

# A DIFFERENT KIND OF DIVERSITY

**Collaboration across  
content areas  
intensifies learning**

**By Ryan R. Goble and Nick Sousanis**

**M**ost high school graduates probably recognize the names Watson and Crick. Those with sharp memories might even remember that these guys discovered the structure of DNA. Few people outside the sciences know about James Watson's and Francis Crick's unwitting collaborator — Rosalind Franklin. Although many acknowledge Franklin had developed the best x-ray images of DNA, she did not have an “aha” moment enabling her to see the structure right in front of her eyes. Evolutionary biologist and science writer Olivia Judson (2009) proposes that Franklin “had a fixed idea about how the problem should be solved. Namely, she wanted to work out the structure using the methods she had been taught.”

Franklin's work laid the foundation for Watson and Crick. They used her images (without Franklin's knowledge) to create their Nobel-winning hypothesis about the structure of DNA.

Allen Repko (2008) suggests interdisciplinary processes were essential for Watson and Crick in unraveling the structure of DNA. Early on, they recognized the limitations of coming at the problem from a single discipline and sought to verse themselves in several other relevant disciplines to construct a multidimensional picture of what they were after (pp. 229, 255). From that vantage point, they could integrate different sources of information, including Franklin's, to eventually find a



solution that those more deeply versed in particular areas could not (pp. 304-306). As for Franklin, Judson suggests her failure was due to a lack of imagination and an inability to see beyond the disciplinary boundaries that framed her perspective.

The discovery of DNA is a classic example of the importance of working across content areas. We are both pursuing doctorates in interdisciplinary studies and are interested in learning experiences that “connect the dots” between disciplines. We’ve both experienced the possibilities of interdisciplinary work and find that our richest personal

boundaries. Presently, Goble works with both preservice and inservice teachers. One of his classes, “Reading Across the Curriculum,” is for undergraduate preservice teachers in every discipline. Many of those who are not working on language arts certifications come to the course with a preconceived notion that only English teachers need to worry about reading and writing. Fortunately, the course is designed to transform those assumptions as students discover common ground across content areas.

For the course’s final assessment, each student develops a unit that they share with practicing teachers at an open house. While this seems like the obvious course climax, the real transformations occur during the month that precedes the final showcase. Students spend four weeks participating in a series of 40-minute workshops, where their lessons are critiqued using a protocol by interdisciplinary groups of their classmates.

After one round of workshops in the spring, Goble asked the students about their experience working in these intellectually diverse groups. Megan Allen, an English teacher, said, “I do not know how to edit my lesson plan for students who are not specifically English creative. It’s helpful when I have a math or science major in my group. If they don’t fully understand the material, they can look carefully at what seems to be most confusing and tell me why.”

The course is evolutionary by design. After intense collaboration, students used to working with people in their major start to see the value of collaborating across content areas. Sarah Lavery, a preservice English teacher, articulates one of the things we believe is an essential characteristic of interdisciplinary collaboration. She says, “What comes naturally to me — like literary criticism — I would have to explain carefully to [math and science teachers] just like 9th graders. Similarly, I need things in math explained to me in-depth. Teaching me math is like teaching a 9th grader.”

We believe it is essential for teachers at every level to be able to teach “who they are” and “who they aren’t.” This ability to see things from multiple points of view is why many believe interdisciplinarity is essential for professional growth.

