



TEACHING MATTERS

newsletter

UNB Saint John

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“TEACHING DEEPLY”

EDITORIAL BY DAVID CREELMAN & SANDRA BELL

Let's admit it: every once in a while, when we are rushed or underprepared, all we really want to do as teachers is to get through the lecture intact. But such moments, occasional as they are, are not terribly satisfying. Much better are those classes when we teach deeply, when we are well prepared, allow the students to really dig into the material, facilitate links between parts of the course, and allow the students to see how the material at hand relates to larger developments in research and society. Deep teaching can lead to deeper learning. Such moments happen and while they may have something to do with luck, they definitely happen more often if we plan to integrate multiple levels into our teaching.

In this edition of *Teaching Matters* we reflect on how we can better appreciate and better prepare for such moments of deep teaching and learning. Dr Donnelly's article reflects on a sometimes neglected moment when our research enters into our teaching, and into the teaching practices of other institutions. Dr McLaughlin's work on biography in the classroom demonstrates the importance of incorporating some of our own history and experience into the courses we teach. Dr. Wasylikiw and Dr Tomes remind us that even the assessment processes in our courses can be used to deepen and develop a student's learning. And finally, Dr Murray's article outlines how even the last class of the term can act as a capstone, securing the gains our students have made. Almost every element of our teaching can be used to help our students experience our courses more fully and we hope these articles, some of which were presented at last year's AAU Showcase here at UNBSJ, inspire a few new ideas for you. Dig in!

University of New Brunswick

Saint John, New Brunswick, Canada

TEACHING MATTERS IN ALL ITS FORMS

BY FRED DONNELLY - DEPT OF HISTORY & POLITICS, UNB SAINT JOHN

If teaching really does matter, then it should be recognized in all its various forms. For those faculty members at the University of New Brunswick one guideline to the assessment and recognition of teaching is section 25D.06 (a) of our 2005 Collective Agreement. Broadly worded it covers a wide range including: student opinion surveys, curriculum development, supervision of theses, use of innovative teaching techniques and publication to "advance teaching effectiveness".

Most faculty, I suggest, do not publish in the field of educational innovation and advancement so the emphasis of teaching assessment usually comes down to what the instructor does in the class room at his or her home institution. A common complaint is that too much significance is attached to the student opinion surveys.

Moreover the necessity to focus on the teaching function at the place of employment may obscure other, wider contributions a faculty member has made in the dissemination of knowledge. Sometimes lost in the process is a phrase in the UNB Collective Agreement's teaching criteria that refers to "public and/or continuing education activities".

Perhaps these are the terms we should re-examine in our efforts to assess teaching in all its aspects, including that done at other institutions. Here I want to draw attention to what I think is a neglected aspect of the pedagogical achievements of many faculty.

Some members of faculty have publications that are used as readings by instructors at various universities across Canada and in other countries. In such cases we are dealing with an aspect of a publication that is beyond and separate from its research dimension. The publication has been deemed a significant part of the literature on a topic by colleagues, often unknown personally to the author, and included on a graduate or undergraduate course reading list.

With the advent of the Google search it has become possible for academics to find their publications on reading lists at other universities. At some institutions the course reading lists are posted on the Internet and are usually accessible somewhere via the university's home page. A search for your own name as it appears on publication often turns up interesting and unexpected results.

Here are three examples from publications of faculty in the History and Politics Department at the University of New Brunswick's Saint John Campus.

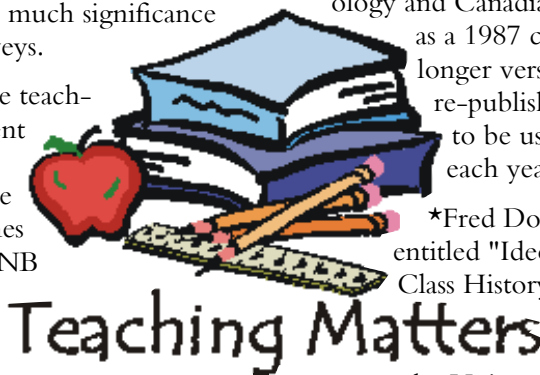
*Joanna Everitt (Politics) co-edited an anthology of readings with Brenda O'Neill entitled *Citizen Politics* (Oxford University Press, 2002). A quick check via an online search reveals her book is used for course readings in third and fourth year Political Science courses at McGill, Wilfrid Laurier and Toronto universities.

*Gerg Marquis (History) has had an essay adopted as a course reading in Law 1000 at Carleton University in Ottawa. Entitled "Doing Justice to 'British Justice': Law, Ideology and Canadian Historiography" it was presented as a 1987 conference paper, then published in a longer version in a book, then the original was re-published in a course pack by Captus Press to be used by large numbers of law students each year.

*Fred Donnelly (History) has a journal article entitled "Ideology and Early English Working Class History: E.P. Thompson and his Critics", *Social History*, 2 (1976) that is on the current reading list in senior courses at the University of Warwick and the London School of Economics in England.

The three examples have some common features and some significant differences. In all three cases we have a positive assessment by "external" colleagues of the pedagogical value of these publications. In Joanna Everitt's anthology there is an editorial dimension quite distinct from her own research contribution to the book. The papers or essays selected by her in her *Citizen Politics* have made a successful contribution to the teaching of Political Science beyond the walls of the University of New Brunswick in Saint John.

Greg Marquis' publication is something quite different in that it has pedagogical utility in another discipline. A work of a Canadian legal historian has become a widely used reading in a Faculty of Law. In addition Greg estimates that far more students have read that article at Carleton than he has ever taught at the University of New Brunswick.



TEACHING MATTERS IN ALL ITS FORMS (CONTINUED)

BY FRED DONNELLY - DEPT OF HISTORY & POLITICS

My own effort in this regard has another, some would say, strange aspect. Originally written as a contribution to a "hot" debate in British social history several decades ago it has become a permanent member of many a reading list, especially in historiography courses. Perhaps it illustrates how some publications exhibiting a pedagogical usefulness can have an extraordinarily long "shelf life".

