A Measure of College Student Course Engagement

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ABSTRACT **Student engagement is considered an important predictor of student achievement, but few researchers have attempted to derive a valid and reliable measure of college student engagement in particular courses. In 2 studies, we developed and explored the validity of a measure of student engagement, the Student Course Engagement Questionnaire (SCEQ). Exploratory factor analysis revealed 4 dimensions of college student engagement that were distinct and reliable: skills engagement, participation/interaction engagement, emotional engagement, and performance engagement. We reported evidence of the convergent and discriminant validity of the measure. In particular, we found relationships between factors on the SCEQ and self-report measures of engagement, endorsement of self-theories, goal preferences, and grades.**

Key words: achievement of college students, Student Course Engagement Questionnaire, student engagement in lower division courses

We began with a basic question born of our frustration with teaching lower division mathematics and psychology courses: How do we optimize the learning environment and outcomes? We believed that one approach was to get students more engaged, that is, more involved in the course. We thought that we could identify student engagement from specific behaviors, like raising hands or asking questions. However, we had difficulty predicting who was engaged from only those overt behaviors, especially among students with personal or cultural backgrounds different from our own (Chism, 2002). Knowing about students' level of engagement might be useful when teachers work with individual students and design classroom experiences.

When we examined the literature on student engagement, we found general agreement that engaged students are good learners and that effective teaching stimulates and sustains student engagement (Guthrie & Anderson, 1999; Pintrich & DeGroot, 1990; Skinner & Belmont, 1993). For example, Skinner, Wellborn, and Connell (1990) investigated predictors of achievement in grade school students and determined that engagement mediated the effects of students' beliefs about learning on school achievement (e.g., grades). In addition, Skinner and Belmont found a reciprocal relationship between student engagement and teacher involvement.

In spite of some encouraging results, we found that the definitions and measurement of student engagement in the literature, particularly at the college level, were limited. First, many researchers have studied cognitive engagement or the use of students' more complex cognitive strategies (e.g., Meece, Blumenfeld, & Hoyle, 1988; Pintrich & Schunk, 1996). Second, much research has focused on engagement in specific tasks, such as reading (e.g., Guthrie & Alvermann, 1999). Third, studies have focused on engagement in elementary schools and, to a lesser extent, secondary schools (e.g., Skinner & Belmont, 1993). Many of those authors tied their notions of engagement to more general theories of motivation.

At the college level, many studies assess engagement at the "macro level," including projects at Syracuse University (Froh & Hawkes, 1996), the Higher Education Research Institute (HERI; Pace, 1983), and the National Survey of Student Engagement (NSSE) at Indiana University (NSSE; 2000, 2002). For example, the NSSE assesses "whether an *institution's* programs and practices are having the desired effect on students' activities, experiences, and outcomes" (NSSE, 2000, p. 1, emphasis added). The survey measures engagement as a global quality that students have in relation to elements such as level of academic challenge and supportive campus environments. The NSSE focuses on active learning and other educational experiences but does not focus on individual courses; rather, it assesses students' overall perceptions.

Given our desire to improve our own college courses, we wanted to focus specifically on engagement in particular

This research was supported by a Teaching Enhancement Grant awarded to the first two authors from the University of Colorado at Denver and by a small grant from the CU President's Teaching Scholars Program; all authors made equal contributions.

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college courses, especially required lower division courses. We focused primarily on the "micro" level—what happens in and immediately surrounding class—for several reasons. We believed that at the micro level we had the most control and could make the most—or at least the most immediate—difference. The major influence of teachers is on student behavior and feelings in the classroom because, as research suggests, students do not spend much time studying outside of class, and they seem to be spending even less outside time studying than in previous years (Erickson & Strommer, 1991; NSSE, 2000, 2002) and more time on activities such as "surfing the net" (Sax, Lindholm, Astin, Korn, & Mahoney, 2001).We also believed that students' levels of engagement may be variable across courses and over time in a given course.

