Shared Problems of Practice:

A Cross-Sector English and Mathematics Collaboration

Sean W. Agriss,
Eastern Washington University

Barbara Alvin
Eastern Washington University

Jackie Coomes
Eastern Washington University

Debra Olson
Spokane Falls Community College

Andrea Reid
Spokane Community College

Justin Young
Eastern Washington University

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Abstract

The authors report on a three-year project focusing on the development and implementation of a self-directed, regional, professional development structure for approximately 50 regional K-12, community college, and university faculty in English language arts (ELA) and mathematics. Focusing on the goals of decreasing the proportion of high school graduates placing into developmental courses and increasing the proportion of college students satisfactorily completing college-level ELA and mathematics courses, project participants address high school to college transition difficulties in both ELA and math. A professional learning project was established to target the complex and persistent problems of students' high school to college transition. Professional learning through inquiry helped us to examine our practices in relation to the problem. This regional collaborative professional development project consisting of ELA and math faculty from Eastern Washington University, Community Colleges of Spokane, Spokane Public Schools, and area rural districts shows common problems of practice across sectors and content areas. The three main problems of practice identified are 1) independent learning, 2) critical reading and writing skills, and 3) critical thinking and problem solving skills. An important aspect of inquiry learning is in sharing results of our work, both internally and externally, which allows for collective learning about the problem and its possible solutions (Morris & Hiebert, 2011; Palmisano, 2013).

Introduction

Approximately 50 mathematics and English language arts (ELA) and math faculty members from Eastern Washington University, Community Colleges of Spokane, Spokane Public Schools, and area rural school districts began working on a three-year collaborative professional development project titled "Successful Transitions to College: Collaboration for Alignment to the Common Core State Standards" (STC) in the fall of 2014. This project strengthens the K-16 alignment of ELA and mathematics curriculum and instruction across the schools and colleges, facilitates K-12 and higher education faculty members fully implementing Washington state's adoption of Common Core State Standards (CCSS), and ensures a smoother transition from high school to college for the region's low-income students.

STC is a professional network allowing sustained cross-sector collaboration as regional educational leaders identify curricular and instructional alignment issues. Through providing time and resources for faculty members to develop, research, test, and apply solutions to shared problems of practice across institution, collaborative inquiry occurs through a generative process and builds instructors' capacity to closely examine their own teaching practices. The inquiry process provides space and tools to imagine and implement potential solutions to improve student success and to gather and analyze evidence of each strategy's efficacy (Morris & Hiebert, 2011). Informed by scholarship promoting changes to teaching practices across sectors in order to more effectively support students in the transition from high school to college (Conley, 2011), this approach is shaped by research on best practices in the development of both professional learning communities (Darling-Hammond, et al., 2009) and networked improvement communities (Bryk, Gomez, & Grunow, 2011).

Sustained inquiry learning requires the development of an inquiry stance—that instructors identify problems, realize and question their assumptions, and examine their own roles in solving the problem (Nelson, Slavit, & Deuel, 2012). STC has high but achievable high school to college transition goals for both ELA and mathematics:

- lower rates of student placement into developmental courses;
- higher student pass-rates in college-level classes; and
- the collaborative faculty development of a repository of instructional resources.

All participants attended three workshops in years one and two of the project, and content specific cross-sector cohorts met and worked between the large meetings. This same structure will continue in year three as cohorts are researching, designing, and iteratively implementing and revising specific curricular resources for use across sectors.

Methods

Collaborative inquiry across institutions requires consistent planning, flexibility, and adaptation. Designers and facilitators assisted in creating conditions and support for collaborative, systematic, and ongoing inquiry. Two main strands of research—professional learning communities and adult cognitive motivational learning theories—were employed to support faculty in their ongoing work. Research and methods found in the literature connected to professional learning communities grounded and informed our constructivist and collaborative approach to our work (Annenberg, 2004; Wenger 1998). In this approach, collaborators work together to 1) define a problem of practice; 2) reach agreement on goals; 3) generate solutions; and 4) systematically test and gather evidence on the efficacy of these solution. Instructors who work in different educational systems require assistance to build relationships, understand each other's challenges and constraints, and find common areas to target. Research in adult learning

theories (Brookfield, 1988; Trivette, et al, 2009) and cognitive motivational theories (Csikszentmihalyi, 1997) were used to create optimal conditions for educators to share expertise and collaborate in ways that are highly productive. Through these theoretical lenses, project leaders work to provide resources and structure to support the process; create protocols for collective guided inquiry; find, distribute, and facilitate discussion of applicable research; and structure meetings to help groups understand the process of inquiry.