What I would like to see as a greater appreciation of this type of publication in our consideration of the teaching of colleagues. Faculty should be encouraged to list in the c.v those of their publications used at other institutions of higher learning. These should be listed separately, and double counted, in both the research and the teaching assessment. Such publications have an element of external assessment and they have a pedagogical dimension I see as separate and distinct from their scholarly research contribution.

Fred Donnelly teaches British History at the University of New Brunswick in Saint John.

CALL FOR PAPERS: NEXT ISSUE

DAVID CREELMAN & SANDRA BELL

Next Issue: The winter 2010 issue of *Teaching Matters* will provide a venue for students to speak out about what works (or not) in the classroom, and what motivates them to learn. Watch for the "Dear Professor" issue! Here's the call we will be sending out to students.

"Dear Professor"

Students: We need your opinions!

Teaching Matters is a bi-annual publication devoted to teaching and learning on the UNB Saint John Campus; its primary audience is our faculty—your professors. We are hoping to make the 2010 Winter publication our "Dear Professor" edition, full of teaching and learning issues that you, the students, feel are important. As professors, we don't often get the feedback we need to become better teachers, so **help us** by letting us know what you think. What are the teaching approaches in the classroom that help you learn? What does and doesn't work? What motivates you to want to learn? What were your best (or worst) learning experiences?

If you wish to contribute to this publication of *Teaching Matters*, please send a one or two paragraph "Dear Professor" letter to one of the co-editors: Dr. David Creelman and Dr. Sandra Bell. If you have any questions, please send inquiries to either creelman@unbsj.ca or sbell@unbsj.ca.

If you wish your letter to be anonymous, please send it to Rosemary Dionne, secretary for the Teaching and Learning Centre on campus; Rosemary will remove any identifying material from your email. Her email address is rdionne@unbsj.ca. You can also bring a hard-copy to the Teaching and Learning Centre (Ward Chipman Library 234A), marked "Attention: Rosemary Dionne."

The co-editors of *Teaching Matters* reserve the right to edit letters. Remember that your letter might be published, so please make your criticism constructive and avoid personal attacks!

BIOGRAPHY: MEETING SIMPLY IN COMPLEXITY

MY BEGINNINGS WITH BIOGRAPHY

BY JOHN GRANT MCLOUGHLIN - DEPT OF EDUCATION, UNB

Fifteen years ago I began an unusual first year (1000 level) math course with a group of students at an Atlantic Canadian institution. Some things were particularly atypical about the course. First year students were not allowed to take the course, as the official prerequisite of completion of a first year math course precluded their participation in a fall course offering. The course was also unusual in that it had not been offered before at this location. A small number of students registered for this course.

Why do I mention the teaching of that course? It was particularly significant for me. The course formed the basis of my doctoral dissertation: *Exploring Students' Perceptions of Mathematics through the Context of an Undergraduate Problem Solving Course* (Grant McLoughlin, 1997). This dual experience of teacher and researcher was integral in the development of my own teaching philosophy. Writing was integrated into the teaching of the course. One such written assignment was biographical. Students shared insights into their mathematical stories through writing. Over the past fifteen years, this practice has become a core component of my teaching.

Informal Assessment

Who are the students in my class this term? What are they bringing with them to the class? Do they have an anxiety about mathematics? Is it fair to assume that they know the concepts and terminology that they should have in place at the outset of the term? Broadly speaking, I set out to create a picture of the individuals and the collective during that critical opening week of a course. This entire process is referred to here as **Informal Assessment**. Underlying this process is an intention on my part to gather knowledge about my class in a way that promotes a healthy learning environment while not threatening, but rather welcoming the students into the class. As adult learners, these students must take responsibility for the implications that may arise. For example, if it turns out that their math skills are evidently weak, then they can come forth to address that concern. Also, the biographical piece is intended to open a channel for communication.

This article details two examples of informal assessment. One activity, *The Colour of Math*, is shared here prior to shifting the focus exclusively to the focal point, namely, biography.

The Colour of Math

If math is a colour, what colour would it be? And why did you select that colour?

Please respond to those questions on the piece of paper provided to you. Please do not put your name on the paper.

I ask this question before introducing myself to the class the first day. I proceed to make a couple of tours of the class walking with an envelope opened for the deposit of the completed responses. Then when the students' responses have been completed, I pull them out of the envelope and read them aloud reminding them that they are anonymous unless they identify their own to others.

The responses have a way of putting people at ease while engaging us in some amusement at the images conjured about math or the hidden written talents among us. The fact that math is blue to some is not so telling; instead the richness comes through the description of it being blue like the sky when it is bright, or blue since that expressed one's feeling when they heard the word.

Two undergraduate experiences with the colour of math are particularly memorable to me. While at Memorial University of Newfoundland (MUN) I taught a statistics course dedicated to nursing students. The dark images presented through this activity effectively brought forth the high level of anxiety and apprehension in the opening moments of the course, without introducing a number or a symbol. However, it also offered a comfortable place of entry for these same students as the companionship was evident. No one was alone with their anxiety! Then there was one section of an elementary math methods' course at MUN one year in which the majority of students clearly depicted math as being bright and something that was enjoyed by them. My experience with elementary math teachers told me this was a special group. Unlike most groups, here I would have to challenge the class in a different way since they were very good at math. Further, I would need to be especially conscious of the anxious as they would not have the usual comfort in large numbers that was expected. Such insights on the first day are beneficial to the development of the course as a whole.

The experience in other cultural settings has been particularly enriching to my teaching. For example, I have taught

in UNB's B.Ed. Program with teachers in Trinidad and Tobago on six occasions to date. The participating students are experienced teachers who are now seeking a degree. These teachers are surprised that such a question even gets asked in a math class. The invitation to write and offer insight into the emotional aspect of math is contrary to their exam-focused experiences. The colourful writing and expressive language makes this a wonderful way to open the avenues of communication between cultures and peers while framing a healthy atmosphere for building a learning community.