Many authors have described *engagement* as a multidimensional phenomenon. Most definitions include at least behavioral and affective components. For example, Skinner and colleagues (1990) defined engagement as "children's initiation of action, effort, and persistence on schoolwork, as well as their ambient emotional states during learning activities" (p. 24). Mosenthal (1999) stated that engagement "is grounded in the cognitive and affective systems of learners and readers" (p. 12). Several authors also have noted that engagement has an interpersonal component; interactions with teachers and other students can be an important part of the classroom experience (Connell & Wellborn, 1991; Deci, Connell, & Ryan, 1985; Guthrie & Anderson, 1999; Skinner & Belmont, 1993). For example, Guthrie and Anderson stated, "Social interaction patterns in the classroom can amplify or constrict students' intrinsic motivations, their use of self-regulated strategies, and their attainment of deep conceptual knowledge" (p. 20).

We developed a reliable, valid, and multidimensional measure of college student course engagement. In this article, we present two studies. In the first study, we describe the instrument and initial reliability and validity data. In the second study, we assess the relationship of engagement to grades in a freshman mathematics course.

STUDY 1: DEVELOPMENT OF THE STUDENT COURSE ENGAGEMENT QUESTIONNAIRE (SCEQ)

We used standard psychometric procedures for scale development (Hinkin, 1998). Typically, authors have developed measures of student engagement by using theory. Although there are advantages to using theory to guide instrument development (DeVellis, 1991), that approach may also yield measures that ignore important facets of student engagement that occur in actual learning situations. Hence, we used an inductive approach to capture the many potential dimensions of student engagement. We then assessed the psychometric properties of the instrument by including initial item reduction through exploratory factor analysis and examination of reliability estimates.

To provide an initial assessment of construct validity, we examined the relation of our student-engagement measure with three other measures that provided indications of convergent and discriminant validity (Hinkin, 1998). First, we expected that the student engagement measure would correlate with global items that asked students to self-report their own levels of engagement. We hypothesized that the student engagement measure would be related to two types of self-reported engagement: (a) absolute engagement in their present course and (b) *relative* engagement, a judgment of how engaged students are in a particular course compared with how engaged they are in other courses.

Second, following the work of Dweck and her collaborators (e.g., Dweck, 1999; Dweck & Leggett, 1988), we investigated student self-theories and their possible relationship to student engagement. Briefly, Dweck classified students according to whether they hold an *entity* theory of learning or an *incremental* theory of learning. Those in the former group believe that they have a predetermined capacity for learning; the "container" may be large, but it is limited, and the best one can do is fill it to capacity. Incremental theorists believe that the capacity for learning can be extended and that the container can be stretched in various directions. We hypothesized that student engagement is related positively to incremental theory because students who are engaged in learning presumably believe that this engagement will increase their capacity for learning.

Third, we examined the associations between student engagement and motivational goals. Students approach tasks with differing levels and types of motivation. Dweck and Leggett (1988), Dweck (1999), and Molden and Dweck (2000) proposed a social-cognitive model that delineates a motivational pattern of mastery. In a series of studies, they found that some children set learning goals that are related to increased competence. Such a learning strategy leads to a mastery-oriented pattern in which students (a) are intrinsically motivated, (b) seek challenging tasks, and (c) maintain effective striving after they experience failure. Other students adopt performance goals that focus on their gaining favorable judgments of their competence. Students with performance goals are more concerned with proving their ability to others and are more extrinsically motivated than are those with a learning-goal orientation. We expected that students with a learning-goal orientation would be more engaged than would those with a performance orientation.

Dweck and Leggett's (1988) model is consistent with the ideas of Miller, Greene, Montalvo, Ravindran, and Nichols (1996), who found that differences in student engagement may result from two frames of reference for evaluating competence: mastery and performance orientations. Students with a mastery orientation are concerned with increasing their competence; those with a performance orientation are more concerned with gaining favorable judgments. Researchers have found that goal orientation predicts different learning strategies (Ames & Archer, 1988; Meece et

al., 1988; Miller et al., 1996) and academic achievement (Greene & Miller, 1996; Meece & Holt, 1993).

Method

Participants and Procedure

We used an inductive method to generate items that reflected the construct of student engagement by asking undergraduates and faculty to describe what engaged students do, feel, and think. From the student and faculty responses, we developed a preliminary scale that consisted of 27 behaviors and attitudes that may be indicative of engagement. We incorporated the 27 items into the initial SCEQ.

