

Assessing Academic Advising Outcomes Using Social Cognitive Theory: A Validity and Reliability Study

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The validity and reliability of three instruments, the Counselor Rubric for Gauging Student Understanding of Academic Planning, micro-analytic questions, and the Student Survey for Understanding Academic Planning, all based on social cognitive theory, were tested as means to assess self-efficacy and self-regulated learning in college academic planning. The rubric assessed pre- and post-intervention self-regulated learning of academic-planning strategy levels. The micro-analytic questions assessed self-regulated learning during forethought and self-reflection phases. Post-intervention self-efficacy in academic planning and retrospectively evaluated pre-intervention self-efficacy were measured by the survey. All three instruments showed strong validity and reliability, but the survey did not distinguish between different self-efficacy challenge levels.

KEY WORDS: academic planning; *Counselor Rubric for Gauging Student Understanding of Academic Planning*; micro-analytic questions; self-efficacy; self-regulated learning; *Student Survey for Understanding Academic Planning*

Both this article and a 2013 *NACADA Journal* publication (Erlich & Russ-Eft, forthcoming), reporting the results of the social cognitive theory application to advising, are based on research conducted on a campus where counselors fulfilled the academic advising role. To clearly communicate with the participants of the research, we employed terminology of the campus in the research instruments. Therefore, in both *Journal* articles, we use the terms *counselor(s)* and *academic advisor(s)* interchangeably, but in all cases we refer only to the practices of academic advising.

Academic advising for community college students provides a critical student service (Gordon, Habley, & Grites, 2008). It helps students orient themselves and adjust to an entirely new academic system and lifestyle (Pascarella & Terenzini, 2005). However, academic advisors face a dearth of valid and reliable instruments designed to measure student learning outcomes generated during academic advising (Schuh, 2008). Several standardized instruments are used to assess student's engage-

ment experiences at college, such as the *National Survey of Student Engagement* (National Survey of Student Engagement, 2012) and the *Community College Survey of Student Engagement* (University of Texas at Austin, 2012). They assist in identifying key elements in the teacher-learner environment that promote student success and completion. However, they do not measure learning outcomes gained at the time of the specific interventions nor explain how learning occurred.

Several recent publications suggest ways to assess student learning by using quantitative (e.g., survey) or qualitative methods (e.g., learning portfolios) (Bresciani, Zelna, & Anderson, 2004; Kuh, Kinzie, Schuh, & Whitt, 2005; Schuh, 2008; Smith, Szelest, & Downey, 2004; Troxel, 2008). However, no specific instruments have been designed to assess academic-planning learning outcomes at the time academic advising is delivered. In addition, extant instruments typically do not represent a consistent theoretical learning perspective nor did the designers publish validity and reliability information. The validity and reliability tests, in particular, help determine whether the instruments consistently measure learning in the academic advising session.

Research Purpose

Using Bandura's (1986, 1997) social cognitive theory, we developed and validated three instruments measuring student learning during the academic advising process. Specifically, we applied the constructs of self-efficacy and self-regulated learning, per Zimmerman (2000), to assess the changes in community college students' self-efficacy in academic planning and self-regulated learning-strategy levels as outcomes of an academic advising session.

We studied the following self-efficacy and self-regulated learning assessment tools for use in academic advising: *Counselor Rubric for Gauging Student Understanding of Academic Planning* (hereafter, the *rubric*) (Erlich, 2008), micro-analytic questions (Erlich, 2009a), and the *Student Survey for Understanding Academic Planning* (hereafter, the *survey*) (Erlich, 2009b), all of which apply self-efficacy theory and self-regulation theory con-

tained within social cognitive theory (Bandura, 1986, 1997) to the academic advising setting. See Appendices A, B, and C.

To interpret any self-regulated learning and self-efficacy assessment results stemming from the rubric, as used with micro-analytic questions, and the student survey, we needed to determine the validity and reliability of all three instruments. As Schunk (2008) eloquently stated, "It is incumbent upon researchers to clearly explain how their measures are reliable and valid indicators of the variables they are attempting to study" (p. 466).

Social Cognitive Theory

Self-efficacy Beliefs

Self-efficacy beliefs can be defined as confidence for engaging in activities that lead to one's specific goals (Bandura, 1997). These beliefs appear to be positively correlated to perseverance toward one's goals (Bandura, 1997; Bolt, Killough, & Koh, 2001; Pajares, 1996; Yi & Davis, 2003). Such beliefs certainly impact a student's educational performance (Pajares, 1996). For example, strong confidence in one's study habits and efforts contributes to increased academic achievement (Kitsantas, Cheema, & Ware, 2011; Ramdass & Zimmerman, 2011; Zimmerman, Bandura, & Martinez-Pons, 1992; Zimmerman & Schunk, 2011).

Self-regulated Learning

Self-regulated learning refers to the process of taking active control and responsibility for learning such that students employ a variety of strategies and adjust them, as needed, to aid in learning. Zimmerman (2000) developed a model showing the self-regulation process in a three-step cycle: forethought, performance, and self-reflection.

