Collaboration in Teaching

Last year, in partnership with the academic deans, the Faculty Instructional Development Committee (FIDC) sought to further the impact of the long-standing Summer Instructional Development Projects grants by asking faculty to cluster the projects and work collaboratively on course design or redesign. The intent was to support faculty in embracing a broader view of student learning that encompasses not only their own courses, but also other courses their students take. Ultimately the goal of the program is to enhance the student learning experience by bringing intentionality, coherence, and sound pedagogical practice to how students experience the curriculum.

In response to the call for proposals the committee received nine proposals for cluster projects involving 31 faculty. We were able to fully fund 6 projects involving 22 faculty (details on page 2), and we’ve asked a few faculty to share their thoughts on their summer collaborative course design work in this issue.

Given the strong success of the program, the FIDC has again sought and received support from the deans to go forward with the cluster projects this year. As you can see from last year’s project titles, faculty seeking to collaborate in a cohort of three or more have multiple options for proposing an SIDP cluster. A group from a single discipline or academic unit may work together to embed a common learning outcome or theme (e.g., information literacy, sustainability, integrity) or to create alignment between courses (e.g., an intro course, a required 200 level course, and a capstone). An interdisciplinary cohort might pursue a specific pedagogical approach (e.g., experiential learning, inquiry-based learning, undergraduate research) or use comparable teaching resources (e.g., an active learning classroom, distance technologies). Or faculty might improve common types of experiences in the curriculum (e.g., adding specific objectives/course content to capstone courses, embedding specific assignments in courses that give academic structure to internships, preparing common learning goals for first year courses).

The FIDC will offer a lunch information session on the Cluster Program on Monday, November 24 from 12-1 in the Badlands Room in the Union. If you are interested in applying for summer funding through the program, please join us. And if you have collaborators in mind, ask them to come, too. Members of the committee will help with the development of ideas, with pointers on writing a strong proposal, and with assessment strategies. Please register for the session and lunch by noon on Monday, November 17, by contacting Jeanne Boppre at jeanne.boppre@und.edu or 777-3325.

The proposal deadline is March 2 at noon. Faculty applying as an SIDP Cluster
must include a plan describing how they will function as a cohort group and how their activities will lead to significant collaboration. We encourage consideration of formal workshops now supported by OID (Teaching with Writing or Teaching with Technology workshops) as one means of assisting group efforts and creating opportunities for collaboration. To explore ideas for a cohort group, contact Anne Kelsch (701.777.4233 or anne.kelsch@UND.edu). Full program details are available at oid.UND.edu.

2014 SIDP Cluster Personal Reflection by Clement Tang

Project title: A case for cases in transport phenomena—a novel approach for a highly mathematical subject

Cluster members: Yun Ji (Chemical Engineering), Gautham Krishnamoorthy (Chemical Engineering), and Clement Tang (Mechanical Engineering)

Our cluster consists of faculty members from the Chemical Engineering and the Mechanical Engineering departments, and we are instructors of courses related to the subject called transport phenomena. The subject, transport phenomena, is the study of momentum, heat, and mass transfer. It lies at the heart of several engineering disciplines, and more profoundly in chemical engineering and mechanical engineering. Transport phenomena courses in engineering use physics and advanced mathematics to communicate concepts within the covered topics. In order for students to thrive in these courses, they would need to be comfortable with physics and advanced mathematics.

As instructors for courses in transport phenomena, we had casual conversations about the difficulties we faced in teaching these courses. One common difficulty that we see in our students is that they get bogged down with the advanced mathematics, and become unable to get a better understanding of the concepts within the courses, or worse they start to lose interest.

We received an announcement from our Dean’s office, in January 2014, about the opportunity for collaborative teaching-related projects in the form of SIDP clusters. (OID actually announced the SIDP cluster opportunity in December 2013, but I did not pay attention to it.) So, I attended the SIDP Cluster Information Session organized by OID, on January 17, to find out more information. Later that month, we discussed the possibility of articulating a cluster project that could be turned into something useful in our transport phenomena courses. After a few days of deliberations, we decided that we needed something that the students can relate in the real world scenario, and at the same time they get to utilize the physics and advanced mathematics involved in the courses. So, we came up with a project on developing case studies for our courses.

