of proximal development. Consider, in contrast, when the thesis instructor offers guidance in the online format:

> "Portions of the Data Collection and Data Analysis sections should be moved to the Results and Discussion sections. The Methodology section contains a description of what you did rather than your findings or your opinions."

With the more relaxed time-constraints of the online register, the instructor is able to draw attention to the disorganization without explicitly pointing out which parts of the text are problematic. If the student cannot make the determination on her own there is time for her to ask the instructor for more precise direction. Arguably, such asking is evidence that these organizational abilities are not yet in the process of maturing.

In placing greater focus on the research literature, the students build the intertextual cohesion between their thesis and published research, re-contextualizing their study. In preparation, each student is assigned a published research paper to review that relates to the topic of her study. The student leads an online discussion of the paper, discussing

how the paper is written. The following excerpt illustrates how one student leader responds to a question posed by another student:

> Q: I noticed that you stated that the literature review was hard to follow at times, did you mean that the author of the study "jumped" around (didn't follow a logical sequence) a lot in the literature review?
>
> A: It was hard to follow because the authors did jump around plus there were so many acronyms. At least the authors had defined each one. I really had to read the review a few times in order to have a better understanding of it. I think one of the reasons it was hard to follow because there were some many citations. For example (Hall, Hughes, & Filbert, 2000 ; Lewis, 2000; MacArthur & Haynes, 1995; Rieth & Semmel, 1991; Woodward et al. 1986).

She concludes "when I do my review, I can have a better understanding on what a good literature review is."

While we have progressed in creating a better learning experience for the students across the two courses, we continue to face disturbances in the activity system per se. Changing part of the system toward a new vision of a program that is centered on the learner and transformational of her practices has created new dis-coordinations. There is evidence that the sequencing of the teacher research course is best done just before or during the first part of the thesis course (their scheduling may overlap). Courses for cohorts are scheduled school wide, however, and there have been problems in meeting this new constraint while coordinating professors' availability across programs. There also remains the necessity for better integration of the students' thesis work into other courses. This involves improving the socio-cultural cohesion of the system by coordinating with other course mentors not only toward the redesign of courses to improve their intertextual cohesion, but also training adjunct faculty instructors in new teaching practices. We see the possibility for a whole new form of program, but as the only two of its faculty who have begun to question the existing one, we are challenged in making it happen.

Traveling through the zone of proximal development

Our own zone of proximal development is in the vision is of a more learner centered, transformational program. Engeström anticipated this moment with his conceptualization of traveling through a *collective* zone of proximal development.

> "…teaching and learning are moving within the zone only when they aim at developing historically new forms of activity, not just at letting the learners acquire the societally existing or dominant forms as something individually new. To aim at developing historically new forms of activity implies an instructional practice which follows the learners into their life activities outside the classroom. It also implies the necessity of forming true expansive learning activity in and between the learners." (Engeström, 1997, p. 185)

We face several dilemmas. The first is in the simultaneously intriguing and daunting task of attempting to change an entire system. Joan's vision of the CAGS program becoming more learner-centered and Bill's method of applying "local contentious practice" to guide students' design of their research projects are two of the concepts and models we have discussed that could be taken up by the system to begin moving through the zone of proximal development. But because the vision is one of a new system of practice, expansive learning theory indicates that more people must participate *together* in questioning the existing practice of the CAGS program. The "learners" in our case are the students, professors and staff of the school of education – a much greater subject than the two authors of this paper.

Questioning the practice could happen cooperatively through the extension of our action research to include others. Language is the essential component for people in the system to communicate with each other and coordinate their work toward a common object. Certainly we will face the challenge of communicating meaningfully across the system about the dynamics of system change. Activity Theory and Systemic Functional Linguistics offer semiotic resources for shared meaning in this regard and their methods are the means to keep the research systematic. But the technicality of their linguistic features could be a barrier to their appropriation.

While including others will make the research more systemic, this will have the result of bringing in different perspectives from people in other roles and may change the nature of the research itself. We admit that as a small part of the system, our own perspectives are skewed by our own personal-histories and present struggles in the system, i.e. our own contentious practices. Other visions may prevail. While we have the means in this moment to act systemically and systematically, much uncertainty remains.

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