Forethought phase. The forethought phase of Zimmerman's (2000) model includes several subprocesses: goal setting (deciding upon learning objectives) and strategic planning (identifying the optimal learning strategies needed to reach the goal). Motivational beliefs of self-efficacy and outcome expectations also comprise, in part, the forethought phase, and research shows that self-efficacy beliefs allow for prediction of behaviors such as choice of activities, effort, and persistence (Bandura, 1997; Yi & Davis, 2003; Zimmerman, 1989).

Performance phase. The forethought phase influences the performance phase, at which time a student implements his or her strategic plan for learning (Cleary & Zimmerman, 2004; Zimmerman, 2000). During the performance phase,

the learner undertakes activities, guided by self-controlled subprocesses, such as self-instruction, focused attention, and task strategies, to enhance learning performance. The student conducts self-observation to monitor her or his personal performance.

Self-reflection phase. During the self-reflection phase, the learner evaluates his or her performance effectiveness and makes adjustments to learning strategies to improve future performance. This phase is constituted by the two subprocesses of self-judgment and self-reaction (Cleary & Zimmerman, 2004; Zimmerman, 2000). Based upon one's conclusions from the self-reflection phase, new information is cycled into the next forethought phase in the cycle to influence cognitions, affect, behavior, and motivation.

Methods

The Counselor Rubric

In 2008, Erlich, a coauthor of this article, created the counselor rubric to measure a student's self-regulated learning strategies for academic planning. The rubric relates to the content in advising sessions where advisors focus on evaluating student transcripts in five content areas: a) associate degree general-education pattern; b) associate degree, major, core courses; c) 60-unit requirement for earning the associate degree; d) transfer general education patterns for the University of California and California State University systems; and e) required course work in the transfer major, which are archived in the ASSIST (n.d.) repository of transfer information for California.

From the practitioner's perspective, the end goal for each academic advising session is student demonstration of increased levels in self-efficacy and self-regulated learning for academic planning. To measure student achievement in this area, the advisor needs standards for defining academic-planning strategy levels. The rubric defines four levels of student understanding and demonstrated self-regulated learning-strategy levels: *no recognition* (NR)—does not know any academic planning information; *recognizes* (R)—possesses basic understanding of the information and its usefulness; *chooses* (Ch)—shows moderate understanding and can apply information to course selection; *creates* (Cr)—demonstrates proficient understanding as characterized by the ability to prioritize strategically and plan courses to meet academic goals.

The rubric definitions are based on demonstrated student use of several self-regulated learn-

ing strategies as first identified by Zimmerman and Martinez-Pons (1988): self-evaluating, organizing and transforming, goal setting and planning, seeking information, and seeking assistance. Recorded on the following scale, the advisor rates a student's demonstrated strategy level as follows: NR = 1; R = 2; Ch = 3; Cr = 4. The means for the pre- and post-session scores are calculated and *t* tests completed to determine mean differences.

Micro-analytic Assessment Questions

For the purposes of this research, self-regulated learning is not viewed as an ability that a student possesses before attending an advising session but rather as an event with a) a beginning, when an advisor assesses a student's current goals and strategic plans (forethought phase); b) a process portion during the appointment, when the student practices the new academic-planning task strategies (performance phase); and c) an end point, when the student self-evaluates her or his own performance and makes adaptive changes to improve it (self-reflection phase). To capture student responses during the forethought and self-reflection stages of the academic advising session, Erlich (2009a) created the six micro-analytic questions that reveal self-regulated learning subprocesses. Micro-analytic assessments have been historically used in self-efficacy and self-regulated learning studies (Bandura, 1977, 1986; Cleary & Zimmerman, 2001; Cleary, Zimmerman, & Keating, 2006; Kitsantas & Zimmerman, 2002).

By asking students micro-analytic Questions 1 and 2 (the initial goal for the session and pre-intervention-strategy level), the advisor assesses the forethought phase with the same scoring rules used for scoring the rubric: NR = 1, R = 2, Ch = 3, and Cr = 4. The advisor scores student's demonstrated academic-planning strategy levels about content on the associate degree, transfer, or both, depending upon the student's goals for session.

Advisors use micro-analytic Questions 3, 4, 5, and 6 to learn about student self-reflection. Question 3 allows for assessment of a student's post-intervention strategy-level learned outcome as per the rubric, and Question 4 provides information about a student's retrospective pre-intervention self-efficacy. Scores range from 0 to 10. Question 5, with a 0 for "no" and a 1 for "yes," reveals student's reaction to his or her own learning progress. Also based on the rubric definitions, the answer to Question 6 shows a student's adjustment inferences—the intended strategy level the student will use in future academic planning.