We proposed the development of a total of twelve cases over a four-week period in a modular manner. For the cases to be useful in our courses, we needed to ensure that each case can be employed interchangeably at different levels (undergraduate / graduate) and across disciplines (chemical/mechanical...
engineering), with only slight modifications. As a cohort, we realized that teaching is not simply a knowledge delivery mechanism, but rather a creative endeavor to facilitate learning. So, our main goal in developing these case studies was to create opportunities for students to practice problem solving with real world applications. At the same time, we can use these cases to promote deeper understanding of the subjects and encourage life-long learning in the process.

By the end of the summer, we completed our twelve cases. As it turned out, one of the cases developed by Gautham is very applicable in my current graduate level Conduction and Radiation Heat Transfer (ME 575) course. I modified his case slightly to better reflect the course materials that I am covering, and assigned it as a mini project for my class.

One of the most obvious impacts that I benefited from our cluster project is that I get to see, and learn from, my partners’ pedagogies. Since we need to ensure that our cases can be employed interchangeably in our courses, understanding each other’s teaching approach was very important. In a sense, the cluster project forced us to evaluate our own curriculum and teaching method. This is especially true when our collaborative effort involved different engineering disciplines. Another impact is that the cases we developed can be used in other courses that we teach. Originally, the cases that we proposed were for ChE 301, ChE 501, and ME 575. But now that we have developed the cases, I can use some of them in my ME 474 course, which has just been newly assigned to me for spring 2015.

In retrospect, when I consider what brought us to form our SIDP cluster is that we, as individual instructors, realized the common obstacle in our courses. The SIDP cluster provided us the impetus to learn from each other’s pedagogical strengths, and at the same time we get to self-evaluate our own approach in our courses. If we perceive teaching as a creative effort to facilitate learning, then I think my involvement with the SIDP cluster has indeed promoted creativity in my pedagogical skills development.

2014 SIDP Cluster Personal Reflection
by Frank Bowman

Project title: Collaboratively Redeveloping the Chemical Engineering Laboratory Sequence – Integrating Teamwork, Communication, Course Objectives, and Statistical Design Across the Curriculum

Cluster members: Frank Bowman, Ed Kolodka, Gautham Krishnamoorthy, Bob Wills (Chemical Engineering)

During summer 2014 four faculty members in the Chemical Engineering department worked together on a collaborative SIDP Cluster project. Our goal was to update the sequence of four laboratory courses required of all ChE undergraduates by incorporating several across the curriculum themes within each course. Over the past several years, assessment of student learning and feedback from alumni, employers and current students helped the ChE department to identify four specific areas for improvement in our lab sequence:

a) formalized training in teamwork skills,
b) greater preparation in effective communication – both written and verbal,
c) realignment between lab and lecture courses and within the lab sequence after recent changes in the ChE curriculum, and
d) additional opportunity for students to practice statistical design of experiments.

While elements of each of these themes already existed in the lab courses, we felt that a collaborative effort across the entire lab sequence would be the most effective means to further enhance student learning. Previous efforts at incorporating these themes had been done primarily by individual instructors. The call for SIDP Cluster Project proposals in Spring 2014 was an ideal opportunity for us to work together as a cohort to provide a much stronger and coherent curriculum.

We organized our work so that each lab instructor focused their effort on one of the four targeted themes. Each instructor developed case studies and instruction modules for that theme and then worked with instructors of the other labs to incorporate the new learning activities into each lab class. This was done to ensure that each theme is addressed in a coherent fashion from course to course, with the appropriate level of complexity for each course. Doing this helped us to look beyond our own individual course and consider the lab sequence as an integrated whole. We held formal weekly meetings throughout the summer to update the group on our progress and to get consensus on planned changes. But much of the work and interactions occurred informally as we regularly consulted with each other on how themes might best be applied in the different courses.

So what did we accomplish? For the teamwork theme, we outlined and began developing mini-modules on team roles, effective meetings, time management (Lab I), interpersonal communication, intrapersonal communication (Lab II), conflict management, overcoming team dysfunction (Lab III),
I was very pleased this summer to welcome a new North Dakota colleague, Dr. Paul Kelter, as the founding Director of the Center for Instructional Excellence and Innovation at NDSU. As center director Dr. Kelter’s work is in some ways like mine as Director of OID: he will provide leadership in the development and support of innovative and emerging pedagogies across the institution. Additionally, his position has a STEM (Science, Technology, Engineering and Mathematics) focus. Paul directs NDSU’s interdisciplinary STEM Education PhD program which prepares doctoral students whose research focuses on STEM teaching and learning at the collegiate level. He also directs the Center for Science and Mathematics Education, which offers infrastructure to support collaborative K-20 science, mathematics, and engineering education projects.