We recruited participants from among students at the University of Colorado at Denver, an urban commuter campus that comprises not only a typical college population but also a substantial number of nontraditional students—older, working adults who attend school parttime. The sampling process was not totally random; not all students had an equal chance to participate. Rather, we recruited participants by visiting a variety of classes that represented two levels (upper division and lower division) in each of three disciplines—psychology, political science, and mathematics. We collected data from 266 undergraduates (90 men, 176 women). Their ages ranged from 18 to 56 years (M = 23.02, SD = 6.29), which reflected the composition of the general student body.

Having determined the 27 behaviors and attitudes for the SCEQ, we administered the questionnaire during class meetings so that participants would complete it when the specific course was most salient. After signing a consent form and agreeing to participate, students read the following instructions, after which they completed the SCEQ: "To what extent do the following behaviors, thoughts, and feelings describe you, in this course. Please rate each of them on the following scale: 1 = *not at all characteristic of me*, 2 = *not really characteristic of me*, 3 = *moderately characteristic of me*, 4 = *characteristic of me*, 5 = *very characteristic of me*."

Participants then completed the following global engagement items: "How *engaged* are you in this class? (1 = *not at all engaged*, 6 = *extremely engaged*)"; and, "How engaged are you in this class, compared to the other courses you're taking this semester? (1 = *less engaged than in any of my other courses*, 6 = *more engaged than in any of my other courses*)."

To assess the extent to which participants were oriented toward an incremental theory (learning can be extended and is not a fixed entity), we asked participants to state the extent to which they agreed (1 = *strongly agree* to 6 = *not at all agree*) with the following statement: "You have a certain amount of intelligence and you can't do much to change it." The higher the score, the greater the orientation toward an incremental theory of learning.

To assess goal orientation, we used one item: "If I *had* to choose between getting a good grade and being challenged in class, I would choose:____ 'good grade'_____ 'being challenged.'" The classification proved meaningful, as our sample split nearly evenly between students who reported learning goals and those who reported performance goals. However, categorizing students as having learning or performance goals does not mean that students have only one type of goal. Our measure did not assess the relative strength of those goals—only a preference.

Results and Discussion

Exploratory Factor Analysis and Reliability Estimates

Kelloway (1995) suggested that exploratory factor analysis is useful in the early stages of scale development; one can determine the items that load best on each factor. To test the factor structure of the student engagement measure, we conducted an exploratory factor analysis and constructed reliability estimates.

Factor structure of student engagement responses. We performed principal axis factoring with varimax rotation on the 27 student engagement items. Following factor analyses on a seven-factor and four-factor solution and inspection of a scree plot, we retained four factors. Interpretability of factors was difficult after four factors, and the scree plot suggested that the absolute size of the slope showed little decrease after four factors. The four factors accounted for 42.69% of the variance; the factor solution and all the items appear in Table 1.

The first factor consisted of nine items that we labeled skills engagement (13.91% of the variance) because it represented student engagement through practicing skills. Items included "Taking good notes in class" and "Looking over class notes between classes to make sure I understand the material." Coefficient alpha was .82. Skills engagement seems to include general learning strategies (Weinstein, Goetz, & Alexander, 1986) that one can use to attain intrinsic and extrinsic rewards (Sansone & Harackiewicz, 2000) and may be related to the level of academic challenge (NSSE, 2000).

The second factor consisted of five items that we labeled emotional engagement (10.20% of the variance) because it represented student engagement through emotional involvement with the class material. Items included "Applying course material to my life," "Really desiring to learn the material," and "Thinking about the course between class meetings." (For all factors, we listed only two or three examples in the text; all items are listed in Table 1.) Coefficient alpha was .82. The finding of an emotional engagement factor is consistent with findings of researchers who discuss an affective component to engagement (e.g., Mosenthal, 1999; Skinner et al., 1990). In addition, all the items for emotional engagement are virtually invisible. We can make the items more visible by, for example, requiring papers in which students relate course concepts to their lives. However, instructors may benefit from the realization that a level of student engagement exists that ordinarily

