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### Helping Students Make It Stick

**Peter C. Brown**

**Author of Make it Stick: The Science of Successful Learning**

The most effective strategies for making learning stick are far from what most of us do as professors and students. Professors commonly focus on lecturing and explaining. Students lean on underlining, highlighting and rereading notes and texts (the preferred study strategies of more than 80% of college students). In other words, intuition tells us to try to drive new learning into the brain, but a large body of empirical evidence shows that trying to get new learning out of the brain is what builds the robust neural pathways that make the learning stick. Mental effort builds mental ability.

Cognitive psychologists Robert and Elizabeth Bjork at UCLA have coined the phrase “desirable difficulties” to characterize strategies that require the kinds of active mental engagement that make learning deeper and more durable. Among these are retrieving learning from memory; spacing and mixing practice sessions when studying (mixing up topics rather than cramming); testing oneself to practice retrieving information; trying to generate the answer to an unfamiliar problem before being taught the solution, followed by corrective feedback and instruction; and elaborating on new material to give it meaning by putting it in one's own words, connecting it to what one already knows, and perhaps constructing mental cues to help recall the knowledge later.

How can such strategies be brought into the classroom without creating untenable demands on professors? Henry Roediger at Washington University at St. Louis, whose research helps to inform the new science of learning, says that for starters professors can trade off some of their lecture time to engage students in grappling with class material. Below are short recaps of how three professors have made room for desirable difficulties in their classrooms.

**Mary Pat Wenderoth, biology, University of Washington, Seattle**

In a Biology 220 course, Wenderoth and a colleague switched from what she calls a “low-structure” format (midterms and a final) to a “high-structure” format, with daily reading quizzes and weekly practice exams.

Wenderoth says this change was most challenging in the first year because of the extra time to write the practice exams. The best source was old exam questions. Wenderoth asks students to grade their own answers (to increase metacognition).
and then either the instructor, lab coordinator or lead TA checks the answers. This approach gives the instructor insight into how students are thinking about topics and gives students practice in writing out answers.

Wenderoth says that her biggest change to class structure has been to prioritize the information. She cites Grant Wiggins' and Jay McTighe's book Understanding by Design. “They talk about 3 levels of information: enduring understanding, important to know and do, worth being familiar with.” To make time in her classes for students to actually work with and solve problems, Wenderoth has moved the information “worth being familiar with” either to the reading quiz or greatly minimized it in class. “Isolated pieces of information that fit into this latter category are seldom retained, and Google is a ready source.”

Wenderoth says, “The biggest change to my teaching is that I approach each class with the mantra 'Ask. Don't tell.' I basically use the same class notes/outlines and just use them in a different way. I figure out how to ask students questions to guide them into constructing their own understanding of the topic.

“So time-wise, creating reading quizzes takes time the first time through, weekly practice exams are just old exam questions. Reviewing student answers can take time if the instructor does it rather than the lead TA. Prep for class just means I have to think about what students struggle with and how to ask the right questions to guide their understanding. This last one takes time to get good at, but with practice even the instructor gets better and teaching becomes much more fun.”

Andrew Sobel, political economics, Washington University at St. Louis

Sobel teaches a big lecture course in international political economics to freshmen and sophomores. The class meets 26 times over 13 weeks. When he learned about the benefits of retrieval practice as a learning strategy, Sobel instituted 9 quizzes spaced across the semester. He tells the students which days the quizzes will be given, so there are no surprises.

(Sobel had tried a regime of pop quizzes some years earlier, thinking it might create an incentive for better attendance, but had to abandon them. When students did poorly in a quiz they dropped the course rather than risk a bad grade, and class reviews and enrollment plummeted.)

To accommodate the quizzes without sacrificing more lecture time than he was willing to give up, Sobel dropped the midterm and final exams. Every quiz covers recent material and also reaches back to help lock-in material from earlier in the semester and connect it to subsequent learning. The quizzes count for 90% of a student’s grade, and the last 10% is at Sobel’s discretion.

Five years into this new format he said, “The quality of discussions in class has gone way up. I see that big a difference in their written work, just by going from three exams to nine quizzes.” By the end of the semester student mastery is comparable to what he's seeing in his upper division classes. Meanwhile, the predictable quizzing schedule has been accepted and even embraced by students -- class enrollment has grown from 165 to 185 and counting.

“The interesting thing about adopting this strategy is I now recognize that as good a teacher as I might think I am, my teaching is only a component of their learning, and how I structure it has a lot to do with it, maybe even more.”

Kathleen McDermott, psychology, Washington University at St. Louis

McDermott administers daily low-stakes quizzes in a university class on human learning and memory. It’s a class of 25 students that meets twice a week for 14 weeks, minus midterms and a final exam.