Dr. Kelter brings an impressive wealth of experience to his position. His 34-year career in higher education has focused on the integration and transfer of knowledge among students and teachers at all levels. He was the inaugural director of the Science Outreach Office at the University of Wisconsin–Oshkosh, where many of the programs he instituted via external funding remain vibrant. He was co-PI on the long-term Operation Chemistry literacy program for all levels of teachers, and parlayed that national program into grant-funded summer and year-round workshops in Wisconsin, Nebraska, and North Carolina over a 15-year period.

During his seven year tenure at Northern Illinois University (where he was designated a Board of Trustees Professor – their highest academic honor), Kelter worked extensively with middle school teachers in high-Latino population communities in the service of science education. He has also been at the forefront of science literacy for postsecondary students via three major chemistry textbooks aimed at the first-year chemistry audience, as well as a book on the international impact of chemistry learning. Kelter has won multiple campus, state, and national awards in education, including career-long designations as a distinguished teacher at the Universities of Wisconsin-Oshkosh, Nebraska, and Illinois. His current interests include advocating for literacy in sustainable development among students and teachers.

When Paul told me that he had expertise with teaching around diversity and globalization, I immediately asked him to come speak about it at UND. The topic is timely—with Sandra Mitchell as our new Association Vice President for Diversity and the formation of the Global Engagement Team by the Provost’s Office, it is an ideal time to focus on pedagogy and student engagement around these issues.

Fortuitously, my invitation to Paul to share his expertise and make connections at UND was soon followed by my introduction to another new colleague. I have been delighted to get to know Dr. Robert (Bob) Pawloski, who began this fall as the STEM Field Coordinator for UND’s College of Education and Human Development. This new position was created through blended funding from the College of Education, the Office of the Provost, the College of Arts and Sciences, and the College of Engineering. Mirroring some of Paul’s work at NDSU, Dr. Pawloski will be working to coordinate UND faculty interested in a STEM Coalition in support of collaboration with the public schools. While a number of our colleagues have been engaged in really exciting projects involving the public schools, to date their efforts have not been brought together institutionally. Bob will be facilitating collaboration and expanding outreach efforts, with the intent of also incorporating other disciplines – particularly as part of a “STEM to STEAM” effort that seeks to engage the arts with the sciences in this work.

Dr. Pawloski began his career with twenty-years as a 7th & 8th grade teacher of mathematics and technology. He went on to advocate for the integration of educational technology into K12 and teacher preparation at the state and na-
tional level. Seventeen years with the University of Nebraska System saw him outreaching, implementing, and evaluating projects across a variety of disciplines, ranging from “Your Backyard from Space” (NASA), “Virtual Interactive Construction Education” (NSF), “PT3” and “Teaching American History” (US Department of Education), to “Bioinformatics and Interprofessional Education in Nursing” (HRSA). He also served six years as the Web Content Manager for the National Council for the Lewis & Clark Bicentennial. His interests and expertise emanate from passion for continuous improvement in educational and social programming, as well as mentoring and the development of professionals who serve social enterprises, healthcare, and preK-20 education.

So as you can see a collision of like-thinking and good timing lead to this invitation to you to join us for lunch, an engaging keynote on pedagogy, and -- for those interested -- a beginning conversation on collaboration. Details are below.

We hope you can join us!

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Lunch Keynote

Teaching Science With An Eye Toward Diversity and Globalization

Dr. Paul Kelter, Director of the Center for Instructional Excellence and Innovation at NDSU

Tuesday, December 2, 12:30-1:30 pm, Memorial Union North Ballroom

Dr. Kelter’s talk is anchored by fourteen assertions about teaching and learning that support the creation of a question-based classroom. As such classrooms incorporate diversity and globalization, they generate vital opportunities to introduce and support learning in science – or any field. Although first-year chemistry is used as a framework for this discussion, the principles apply broadly for all faculty who seek to inspire student engagement. Kelter argues that ultimately our students should find learning useful for their lives because it helps to create order out of chaos, and it assists them in to making sound decisions based on understanding and experience.