Biography across Cultures

Much of my teaching in recent years has been with teachers in other settings. Two courses were taught during the month of January 2006 with a group of 23 Bhutanese elementary teachers in Samtse, Bhutan. Much was gained from the biographical opening to the courses. (Please see Appendix A.) Two particular revelations struck me through the course of reading the pieces. First, corporal punishment had been associated with the learning of mathematics. Errors were punished frequently through physical means, thus contributing to the subsequent observations of diminished risk taking and problem solving experiences. Second, the gratitude for the opportunity to write in a class about personal experience was uplifting to many students. It appeared to potentially serve a healing role. These observations have been reinforced through my teaching experiences in Trinidad and Tobago, where I have taught approximately 325 students.

The biographies in Trinidad and Tobago have informed me deeply about the context and experiences of the unusual B.Ed. students -- unusual in that the majority are between the ages of about 32 and 45 with an average of about 15 years teaching experience. They have not been in math classes as students for many years, but rather as teachers. The assigned biographical sketch is given in the opening class and is to be submitted no later than the third day of classes, so that I can respond to all of them prior to leaving the area. This is particularly important for the eight or ten that, I feel upon reading, require a further conversation. This may be due to the evident anxiety, a difficult personal situation, or a request on the part of the student.

Excerpts from several biographical sketches provide snapshots of the picture being created through this process. The indented comments are actual excerpts; other comments are my own:

The personal matters in people's lives depict to me the relative unimportance of a course, as well as providing a

sense of the obstacles external to anything mathematical in nature:

Some of the challenges facing me are an asthmatic husband who gets ill quite frequently and a paralyzed brother whom I have been caring for ... my father is aging and is ill very often as well. For now they are my only distractions...

Immediate practical concerns may be raised. Keeping in mind that this course would become an online course the following week, the revelation of this student is helpful:

Where I live poses some difficulty for me in doing this programme, since I am unable to get phone line from the telephone company so that I can be online. The area is a new development and all the existing lines are in use.

Then there are the prior experiences with mathematics that could be described as ugly or possibly horrific at a personal level. It is important for me and these students to remember these experiences have been inflicted by others in the teaching profession. One student recalls the following incident:

The teacher called a spontaneous 'tables test'. She would call out the questions and we had to write the answers within a specific timeframe. I gave several wrong answers. I was scared mainly because she had a whip that she used to punish us when we did badly. However I was in for a lot more than just the whip that day as I was the only child to get less than half of the questions correctly.

Along with four strokes she presented me with my own nametag "duncy head". My teacher laughed as she stuck it to my uniform. I remember my classmates laughing and calling me names. I tried very hard not to show I was hurt, but I could not. I cried and cried. I did not tell my parents what happened that day for fear of being further ridiculed.

Others share thoughts that articulate the sense of angst or awkwardness associated with their mathematical story, for example:

I struggled with Math at Teacher's College and passed by the grace of God and have always struggled to understand the reason for Math in this existence. As a child I developed bogus ways to solve Mathematical problems, which took me through my adult life. When my first child was about 7 years old, I had to 'unlearn' these techniques in order to help him.

Another student expresses recent anguish upon learning that her cohort's first UNB course would be math:

When I learnt the first module in this course was Math I became petrified, anxious and down right devastated. I even cried.

Cultural realities of the present educational context become apparent through the words of the teachers. The significance of achievement, as measured by success on a national exam, takes on a power of its own. The following excerpts from three individuals point to its impact on teaching, identity, and perception.

I certainly never have the opportunity to do too much conceptual teaching when the main focus of all the stakeholders (teachers, parents, principal, pupil) is to enter a prestigious secondary school.

My Form 1 Math teacher made no secret of who his favourite students were. I was not one of them but because I was so fond of him, I really tried hard to make high marks. I wanted so bad for him to take notice of me. When he did, it was for all the wrong reasons; re: my behaviour in class. He remained with us for three years. I kept trying to impress him and was eventually rewarded with a distinction in CXC Math. It was then that he remembered my name.

I have always liked Mathematics, but yet always fearful of failing it. I failed it at GCE (General Certificate Examination) but was successful afterwards.

Several themes emerge as threads in my experience with the Trinidadian teachers. The following comments capture a common sentiment, namely, an anxiety that has been moderated by years of teaching the subject. Returning after years to again be students of math brings back some of that anxiety tempered by an adult maturity in terms of learning. Underlying this commitment is the desire to do what is best for the children they teach. Gratitude and respect are evident at many levels as these teachers encounter math differently than before. Keep in mind that even that first day together has already created a distinction between past and present images of mathematics.

To be quite frank, I have not yet overcome my fear for Mathematics, but I am not as uncomfortable as I was when I started teaching. I am still apprehensive with certain topics, long division being one such topic. I am really excited when learning; often it is like a light bulb just going on in my head. More than knowing and en-

joying the subject myself however, I feel I have a responsibility to communicate this knowledge to my students in a non-threatening and enjoyable way.

It is important to reiterate the fact that this takes place after the opening class, in this case a day of math. They have experienced aspects of the aforementioned informal assessment process when they write the sketches. I mention this and close the section with an example that reminds me of another reason this is so important. My perceptions are affected by what is written, as frequently my own perception of the adult learner, while perhaps accurate, may clash with the perception they entered the class with hours earlier. Hence, the written response and the reading weave together nicely to bridge this reality. The following is a response from me to one of the students:

The sketches are valuable in so many ways. I sense in class that you are doing well at making sense of the math being discussed. In fact, it seems like you are thriving with the approach and the learning environment. (I hope that my perception is not far off. Let me know please if it is.) Anyhow your history does not paint as bright a picture. Let's hope that the excellent lecturer at Teacher's College marked a turning point that continues to blossom here. Welcome and thank you for the reflections. John

DISCUSSION

Informal assessment and particularly the biographical work have become foundational to my philosophy of teaching. I no longer circulate the course outline on the opening day as there needs to be flexibility on my part to modify expectations should something unusual arise. Classes hold surprises. I will return to Trinidad at least twice during the 2009-2010 academic year with knowledge that my awareness of the cultural and learning contexts are much enhanced from my first visit in 2003. However, this knowledge is accompanied by an even greater sense of knowing that I also know less -- there is much that comes forth in each course with another cohort made up of distinct people forming a collective identity, yet remaining 50 or 60 individuals at the core. Each person holds many stories. Upon leaving at the end of one week together it is not possible to know which of those students will encounter life-changing events during the term ahead. This is also true in classes on campus at UNB.