Prior to the initial gathering of all participants, project leaders worked to understand values, build collaboration, and develop understanding and ownership of the problems by creating a website where they posted readings and discussion prompts. The readings included articles on equity, on problems of transferring knowledge, and on teacher learning through inquiry. In an online discussion of these articles, participants explored the readings before the first meeting. This helped them to build relationships, which led to the creation of professional learning ELA and math cohorts composed of regional high school, college, and university faculty. At the outset of the project, content specific cohorts were developed intentionally to include teachers from both rural and urban low-income school districts, four-year university faculty, and two-year community college faculty. Initially, participants took part in a collaborative protocol process focusing on evidence-based skills and content to examine the alignment of their existing classroom practices to CCSS. Each instructor was expected to follow through on an iterative process designed to build shared understandings of problems, generate approaches designed to produce better results, and assess and reflect on the results (Palmisano, 2013). The inquiry process required participants to share responsibility for the high school to college transition problems. An important part of the process, from beginning to end, is for participants to reflectively and reflexively share their experiences, processes, and the results. In

year one, project leadership facilitated two specific opportunities to reach these ends: examination of standards and classroom observations.

Examination of Standards

Prior to choosing a problem of practice, project participants examined and discussed the CCSS in Mathematics and the CCSS in ELA/Literacy. In particular, they deliberated over the Standards for Mathematical Practices and the ELA portraits of college-ready students in order to create descriptions of characteristics they sought to develop in their students. Then, they identified problems of practice that affect students' development of these ideal characteristics. Each ELA or mathematics cross-sector cohort of instructors involved in the STC project was asked to choose a *problem of practice* regarding teaching and learning that negatively affects students' likelihood of placing into college-level classes in composition or mathematics and/or successfully completing college-level courses in English composition or mathematics within the first two years after completing high school.

Classroom Observations

After identifying problems of practice, project leadership designed a specific observation protocol—the "Student Experience Visit"—to visit each other's classrooms and to determine shared issues on which to focus. Approaching these classroom visits from the student perspective helped participants avoid feeling judged on their teaching and, instead, opened conversation about the inherent challenges students face within every classroom. Teachers observed and described evidence of students' understanding of learning objectives and expectations, as well as identified opportunities for students to gain the necessary skills to meet those objectives and expectations. The observation protocol asked participants to identify the skills and demands students face in each environment. Observations included noting how the

skills expected of students in the classroom environment they observed differed from expectations in their own classroom environment—high school instructors visited two-year and four-year classrooms, two-year faculty visited high school classrooms and four-year classrooms, and so on. Through the observation protocol processes, each of the cohorts continued to narrow to a particular focus, derived from a common problem of practice.

Results

Discussion among ELA and mathematics instructors, based on the examination of standards and classroom observations, led to the realization that the desirable attributes and practices for success in learning mathematics mirror the portraits in college-ready ELA students. Based on these early discussions, a key idea arose—ELA and math cohorts identified similarly themed cross-content problems of practice:

- Independent learning
- Critical reading and writing skills
- Critical thinking and problem solving skills

What follows is the data, in these three themed problems of practice categories, based on STC instructor participation in the examination of standards, classroom observations, and facilitated discussions.

Independent Learning

It was a common expectation, across sectors and content areas, that students would independently apply concepts covered in classwork. Problems of practice identified by two math cohorts and one ELA cohort focus specifically on independent learning:

- Algebra A Cohort—How can we observe and measure students using resources other than the teacher (without a prompt)?

- Algebra B Cohort—Creating a classroom environment that promotes independent learning and perseverance.
- ELA D Cohort—Develop students' abilities to independently discover and apply applicable processes when they encounter literacy situations in various classes.

These three cohorts recognized that instructors managed issues related to students' independence: motivation, preparedness, curiosity, and reflective questioning.