TABLE 1. Factor Structure of Student Course Engagement Questionnaire

Items	Factor 1 (Skills)	Factor 2 (Emotional)	Factor 3 (Part/int)	Factor 4 (Performance)
Making sure to study on a regular basis	.64			
Putting forth effort	.59			
Doing all the homework problems	.57			
Staying up on the readings	.55			
Looking over class notes between classes to make sure I understand the material	.53			
Being organized	.53			
Taking good notes in class	.53			
Listening carefully in class	.51			
Coming to class every day	.47			
Finding ways to make the course material relevant to my life		.86		
Applying course material to my life		.86		
Finding ways to make the course interesting to me		.54		
Thinking about the course between class meetings		.46		
Really desiring to learn the material		.43		
Raising my hand in class			.82	
Asking questions when I don't understand the instructor			.64	
Having fun in class			.57	
Participating actively in small-group discussions			.55	
Going to the professor's office hours to review assignments or tests or to ask questions			.50	
Helping fellow students			.45	
Getting a good grade				.77
Doing well on the tests				.68
Being confident that I can learn and do well in the class				.64

Note. Part/int = participation/interaction. Factor loadings less than .40 are not displayed.

cannot be assessed by one observing students' behavior in the classroom.

The third factor consisted of six items that we labeled participation/interaction engagement (9.68% of the variance) because it represented student engagement through participation in class and interactions with instructors and other students. Items included "Asking questions when I don't understand the instructor," "Raising my hand in class," "Having fun in class," and "Helping fellow students." Coefficient alpha was .79. Most items on the participation/interaction factor converge with the NSSE (2000, 2002) category of faculty interaction. However, the factor also includes "Participating in small-group discussions." That item and the one about helping students correspond to the NSSE category of active and collaborative learning.

The fourth factor consisted of three items that we labeled performance engagement (8.90% of the variance) because it represented student engagement through levels of performance in the class. Items included "Being confident that I can learn and do well in the class," "Getting a good grade," and "Doing well on the tests." Coefficient alpha was .76. That factor appeared to be related to extrinsic motivation (Sansone & Harackiewicz, 2000) and to performance goals rather than learning or mastery goals (Molden & Dweck, 2000).

Four items were excluded because they either did not load on a factor ("Sitting toward the front of class, where it's easier to pay attention" and "Figuring out what's expected of me in this class") or loaded on a second factor ("Contacting the professor [phone or e-mail] when I have a question" and "Being determined to succeed"). The factor analysis resulted in a 23-item final version of the SCEQ.

Reliability of factors and preliminary evidence of discriminant validity. The intercorrelations, descriptive statistics, and reliabilities for the student engagement variables appear in Table 2. All student engagement factors showed reasonable reliability that ranged from .76 to .82. The highest of the correlations among the student engagement factors was .44

TABLE 2. Correlations, Descriptives, and Reliabilities of Student Engagement Factors

Factor	*M*	*SD*	Skills	Emotional	Part/int	Performance
Skills	3.70	.66	(.82)			
Emotional	3.53	.80	0.44	(.82)		
Participation	3.06	.84	0.26	0.34	(.79)	
Performance	4.06	.69	0.36	0.25	0.23	(.76)

Note. Part/int = participation/interaction. Coefficient alphas are displayed in the diagonal in parentheses. All coefficients are statistically significant at $p < .01$.

between skills and emotional engagement, lending some support for the discriminant validity of the student engagement measure. To conclude, the results provide preliminary evidence for a four-factor structure and internal consistency of the SCEQ. In the following analyses, we used participants' scores on each of the four SCEQ factors.

Self-Reported Engagement

We performed two analyses that regressed absolute engagement and relative engagement on the four student engagement factors of the SCEQ, which accounted for 23% of the variance in absolute engagement (engagement in the current class), $F(4, 261) = 21.07$, $p < .001$. Emotional engagement ($\beta = .38$) and participation/interaction engagement ($\beta = .16$) were positive predictors of absolute engagement. In the second analysis, we regressed relative engagement (engagement compared with other classes) on the four engagement factors. The student engagement factors accounted for 12% of the variance in relative engagement, $F(4, 261) = 10.51$, $p < .001$. Emotional engagement ($\beta = .23$) was a positive predictor of relative engagement.

Incremental and Entity Self-Theories

We examined the role of self-theories by regressing belief in incremental theory on the four SCEQ factors. The analysis revealed that 5% of the variance in incremental theory beliefs was explained by the student engagement factors, $F(4, 260) = 4.55$, $p < .001$. Emotional engagement ($\beta = .15$) was a positive predictor of belief in incremental theory.

