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OF CHANGE IN HIGHER
EDUCATION ASSESSMENT**

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ISSUES IN THE ANALYSIS OF CHANGE IN HIGHER EDUCATION ASSESSMENT¹

Showing change in student abilities and learning and relating that change to the curriculum is an important new goal for institutional and program assessment. But what are the best methods? How might aggregate patterns be described in ways that preserve individual growth patterns? How can we capture students' qualitative transitions in developing complex abilities? When change is non-linear, what are the implications? These new issues in assessment make the measurement and analysis of change complex. New methods can inform our thinking about assessing student learning outcomes.² Here is my rationale for why they are needed, along with some questions for discussion that have emerged in practice.

Why is analyzing change over time an important topic? Linking assessment of student outcomes to learning is a major thrust in the assessment movement. True, prior research on college outcomes (e.g., Feldman & Newcomb, 1969) shows that college makes a difference; traditional-age students who attend or graduate from college achieve greater benefits, in contrast to those who do not attend or graduate. Ernest Pascarella and Patrick Terenzini [1991] recently completed a review of such studies (Terenzini, 1989). However, most studies link college outcomes to particular aspects of the college environment but not to curriculum. What is new? The assessment movement is asking a different kind of question: *Can we link student learning outcomes to learning in college*—to a course, to a general education program, to a major, to a coherent curriculum? So, while several studies have shown that college makes a difference, a new challenge is

showing that what faculty systematically do to plan instruction and make learning happen can be linked to student learning outcomes.

Before considering the question of whether teaching causes changes in student learning, it helps to review one of the basic assumptions that drives the assessment movement: *Change is an outcome to be demonstrated*. The assessment movement does not take change for granted. I believe that most educators do hold the traditional belief that changes in student learning are an aim of education. We do not assume that students will automatically develop their abilities to the fullest when they are “exposed” to our “best” college environments. We do not assume that students who receive diplomas automatically perform effectively in the world of work and civic life. Most important, we do not assume that changes in desirable student learning outcomes happen for each student. When change is an outcome to be demonstrated, then several questions follow.

1. How best do we show change and change patterns? What analysis strategies describe intra-individual and inter-individual changes in student performance over time? Who changes and why?

We can begin to respond to this challenge by analyzing change itself. Those of us currently engaged in assessing student learning outcomes of individual courses, general education, the major, or the broad outcomes of a curriculum or college are well aware of the difficulties of identifying or designing instruments that might measure change, let alone of strategies to analyze change—should it occur. But as we create a picture of graduating student or alumnae outcomes—a

picture of end-point achievements—we naturally move toward considering change as an outcome. Students are expected to change in some important ways from when they enter a postsecondary curriculum to when they exit, in addition to changes that can be attributed to maturation, family and economic history, prior educational opportunity and achievement, cultural background, and so on (Mentkowski & Doherty, 1984; Mentkowski & Loacker, 1985).

However, assessment's purpose is not just to demonstrate student achievement by showing mean differences between beginning and graduating students, and to factor out the influences of unalterable variables so one can make plausible links to curriculum. A major purpose of assessment is to generate information that can be used to improve individual student learning and programs. The question of who changes and why is therefore central. Aggregate information that communicates average differences between groups often does not give the kind of information that educators need to improve teaching and curriculum.

What educators need is information on inter-individual and intra-individual patterns: Who changes and why? How does change occur and for whom? How does development toward desirable outcomes happen and for whom? Thus, faculty are interested in individual scores, but they are more interested in patterns—these students develop like this, these like this, and so on. Faculty also want to know about the kinds of changes that are likely to occur. This information is different from information about individual differences among students upon entry to a course or program. Certainly, faculty are interested in individual differences—in learning styles or prior course sequences completed. However,

my experiences suggest that faculty are even more interested in the *patterns of change that occur while the student is learning*. Differences in change patterns are important because faculty intend to intervene to promote change for each student.

For example, an instructor with a large group of students may be very interested in differential patterns for various groups of students, because many of these faculty do not usually have the luxury of one-on-one instruction. They ask, are there different learning paths that are best for different groups of students? A faculty member can develop these learning paths with information on differential patterns of achievement. Assessment strategies that generate averages from aggregate performance at the beginning and end of a course, general education sequence, or a major are not that helpful for those faculty intent on improving learning for *each* student by constructing different learning paths, or by better understanding the learning blocks in students who seem to have some consistent difficulties.

Inter-individual and intra-individual change patterns can be particularly helpful to those educators who find that students learn best when they receive individual feedback on their performance on classroom and curriculum-wide assessments (Alverno College/FIPSE Assessment Project, 1987; Loacker, Cromwell, & O'Brien, 1986; Schulte, Benson, Scarboro & Turcotte, 1989) [Loacker & Mentkowski, 1993; Schulte & Loacker, 1994]. This expectation for feedback extends to any kind of instrument that students complete—even when a primary purpose of an out-of-class measure is to demonstrate aggregate student changes toward broad curricular goals, that is, to see how students are generally doing, so

one can improve a coherent, general education curriculum. For both purposes—accountability and improvement—feedback from change patterns is much more meaningful.

2. What are patterns in the development of complex, multidimensional, higher-order abilities that are expected to transfer?