The Student Survey

Erlich (2009b) created the student survey, which measures self-efficacy in academic planning, to obtain a student's rating of their retrospective pre-intervention self-efficacy and post-intervention self-efficacy in academic planning. (Taylor, Russ-Eft, and Taylor [2009] provide a review of retrospective pre-tests.) The self-efficacy scale ranges from 0 to 10, and it features descriptive labels of *no confidence*, *limited confidence*, *moderate confidence*, and *highly confident*. Students report their scores in the appropriate columns, which appear on a single page, during the self-reflection phase. By providing the student's self-evaluation perspective, the instrument serves as a check on the advisor evaluations made with the rubric and micro-analytic questions.

Bandura's books and articles (1997, 2006) on standards for creating self-efficacy scales were used for reference. These standards required four core areas to be addressed: content validity, domain specification, gradations of challenge, and response rating scale.

Sample

Students ($N = 120$) from a community college located in a large metropolitan area in California participated in the study. The sample consisted of 61 women, 56 men; 3 chose not to answer the question on gender. Ages ranged from 18 to 60 years; the median age was 21 years, and 70% of the sample were between 18 and 24 years old. The students in this study had completed between 0 and 91 academic units; the median number of units completed was 31. To minimize Type I and II errors, α was set at .05, reflecting a willingness to make either type of error 5 times out of 100. To maximize the power ($1 - \beta$) of detecting a significant difference, β was set at .90; in other words, we expected that 9 times out of 10 a significant difference would be detected. Based upon these calculations, we needed to secure a sample of 44 students (Lenth, 2006-2009).

Procedures

For this study, we used a quasi-experimental, retrospective pretest-posttest design with typical academic advising interventions offered to all participants; that is, all academic advising sessions included the same services that students typically receive when addressing the specific topics under study. During each session, the counselor sought to help students become more self-confident and self-directed in their academic planning. The advis-

ing offered was based on processes of cycling students through self-regulated learning phases (Zimmerman, 2000; Zimmerman & Cleary, 2006) and using interventions based in social cognitive theory, such as guided mastery and efficacy building as means to increase students' self-regulated learning and self-efficacy in academic planning. The following sequence clarifies the academic advising procedures:

1. Student arrived for an academic advising appointment or on a walk-in basis. The counselor began the session by asking micro-analytic Questions 1 and 2, designed to assess the forethought phase of self-regulated learning, specifically, the student's goals for the session and her or his currently used strategic plans for reaching these goals.
2. The counselor assessed student's answers based upon self-regulated learning definitions found in the rubric.
3. The counselor's assessment of the student's demonstrated self-regulated learning-strategy levels in academic planning led to the advising interventions administered.
4. During the performance phase, the student practiced (emulated) the new academic-planning strategy modeled by the counselor during the session. The student received constructive feedback for improving performance.
5. During the self-reflection phase, the student evaluated his or her new academic-planning strategy performance by answering micro-analytic Question 3. This revealed the student's post-intervention self-regulated learning-strategy level, which the counselor rated per the rubric.
6. During the self-reflection phase, the student completed the survey to rate post-intervention self-efficacy beliefs in academic planning and then retrospectively to rate pre-intervention self-efficacy.
7. Additionally, the student answered micro-analytic Question 4 about pre-intervention self-efficacy. Question 5 revealed student's reaction to her or his own learning-goal progress, and based upon the rubric definitions, the answer to Question 6 showed a student's adjustment inferences—the intended strategy level the student will use in future academic planning.
8. Students whose academic advising session

contained all of the above elements were asked for their consent for us to use their survey answers as well as the counselor rubric ratings and recorded responses to the six micro-analytic questions.

Analyses

Statistical methods used to analyze the validity of the instruments included factor analysis (extraction method was principal component analysis; rotation method was varimax with Kaiser normalization), paired-samples *t* tests, and correlations. Statistical methods used to analyze reliability of the instruments included Cronbach's α and Pearson correlation for test-retest reliability.

Results

We applied content and construct validity tests to the rubric, micro-analytic questions, and the survey. Content validity assessment allows researchers to answer the question, "Are we measuring and covering the content we intended to measure?" Construct validity testing allows researchers to determine if the instrument measures the intended elements, in this case, self-regulated learning and self-efficacy in academic planning.

Validity of the Counselor Rubric

To address content validity, we asked 19 community-college counselor colleagues (experts) to examine the rubric and give their opinions on whether it adequately describes the content of academic planning. Of these experts, 95% answered in the affirmative.

We examined construct validity for the rubric by using factor analysis and correlation. Table 1 presents the results. Principal component factor analysis of the rubric showed two component factors that accounted for 87.4% of total variance. The first factor's eigenvalue was 6.806 and accounted for 68.1% of the reliable variance. The second factor's eigenvalue was 1.944 and accounted for 19.4% of the reliable variance. Eigenvalues answer the question, "How much of the variability is explained?" (Neil Willits, Senior Statistician Consultant at the University of California, Davis, personal correspondence, July 22, 2010) (Diekhoff, 1992).