One classroom observation revealed that an instructor communicated the need for independent learning through his pedagogical actions. In certain instances, the instructor would only give guiding questions and partial answers help to students after they had made some progress on the problem on their own. He would lead them with a question or a thoughtful comment and continue to emphasize independent learning instead of showing a student how to do a problem. Another observer noted an interaction between a student and instructor focused on the value of independent learning. The student was expressing that he was ashamed and disappointed that he spent multiple hours trying to solve and understand only a few homework assignment problems. The instructor's response was to smile and encourage the student to be proud of the work completed and in persevering through the struggle to understanding. This conversation took place in class and highlighted the emphasis on independent learning in this course.

Critical Reading and Writing Skills

Another common problem of practice theme identified by both ELA and math participant instructors was the need for students to read and write critically:

- Calculus A Cohort—Students need to improve their ability to read for content and think critically about what they read. Many students are not reading the text. Students who are reading are not fully comprehending.
- ELA B Cohort—Students struggle to provide an objective summary of academic texts.

There is an emphasis in these identified problems of practice of students' approaches to a variety of literacy situations, which includes both reading and writing. While there is an explicit focus on critical reading skills, writing activities like objectively summarizing, are closely connected to reading. The composing process inherently requires the ability to critically read one's own writing. This relationship between critical reading and critical writing relates directly to results found by cohorts. Much of the concern of STC participants focused on student preparedness to effectively connect the reading of texts to their own production of texts.

Critical Thinking and Problem Solving Skills

Critical thinking and problem solving was third theme that appeared through STC participants' examination of standards, classroom observations, and facilitated discussions. It's important to note that instructors saw this theme as directly related to the both other identified themes—independent learning and critical reading and writing skills. Specific problems of practice focused on critical thinking and problem solving skills included the following:

- Geometry Cohort—Students don't understand formulas well; therefore, they have a harder time applying them and applying them to novel situations. Instruction focuses too much on plug and chug, and not enough on making sense of the formulas students are using.
- ELA Cohort A—Students are challenged to both discern the relevant aspects of source material used by authors and to effectively integrate that material as authors themselves.

- ELA Cohort C—Student do not use text as a means to increase their experience/expertise.

Instructors, again across sectors and content areas, showed interest in helping students to think critically about a problem or task before applying a process, procedure, or formula. They consistently asked students to reflect on processes and revise approaches through continual reflection and justification of responses. A common approach to addressing these problems of practice was discussion and group work in both ELA and math classrooms. One instructor noted, "I expect my students to self-assess and ask questions. I expect students to be able to answer questions in class, make connections to prior knowledge, and explain their thinking…On most days there is structured group work and collaborative learning. Another participant explained, "I observed students eager and interested in participating in the problem solving...I saw students using good reasoning, communicating well, and persevering in problem solving." Instructors observed practices—asking critical thinking questions, asking students to collaborate, and engaging students in whole class discussions—to facilitate critical thinking and problem solving. These practices were valued in all classrooms, regardless of sector or content area. All instructors expected students to work on challenging problems, engage effectively at every stage of the problem solving process, strive to make sense of the concepts they were learning, and clearly describe their thinking.

Discussion

The problems of practice identified by participating STC instructors, based on their varied classroom experiences, suggest that students' independence, critical reading and writing skills, and critical thinking and problem solving skills are of concern across sectors and content areas that lead to ongoing and shared challenges for instructors and their students in the transition from high school to college in both ELA and math. Examining the standards together

and observing each other's classrooms encouraged instructors to question their assumptions about students' experiences in other sectors. These experiences provided participants space to support a deeper collaboration and a clearer understanding of the range of systems, from high school to college, that students must navigate. Instructors targeted difficult, but shared, aspects of teaching and learning that helped them see student experiences in a variety of classroom settings, while initiating a process to become cross-sector partners in search of solutions (Coomes, Alvin, & Olson, in publication).