What kinds of changes are important to understand? The educational reform movement introduces a second consideration in analyzing change (Mentkowski, 1989) [Mentkowski, Astin, Ewell, & Moran, 1991]. Educators are creating a more explicit picture of what they want students to achieve, such as critical thinking. They are defining outcomes in much more complex ways—with criteria and standards. At Alverno, for example, we view abilities as multidimensional, as complex combinations of skills, motivations, self-perceptions, attitudes, values, knowledge, and behaviors [Mentkowski & Rogers, 1993]. Faculty ask, what are patterns of development in critical thinking abilities (Cromwell, 1986; Halonen, 1986), or other complex, higher-order abilities (Frederiksen, 1986; Gardner, 1983; Sternberg, 1985)? What are patterns of development in experiential (Hutchings & Wutzdorff, 1988) or collaborative and connected learning (Belenky, Clinchy, Goldberger & Tarule, 1986)?

Complications in analyzing change arise when faculty are assessing complex abilities that call for complex student performances. Here, “good evidence,” or the unit of analysis, is not a test item. The unit is the performance itself—which calls for qualitative, expert judgment (Mentkowski, 1989). How best can we capture students’ complex, qualitative transitions from one level of an ability to

another? The unit of analysis is expanding from student selection of predetermined multiple choice alternatives—or even short answers—to include proactive, open, interactive, dynamic, sustained student performance. These qualitative methods use multiple response modes such as the essay, the interview, the critical incident log, the journal, the oral presentation, the discussion, the performance in a laboratory, the recital, the sculpture, the interaction with a school class, or standardized patient, or actual client. These methods call for sophisticated, expert judgment based on criteria.

When we are making these complex judgments, we may be looking for a complex ability like critical thinking in a student’s performance in the major. Will we expect to see more of the same if we look for that ability in a capstone seminar or five years after graduation? Probably not. We will expect to see a qualitatively different ability, particularly when a student demonstrates that ability in a setting that is quite different from college. Thus, when our developmental model assumes change, rather than persistence alone, it follows that if the person does not have the ability, we do not assume that they cannot develop it, or even that they cannot demonstrate it.

While these are some immediate assessment issues that drive educators’ interest in analyzing change, institutional mission statements have set other, broad goals for a college education. These mission statements reflect what college faculty and college student personnel have taught us: Development is an aim of education. Desirable outcomes are defined as intellectual, moral, and ego development—as personal growth. Cognitive-developmental theorists such as Lawrence Kohlberg, Carol Gilligan, Jane Loevinger, William Perry, James Rest, Jean Piaget, and

Arthur Chickering have reinforced this idea (Chickering and Associates, 1981). They have had an impact on higher education outcome definitions.

Thus, as developmental educators, we consider these kinds of changes as student learning outcomes. We expect to do some rethinking around the kinds of models that will work. We are used to applying measurement models that measure change not by describing qualitative transitions, but rather, that add up the number of items correct on a test, and give us a quantitative picture of amounts of change from two repeated administrations of the same measure.

The appropriate measurement model to consider here, however, is development and change, not consistency and stability across time, or continuation of a similar ability. Samuel Messick (1980) argues that assuming change rather than consistency should influence our expectations; I think it changes our ideas about what is valid measurement as well. Once we begin to rethink our assumptions about what kinds of measurement or judgment are valid, we need to rethink our models for analyzing change. *Assuming that change occurs* means that prediction will not necessarily rest on an additive model. That is, we will not necessarily expect to see “more of the same” after instruction or after college, but rather, we expect coherent yet qualitatively different learning outcomes. When we show change, instruments and analysis strategies must validly take this assumption into consideration.

What happens when we add the assumption that development is, at times, nonlinear? Alverno Longitudinal Study results suggest that individuals recycle through earlier forms of thinking when they meet new situations (Mentkowski,

1988). Here, change is not always consistent, “upward” movement on measures of development. How does this observation shape the assumptions underlying models of program and institutional assessment when one is demonstrating that curriculum makes a difference in student changes in abilities, learning, and personal growth? Clearly, we need to expand ways to synthesize and interpret nonlinear, individual and group patterns in complex, multidimensional, higher-order abilities.

3. How best do educators show change patterns in student learning outcomes as a function of learning? What analysis strategies can lead to insights about the impact of a course? of a general education curriculum? of a particular major or professional program? of a faculty-designed, coherent curriculum? of a particular college? What analysis strategies best describe change patterns after college?

With these questions, educators come full circle to this “new” challenge: Can we demonstrate that the outcomes of learning are linked to curriculum? In sum, educators familiar with the literature on college student growth know that students change through maturation and other influences unrelated or indirectly related to formal learning experiences—whether students are traditional-age or more experienced. Thus, the analysis of changes in student outcomes in relation to educator expectations for student performance must ultimately be linked to learning in a course, a general education sequence, the major field, or the curriculum as a whole. Making those causal links to demonstrate student achievement means rethinking our assumptions about analyzing change.

ENDNOTES

¹ Mentkowski, M. (1990, June). Issues in the analysis of change in higher education assessment. In M. Mentkowski (Chair), *Individuals and patterns: Analyzing change over time*. Paper prepared for a symposium at the Fifth National Conference on Assessment in Higher Education sponsored by the American Association for Higher Education, Washington, DC. Milwaukee, WI: Alverno Productions.

² Panelists Linda Collins (University of Southern California), Keith Widaman (University of California, Riverside), and John Willett (Harvard University) describe some new approaches to the analysis of change that cut through the complexity and help educators think about analyzing change in better ways (American Psychological Association Science Directorate, et. al, 1989) [Collins & Horn, 1991].

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