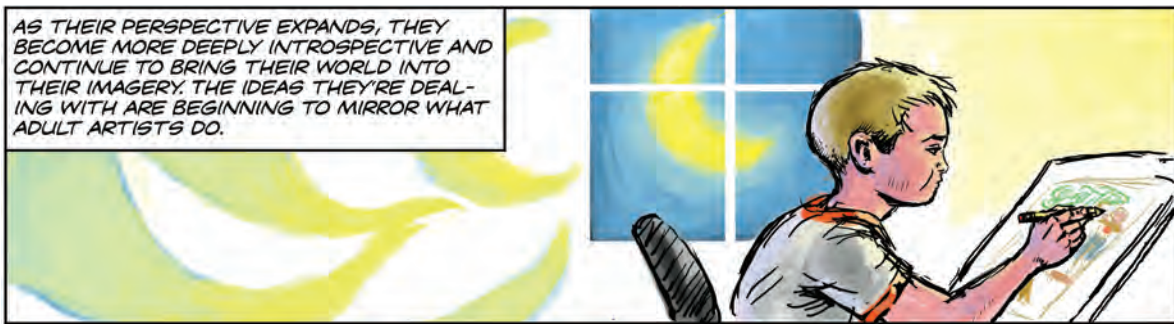
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and professional learning occurs when working with intellectually diverse groups of people and ideas.

While each of us focused on a specific discipline in the undergraduate stage of our journeys, we have both always sought to expand our reach beyond those disciplinary

#### **INTERDISCIPLINARITY**

Conceptually, interdisciplinarity can be fuzzy. Thankfully, scholars like Repko and Julie Thompson Klein offer definitions we can build on. Klein (1990) sees interdisciplinarity as a bridge that links different disciplines while



Nick Sousanis uses art to expand his disciplines. This is a panel from his “Expansive Foundations: An Overview of Artistic Development in Children,” based on a college course.

AS THEIR PERSPECTIVE EXPANDS, THEY BECOME MORE DEEPLY INTROSPECTIVE AND CONTINUE TO BRING THEIR WORLD INTO THEIR IMAGERY. THE IDEAS THEY'RE DEALING WITH ARE BEGINNING TO MIRROR WHAT ADULT ARTISTS DO.

restructuring and integrating knowledge on a grand scale (p. 28). The interdisciplinary approach is not against disciplinary knowledge. It recognizes the disciplines as enabling great sight, but insists that they do not show us the whole picture. In the same way that we do not have stereoscopic vision with a single eye, a single discipline’s reliance on a solitary viewpoint restricts our perception.

In interdisciplinarity, multiple points of view are essential to create the “aha” moments. By putting diverse disciplines in conversation with one another, spaces open up for making unexpected connections. These connections across content areas usually yield solutions that most people would label as creativity in action. Max Ernst (Ghiselin, 1952) defines creativity as “the pairing of two realities which apparently cannot be paired on a plane apparently not suited to them” (p. 66). When we start making a practice of pairing unrelated content areas, creative breakthroughs occur that transcend existing disciplinary thinking and boundaries.

When we as teachers don’t reach outside our discipline to connect to content that might be of interest to our students, we increase the risk that our students might miss out on the richness of the subject we are trying to explore. Disciplinary specialization can narrow perspective. Creativity researcher Sir Ken Robinson (2001) writes, “As knowledge expands, greater specialization is inevitable. The risk is that we lose sight of the larger picture, of how ideas connect and can inform each other” (p. 171).

Elizabeth Gebauer, a science teacher, said, “I enjoy working in interdisciplinary groups because those outside of your own discipline approach the topic from a completely different point of view. As a science major, I sit in science class after science class, and the majority of [the courses] are taught in the same way. It is only natural that I would approach the topic in a similar manner. It is beneficial to work with people that have not been in that same classroom environment and can provide new insight.”

### WORK ACROSS CONTENT AREAS

In their groundbreaking creativity research, psychologists Mihaly Csikszentmihalyi (1997) and Howard Gardner (1993) began to articulate the value of working across domains as a ma-

ajor source of creative innovation. These ideas have moved into natural science, where “breakthroughs increasingly come from teams of bright, diverse people. That’s why interdisciplinary work is the biggest trend in scientific research” (Dreifus, 2008). While many educators have gut feelings about the value of working outside their content areas, we can now look to a developing body of research on collaboration, problem solving, cognition, and creativity to rethink traditional disciplinary school structures.