REFERENCES

Grant McLoughlin, John. (1997). *Exploring Students' Perceptions of Mathematics through the Context of an Undergraduate Problem Solving Course*. Doctoral dissertation, State University of New York at Buffalo.

APPENDIX A

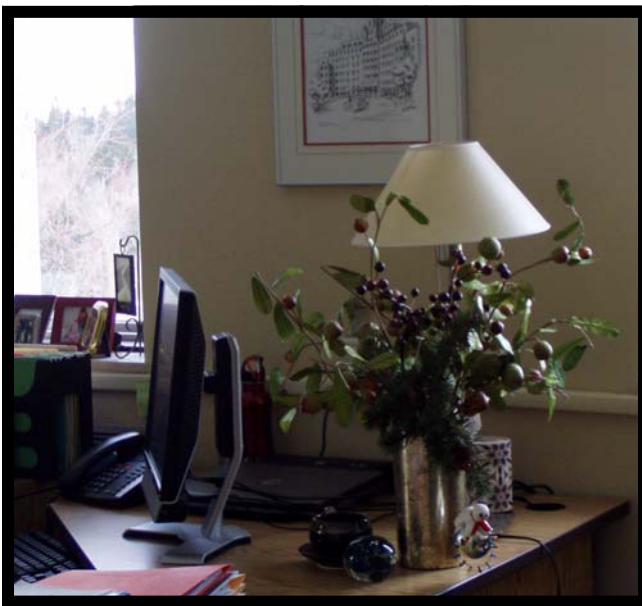
ASSIGNMENT 1: AUTOBIOGRAPHICAL SKETCH

All students are required to write a brief autobiographical piece about their mathematical history. It is particularly important to identify some of your feelings toward mathematics. You are encouraged to identify one or two significant incidents or experiences that may have shaped your perceptions. The stories are personal and will not be shared with the class.

Please consider this as an invitation also to share any special circumstances (e.g. pending surgery; serious illness of family member; an issue related to learning) that may interfere with your participation in the course. You are welcome to share such a circumstance through conversation rather than writing.

This assignment will not be graded. Comments will be provided as a means of facilitating communication between individual students and John Grant McLoughlin.

Where Is This Place?



Win a Mystery Prize!

If you are the first to respond via email to sjteach@unbsj.ca with the correct location you will be the winner of the mystery prize.

Competition is stiff, so act quickly!

VPETC members are excluded from this competition.

USING TESTS TO ENHANCE ACTIVE LEARNING

LOUISE WASYLKIW & JENNIFER TOMES, MOUNT ALLISON UNIVERSITY

This paper explores how tests can enhance active learning and we focus specifically on the learning that occurs outside of the classroom when students are expecting to encounter a test (i.e., when studying). Although alternative assessment techniques are often recommended (e.g., Gulikers, Kest, Kirschner, & Bastiaens, 2008; Tian, 2007), it appears that tests remain the mainstay of evaluation in higher education (Wasylikiw, Tomes, & Smith, 2008) making it imperative that we, as educators, understand the effect testing has on learning.

In this paper, we discuss popular testing strategies used in post-secondary education and the effects they have on learning, how to balance the need for assessment with the need for learning (and the fact that these concepts are not mutually exclusive or contradictory), how to avoid pitfalls associated with some types of tests and how educators can choose tests that foster active learning. We will review some of our own work as well as that of other researchers in the area to accomplish these goals. Before going any further, take a moment to consider the test types currently in your own testing repertoire. We are referring to the format of tests used in formal settings as a means of evaluating the knowledge and/or skills students acquire during your classes. Consider the type of questions, problems, or the like that you use to assess learning and achievement. Do you use a variety of testing formats? Do you use different formats in different classes, at different levels? In addition to listing the types of tests used, we would suggest that you ask yourself two additional questions: Why do I use that test type? And what kind of learning is being tested?

Purposes of Tests

Gross-Davis (2001) suggested that tests serve (at least) four functions, including evaluation of student learning, motivation of student achievement, assessment of teaching effectiveness and reinforcement of learning. Although this list appears to capture many important aspects, it reflects educators' views of tests, and one question we were interested in investigating concerned students' perceptions of tests. In 2008, Wasylikiw, Tomes and Smith asked students to indicate the benefits and the drawbacks of testing. Not surprisingly and certainly consistent with Gross-Davis, a number (44.8%) of students indicated that tests measure understanding and learning, and further, a substantial portion (21.8%) indicated tests did indeed motivate learning. And yet in spite of this, some students do not perceive this to be

happening. When asked about the drawbacks of testing, common responses were that testing only involves regurgitation and does not reflect actual knowledge (reported by 12.6% of the sample) and that tests do not reflect actual knowledge (reported by 10.3% of the sample; Wasylikiw et al., 2008). This research is important insofar as it reflects students' attitudes and beliefs which, in turn, contribute to students' decisions about how to prepare for tests. We can conclude that not all students see tests as indicators of learning.

Learning and Tests

To appreciate the link between learning and tests, we begin with our understanding of types of learning and test formats. Before considering what the optimal type of test is, one must consider the nature of the material being taught and what the learning objectives are. As noted by Angelo (1991), types of learning include facts (learning *what* – declarative learning), procedural learning (learning *how*), conditional learning (learning *when* and *where*) and reflective learning (learning *why*). When considering the effectiveness of tests and testing, one issue that needs to be considered is the type of learning one is intending to promote. Some classes or situations may target declarative learning (e.g. students acquiring the basic vocabulary of a new subject area), and others encourage reflective learning (e.g. students understanding a scientific theory so they can predict specific behaviours or outcomes in a novel situation); still others target procedural learning (e.g. students learning how to take a pulse properly). Indeed, many instructors likely target multiple types of learning in their courses.

