THE BEACON

THE QUARTERLY NEWSLETTER OF THE CENTER FOR TEACHING AND LEARNING

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In this issue

Upcoming Events

Has it been too many years since your last stats course? Do you want to do research, but the thought of doing stats makes you queasy? Are you ready to do battle again with your least favorite class from college? Then…..

Have we got a series for you!

Throughout next fall and spring, the Statistical Consulting Group will be sharing their expertise holding "Stats Boot Camps" with NSU's HPD faculty free of charge.

The sessions will be held in the Chancellor's Dining Room, 5th floor of the Terry Building, from noon to 1:30 p.m. Lunch will be provided.

Dates: August 25, September 22, October 27, November 10, January 13, February 11, March 10, and April 14. Each session is separate, so feel free to come to only one or as many as you would like.

RSVP to Kathleen Hagen at extension 1235 or khagen@nsu.nova.edu no later than 3 days before each session.

ANALYZING INSTRUCTOR CLASSROOM BEHAVIOR

by Stan Cohen, Ed. D.

Professor behavior is critical in promoting the teacher-learning process. Therefore, it is vital that we study our own classroom behavior and how it impacts learning. As teachers, we are either interacting with students individually or in groups. Sometimes the groups are small, but at HPD they are usually very large. In the process of both verbal and non-verbal interaction we need to incorporate some sound principles that are known to enhance learning outcomes. Some kind of objective observation and analysis can provide us with the information needed to change our behavior. However, it is essential that such information becomes a basis for change without fear of criticism. We can then feel free to experiment with new skills.

Some of the most important verbal skills according to Amidon and Flanders are:

1.) Ability to accept, clarify, and use students' ideas. Adult learners have a background of personal experience. Using some of their ideas to achieve the same objectives of your lesson will result in increased motivation to learn more.

2.) Ability to state objectively a student's point of view. Even if a point of view is really far out, withholding judgment at the time will result in an increase in student participation.

3.) Ability to reflect accurately the ideas of others. When many students can express their ideas on the same topic, a real discussion has occurred. The more people involved, the better the interaction.

4.) Ability to summarize ideas presented in group discussions. When we as teachers pull together a variety of ideas obtained from discussions, we can emphasize the most important concepts. This facilitates better scores on examinations.

5.) Ability to communicate encouragement. All learners do better in a positive environment. Criticism, especially in front of other students, tends to be destructive. If you must read the riot act, do it quickly and indicate what you want. Extensive criticism develops the "nag syndrome".

6.) Ability to question others without causing defensive behavior. It's all in the way we ask questions and in our non-verbal responses. A disgusted look equals a thousand words and will result in defensive student behavior.

7.) Ability to use constructive criticism without harming personal worth. The key here is constructive. Anyone can find fault. Making suggestions to correct mistakes is part of the constructive process.

One system for measuring these skills and giving feedback to professors is called Flanders Interaction Analysis. Every three seconds a number is recorded by an observer in a ten-point scale. The statements are classified as either direct or indirect and then subdivided into the following categories: (1) accepting feelings (2) praise or encouragement (3) accepting students' ideas (4) asking questions

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ASK THE EXPERTS:
"STANDARD ERROR OF MEASUREMENT"
WHAT IS IT? WHAT ARE ITS APPLICATIONS TO TESTING?
by Patrick Hardigan, Ph. D.

Q: When the Testing Center scores our tests, we get a statistic that I am not familiar with. Can you please describe the standard error of measurement and its application to test taking?

The standard error of measurement (SEM) is a statistical phenomenon and is unrelated to the accuracy of scoring. All test results, including scores on tests and quizzes designed by classroom teachers, are subject to the standard error of measurement.

If a student were to take the same test repeatedly, with no change in his level of knowledge and preparation, it is possible that some of the resulting scores would be slightly higher or slightly lower than the score that precisely reflects the student's actual level of knowledge and ability. The difference between a student's actual score and his highest or lowest hypothetical score is known as the standard error of measurement.