We labeled Factor 1 "self-regulated learning-strategy levels applied to transfer." We chose this name for Factor 1 based on the component matrix conducted with varimax rotation (see Table 2). Factor 1 loaded heavily on strategy levels for transfer content for both pre- and post-intervention. Factor loadings for strategy levels related to transfer

Table 1. Factor analysis of rubric, $N = 67$

Content Area	Mean	SD
Pre-intervention Strategy Level		
Associate Degree General Education	2.04	.878
Associate Degree Major	2.04	.878
Earned Associate Degree	2.04	.878
Transfer General Education	2.85	.821
Transfer Major	2.75	.959
Post-intervention Strategy Level		
Associate Degree General Education	3.36	.792
Associate Degree Major	3.36	.792
Earned Associate Degree	3.36	.792
Transfer General Education	3.66	.617
Transfer Major	3.60	.698
Factors	Total	% of Variance
1	6.806	68.058
2	1.944	19.435

general education were .874 (pre) and .915 (post), and factor loadings for strategy levels for transfer major were .910 (pre) and .932 (post).

We labeled Factor 2 “self-regulated learning strategy levels applied to associate degree.” Factor 2 loaded heavily on strategy levels for associate degree content for both pre- (.955) and post-intervention (.665). See Table 2.

The factor analysis output delineated the items that show correlation values, called “communalities.” The data answer the question, “How do assessment items relate to each other and to the instrument’s overall concept?” The correlation values were all very high, ranging from .81 to

.93, indicating that the instrument was consistently measuring the same concept.

The evidence illustrated that the rubric measured what was intended—the student’s demonstrated self-regulated learning of academic-planning strategies related to associate degree and transfer content at both pre- and post-intervention points. The result meant that the instrument shows content and construct validity: It measured the items of interest, which were accurately articulated.

Reliability of the Counselor Rubric

Instrument validity depends upon its reliability. As explained by Anastasi (1982), “Reliability

Table 2. Two factors identified for the rubric

Variable	Varimax Rotated Component Matrix ^a	
	Factor 1	Factor 2
Pre-intervention Strategy Level		
Associate Degree General Education	.165	.955†
Associate Degree Major	.165	.955†
Earned Associate Degree	.165	.955†
Transfer General Education	.874†	.297
Transfer Major	.910†	.192
Post-intervention Strategy Level		
Associate General Education	.612	.665†
Associate Degree Major	.612	.665†
Earned Associate Degree	.612	.665†
Transfer General Education	.915†	.223
Transfer Major	.932†	.105

Note. Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization

^aRotation converged in 3 iterations.

†Indicates high factor loadings >.60.

refers to the consistency of scores obtained by the same persons when reexamined with the same test on different occasions..." (p. 102). We calculated two measures, Cronbach's α and test-retest reliability, to determine the internal consistency and reliability of the rubric. Cronbach's α measured the internal consistency of the scale items; values could be distributed from +1 to -1. These results appear in Table 3. The correlations were very high, .90 between pre-scores and .94 between post-scores on all five content items.

We used Pearson correlation to evaluate the strength of test-retest reliability between pre- and post-intervention ratings, which measured .98. One-way analysis of variance (ANOVA) of within people-between items showed consistent significant changes between the pre- and post-intervention measures within each case: $F(9, 66) = 118.658$, $p < .001$. The data indicate that the rubric shows reliability and internal consistency.

Validity of Micro-analytic Questions

To test for instrument validity, we used student responses to the micro-analytic questions asked

by the counselor during the forethought and self-reflection phases of the academic advising session. Specifically we conducted a factor analysis (principal component) on a) student's stated goal for the session (Question 1), b) counselor interventions administered to address this goal, and c) student's stated adjustment intentions (Question 6) for using this new academic-planning strategy in the future. Factor analysis results appear in Table 4.

Per the varimax rotation method, Factor 1, labeled "self-regulated learning phases in transfer academic planning," loaded in a large, positive direction on transfer content, with three out of three loadings ranging from .94 to .96 (see Table 5). Factor 2, "self-regulated learning phases in associate degree academic planning," loaded in a large positive direction on associate degree content, with two out of three loadings at .96 and the third at .42.

The communality values ranged from .77 to .99 ($M = .94$) (data not shown). These results show very strong construct validity for the micro-analytic questions; that is, the instrument measured the common theme, self-regulated learning, as intended by design.

Table 3. Reliability of counselor rubric

Cronbach's α	ANOVA Within People-Between Items				
	<i>n</i>	<i>df</i>	<i>F</i>	<i>Sig</i>	Test-Retest
.945	10	9	118.658	.001	.98
Pre-value	.902				
<i>n</i>	5 ^a				
Post-value	.941				
<i>n</i>	5 ^b				
Total <i>N</i>	10				

Note. ^aPre-intervention ratings on all 5 content areas

^bPost-intervention ratings on all 5 content areas

Table 4. Factor analysis of micro-analytic questions, $N = 71$

Content	Means	SD
Initial Goal for Session for Associate Degree (Question 1)	2.96	.801
Initial Goal for Session for Transfer (Question 1)	3.58	.710
Intervention for Associate Degree	2.96	.801
Intervention for Transfer	3.56	.732
Adjustment Inference for Associate Degree (Question 6)	3.42	.768
Adjustment Inference for Transfer (Question 6)	3.59	.688