McDermott gives a 4-item quiz in the last 3-5 minutes of every class. The questions hit the high points of the lecture and/or the readings. If students have understood the material, they will get all 4 answers right, but they’ll have to think in order to do it. Anything covered in the course to-date is fair game for a quiz, and she will sometimes draw from past material that she feels the students haven’t fully grasped and need to review.

To accommodate unexpected absences and keep demands on McDermott’s time manageable, students are allowed to drop four quizzes across the semester. In exchange, absences need not be justified, and no missed quizzes will be made up.

By the end of the semester, her students say that the quizzes have helped them keep up with the course and discover when they are getting off track and need to bone up. “The key with quizzes is to establish very clear ground rules for the student, and make them manageable for the professor,” McDermott says. “As a student, you’re either there and you take it, or you’re not. For the professor, no hassling over makeup tests.”

The quizzes in totality count for 20% of a student’s grade in the course. In addition, she gives two midterm exams and a final. The last two exams are cumulative, reinforcing learning by requiring students to engage in spaced review.

[Adapted from Make it Stick, The Science of Successful Learning, by Peter C. Brown, Henry L. Roediger III, and Mark A. McDaniel, Harvard University Press.]
Many issues facing society are complex and involve many different perspectives. As such, it is becoming increasingly imperative for students to engage in authentic, real-world learning activities that require an integrated, multi-faceted, and evidence-based approach. Performance Tasks represent an effective venue by which faculty can provide students with authentic learning opportunities and are also ideal for “flipped classroom” and active, collaborative approaches to learning.

A Performance Task typically includes a scenario focused on some important topic, a “document library” of materials (such as corporate memos, articles from a local paper, scientific reports, historical materials, etc.), and a set of questions. Answering the questions requires students to analyze complex, realistic scenarios and involves synthesizing information from multiple sources; developing sound conclusions based on all available evidence; and utilizing the most relevant and credible evidence available to justify conclusions. Performance tasks improve higher order thinking and writing skills within the context of course-specific content.

Performance tasks ask students to address muddy, real-world challenges in intellectually engaging contexts. Students address these challenges by applying critical thinking skills and content knowledge, while acquiring additional information as necessary to resolve the problem. The intellectual work required to complete a task is normally very engaging because of its real-world, problem-solving dimensions. They are very effective in terms of learning, while also being useful as graded projects or for a variety of assessment purposes. They can be used as homework assignments or worked on in class. They can also be done individually or in groups.

The CLA workshop will focus on the following general topics:

1. An introduction to critical thinking performance tasks.
2. Thinking about higher order cognitive skills for your students.
3. How to assess higher order thinking.
4. Developing effective rubrics.
5. Developing effective Performance Tasks and sharing results with others.

Faculty who complete the Academy and submit a performance task for inclusion in the program’s “Performance Task Library” are given access to all other performance tasks submitted by previous attendees – a significant benefit to CLA academy participation.

The Office of Instructional Development (OID) will cover all registration costs for UND faculty who wish to attend the two-day workshop (Thursday, February 4th from 8-5 and Friday, February 5th from 8-3).

Further reading on Performance Tasks can be found at: http://jcsites.juniata.edu/faculty/kruse/misc/Chun_Change_TakingTeachingToTask.pdf

If you would like further details on the CLA workshop, contact Jeff Carmichael (Jeffrey.Carmichael@und.edu or 7-4233). To register, please go to: www.oid.und.edu, then “Workshops”. Registration deadline is noon, Monday January 11. However, space is limited and will be offered on a “first come, first served” basis—so register soon!
Putting the Service and the Learning in Service Learning
Hailey Hansen, Communication Intern
UND Center for Community Engagement

Faculty at UND who are new to using service learning as well as those who have been using it in their teaching for years might be interested in learning about some of the best practices for this pedagogy, resources available on campus, and local opportunities available to students. Growing numbers of universities, UND among them, have seen the value of incorporating service-learning as a method into the curriculum to engage students in their learning. By working collaboratively with residents and organizations, such learning can provide an important academic benefit to the community. Read on to find out more.

What is service learning?
Service-learning can be misunderstood when it is viewed as community service projects like volunteer work. As important as volunteering is, service learning is quite different, because it combines community benefits with academic learning, while community service may be simply raking leaves or painting a fence. Service learning offers learning beyond the walls of the classroom through collaborations with the community and its residents. Incorporating an active learning strategy in an authentic context challenges students in new ways to discover or apply course knowledge.

What is UND doing with service learning?
The UND Service-Learning Program was developed in 2008 by interested faculty with support from the Center for Community Engagement. According to Lana Rakow, director of the Center and professor of Communication, UND faculty developed a definition of service learning to use as a guide, a definition that identifies service learning as experiential learning for academic credit that benefits the community. They also developed learning goals which they encourage faculty to add to their course goals (see “Choose Learning Goals” table). Faculty who are teaching service-learning courses are asked to collect assessment information from students and their community partners for the faculty member's benefit as well as to help the Center gather information about the impact of the method. Assessment methods and ready-to-use forms are available on the Center's website (www.communityengagement.und.edu).