The standard error of measurement (SEM) is an estimate of error to use in interpreting an individual's test score. A test score is an estimate of a person's "true" test performance. Using a reliability coefficient and the test's standard deviation, we can calculate this value:

$$SEM = S\sqrt{1 - r}$$

Where: S = the standard deviation for the test
r = the reliability coefficient for the test

For example,... a test with a reliability coefficient of .96 and a standard deviation of 15 yields of SEM of 3. Now that we have a SEM of 3 we can apply it to a real life situation.

$$SEM = S \times \sqrt{1 - r} = 15 \times \sqrt{(1-.96)} = 15 \times \sqrt{.04} = 15 \times .2 = 3$$

Example: Joe took the statistics exam and received a score of 90.

Let's build a "band of error" around Joe's test score of 90, using a 68% interval. A 68% interval is approximately equal to 1 standard deviation on either side of the mean. For a 68% interval, use the following formula: Test score ± 1(SEM)

Where: The SEM score is Joe's score ± 1(SEM) = 90 ± (1x3) = 90 ± 3

Why the "± 1"? Because we are adopting the normal distribution for our theoretical distribution of error, and 68% of the values lie within the area between 1 standard deviation below the mean and 1 standard deviation above the mean. Chances are 68 out of 100 that Joe's true score falls within the range of 87 and 93. What about a 95% confidence interval?

Test score ± 2(SEM) = 90 ± (2x3) = 90 ± 6. Chances are 95 out of 100 that Joe's true score falls within the range of 84 and 96.

Reminder:

The first session of the *"Stats Boot Camp"* series is:

Wednesday, August 25, 2004 12:00-1:30p.m.

Chancellor's Dining Room, 5th Floor Terry Building

RSVP: Kathleen Hagen ext. 1235 or khagen@nova.edu

FOCUS ON EDUCATIONAL RESEARCH:
SCRAMBLING
by Patrick Hardigan, Ph. D.

The issue called "scrambling" is referred to in the measurement world as "test item context effects." Item context effect concerns itself with whether the performance of test items change when the content, difficulty, or order of previous items is altered. The fundamental question is really whether the cognitive tasks presented on a test are the same for all test-takers. Research suggests that altering the order of test questions impacts low achieving test-takers more than high achieving test takers. For example, two commonly known effects are practice effects and fatigue effects. These effects are usually assumed to be constant across ability levels. However, this is not true. Research demonstrates that students with higher ability perform better on the second test they took while students with lower ability did worse on the second test they took. Research has also found a real interaction effect between gender and item order effects. Results show us that female test-takers scored lower than male test-takers when items were ordered easy to difficult under a "timed" test situation. Because most classroom tests have a time element, scrambling questions may affect female scores more than male scores. Clearly, item context effects must be accounted for when designing classroom tests; as such, to avoid this problem the Testing Center does not "scramble" questions.

Sources: Cathy Wendler, Lei Yu, Karin Zeller, Jill B. Carey. (2004). *Differential "Order Effects" of Testing Across Ability Levels.* American Educational Research Association Meeting: San Diego, CA.

Ryan, K., Shuwan, C. (1997). *An examination of item context effects, DIF, and gender DIF.* American Educational Research Association Meeting: Chicago, IL.

Leary, L.F., & Dorans, N.J. (1985). *Implications for altering the context in which test items appear: A historical perspective on an immediate concern.* Review of Educational Research, 55, 387-413.

Plake, B.S., Ansorge, C.J., Parker, C.S., & Lowry, S.R. (1982). *Effects of item arrangement, knowledge of arrangement, test anxiety, and sex on test performance.* Journal of Educational Measurement, 19, 49-58.

Stan's Soap Box

When students attend class because of a threat of an examination or a grade penalty for poor attendance, are we saying we cannot adequately motivate our content? Are threats the best incentive we have? I think not.

Yes, we have large classes. Yes, the lecture method is the best way to disseminate large quantities of factual information. Yes, in three weeks 50% of factual material is forgotten and in six months another 50% of that is lost. This has been documented in numerous learning studies.