Factors	Initial Eigenvalues Total	% of Variance	Total Variance Explained Cumulative %
1	4.376	72.933	72.933
2	1.285	21.412	94.344

Note. Extraction method: principal component analysis

Table 5. Varimax factor loadings on micro-analytic self-regulated learning questions

Content	Varimax Rotated Component ^a	
	Factor Loadings 1	Factor Loadings 2
Initial Goal for Session for Associate Degree (Question 1)	.243	.968†
Initial Goal for Session for Transfer (Question 1)	.964†	.209
Intervention for Associate Degree	.243	.968†
Intervention for Transfer	.964†	.166
Adjustment Inference for Associate Degree (Question 6)	.776†	.420
Adjustment Inference for Transfer (Question 6)	.945†	.263

Note. Extraction Method: principal component analysis; rotation method: varimax with Kaiser normalization

^a2 components extracted. Rotation converged in 3 iterations.

†Indicates high factor loadings > .60.

Reliability of Micro-analytic Questions

We determined the reliability of the micro-analytic questions by calculating Cronbach's α and conducting a test-retest to find Pearson correlation values. Table 6 presents these results. The Cronbach's α value of .92 shows strong internal consistency. The Pearson correlation value was .94. The ANOVA showed a significant difference in within people-between items, $F(5, 70) = 34.626$, $p < .001$, indicating consistent significant changes between the pre-post measures within each case.

The micro-analytic questions showed consistency and reliability appropriate for assessing students' self-regulated learning progression throughout the academic advising session in which associate degree and transfer planning were addressed.

Validity of the Student Survey

We addressed content validity of the survey, in part, by observing students as they provided answers to the questions. Both before and after the interventions, students understood and answered

the questions, demonstrating no confusion during the process.

We established the construct validity of the survey by conducting a factor analysis on the 30 survey variables. Table 7 provides the factor analysis results. The principal component factor analysis of the student survey yielded 7 factors that accounted for 78% of the total variance.

We employed varimax rotation to interpret the 3 primary factors. Table 8 displays the results for Factor 1, "retrospective pre-intervention self-efficacy on all academic planning content across three graduation levels," which was named because of the high factor loadings (defined as > .60 as per Suhr, 2006) on all but two retrospective pre-intervention self-efficacy ratings for associate degree and transfer academic-planning content across challenge levels R, Ch, and Cr.

The varimax rotation results for Factors 2 and 3 appear in Table 9. Factors 2 and 3 were named "post-intervention self-efficacy ratings on all academic planning content across three graduation levels." Factors 2 and 3 showed several high factor

Table 6. Reliability of micro-analytic questions

Cronbach's α	ANOVA Within People-Between Items				
	<i>n</i>	<i>df</i>	<i>F</i>	Sig	Test-Retest
.921	6	5	34.626	.001	.94
Part 1 Value	.843				
n of Items	3 ^a				
Part 2 Value	.935				
n of Items	3 ^b				
Total N of Items	6				

Note. ^aInitial Goal for Session Associate Degree and Transfer, Intervention Associate Degree

^bIntervention for Transfer, Adjustment Inference for Associate Degree and Transfer

Table 7. Factor analysis of student survey self-efficacy—total variance

Factors	Initial Eigenvalues	% of Variance	Cumulative %
	Total		
1	9.106	30.354	30.354
2	6.384	21.282	51.635
3	2.406	8.020	59.655
4	1.705	5.683	65.338
5	1.539	5.130	70.468
6	1.268	4.225	74.693
7	1.058	3.528	78.221

Table 8. Varimax rotated Factor 1 loadings

Content	Varimax Rotated Component Matrix ^a		
	Pre-intervention Self-efficacy Ratings		
	Recognizes (R)	Chooses (Ch)	Creates Plan (Cr)
Associate Degree General Education	.783†	.709†	.805†
Associate Degree Major	.779†	.591†	.789†
Earned Associate Degree	.788†	.790†	.887†
Transfer General Education	.749†	.705†	.788†
Transfer Major	.204	.316	.787†

Note. Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization

^aRotation converged in 14 iterations.

†Indicates high factor loadings > .60.

loadings (defined as > .60 as per Suhr, 2006) on post-intervention self-efficacy ratings for associate degree and transfer academic-planning content. Factor 2 loadings were high for the Ch and Cr challenge levels. Factor 3 loadings were high for R. The factor analysis output included communality values that ranged from .59 to .95 ($M = .78$), indicating that the instrument measured self-efficacy in academic planning as designed (data not shown).

Perceived efficacy should be measured against levels of task demands that represent gradations of challenges or impediments to successful performance. Self-efficacy appraisals reflect the level of difficulty individuals believe they can surmount (Bandura, 2006, p. 311). A series of paired-samples *t* tests was used to determine whether significant mean differences existed between the gradations of challenge levels R, Ch, and Cr. See Table 10 for results based on retrospective pre-intervention self-efficacy scores. Overall, the results show a mixed picture. Tests of 4 pairs reveal significant mean differences while tests on 11 pairs showed no significant mean differences. These data suggest that

students rated their self-efficacy similarly across all three gradations of challenge levels.