How do I get started?
Seasoned service-learning faculty have some sound advice for those who might want to give it a try. LaRoyce Batchelor, for example, an instructor of Entrepreneurship and the recipient of the 2014 Faculty Service Learning Award presented by the Center for Community Engagement, has used short term and long term projects. “Service-learning can be done in as little time as half an hour. It depends on the interaction of the students with their client and how rich they want their experience to be,” she said. One of Batchelor's service-learning projects extended over a course of several semesters with a particular client, Red River Valley Community Action, which worked with students who helped them create a business plan, perform extensive research, and conduct a competitive analysis. When Batchelor was asked what advice she would give to interested faculty, she gave five guidelines she uses to determine if the community organization or client will be effective in relation to her course goals. First, she said, ask yourself, is this client ready to interact with my student? The student should treat the service organization as a client, not as a professor. Second, does this sit within the learning outcomes of the course? Third, how much information do I give my students in order to prepare them for this client? If the community organization is too complicated, it may not be a good fit because learning outcomes might get lost. Fourth, how would my student put this on a resume? And last, at what point do I fire a student or client? Anticipating how to deal with potential problems can lead to positive conflict resolution if problems come up.

What service-learning opportunities are available for UND students?
There are plenty of opportunities available locally and regionally for students in any discipline, according to Rakow. For example, plans have begun for an event in April of 2016 that Rakow hopes faculty will consider. A forum resulting from collaboration of academic programs and courses will lead to a day of learning together by students, faculty, and the community. Projects conducted by students in service learning courses will be welcomed. If you are interested in helping plan or involving your courses in the forum, please contact Rakow at 701.777.2287 or lana.rakow@und.edu.

How can I get help and support for using service learning?
A box lunch discussion on service learning will be held Tuesday, Dec. 8 at 12:30 in the Badlands Room of the Memorial Union. The event is co-sponsored by the Office of Instructional Development and the Center for Community Engagement. If you can't make it to the lunch, Rakow said she is happy to talk to any faculty member or department looking for projects and community partners or resources on how to use service-learning.
Choose Learning Goals for Your Service-Learning Course

Want to use service learning in a course? UND faculty are encouraged to add at least one of the first three goals as well as the last to course goals. Goal #1 addresses Essential Studies outcomes. The indicators below each goal provide ways to gauge what learning has occurred.

1. Civic Skills - Students are prepared with the skills to participate in the public life of their communities.
   a. Students use a variety of thinking and reasoning skills, including civic imagination, in civic contexts
   b. Students write and speak in civic settings with a sense of purpose and audience
   c. Students access and evaluate information for civic purposes
   d. Students understand socio-cultural diversity in its community contexts

2. Civic Knowledge – Students are able to participate knowledgeably as citizens in public life.
   a. Students apply their knowledge of the community or of matters of public importance to civic contexts
   b. Students demonstrate their understanding of a citizen’s responsibilities to others, to society, and to the environment
   c. Students analyze underlying issues and assumptions to help solve public problems
   d. Students conduct community-based research to benefit communities

3. Civic Professionalism – Students learn how their fields, professions, or careers can contribute positively to public life.
   a. Students analyze critically how the actions and decisions of professions and professionals impact a community, society, or global context
   b. Students identify the civic and ethical responsibilities of people in specific fields/careers/professions
   c. Students apply professional knowledge to address needs and opportunities of communities

4. Civic Impact – Students improve community well-being through their academic service.
   a. Service addresses a community need or opportunity determined by community members or community partners
   b. Service involves a reciprocal relationship with community members or partners
   c. Service provides beneficial results to community members or partners
   d. Service helps bring the University and its communities closer together.

Summer Instructional Development Professorships

Proposals for Summer Instructional Development Professorships (SIDPs) are due March 1, 2016 (by noon). Summer salary stipends are $4,000.

The Office of Instructional Development (OID) and the Faculty Instructional Development Committee (FIDC) award Summer Instructional Development Professorships (SIDPs) to faculty working on innovative instructional projects. The projects are intended to support instructional development that has the potential to improve the quality of teaching at UND and goes beyond normal course development.

1) Faculty might seek to apply a specific pedagogical approach (e.g., experiential learning, inquiry-based learning, game-based learning, undergraduate research) or use comparable teaching resources (e.g. the SCALE-UP classroom, distance technologies).

2) Faculty might seek to improve certain common types of classes or common subjects that they want to embed in courses that already exist in the curriculum (e.g., adding specific objectives/course content to capstone courses, embedding specific information in courses that give academic structure to internships, or preparing common subject matter for introductory courses).