Learning Versus Performance-Goal Orientation

We performed a multivariate analysis of variance on the four SCEQ factors; goal orientation was the independent variable (learning vs. performance). The analysis revealed a statistically significant effect of goal orientation, Wilks's $\Lambda = .88$, $F(4, 254) = 8.73$, $p < .001$. Univariate analyses revealed that students with a learning orientation were more emotionally engaged ($M = 3.74$; $SD = .75$) than were students with a performance orientation ($M = 3.35$, $SD = .79$), $F(1, 257) = 15.40$, $p < .001$, and students with a learning orientation had more participation/interaction engagement ($M = 3.34$, $SD = .95$) than did those with a performance orientation ($M = 2.80$, $SD = .95$), $F(1, 257) = 22.89$, $p < .001$. Students with a performance-goal orientation showed more performance engagement ($M = 4.20$, $SD = .65$) than did those with a learning orientation ($M = 3.96$; $SD = .59$), $F(1, 257) = 8.31$, $p < .01$.

The results appear to indicate that emotional engagement is related to several other indexes of student motivation—from self-reported global ratings of absolute and relative engagement to the presence of incremental self-theories and learning goals. The SCEQ performance engagement factor is related to the presence of performance goals but not to other indexes of engagement.

STUDY 2: SCEQ AND COURSE GRADES

The results of the first study suggested four dimensions of student engagement. In this second study, we intended to verify further the validity of the SCEQ by testing the measure on a different group of participants. To investigate whether the SCEQ might be useful in educational settings, we investigated its relation to grades. We do not suggest that grades are the best or ultimate measure of learning, but they are a commonly accepted proxy measure. On the basis of previous research (e.g., Finn & Rock, 1997; Skinner & Belmont, 1993), we hypothesized that students who were more engaged in the classroom would perform better in the classroom than those who were not engaged.

Method

Participants and Procedure

Again, opportunity, rather than truly random selection, determined our choice of participants. For this study, we collected SCEQ data from 40 undergraduates (30 women, 10 men) who were enrolled in a basic liberal arts mathematics class and who majored in a wide variety of subjects. Their ages ranged from 18 to 45 years ($M = 21.72$, $SD = 7.54$). We

obtained grades from the instructor (the second author, who was blind to engagement data) at the end of the course. To preserve student privacy, we identified students with a code number to match grades with completed measures; only one research assistant retained access to the master list of names and codes. During the first part of the semester, participants completed a consent form that explained that they would complete a short questionnaire and give permission to share their grades with the researchers. The form also explained the steps that we took to assure their anonymity. After signing the consent form, they completed the SCEQ.

We obtained three grades for each participant: (a) average grade on weekly homework assignments, (b) midterm examination grades, and (c) final examination grades. The weekly homework assignments required that students complete several mathematical problems on their own time. Students could receive feedback on their assignments before turning them in for a grade. Thus, most students lost points on the assignments by not turning them in rather than by failing to answer the problems correctly. The assignments accounted for the majority of the final course grade. The open-book, in-class examinations included a variety of problems requiring an application of knowledge.

Results and Discussion

We performed several analyses by regressing student grades on the four student engagement factors. The first regression analysis revealed that the student engagement factor explained 26% of the variance in homework assignment grades, $F(4, 35) = 2.97$, $p < .05$. The only significant predictor of homework assignment grades was performance engagement ($\beta = .28$). None of the other predictors was statistically significant.

The second regression analysis revealed that the student-engagement factor explained 28% of the variance in midterm examination grades, $F(4, 35) = 4.14$, $p < .01$. Significant predictors of midterm grades were performance engagement ($\beta = .38$), participation/interaction engagement ($\beta = .30$), and skills engagement ($\beta = .50$).

The final regression analysis revealed that the student-engagement factor explained 30% of the variance in the final examination grades, $F(4, 35) = 4.00$, $p < .05$. The only significant predictor of final examination grade was participation/interaction engagement ($\beta = .62$). None of the other predictors was statistically significant.