Paired-samples correlation values (.55 to .92) showed significant and strong relationships between the three self-efficacy gradations of challenge levels ($p < .001$).

These findings suggest that the survey is a valid instrument for measuring post-intervention and retrospective pre-intervention self-efficacy in academic planning content for both associate degree and transfer content. However, the absence of significant differences between self-efficacy gradations of challenge (R, Ch, Cr) means that the survey lacks some capacity for determining these levels. Therefore, we recommend that survey users emphasize results of students' retrospective pre-intervention self-efficacy on academic planning content within the context of the self-regulated learning-strategy level as rated by the advisor using the rubric. In this way, student's retrospective pre-intervention self-efficacy can be interpreted with consideration of the specific reasons for and planning-level contexts of the advising session.

Table 9. Varimax rotated Factors 2 and 3 loadings

Content	Varimax Rotated Component Matrix ^a					
	Post-intervention Self-efficacy					
	Recognizes (R)		Chooses (Ch)		Creates Plan (Cr)	
	Factor 2	Factor 3	Factor 2	Factor 3	Factor 2	Factor 3
Associate Degree General Education	.275	.710†	.712†	.139	.701†	.118
Associate Degree Major	.484	.237	.830†	.119	.609†	.462
Earned Associate Degree	.288	.851†	.210	.684†	.181	.400
Transfer General Education	.330	.704†	.731†	.386	.862†	.222
Transfer Major	.062	.091	.136	.067	.854†	.122

Note. Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization

^aRotation converged in 14 iterations.

† Indicates high factor loadings > .60

Table 10. Paired-samples *t* test mean differences between R, Ch, and Cr gradations of challenge

Content		<i>t</i>	<i>df</i>	Sig. (2-tailed)
Associate Degree General Education				
Pair 1	Recognizes with Chooses	-2.759	84	.007*
Pair 2	Recognizes with Creates Plan	-1.371	68	.175
Pair 3	Chooses with Creates Plan	.727	70	.470
Associate Degree Major				
Pair 1	Recognizes with Chooses	-.738	85	.463
Pair 2	Recognizes with Creates Plan	-.855	67	.395
Pair 3	Chooses with Creates Plan	-.164	69	.870
Earned Associate Degree				
Pair 1	Recognizes with Chooses	1.505	84	.136
Pair 2	Recognizes with Creates Plan	2.281	68	.026*
Pair 3	Chooses with Creates Plan	1.533	70	.130
Transfer General Education				
Pair 1	Recognizes with Chooses	-2.085	101	.040*
Pair 2	Recognizes with Creates Plan	.783	87	.436
Pair 3	Chooses with Creates Plan	2.783	89	.007*
Transfer Major				
Pair 1	Recognizes with Chooses	.218	98	.828
Pair 2	Recognizes with Creates Plan	.683	88	.496
Pair 3	Chooses with Creates Plan	.357	90	.722

Note. * $p < .05$.

Student Survey Reliability

To determine the reliability of the survey, we used Cronbach's α and Pearson correlation in a test-retest. See Table 11. Cronbach's α (.91) measured the internal consistency of the scale items. The Pearson correlation, used to evaluate the strength of test-retest reliability between pre- and post-intervention, measured .96. For within people-between items, the ANOVA showed consistent significant

changes between the pre- and post-intervention measures: $F(29, 63) = 60.867, p < .001$. These results suggest that the survey offers internal consistency and reliability for assessing pre- and post-intervention self-efficacy for associate degree and transfer academic-planning content.

Discussion

We conducted this study to address the need for

Table 11. Student survey self-efficacy scale reliability analysis

Cronbach's α		ANOVA Within People–Between Items				
		<i>n</i>	<i>df</i>	<i>F</i>	Sig	Test-Retest
Part 1	.913	30	29	60.867	.001	.96
	Value	.770				
Part 2	<i>n</i>	15 ^a				
	Value	.883				
Total <i>N</i>	<i>n</i>	15 ^b				
	30					

Note. ^aRecognizes all 5 content areas at pre- and post-intervention; chooses all 5 content areas at post-intervention

^bChooses all 5 content areas at pre-intervention; creates plan for all 5 content areas at pre- and post-intervention

creating valid and reliable instruments designed to measure student learning outcomes at the time academic advising is delivered. As Schuh (2008) stated, “Choosing an instrument that is well crafted in terms of its psychometrics (validity and reliability) and that measures constructs of value to the institution and its students are central to the measurement process” (p. 364). Through this study, we demonstrate the validity and reliability of three assessment instruments that college academic advisors can use to measure student learning gained from an academic advising session.