At 1:30, following Dr. Kelter’s talk, there will be an opportunity for faculty interested in learning more about collaboration within Science, Technology, Engineering and Mathematics (STEM)/STEAM (which adds Art and Design to STEM) to meet with Dr. Kelter and Dr. Pawloski, UND’s new STEM Field Coordinator.

Please rsvp to und.oid@email.und.edu by Tuesday, November 25 at noon to reserve a lunch
team decision making (Lab IV). We also identified a web-based peer assessment tool that will be used throughout the curriculum to provide formative evaluations to help students identify and develop behaviors that contribute to effective teams.

Work on improving written and oral presentation skills developed a road map of the different assignments, feedback methods, and forms of writing and presenting that are used throughout the four courses and how they can build upon each other to give students repeated practice. One key addition to the curriculum will be video recordings of student presentations, followed by faculty-guided self-assessment to identify areas for improvement.

For the statistical design of experiments theme, we developed a case study on “baking a cake” that is used initially to teach basic statistical design, but is then extended in subsequent classes to teach multi-variable analysis and optimization. A rubric was also designed for assessing student understanding and application of statistical design techniques. It will be used in all four lab course to monitor student progress in learning these skills.

Efforts to align courses began with a thorough assessment of concepts and experiments in each of the 4 lab classes. Based on that review, 3 experiments were identified for removal (because the reinforced concepts no longer being emphasized in the overall ChE curriculum) and 4 new experiments were proposed. Two of those were fully developed and are being implemented in courses this academic year, while the other two are waiting on completion of lab space renovations before purchasing the necessary equipment.

Going into the summer we knew that four weeks would not be enough time to complete all our planned improvements and as we worked together we found even more ideas for enhancing the lab courses. But that dedicated time working together was invaluable as we were able to make many updates to these courses and develop a concrete plan for further integrating these themes in the future. We also gained a much deeper understanding of the curriculum and how individual courses and concepts fit together. We look forward to seeing how these changes in the lab sequence, and our approach to teaching it, will improve student learning.

2014 SIDP Cluster Personal Reflection
by Matt Cavalli

“Supplemental Learning Aids Across an Engineering Curriculum”

Cluster members: Matthew Cavalli, Dustin McNally, Jeremiah Neubert, Lowell Stanlake (Mechanical Engineering)

The cluster structure of the Summer 2014 SIDP was a natural continuation for a project already underway in the College of Engineering and Mines to investigate flipped learning and alternate pedagogies for both on-campus and distance students. A pilot project in Fall 2013 had looked at the effectiveness of flipped teaching in a variety of engineering courses. Three members of the pilot study, along with one additional faculty member, decided to pursue funding for SIDP cluster work as a way of continuing the development of alternate pedagogies.

Rather than focus on direct integration of topics across multiple courses, the focus of the project was on the mechanics of course delivery – first identifying available tools, then evaluating them, and finally applying them in one course each. The common starting concept was that each course would be taught (either partially or completely) in the flipped format. Courses ranged from an introductory freshman course focused on computer-aided drafting and design to a junior course focused on material science. As one can

continued on page 7
imagine, effective teaching techniques for training students to use computer-aided design software and for helping them learn about the behavior of materials can be quite different. Each instructor identified key performance criteria they required from any tool to be able to successfully apply to their course. Approximately a dozen software packages were evaluated. Eventually, Adobe Captivate was identified as the ‘best’ (or maybe least worst) option.

Approximately one half of the SIDP period was spent on the initial evaluation of available tools. The structure of the SIDP cluster program forced regular interactions between participants, leading to more objective evaluation of potential software packages than would likely have occurred had any one instructor performed the analysis on their own. On one hand, this may have meant that none of us selected our ‘perfect’ option. On the other hand, the hope was that one outcome of this work would be the adoption of similar teaching techniques in additional courses because of the flexibility of the selected software.

The second half of the SIDP period was spent in developing materials for each of our courses using Adobe Captivate. Regular group meetings became less about group decision-making and more about peer review and suggestions to improve the materials we developed. Idiosyncrasies of the software alternately led to shared excitement or commiseration.