Our findings may be explained, in part, by the nature of the course, the tests, and the assignments. We studied a freshman-level class, and students at that level may not be as used to interaction, participation, and active learning as are seniors (NSSE, 2000), especially in a mathematics class, which was not the major of the participants. The relationship of performance engagement—which may include involvement in achieving extrinsic rewards—with assignment and midterm grades makes sense given that the assignments rewarded sheer effort and that the midterm was an open-book test. That finding also is consistent with previous research showing that extrinsic motivation is useful when the material is new and not intrinsically interesting (Sansone & Harackiewicz, 2000), which was true in this study. Given that most of the course grade was based on the assignments, other types of engagement—skills and participation/interaction—accounted for some of the variance on test grades. Here, students' behavior on tests seemed to be more about wanting to learn the material than only about receiving an external grade.

General Discussion

This research provides initial validation of the SCEQ, a measure of college student course engagement. We found evidence of four interpretable and internally consistent factors: skills, emotional, participation/interaction, and performance. Apart from the correlation between emotional and skills engagement, the correlations among the student engagement variables were moderately low, suggesting initial evidence for the discriminant validity of the measure.

We also obtained evidence of convergent and discriminant validity of the SCEQ by relating SCEQ scores with related constructs associated with student learning and motivation. All four of the SCEQ factors were associated with at least one other measure; the different patterns among the variables supported the distinctiveness of the student engagement factors. For example, performance engagement was associated mainly with traditional or extrinsic outcomes of achievement, such as assignment grades and midterm examinations. In comparison, emotional engagement was associated with intrinsic outcomes of learning, such as being engaged in the class and holding an incremental theory about learning. Participation/interaction was the factor that related to a variety of internal and external indexes. That finding is consistent with previous research (e.g., Hake, 1998; NSSE, 2000) that highlights the importance of faculty interaction and collaborative learning.

We also obtained evidence for the reliability of the measure; all the factors had reliabilities above the recommended level. Therefore, this research shows empirical evidence of the usefulness of the SCEQ. The questionnaire gives an easily administered but comprehensive snapshot of students' engagement. It also provides more information than simply asking students how they feel (skewed toward emotional engagement), watching their performance in class (skewed toward skills and participation/interaction engagement), or making inferences according to their grades (skewed toward performance engagement).That course-specific snapshot complements the global picture provided by such surveys as those of HERI (Pace, 1983) or NSSE (2000, 2002). In-class focus on a variety of types of engagement can complement college policies that provide additional learning opportunities and quality for students.

This research supports a multidimensional construct of student engagement. Moreover, some of the dimensions are not necessarily obvious to observers. Thus, instructors receive only part of the picture if they focus on the obvious signs of engagement, such as raising hands and asking questions. For example, emotional engagement was associated positively with general self-report ratings of engagement, a belief in an incremental theory of learning, and learning (rather than performance) goals. Helping students become emotionally engaged may be an important complement to teaching knowledge and skills (Weinstein et al., 1986) and may include teachers' instilling attitudes or developing a culture of learning, fun, and interaction in the classroom. Knowing about students' levels and types of engagement may be especially useful for faculty members who teach a large number of part-time, older, and commuter students who are not globally engaged (NSSE, 2000, 2002) and need to be inspired in the classroom.

Although we measured engagement at only one point in the semester, the SCEQ can be administered at various times because it is short. On the macro level, NSSE (2000) did a cross-sectional study of global engagement among freshmen and seniors to detect changes in engagement over the years. On the micro level, our measure can answer questions about what happens during the course of a semester. For example, what happens to students who fail the first assignment or test (Molden & Dweck, 2000)? On the basis of findings by Dweck (1999) and Molden and Dweck that performance goals suffer most from failure, and our findings of the relationship between grades and engagement, we predict that performance engagement may suffer most after a failure experience in a course.

This study is obviously only a beginning. Although participants in the study represented traditional and nontraditional students, our sample sizes were small and not fully random. We studied students from classes limited in number and type. Researchers can paint a more subtle picture of students in various institutions and types of courses. Future validation of the student engagement measure could also focus on the relation of the measure with other constructs. For example, identifying antecedents of student engagement will enable educators to consider interventions to promote engagement. In addition, the extent to which the teacher is engaged might be a strong predictor of student engagement and, subsequently, student learning. Previous research has reported that, not surprisingly, teacher behaviors influence student engagement (Skinner et al., 1990). As with any new measure, ongoing research will be necessary to refine construct validity because scale development is an iterative process. Despite the limitations, the SCEQ shows promise as a useful tool for researchers and instructors.