Additionally, the literature cites calls for use of theory to guide advising practice. “Academic advising cannot be performed or studied without theory” (Hagen & Jordan, 2008, pp. 18-19). The second issue of the 2011 *NACADA Journal* brought together examples of diverse personality and social psychology theories and practices applicable to academic advising. In our article in this special issue (Erich & Russ-Eft, 2011), we discussed ways to fruitfully use social cognitive theory in academic advising. The results from the study presented here demonstrate the validity and reliability of three assessment instruments theoretically based in social cognitive theory (per Bandura, 1986, 1997).

Our results indicate that the rubric and micro-analytic questions were valid and reliable in assessing self-regulated learning in academic planning. The survey showed strong validity and reliability for assessing post-intervention and retrospective pre-intervention self-efficacy of associate degree and transfer content. Moreover, when used together, the assessment instruments documented pre- and post-intervention changes in self-regulated learning and self-efficacy in academic planning. The micro-analytic questions provided valid and reliable assessments for describing changes in self-regulated learning throughout the academic

advising session.

However, the survey did not reveal distinguishable self-efficacy gradations of challenge (R, Ch, Cr) levels in a consistent manner. Therefore, future researchers should improve the survey to yield this information. Perhaps statements could more clearly specify the conditions under which students face challenges in academic planning. For example, the phrase “absent counselor assistance” added to the item “how confident are you that you can recognize associate degree general education?” may better differentiate student self-efficacy ratings when faced with increased challenge levels.

Additionally, upon reviewing recent research on retrospective pretest data (Nimon, Zigarmi, & Allen, 2011), we recommend reformatting the survey. Nimon et al. (2011) found that post-test ratings that appear on pages adjacent to retrospective pretest ratings produced greater rater bias than if the pages could not be visually compared.

Limitations of Study

This study involved students at one community college in California. Thus, a replication study with other students at other institutions is needed.

In addition, because further development of the survey is needed, the value of its use in present form may be in question. Despite its inability to distinguish challenge levels (R, Ch, Cr), it proved valid and reliable for assessing self-efficacy in academic planning for post-intervention self-efficacy and retrospective pre-intervention self-efficacy on associate degree and transfer content. It also served as an excellent check on student's own assessment of learning.

While completing the survey, 4 of 120 students indicated they did not understand some of the survey questions. The counselor restated and reviewed the intervention content with these students, thus

gaining valuable feedback about ways to improve advising practice intervention.

Implications

We uncovered interesting and useful results when using all three instruments. For example, by interpreting students' self-efficacy ratings within the advisor's ratings of student's self-regulated learning-strategy levels (R, Ch, Cr), we could examine the relationships between self-efficacy and self-regulated learning. Higher self-efficacy ratings may be associated with higher self-regulated learning-strategy levels. The rubric may indicate that students who operate at higher strategy levels also express higher self-efficacy. Exploring whether self-efficacy rises along with student's advancement to higher strategy levels could be productively examined with the assessment instruments.

Additionally, these instruments benefit students by providing feedback on their initial advising-session goals, thus increasing their self-efficacy. Advisors benefit by being able to document student's demonstrated self-regulated learning-strategy levels over time and monitor student progress. They can also examine their academic advising process for facilitating students' achievement of desired learned outcomes in self-efficacy and self-regulated learning in academic planning. As a result of their evaluation, they can make improvements and modifications to their practice and thus enhance student learning.

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Authors' Notes

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Appendix A. Counselor rubric for gauging student's level of understanding academic planning

Student ID#: _____ Date: _____

Major: _____ Total units completed: _____

INSTRUCTIONS: Using the rubric provided below, please mark the student's levels of understanding academic planning content **BEFORE** and **AFTER** this counseling session.

Content	No Recognition (NR)		Recognizes (R)		Chooses (Ch)		Creates (Cr)	
	Before	After	Before	After	Before	After	Before	After
AA/AS Degree GE Pattern								
Major and/or Certificate								
Earning an AA/AS Degree (60 units – GE, major and electives)								
CSU GE-Breadth/IGETC								
Transfer Major using ASSIST								

Rubric Definitions**No Recognition (NR)***Minimal Understanding*

- Does not recognize the associate degree general education pattern
- Does not know each area of general education must be completed for the degree
- Does not recognize course work required for the major or certificate
- Does not know the requirements for an associate degree
- Does not recognize CSU GE-Breadth or IGETC pattern
- Does not recognize ASSIST web site nor articulation agreements

Recognizes (R)*Basic Understanding*

- Recognizes the associate degree general education pattern and knows to choose a course from each area
- Recognizes associate degree majors and the courses required for the majors or certificates
- Explains the requirements for an associate degree: 60 units consisting of general education, major requirements, and electives (if necessary)
- Recognizes the CSU GE-Breadth or IGETC pattern and knows to choose a course from each area
- Explains reasons for using ASSIST and how articulation agreements are used to find courses required for a transfer major

Chooses By Applying Information (Ch)*Moderate Understanding Shown Through Student Behaviors*

- Chooses courses that meet the associate degree general education requirements
- Chooses courses that meet the major or certificate requirements
- Chooses courses that allows for exploration of interesting majors
- Chooses courses that meet CSU or IGETC pattern
- Uses ASSIST articulation agreements to choose courses for the transfer major
- Works with the counselor in completing an educational plan

Appendix A. Counselor rubric for gauging student's level of understanding academic planning (cont.)