Similarly, testing can take a multitude of different formats. Wasylikiw et al. (2008) asked university instructors to list the types of tests they have used and also asked students about their perceptions of the tests they had experienced in university. In Table 1, we provide the various types of tests that were reported. Here, the tests have been separated into two columns. The first column represents the types of tests most would associate with the testing of *what* whereas the second column represents the types of tests often associated with the learning of *how*, *when*, *where*, and *why*. Such a division reflects the idea that it is the test type that dictates the learning that takes place. The distinction between various types of learning is important insofar as it allows instructors to identify their goals in testing and, although

reflective of common misperceptions, implies that choosing a particular format should be, in part, driven by the type of knowledge one expects to have been learned. We are not meaning to imply that certain test types cannot be used to assess other types of learning, but rather that they are commonly associated with these types of learning and instructors, at least implicitly, likely assume they will motivate students to engage the material in specific ways.

Table 1: *Types of tests*

Testing:

How can tests enhance student engagement?

<i>What</i>	<i>How, when, where, why</i>
Multiple choice	Applied short/long answer
True-false items	Take home tests
Matching items	Problem sets
Fill in the blanks	Oral tests
Factual short/long answer	Performance tests
Definitions	Subset testing

We know students are not passive recipients of information, rather they are decision makers who choose what to study, when to study, and how long to study (Metcalf & Kornell, 2005). Such decisions are based on students' own perceptions of and preferences for different types of tests. Our research (i.e., Wasylikiw et al., 2008; Wasylikiw, Tomes, Dickinson & Mockler, under review) suggests that students are remarkably consistent in their preferences for test types that fall into the left column of Table 1, including matching items, short answer questions, multiple choice questions and true/false items. We found similar preference patterns using samples of students from different universities (in fact in different provinces). There are a number of potential ways to interpret these preferences. On the one hand, it appears that students prefer tests that are perceived by many to be easier. However, it also appears that students prefer tests for which they are more familiar with the format, as these test types are generally also the ones students report experiencing most frequently. The exception to this second interpretation is that students reported a general dislike of essay tests, a test format which they also indicated they encountered frequently (Wasylikiw et al., under review). Our research further suggests that how stressful a particular testing format is perceived to be negatively impacts students' preferences, a finding corroborated by previous work showing that test-anxiety impedes

test performance (e.g., Miesner & Maki, 2007). Additionally and perhaps most importantly, is our finding that students' perceptions of preparedness predicted preferences such that the more prepared students perceived themselves to be after an average amount of studying, the more students preferred that test type. To us this finding implies that students are going to like those tests for which they know how to prepare. So far, we have a list of commonly used tests and some sense of what students prefer. The remaining question then is how can such tests engage students?

The literature on testing is clear on two points. First, testing benefits learning. There is a growing body of literature supporting the idea that testing improves students' retention of learned material (see Roediger & Karpicke, 2006 for a review). This is known as the *testing effect*. The learning of facts or concepts for one test typically means less investment in re-learning and better recall of those same facts or concepts later. The testing effect holds for multiple choice tests, and is even stronger in the case of short answer questions (Kang, McDermott, & Roediger 2007; McDaniel, Anderson, Derbish, & Morrisette 2007). Despite the lack of research on the testing effects for test types beyond multiple choice and short answer, there is no principled reason to believe that it would not hold for those as well. Secondly, the effect is not limited to formal testing situations but can include the completion of sample tests in study guides and even responding to the students' own test items (e.g. McDaniel et al., 2007). Given this evidence, instructors may want to recommend that students generate their own test items and then answer them. Overall, merely being tested engages students enough to learn material but not every student will invest the time and effort needed for test preparation.

In another investigation (Tomes, Wasylikiw, & Mockler, under review) we tracked students' study behaviours for 10 days prior to a course test to further examine their study behaviours. The almost 1300 specific study strategies that students reported engaging in were broadly categorized into either passive strategies (including reading and reviewing of material, using a highlighter or underlining and simply repeating material over and over/rote memorization) or active strategies (including writing summaries, writing notes, self-quizzing, creating test questions, discussing material with others, developing elaborative mnemonics or creating an integrated web of knowledge). The most commonly reported study strategies were passive reading or reviewing of materials, followed by active creating, writing or processing materials. Students also regularly reported engaging in quizzing and self-testing.

We expected that study behaviours and the type of strategy that students used would be related to their academic outcomes, such as grade on the test they were studying for and final grade in the course. We found the amount of time students reported spending in preparing for a test was not predictive of test performance or final grade in the course; neither was the number of study sessions students engaged in. However, overall a higher proportion of active strategies predicted better test performance and three strategies in particular were related to learning outcomes. First, the more students reported creating and writing summaries and notes, the more likely they would perform better on the test. These study activities typically require students to engage the material in a manner beyond superficial processing, evaluate it, and organize it, and so it is not surprising these behaviours are related to positive learning outcomes. Similarly, students who reported engaging in self-quizzing were the same students who tended to do better on the test. This result reinforces the testing effect literature. Finally, studying with a partner or group had a positive impact on test performance. In spite of the benefit of studying with a partner or group, our results suggest this is an under-utilized behaviour as only half of our sample reported ever doing this. When a student studies with another student, both students may actually take on an instructional role. This corresponds to the evidence that tutoring improves retention of the material for the student who explains the material (e.g., Semb, Ellis, & Araujo, 1993).