Students must, when they enter college, learn to engage with the academic discourse community, an entity with which first-year students traditionally have had little in-depth experience (Lea & Street, 2006). The shift in the CCSS to focus on the "[r]eading, writing, and speaking grounded in evidence from texts, both literary and informational," can be understood as an effort to address this transitional challenge before students enter college (Agriss, Reid, & Young, 2016). Findings from the STC participants suggest that students struggle to effectively participate in the academic discourse community which focuses on independent learning, critical reading and writing, and critical thinking and problem solving. We argue that these problems of practice are related, and that our participants' identification of these key problems of practice is mirrored in the CCSS themselves, and that successful implementation of those standards will require a focus on independence, reading, writing, and critical thinking in both ELA *and* Math. A focus on literacy across disciplines and sectors has the potential to improve student success in reading and writing, and also in the content areas themselves.

Scholarship on the implementation of the Common Core suggests that the CCSS seek to specifically address students' critical thinking ability as key to the successful transition to college. David Conley (2011) argues that, in order to truly meet the standards of the Common

Core, and ensure that students are in fact ready for college, educators must "move classroom teaching away from a focus on worksheets, drill-and-memorize activities" towards a pedagogy that promotes active student engagement, through the cultivation of key "cognitive strategies" (p. 16). While pedagogies such as direct instruction may be more effective in improving short term test scores, the teaching and learning of the cognitive strategies that constitute independence, critical reading and writing, and critical thinking and problem solving is best accomplished with a constructivist approach, which holds that learning can only truly occur via a process of interaction with others and internalization of knowledge within the individual student (Hillocks, 1999). Language use and communication in the classroom is key to learning the kind of cognitive strategies that are essential to the successful transition to college.

In other words, one way to make the kind of epistemological and pedagogical shift that Conley suggests is to engage students in learning through discursive activity in both math and ELA, across the K-16 continuum. Fortunately, both the math and ELA CCSS encourage a discourse-based approach to teaching and learning. In ELA, the CCSS pushes literacy pedagogy away from a direct instruction approach through a focus on the learning of writing as a process and the learning of reading as an individual, contextualized experience (Calkins, Ehrenworth, & Lehman, 2012). Additionally, the teaching and learning of math through discursive practice (often termed "math talk") is supported by the CCSS Standards of Mathematical Practice, as well as by examples within the current literature on the effective teaching and learning of math (Wagganer, 2015; Anderson, Chapin, & O' Connor, 2011; Stein, Engle, Smith, & Hughes, 2008).

The themes of the problems of practice identified by our participants suggest that teachers and administrators across the K-16 continuum are concerned about the relationship

between student ability to use language and think critically and readiness for the independence required to successfully transition from high school to college. Thankfully, the CCSS are designed to directly address these problems of practice, and ideally those students graduating high school will be better prepared to enter college as a result.

Conclusion

The STC project attempts to address issues that high school students face in their transition to college ELA and mathematics classes. While developing a culture of professional learning that asked participants to adopt inquiry stances about teaching and learning, this project created both large and small cross-sector and cross-disciplinary communities of practice where instructors engaged in inquiry-based learning to identify problems of practice. A key outcome of work done by the cross-sector, cross-disciplinary group was the realization that students in both disciplines face similarly themed problems of practice—independence, critical reading and writing skills, and critical thinking and problem solving skills. These three main problems of practice, and the fact that all educational levels agreed on them, indicated the need for a more deliberate scaling of classroom intervention tools to help students build confidence and content competence.

In order to design effective pedagogical tools for the classroom, cohort groups needed to further narrow their focus within a particular problem of practice. As a next step, project leaders designed a protocol titled *Guidelines for Specifying a Problem of Practice and Defining Scope of Work.* This next protocol assists cohorts in transitioning from a problem of practice to planning an intervention. Currently, STC participants are engaging in the systematic study of selected research-based curriculum materials related to the identified problems of practice. They are working collaboratively in their cross-sector cohorts to gain a shared understanding of the

expectations for students' performance as they transition from high school to college ELA and math. Research-based course activities and assignments are being jointly designed and implemented, and participants are collecting data and collaborating to review samples of students' work from all sectors.

Faculty from high schools, community colleges, and the university are working to better understand the expectations placed on students in all sectors. Collaboration on this work will inform participants of differing expectations among sectors, facilitate identification of gaps in the curriculum within and among sectors, and allow faculty to work together across sectors to better assist students in successfully transitioning from high to college.

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