By the end of the SIDP, each instructor had created sufficient material for at least a third of their course.

Developing course materials is often a solitary exercise. By facilitating collaboration, the SIDP cluster funding forced each of us to look at the process differently, considering not just our particular needs but also those of faculty and students in classes before and after our own classes in the curriculum. The support of other instructors working through the same issues at the same time was valuable to the process. And the end result offers the potential for a larger impact on our students’ learning than any course could achieve on its own.

FIDC Funding

The Faculty Instructional Development Committee (FIDC), elected by the University Senate, provides support for course and curriculum development, which goes beyond the means of the individual faculty and academic units. FIDC grants may be used to purchase instructional materials, travel for pedagogical development, travel to make a Scholarship of Teaching and Learning (SoTL) presentation, or other projects related to teaching. To submit a proposal, you will find the necessary information on the OID website. The next deadline is December 1st at noon.

In September and October, the FIDC awarded travel grants to the following faculty members:

- Tami Carmichael (Humanities & Integrated Studies), $640.20 to attend the 2014 Association of Interdisciplinary Studies Conference: Interdisciplinary Public Problems, The Global Community, and Diversity at Michigan State University.
- Sarah Robinson (Communication Sciences & Disorders), $1,000.00 to attend the Annual Convention of the American Speech-Language-Hearing Association in Orlando, Florida.

In consultation with FIDC, the OID Director administers Flexible Grant monies in support of teaching related projects that span programs, departments or colleges. These funds may be used for group meetings or retreat expenses, outside speakers/consultant fees, and a variety of programs and events designed to enhance student learning.

The following faculty members were awarded a Flexible Grant during the months of June and August:

- Sarah Nielsen (Occupational Therapy), $1,000.00 for training session on Experiential Learning in the Occupational Therapy Curriculum.
- Christopher Gable (Music), $400.00 to bring in a visiting composer to conduct a lecture for music educators and music education students focusing on strategies to bring music compositional thinking and new music skills into the early stages of a musician’s education.

To discuss ideas and drafts before submitting a proposal, contact Anne Kelsch, Director, Office of Instructional Development (777-4233 or anne.kelsch@UND.edu)
MEET OUR NEW FACULTY

**Bryan S. Delage, MD** grew up in Brooks, MN, 60 miles east of Grand Forks. He attended Pershing HS in Plummer, MN, graduating in 1981, and the University of Minnesota Morris where he received BAs in Chemistry and Biology, graduating in 1985. He spent the next 2 years at the U of M Duluth Medical School where he participated in Hypothermia research, was an Alpha Omega Alpha nominee, and received the Alworth Memorial Scholarship. He transferred to the U of M School of Medicine in Minneapolis and spent 9 months doing the Rural Physicians Associate Program in Benson, MN. He graduated with an MD in 1989 on the day his daughter was born; and started a UND Family Practice Residency in Fargo in July of 1989, graduating in 1992. Bryan was the Resident Teacher of the Year at the Fargo campus in 1992. He spent the next 22 years practicing the full scope of Family Medicine in the small town of Ortonville, MN making time to race bicycles, compete in a biathlon, and organize a ride from International Falls to New Orleans for MS. He also worked as a Medical Volunteer at the 2002 Olympics in Salt Lake City, served in both the North Dakota Army and Air National Guard, and competed with the ND Guard Biathlon team. Promoted to Colonel in 2013, Bryan is currently the State Air Surgeon with the ND Guard assigned to Joint Force Headquarters in Bismarck. He has also been involved with taking medical providers and students to Haiti; to Mission of Hope for a week of teaching medical providers there, as well as seeing patients on Mobile Medical outreach to local villages. Bryan is a private pilot and flight surgeon, and he enjoys biking, running, hunting, flying, skiing, fishing with friends; and especially time spent with family.

**Nicole Harris** received her Masters Degree in Occupational Therapy from UND in 2012 after obtaining her BS in Kinesiology and Health Promotion from the University of Wyoming. She has been working in a home health setting prior to becoming part of the Occupational Therapy Department faculty. Nicole is currently teaching at UND’s satellite site in Casper, WY. She will begin pursuing an EdD Degree in Educational Administration, specializing in Adult and Postsecondary Education in the spring.