Recommendations

We offer several recommendations that are based on our own research and also the empirical work of others. There is no “perfect” type of test, and conversely there is no inherently evil form of testing; rather, testing needs to be designed to reflect and evaluate the goals of the course. Each type of test has advantages and disadvantages. For example, those tests we classified as Category 1, such as multiple choice tests, tend to be easy to grade, can be marked objectively, allow for wide coverage of course material (because you can include a large number of items on each test), and can be used to assess many types of learning. However, quality items are difficult and time-consuming to develop, there is often a tendency to focus on lower level learning objectives, these test types generally do not allow the ability to assess organization and expression of ideas, and responses may be biased by test wiseness, student reading ability and guessing. Category 2 tests, such as essay tests, tend to be more difficult to mark, are often difficult to mark objectively, limit the range of content that instructors can assess (because fewer items can be included on the test), rely on student writing ability, and are often not favoured by students. However, these test types do allow for

the assessment of multiple types of learning, assess students’ ability to organize and write, eliminate the possibility of guessing and allow students the opportunity to demonstrate originality and creativity.

Instructors need to carefully consider their teaching goals when determining how they will evaluate and assess their students and choose a testing strategy (or strategies) that fit their goals. Testing should not be considered a “necessary evil”, but rather an opportunity to encourage and reinforce learning. Transparency in the classroom is essential and we strongly encourage instructors to talk about test types and learning goals with their students. Student perceptions matter and students are wary of and stressed by testing formats they do not understand or are not sure how to prepare for. As a result, instructors need to prepare students for studying and learning, particularly if they are using a testing method that is less familiar or if they have a testing style that is not typical. Aside from making sure their students are aware of their testing goals, instructors can also provide sample test or test items to increase student familiarity.

Students need to be told how to study effectively. In our research, although active study strategies were positively associated with academic outcomes, the most common study behaviours were passive reading and reviewing (Tomes et al., under review). To encourage effective learning, instructors can provide both general information (e.g., describe types of learning) as well as specific suggestions. For example, given the large literature demonstrating that information that is self-relevant is better remembered (e.g., Symons & Johnson, 1997), instructors can make clear to students that unique examples are a better reflection of knowledge and understanding and encourage them to do so as they prepare for tests.

Similarly, although studying with a partner or group was effective, many students never engaged in this type of study behaviour. Instructors need to teach students not only what to learn, but how to learn. Inform students on how to study, have students generate test questions, and encourage students to study with a partner. Finally, because of the evidence on the testing effect, material that the instructor identifies as important should be tested more than once. This is an argument in favour of cumulative tests.

A number of resources exist that outline the advantages and disadvantages of various test types and we have included a few select references in the appendix for easy access. Our take home message is intended to be that instructors’ decisions should be informed and the first step in such a decision should be answering the questions we posed at the beginning: Why do I use that test type? And what kind of learning is being tested?

Appendix

Resources to recommend for students

1. Practical Information for students: <http://www.testtakingtips.com>
2. How to answer multiple choice questions: <http://www.how-to-study.com/MultipleChoice.htm>
3. Student guide for test preparation & test taking: <http://www.studygs.net/>

Resources for instructors

1. The testing effect:

Roediger, H. L., III, & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science, 17*, 249-255.

2. Subset testing:

Wasylikiw, L., Tomes, J. L. & Smith, F. (2008). Subset testing: Prevalence and implications for study behaviors. *Journal of Experimental Education, 76*, 243-257.

3. Self-referencing:

Bugg, J. M., Delosh, E. L., & McDaniel, M. A. (2008). Improving students' study habits by demonstrating the mnemonic benefits of semantic processing. *Teaching of Psychology, 35*, 96-98.

4. Multiple choice tests: a useful guide on the effective use of MC <http://www.park.edu/cet1/quicktips/multiple.html>

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END WITH A BANG, NOT A WHIMPER: TWELVE WAYS TO ENGAGE STUDENTS ON THE LAST DAY

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I love last words, closing lines. As one who spends her working life in the storied world, I appreciate the power and the responsibility of a really good ending.

Our university and college courses and programs have a lot in common with stories, don't they? Our heroes, the students, have multiple obstacles to overcome, companions and guides they meet along the way; they cover some familiar and some new territory. Aristotle reminds us that all stories need a beginning, a middle, and an end. But while no good storyteller would neglect an ending, university and college instructors often overlook the rich potential of that stage of the educational story. Courses end with a whimper, not with a bang; degrees simply stop, with only a robed ceremony – the ritual equivalent of tacking the words “The End” to the last page of a novel or the last frames of a film – to mark completion. Where are the surprise endings, the invitations to look back, to see the whole story again, this time with new information, fresh eyes, and a new lens? Where are the promises of a sequel?

What happens if we think of our courses as narratives, as stories in which some of the most powerful and meaningful moments are at the end? What happens if, when we plan our classes, we start with the ending in mind and plan backwards? I'm going to argue that both instructor and institutional attention to endings is necessary to help millennial students make sense of and make good use of their education. I'm going to talk about those endings in terms of four principles that John Gardiner and Gretchen Van der Veer outline in *The Senior Year Experience* as the four corners of a good senior year experience: Integration, closure, celebration, and transition. I want to suggest that, even when the larger structures of a senior-year experience are too diffuse for one instructor to manage, most of us have the power of a last class that can serve as a microcosm for educational endings.

I'm afraid I didn't have a lot of good models to draw on from my undergraduate experience. The final class and final week were occasionally focused on the exam – the real closure for the course, I guess – and those were the days before evaluations of teaching. But I do remember one truly memorable conclusion to a class.

It was a course entitled *Introduction to Philosophical Problems*. The whole course was team taught and structured as a term-long argument between two professors, each of whom took an opposite side in huge philosophical ques-

tions – the existence of God, the ways we know the world, the meaning of life, etc. It was riveting. Ken Bain's *What the Best College Teachers Do* urges us to think of starting classes with the big questions and this course *was* the big questions. The last class probably gave us some exam review, but I don't remember that. What I remember was the two of them 'fessing up to which side of which argument they really believed in: wonderfully satisfying as a way to remind us about each big question. We were so curious about which one of them truly believed in God (neither, by the way). But at the end, one of the two talked about what all this meant, why it mattered – and he ended the class with a passage from TS Eliot's “Little Gidding,” from which I get part of my title:

We shall not cease from exploration

And the end of all our exploring

Will be to arrive where we started

And know the place for the first time.