Kevin Dunbar (Lehrer, 2009), a professor at the Laboratory for Complex Thinking and Reasoning at the University of Toronto, uses the term “failure-blindness” to describe what Gebauer’s quote and Rosalind Franklin’s story clearly illustrate. Failure-blindness describes scientists’ inability to deal with or even see unexpected results in their experiments, which happens frequently. Rather than realizing that they have made a new discovery, Dunbar says, scientists typically dismiss unexpected findings as failures. Dunbar has researched these issues in lab settings and found that scientists transcend their blindness most successfully when they debate and discuss ideas with groups composed of others with a diverse knowledge base.

Dunbar found scientists working in diverse groups “forced them to think, if only for a moment, like an intellectual on the margins, filled with self-skepticism.” In our opinion, teachers miss critical learning opportunities when they ignore the margins, where many of their students might be located in relation to their discipline. Sometimes teachers approach Shakespeare, quadratics, or quantum theory as if they were teaching specialists in their content area. When teachers make an effort to collaborate with educators outside of their content areas, they can use the same skepticism their students might bring to a topic to see it a new way. When we reach outside “who we are,” we begin to contextualize the content, process, product, and culture of learning for people “who we aren’t.” This approach helps us address the fact that most people, including our students, don’t have the same background knowledge or learning style as we do.

In related research, Scott Page, a professor of political science and economics at the University of Michigan, found that “teams of individuals with different backgrounds find faster and better ways of solving a problem than a team in which everyone

has similar training and, thus, similar modes of thinking” (Os-kin, 2009, p. 48). Page’s work reinforces the value and importance of divergence and diversity for the creation of new ideas within groups.

When we frame professional development around diverse interdisciplinary dialogues before we begin teaching our lesson, unit, or course, we can see beyond our disciplinary blind spots and expand our visions of teaching and learning. Lavery echoes Dunbar and Page’s research. “When I have math or science majors in my group, I make things as clear and specific as possible because they probably don’t think the way I do,” she said. When working in a K-12 setting, we strive to see content we’ve mastered with a beginner’s mind. If teachers want to reach as many learners as possible, they must think beyond their content specialization.

### INTERDISCIPLINARY PROFESSIONAL DEVELOPMENT

During Goble’s third year as curriculum coordinator at a Bronx high school, the administrative team moved professional development into classrooms. Over the course of the year, Goble collaborated with staff to create highly differentiated learning cohorts. These cohorts were a unique hybrid of professional learning committees and instructional rounds.

Goble’s team created a series of two-week observation windows. During each window, about five staff members would open their rooms for observations. Staff had two days to sign up for observations during that window. Sometimes all the math teachers might rush the sign-up sheets so they could do a math team observation, but most of the time an interdisciplinary group of staff would observe a teacher over a two-week period. Teachers learned about classroom observation, and they focused on schoolwide themes, such as literacy and differentiation. These lenses were built into pre- and post-observation protocols.

Every other week, instead of department meetings or traditional after-school professional development, teachers chose colleagues and classrooms as their laboratories for professional growth. Teachers enjoyed seeing the school with a wide-angle lens and were excited to collaborate with teachers across disciplines. Many valued the unique perceptions of those not trained in their discipline.

In retrospect, this professional development initiative was a series of creative partners and partnerships. That term captures the spirit of the interdisciplinary professional development that we believe is essential for creative teaching and learning.

Remember, interdisciplinarity is not antidiscipline. One teacher pointed out the value in both approaches saying, “People outside my discipline ask great clarification questions. People inside the discipline offer suggestions for good activities and help break down the material into lessons that are manageable.”

Working both within and beyond a content area does not need to be a source of conflict. Robertson (2005) lays out a series of generative paradoxes that are essential to be an effective

teacher. He explains that teachers must live between things like “control and flow” and “subject knowledge and teaching knowledge.” Robertson shows that things that seem contradictory are actually paradoxes that generate new ways of thinking. To those ends, we’d like to add an additional generative paradox to Robertson’s list. We must teach “who we are” and “who we aren’t” to grow as teachers and to serve a wide range of students. This means we must work inside and outside our content-area specializations regularly to improve our practice and grow as professionals.

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