So, how do we motivate our students first to have better attendance by choice, and then, when they do arrive, to be active, eager learners? We can do it by making every session an interactive one in which students are challenged and directly involved. We can do it by helping our students see how science concepts and facts are really valuable when applied to clinical situations. We can do it by not reading our PowerPoint slides to them. We can do it by not reading lecture notes to them, because handouts are a quicker and easier way to share content. We can do it by spending our verbal time on real case study applications, interesting stories that show applications, and complicated conditions that require new knowledge. We can do it by directing our students to make extensive use of web sites to locate new material. This is a way professors and students together can have some fun with content.

We can also motivate our students by giving students a verbal test after ½ hour of lecture. Raise some questions. Have several students react to each other's answers. Call on students who may be reading the newspaper or who are studying course content other than yours. At times, having students dialogue with the person next to them can help clarify difficult material. When you phrase a higher level cognitive question, allow lots of "wait time" (at least 16 seconds) for students' hands to fly up. Resist the urge to answer your own questions - this tends to short-circuit student thinking. Use the phrase "What are your questions?" rather than "Do you have any questions?" Asking questions when there are only 30 seconds left in the class does not work. Questioning time needs to be structured at least half-way into the session to be effective. When planning your lecture notes, build time slots for questions into the plan. Otherwise, you run out of time, and the questions won't happen. It's like making time for physical exercise into our daily lives. Without a plan, it doesn't happen.

I really believe motivating students to engage in learning is our most important responsibility. Concern for interesting content alone is only part of the challenge of teaching. Planning, classroom management, facilitating instruction, knowing our students by name, fair and objective tests, and willingness to change to more effective modalities are key elements in the motivational process.

The Center for Teaching and Learning would like to congratulate Dr. William Hardigan on his upcoming retirement on July 1, and thank him for 15 years of service to NSU as Dean of the College of Pharmacy. We wish you all the best. You will be missed!

Quotes to Brighten Your Day

Live as if you were to die tomorrow. Learn as if you were to live forever.
Mohatma Gandhi

Share your knowledge. It's a way to achieve immortality.
Dalai Lama

Professors known as outstanding lecturers do two things; they use a simple plan and many examples.
W. McKeachie

Laurence Houseman once said, "A saint is one who makes goodness attractive." Surely, a great teacher does the same thing for education.
John Trimble

The task of the excellent teacher is to stimulate "apparently ordinary" people to unusual effort. The tough problem is not in identifying winners: it is in making winners out of ordinary people.
K. Patricia Cross

Effective teaching may be the hardest job there is.
William Glasser

No man can be a good teacher unless he has feelings of warm affection toward his pupils and a genuine desire to impart to them what he himself believes to be of value.
Bertrand Russell

The most important knowledge teachers need to do good work is a knowledge of how students are experiencing learning and perceiving their teacher's actions.
Steven Brookfield

"Students learn what they care about...," Stanford Ericksen has said, but Goethe knew something else: "In all things we learn only from those we love." Add to that Emerson's declaration: "the secret of education lies in respecting the pupil." and we have a formula something like this: "Students learn what they care about, from people they care about and who, they know, care about them..."
Barbara Harrell Carson, 1996,
Thiry Years of Stories

 (continued from Page 1)

(5) lecturing (6) giving directions (7) criticizing or justifying authority (8) responding to teacher questions (9) student initiated talk and (10) silence or confusion. Once the numbers have been recorded for 20 minutes, they are placed in a matrix and the following questions can be answered:

1. **Was class control direct or indirect?** Tallies in categories (4+5+6+7) reflect direct control. Tallies in (1+2+3) show indirect control. The ratio of indirect to direct tallies is called the control index and shows the instructor's tendency toward using either direct or indirect control.
2. **Were students given the opportunity to ask questions and were questions encouraged?** Tallies in the 8-8 and 9-9 cells show student talk. Extended student talk in the 8-9 cells indicates that students are talking longer than 3 seconds. A shift to 8-9 shows the student answered the teacher question and then changed to his/her own ideas.
3. **Were reactions to students' questions positive or negative?** What follows 8s and 9s shows whether a teacher is using criticism or encouragement. An 8-7 or 9-7 would sound like this: "Why can't you get this?", "Everyone else seems to understand.", "Did you read the assignment?", "What's wrong with you?", "This is the worst class I've had in 40 years!".
4. **Was there an emphasis on content and was the lecturing technique dominant?** Build up in the 5-5 cell shows extensive teacher talk. When 95% of all talk is teacher talk, there is very little student active involvement.
5. **Was there evidence of a real discussion, or was it limited teacher-pupil interaction?** 4-8 and 8-4 shows teacher-pupil interaction. This is not a discussion. A real discussion would look like this: 4-8, 10-10, 8-8, 10-10, 8-8 - in which case the teacher is a gate keeper and the conversation is student-to-student-to-student, not teacher-to-student-to-teacher.
6. **Was there sufficient "wait time" following teacher questions to allow students to think?** Research shows that high level conceptual questions or generalizations require much thinking time for adult brains to process information. This is especially true when concepts are based on other concepts. The minimum time required is 16 seconds. When this occurs, 4-9s and 9-10s really increase.
7. **Was there a balance between recall questions and higher level "why" questions?** "Who" and "What" questions elicit recall responses. "Why" and "How" questions generate higher level ones. This requires much teacher thought and planning. Writing (or asking) good conceptual questions is a difficult skills and needs lots of practice.
8. **Was the content summarized?** Summaries are always useful in reinforcing what was learned. They are also appreciated by students because the summaries help them prepare for examinations.
9. **When feedback from students indicated confusion, was information clarified?** Sometimes information content is very confusing. Repeating the same verbal statements only louder does not help clarify. Rephrasing, drawing pictures, giving different examples can help clarify. Often other students can say it in a way that their classmates can better understand.

	1	2	3	4	5	6	7	8	9	10
1	0.27			0.18	0.09				0.09	
2		1.07	0.71	1.52	1.16	0.54			1.34	0.36
3		1.79	0.98	1.70	1.70	0.71	0.18	0.09	0.71	0.09
4			0.09	2.77	0.27	0.27		10.80	1.45	0.36
5		0.54	0.09	3.40	6.70	1.25	0.18	0.09	2.23	0.27
6			0.09	0.71	0.71	1.34	0.18	2.95	0.45	0.54
7				0.45	0.27	0.45	0.71		0.18	0.09
8		2.14	3.66	3.57	1.88	1.79	0.36	16.08	0.54	0.18
9	0.27	1.07	2.32	1.34	1.34	0.45	0.54		4.11	0.18
10	0.09	0.09		0.36	0.62	0.18		0.18	0.54	0.98
TOTAL	0.63	6.70	7.95	16.00	14.74	6.97	2.15	30.20	11.62	3.04
%										

Matrix Total

I/D Ratio = .567
Revised I/d Ratio = .676
I/d Row 8 =
I/d Rows 8 & 9 =
Teacher Talk 55.14

Extended Indirect = 4.82
Extended Direct = 2.68
Extended I/d =
Student Talk 41.82

3-3 Cell = 0.98
9-9 Cell = 4.11
Vicious Circle =
s/t .758

Here is an example of an excellent completed matrix. Notice that teacher talk is only 55%. I have observed one class this year in which total teacher talk was 97.5% and the 4-8 and 4-9 cells were zero, indicating there was no time spent in questioning.

If you are interested in having an assessment of this sort, please contact Dr. Stan Cohen for an appointment. Be assured that no information scored from your matrix will be shared with anyone except you, and you will decide how you want to use the data.

Source: Amidon and Flanders. *A Manual for Understanding and Improving Teacher Classroom Behavior.* Association for Productive Teaching: St. Paul, Minnesota.