Through the unknown, unremembered gate

When the last of earth left to discover

Is that which was the beginning;

And I swear I can still see him holding the thin volume in one hand and gesticulating wildly with the other as he read these last lines.

When the tongues of flame are in-folded

Into the crowned knot of fire

And the fire and the rose are one.

I cannot pretend to have understood completely Dr. Tomkow argument but I knew he was talking about passion and reason, combining thought and feeling in a way that could make our lives better and richer. He was hinting at the greater uses – not mere mercenary ones -- to which we could put what we'd learned. More than that, he was suggesting a greater beauty in what we were doing than we'd thought of before. This was, to borrow Parker Palmer's words, *teaching that takes*. He writes *Our teaching will never take unless it connects with the inward, living core of our students' lives, with our students' inward teaching.* And this was “teaching that took” in the very last class.

But, of course, that is a lot to expect. Many practical considerations restrict our ability to host truly memorable last classes. Time and the tyranny of content press on us. What haven't we told them? Have we missed days to snow or sickness and need to make up for lost time? Even if we have paced ourselves and are ready for a good ending, some students (in some cases, many) choose not to come to the last class, desperate to complete assignments, study for exams, or are under the misapprehension that nothing of importance will happen. And of course, they're tired, we're tired – we all have too much happening at the end of a term, and perhaps we've all had just about enough of each other by this point. That's why planning for that last class is important, planning long before we've run out of steam. When I can, I try to figure out the end before I start and let students know what sorts of things we'll do on the last day. Hopefully, when they're making difficult decisions about the use of their time in those last days before exams, they may be more likely to choose to attend. But once they're there, it really does have to be worth their time. The kinds of useful and memorable things one can do in that last class are endless, but here are a few, and I've grouped them according to Gardiner and Van der Veer's four principles of integration, closure (or reflection), transition, and celebration.

I. Integration

This is what most of us consider when we plan a last class: a review before an exam, a way to remind ourselves about what we've done and how it connects. In a typical review class, instructors might ask students to prepare questions, go through their syllabus to remind themselves of what they've covered, or just listen to the professor talk through the major points of the course. If there is an exam, there might be talk about the structure or focus of the exam itself. I like to ask students to share their exam or study strategies. Here are a few ways to help students pull together the threads of the course:

The Empty Exam: In the second-last class, students get a copy of the final exam – without the actual questions. They review course material and come to the last class with their own version of the final that they can exchange, talk about, or submit sample questions. If your course permits, some of the well-constructed questions could turn up on the final. In addition to being an active review technique and an encouragement to study together, the exercise may relieve some exam anxiety by making the exam's structure visible.

Jeopardy: If you do an internet search for "Jeopardy" and "template," you'll find multiple sites that offer PowerPoint versions of the game for teachers. Write your own questions, and use the game to review important knowledge from the class. Small prizes are always fun.

Snowball questions: Alice Cassidy of UBC's Centre for Teaching and Academic Growth showed me this one: Students can bring their questions for the end of term, written on a small piece of paper. During the class, they can ball the paper up, and throw it in the direction of other students. Each student scrambles to find a snowball, read the retrieved questions and, if they can, answer them. If they can't, the whole class is called on to try to answer the question.

II. Closure

Gardiner and Van Der Veer write about the importance of closure at the end of a degree: that sense of a satisfying end, one that pulls threads together, wraps things up. I also like to think of the importance of reflection at the end, the chance to think about not just what we've learned but also how we've learned it and how our thinking, attitudes, assumptions, or expectations have changed. Here are some ways to encourage that reflection and enclosure:

Expectation cards: Timmons and Wagner write about this exercise, which does require planning. Start the course on the first day by asking students to write their expectations (perhaps also their fears) on an index card. I usually make these anonymous, shuffling them on that first day, and, in a small- or medium-sized class, ask other students to read the cards aloud. Each student has a chance to speak on that first day, though not with the responsibility of sharing his or her own fears or expectations. Hearing the cards gives me a good chance to address some fears and to talk about which expectations we can meet and which we, perhaps, can't. But then I keep the cards, and, on the last class day, students get their own again. They are then invited to reread their own cards and talk about whether those early expectations and fears had been met or realized. Students are encouraged to reflect when they are reminded of where they had begun.

Letters To The Next Class: Another really good way to ask students to reflect on their own experience of the course is to ask them to

write a letter to a member of the next class. They can offer advice, encouragement, and their own experience or anecdotes. In essence, in the letter they can write what they wish they had known when they started the course. (And then you have a ready-made first-class activity for the next time you teach the course.)

End Where You Began: If you began the first class with a big question, a story, an inspiring idea, bring out that same lecture again at the end. I now start my children's literature class, for example, with a mini-lecture on "How J. K. Rowling Changed the World," and I begin the last class with that same lecture.

III. Transition

Of course, even when there is a sense of closure, the end of a course ought to be a beginning as much as an ending, pointing the way to what comes next, either in the program or in the world. So where will students take what they've learned? How does the experience fit the rest of their educational lives? How does it matter in the world beyond the classroom? A last class can help make that transition.

Next Courses and Professors: This is sort of the "if you liked this course, you'll love . . ." category. Introduce the courses that students must or might like to take next, and if schedules allow, introduce the instructors and allow them to say a few words.

Invited Speakers: Invite a speaker who works in the field, who has worked through the program, or who can speak to the way the material you've been working with matters in the world. The idea is to remind students that the purpose of the course has not been an exam and that its meaning goes beyond the grade or even the degree.

Human Resources Canada's Essential Skills: HRDC has determined nine essential skills for the workplace – such as writing, working together, numeracy, working with documents, etc. Students can be invited to talk about the ways in which the course has addressed some or all of these skills. This is an especially pleasing exercise in those courses – like mine – in which the career applicability of, say, Renaissance poetry may not be immediately apparent.