REFERENCES

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*, 260–267.

Chism, N. V. N. (2002). Valuing student differences. In W. J. McKeachie (Ed.). *Teaching tips: Strategies, research, and theory for college and university teachers* (11th ed., pp. 128–147). Boston: Houghton-Mifflin.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self processes in development: Minnesota Symposium on Child Psychology* (Vol. 23, pp. 43–77). Hillsdale, NJ: Erlbaum.

Deci, E. L., Connell, J. P., & Ryan, R. M. (1985). A motivational analysis of self-determination and self-regulation in the classroom. In C. Ames & R. E. Ames (Eds.), *Research on motivation in education: Vol. 2. The classroom milieu* (pp. 13–52). San Diego, CA: Academic Press.

DeVellis, R. F. (1991). *Scale development*. Newbury Park, CA: Sage.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality and development*. Philadelphia: Psychology Press.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256–273.

Erickson, B. L., & Strommer, D. W. (1991). *Teaching college freshmen*. San Francisco: Jossey-Bass.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology, 82*, 221–234.

Froh, R. C., & Hawkes, M. (1996). Assessing student involvement in learning. In R. J. Menges, M. Weimer, & Associates (Eds.), *Teaching on solid ground: Using scholarship to improve practice* (pp. 125–153). San Francisco: Jossey-Bass.

Greene, B. A., & Miller, R. B. (1996). Influences on course performance: Goals, perceived ability, and self-regulation. *Contemporary Educational Psychology, 21*, 181–192.

Guthrie, J. T., & Alvermann, D. E. (Eds.). (1999). *Engaged reading: Processes, practices, and policy implications*. New York: Teachers College Press.

Guthrie, J. T., & Anderson, E. (1999). Engagement in reading: Processes of motivated, strategic, knowledgeable, social readers. In J. T. Guthrie & D. E. Alvermann (Eds.), *Engaged reading: Processes, practices, and policy implications* (pp. 17–45). New York: Teachers College Press.

Hake, R. R. (1998). Interactive-engagement vs. traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics, 66*, 64–74.

Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods, 1*, 104–121.

Kelloway, K. E. (1995). Structural equation modeling in perspective. *Journal of Organizational Behavior, 16*, 215–224.

Meece, J. L., Blumenfeld, P., & Hoyle, R. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology, 80*, 514–523.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology, 26*, 399–427.

Miller, R. B., Greene, B. A., Montalvo, G. P., Ravindran, B., & Nichols, J. D. (1996). Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology, 21*, 388–422.

Molden, D. C., & Dweck, C. S. (2000). Hidden costs (and benefits) of achievement goals. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 131–159). San Diego, CA: Academic Press.

Mosenthal, P. B. (1999). Understanding engagement: Historical and political contexts. In J. T. Guthrie & D. E. Alvermann (Eds.), *Engaged reading: Processes, practices, and policy implications* (pp. 1–16). New York: Teachers College Press.

National Survey of Student Engagement. (2000). *The NSSE report: National benchmarks of effective educational practice*. Bloomington: Indiana University Center for Postsecondary Research and Planning.

National Survey of Student Engagement. (2002). *2002 overview*. Bloomington: Indiana University Center for Postsecondary Research and Planning.

Pace, C. (1983). *College student experiences: A questionnaire* (2nd ed.). Los Angeles: University of California, Higher Education Research Institute.

Pintrich, P. R., & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*, 33–40.

Pintrich, P. R., & Schunk, D. H. (1996). *Motivation in education: Theory, research, and applications*. Englewood Cliffs, NJ: Merrill Prentice-Hall.

Sansone, C., & Harackiewicz, J. M. (Eds.). (2000). *Intrinsic and extrinsic*

motivation: The search for optimal motivation and performance. San Diego, CA: Academic Press.
Sax, L. J., Lindholm, J. A., Astin, A. W., Korn, W. S., & Mahoney, K. M. (2001). *The American freshman: National norms for fall 2002*. Los Angeles: Higher Education Research Institute.
Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*, 571–581.
Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology, 82*, 22–32.
Weinstein, C. E., Goetz, E. T., & Alexander, P. A. (1986). *Learning and study strategies*. New York: Academic Press.