We encourage consideration of formal workshops (Writing Across the Curriculum or Teaching with Technology) as a tool that individuals can use to improve their project.

Note: SIDP projects fund 120 hours of course development work during the period May 16-June 30. The allocation of the course development hours (and associated stipend funds) over this period is at the discretion of the proposers. Because of funding restrictions, all work on SIDPs must be completed by June 30. It is the responsibility of the participant to ensure the SIDP stipend does not conflict with other obligations for summer salary and to secure prior approval from the Provost for any overload effort, if needed.

Faculty Instructional Development Committee announces awards

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.

In November, the FIDC awarded grants to the following faculty members:

- **Danielle Condry** (Basic Science), $1,500 (equipment). Enhancing and Updating Microbiology Lab Experiences in Undergraduate and Professional Programs at the school of Medicine and Health Sciences.

- **Emanual Grant** (Computer Science), $1,500 (international travel). 1st International Workshop on Case Method for Computing Education (CMCE).

- **Mary Haslerud Opp** (Communication). $916.55 (travel). National Communication Association Convention “Embracing Opportunities”.

- **Andrew Quinn** (Social Work). $1,000 (travel) to present “Using Student Produced Videos in a Social Work Human Behavior Class” at the National Social Science and Technology Conference.

- **John Shabb** (Basic Sciences). $1,000 (travel) to present “A Comparison of Active Learning TEAM Approaches: TBL and POGIL” at the 8th Annual Conference on Higher Education Pedagogy.

To discuss ideas and drafts before submitting a FIDC proposal, contact Jeff Carmichael, Acting Director, Office of Instructional Development (777-4233 or jeffrey.carmichael@und.edu).
Spring Faculty Study Seminars

Faculty Study Seminars allow faculty with common interests to learn more about a teaching-related topic. Each group meets approximately four times a semester, at times mutually agreed upon by participants, to read and discuss a teaching-related book (books provided by OID). Your only obligation is to read and to show up prepared for discussion. To sign up for a Faculty Study Seminar, e-mail the facilitator noted below with your contact information (e-mail and phone). You will be contacted to set an initial meeting date.

Interested in leading a Faculty Study Seminar this spring?
Please contact Jeff Carmichael, Acting Director of OID (Jeffrey.Carmichael@und.edu).

Unflattening

By Nick Sousanis (Harvard University Press, 2015)

How do we think? How do we make meaning? How do our students construe the information they encounter? In Unflattening, Nick Sousanis defies conventional forms of scholarly discourse by using graphic art to provide a serious inquiry into the ways humans construct knowledge. Through its graphic innovations, Unflattening challenges the kind of rigid thinking that Sousanis calls “flatness.” By fusing words with images, Unflattening produces knew forms of knowing and encourages readers to access modes of understanding that move beyond traditional learning methods.

As the first graphic scholarly text ever produced, Unflattening provides an engaging and challenging read and will evoke as much discussion over its form as its content.

Tami Carmichael, Director of Integrated Studies, will facilitate this Faculty Study Seminar. To join the group, contact: tami.carmichael@email.und.edu

Look for additional Faculty Study Seminars advertised early in the spring semester.

Writing Center Blurb for Course Syllabi

The Writing Center serves both student and faculty writers from across the disciplines, offering support from the inception of a writing project to its final edits. Students are more likely to use our services when faculty members emphasize the importance of writing, revising, and collaboration. Please consider including the following section in your course syllabi so that our student users are aware of Writing Center services:

For the Spring Semester, The UND Writing Center is open from January 18th to May 13th. The Writing Center offers free 30 minute sessions in which trained Writing Consultants work with undergraduate, graduate, and faculty writers by offering constructive feedback during any stage of the writing process. The Writing Center is open from 10 am – 4 pm, Monday – Friday, and 7 pm – 9 pm, Monday – Thursday. You may schedule an appointment by visiting writingcenter.und.edu or by stopping by Merrifield Room 12 during open hours.
## UPCOMING DEADLINES

**FIDC Grants:**

- December 01, 2015: Travel & Materials
- January 04, 2016: Travel & Materials
- February 01, 2016: Travel & Materials
- March 01, 2016: Travel & Materials and Summer Instructional Development Professorships (SIDPs).

**CLA Academy Performance Task Workshop Registration:**

Monday January 11th, noon. Please go to: www.oid.und.edu, then “Workshops” to register.

Space is limited and will be offered on a “first come, first served” basis—register soon!

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*ON TEACHING* is published six times a year as a service to UND faculty.

OID Director: Jeff Carmichael.
WAC Coordinator and newsletter editor: Shane Winterhalter.
OID/WAC Staff: Jeanne Boppre & Jana Diemert.