IV. Celebration

And finally, a good class deserves a celebration.

Awards Ceremony: In a first year class, students are encouraged to nominate each other for awards based on their contribution to the class; in a 300-level course in which students read *Paradise Lost*, a

very difficult and long poem, each student gets a certificate marking the accomplishment.

A Celebratory Video: "Youtube" is my new best friend. It could be moving or humorous, but an appropriate video clip can pull the course together. I love anything from Taylor Mali (see www.taylormali.com).

Music and Food: I once heard a claim that all human gatherings need music, food, and dancing, and while I haven't managed the dancing yet, some music and food, ideally something connected to the course material, help make a last class a true celebration. Of course, like any of these suggestions, this one has to be tailored to course size, subject, or level: for example, I have bought Turkish Delight for a class of 50 (it's the candy the White Witch uses to seduce in C S Lewis's *The Lion the Witch and the Wardrobe*), but when that class blossomed to 200 the next year, the cost became prohibitive.

And with any of these possibilities, we do find ourselves sometimes constrained by university policy on student ratings of teaching: my preference is to administer them the week before and to leave the last class for other things.

So, in a perfect world, our last classes would be spaces for looking back and looking forward, for pulling together what we've done and for seeing its place in a larger context, for seeing where it can go and why it matters, for seeing how we've changed and where we see ourselves taking this experience. Neglected or overlooked or maligned though it sometimes is, the last class offers a particularly powerful place to query and examine and ponder, and to make our teaching take, through some combination of integration, reflection, celebration, and transition. What we want are endings worthy of the rest of our courses, **so that we can end with a bang, not a whimper.**



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Vianne Timmons and Brian Wagner point out that much has been written on ways to begin a university or college class, but the literature on last classes is sadly lacking. Even a quick look through handbooks to college teaching shows the disproportionate amount of attention given to good beginnings over good endings. *McKeachie's Teaching Tips* and the most recent edition of Barbara Gross Davis' *Tools for Teaching* are notable exceptions.

**UNB SAINT JOHN
AWARDS FOR TEACHING EXCELLENCE (DATE AND FEAT)
RECIPIENTS FOR 2009-2010**

FACULTY OF ARTS

HISTORY AND POLITICSLESLIE JEFFREY
 HUMANITIES & LANGUAGES.....DAVID FLAGEL
 PSYCHOLOGYDENISE LEBLANC-DUCHIN
 SOCIAL SCIENCE.....GARY WORRELL
 FEATJAMES NOBLE

FACULTY OF BUSINESS

.....GARY HALL
TERRY CONROD
 FEATNEIL FRANKLIN

FACULTY OF SASE

BIOLOGYRÉMY ROCHETTE
 COMPUTER SCIENCE &
 APPLIED STATISTICSCONNIE STEWART
 ENGINEERINGDALE ROACH
 MATHEMATICSGEORGE STOICA
 NURSING.....DIANE O'NEIL
 PHYSICSHEATHER MASSON
 FEATJIM KEIFFER

UPDATES FROM THE TEACHING & LEARNING CENTRE (TLC)

Well we are getting ready to celebrate one year “in business” having opened our doors last January. Here are a few of the 2009 highlights.

Supported by the Vice-president’s Excellence in Teaching Committee (VPETC), the Centre’s initiatives include:

- Surveying the campus community – A faculty and graduate survey gathered information about the status of initiatives/services currently offered through the VPETC as well as assessed interests, needs, and preferred method of teaching and learning support that could be offered to our teaching community through the TLC. In tandem the TLC coordinator conducted one-on-one structured interviews with the VP, Deans, Chairs, Directors of ISS and Saint John College as well as the President of the Graduate Students’ Association. This was done in order to gain an appreciation for faculty and departmental teaching and learning needs and strengths, as well as to gain information related to their expectations for the Teaching & Learning Centre. There was 100% success in setting up appointments which demonstrates a willingness of campus leaders to engage meaningfully in the evolving TLC.
- Participating in classroom renovations – At the request of the Deans, meetings were organized of interested faculty, IT Services, and Facilities Management, in order to discuss changes to classrooms that are slated for renovations in the near future. Discussions centered on such issues as seating arrangements, the general dislike of whiteboards, loud ventilation, placement of computer facilities, etc. A written report was produced and submitted to the Deans and other parties.
- Hosting a one-day orientation “New Beginnings: The Fall Term at UNBSJ” – an informational welcome to our teaching community for new faculty, part-time & full-time instructors (UNBSJ & Saint John College) including stipend instructors, and Graduate Student TA’s who would be teaching for the first time.
- Developing, maintaining and promoting interdisciplinary teaching partnerships with other educational institutions (New Brunswick Community College Saint John, Dalhousie Medical School NB and Horizon Health Network Zone 2) – on October 28 the HELP (Health Educators learning Partnership) group hosted a full-day workshop (THE Workshop: Together in Health Education).
- Developing a New Faculty Mentoring Program and a TLC website are the current initiatives. Watch for updates on both initiatives early in 2010.

Bi-Campus Items

- A mechanism was determined for disbursement of funds available from recently received gifts to the university, targeted at enhancing teaching and learning initiatives on both campuses of UNB.
- Two subcommittees of the AUNBT/UNB Joint Committee on Teaching Competence have been working to develop descriptions and guidelines for teaching dossiers. The goal is that through Teaching and Learning Services (TLS, Fredericton) and our Centre the work of those committees will be advanced by developing learning sessions that help faculty learn to develop dossiers and help assessors learn how to assess them based on specific descriptions and guidelines. The TLC and TLS will collaborate in the instructional design and delivery of training sessions for teaching dossier development and assessment to ensure the same material is available to all UNB instructors and assessors, irrespective of their location.
- A decision was reached to rotate membership on the Association of Atlantic Universities Coordinating Committee on Faculty Development on a 3-year cycle; up to this point representation has always been from UNB Fredericton. The decision was celebrated and the coordinator of our Teaching & Learning Centre took over as UNB’s representative in October.