Creates (Cr)

Proficient Understanding Shown Through Student Behaviors

- Creates checklist of courses completed on the general education patterns
- Creates checklist of courses completed toward major requirements
- Accurately states what future courses are required to complete goals
- Expresses clear direction about academic and career goals
- Structures next steps in academic planning
- Creates own educational plan and asks the counselor to verify courses chosen

Note. ASSIST (n.d.); GE is general education; CSU is California State University; IGETC is Inter-segmental General Education Transfer Curriculum. Copyright © Richard J. Erlich, Counselor, Sacramento City College, May 18, 2008. Used with permission. See the Authors' Notes for contact information on the rubric and scoring.

Appendix B. Micro-analytic assessment questions for self-regulated learning phases and academic planning strategies

Scoring	Forethought	Recognizes (R)	Chooses (Ch)	Creates (Cr)
NR (No recognition) R Ch Cr (Associate Degree and Transfer)	#1 Goal Setting	What would you like to obtain from today's session? Do you have major and/or career options that you are considering or exploring? Tell me the story behind your choice of goal(s).		
Yes/No Use Rubric for Scoring NR R Ch Cr	#2 Strategic Plan	Do you know how to do academic planning for reaching your educational goal(s)? Show me how you currently do your academic planning.		
R Ch Cr (Associate Degree and Transfer)	Interventions	Based upon the student's answers to stated goals, and strategic plan questions, advisor determines which intervention strategies (recognize, choose, create) are administered.		
Scoring	Performance			
Yes No Yes No	Task Strategy Self-recording	Student deliberately practices applying Academic Task Strategy that was just modeled, receiving feedback. Student uses the general education and major patterns plus any educational plans.		
Scoring	Self-reflection	Recognizes	Chooses	Creates
Yes No NR R Ch Cr (Associate Degree and Transfer) (Use Rubric for Scoring)	#3 Self-evaluation (Demonstrates criteria for this strategy and strategy's purpose)	What is this sheet called and why is it important?	Tell me why you chose this course.	Tell me why you prioritized your courses in this order.
Administration of Student Self-efficacy Survey/Advisor Completes Rubric*				
Scoring	Self-reflection			
0 – 10 #	#4 Self-efficacy	If you were to rate your level of confidence before a session for doing academic planning on a scale from 0 – 10, 0 being the lowest and 10 being the highest confidence level, what # would you rate yourself?		
Yes No	#5 Self-reaction	You stated your goal for this session was _____. Was your goal for this session met?		
NR R Ch Cr (Associate Degree and Transfer)	#6 Adaptive Inferences (Changes in intended future strategy)	How will you do your future academic planning for reaching your educational goals?		

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Appendix C. Student survey of understanding academic planning

Student ID#: _____ Date: _____											
Please rate how confident you are right now , and how confident you were before the counseling session in performing the academic planning tasks described below. Please read the definitions of <i>Recognizes</i> , <i>Chooses</i> , and <i>Creates</i> .											
Rate your confidence level using the scale from 0 - 10 given below:											
N/A	0	1	2	3	4	5	6	7	8	9	10
No Confidence			Limited Confidence			Moderate Confidence			High Confidence		

Definition	Confidence Now	Confidence Before Session
Recognizes: I can identify this pattern and know why it is used		
1. How confident are you that you can... (0 – 10)	(0 - 10)	(0 - 10)
<i>recognize</i> the associate degree general education pattern		
<i>recognize</i> required courses for completing a college major or certificate pattern		
<i>recognize</i> 60 units of general education, major, and electives that meet associate degree requirements pattern		
<i>recognize</i> the general education transfer pattern for CSU and/or IGETC		
<i>recognize</i> the ASSIST website name and reasons for using it		
Chooses: I can apply this pattern when choosing courses and know why I used it		
2. How confident are you that you can... (0 – 10)	(0 - 10)	(0 - 10)
<i>choose</i> courses from associate degree general education pattern that meets degree requirements		
<i>choose</i> required courses for completing a college major or certificate pattern		
<i>choose</i> 60 units from general education, major, and electives that meet associate degree requirements pattern		
<i>choose</i> courses from each general education transfer pattern area that meets CSU and/or IGETC requirements		
<i>use</i> ASSIST to <i>choose</i> courses in your transfer major pattern		
Creates plan: I can apply this pattern, prioritize courses, and know why		
3. How confident are you that you can... (0 – 10)	(0 - 10)	(0 - 10)
<i>create</i> an educational plan that completes the associate degree general education pattern		
<i>create</i> an educational plan for completing a college major or certificate pattern		
<i>create</i> an educational plan showing 60 units that complete the associate degree requirement pattern		
<i>create</i> an educational plan that completes CSU and/or IGETC General Education transfer pattern		
<i>create</i> an educational plan that completes the required coursework in your transfer major pattern		

Thank you for completing this survey. This information will be kept confidential.

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