

**A CROSS-VALIDATION STUDY OF THE COLLEGE LEARNING EFFECTIVENESS  
INVENTORY (CLEI)**

**by**

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**B.F.A., The Kansas City Art Institute, 2001**

**M.A., Wichita State University, 2005**

**AN ABSTRACT OF A DISSERTATION**

**Submitted in partial fulfillment of the requirements for the degree**

**DOCTOR OF PHILOSOPHY**

**Department of Special Education, Counseling, and Student Affairs  
College of Education**

**KANSAS STATE UNIVERSITY  
Manhattan, Kansas**

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## **ABSTRACT**

This study examines the validity of the College Learning Effectiveness Inventory (CLEI). The CLEI is a new instrument designed to assess issues that college students face that affect their performance, including academic success and persistence. The CLEI serves diagnostic and prescriptive functions. Academic advisors, counselors and others whose work involves supporting student success and retention can use the CLEI to assess an individual student's strengths and weaknesses and use the results to counsel students and provide appropriate remedial activities.

This study compares the following six scales of the College Learning Effectiveness Inventory (CLEI) with instruments that have already been established. The six scales of the CLEI are as follows: (1) Academic Self-Efficacy, (2) Organization and Attention to Study, (3) Stress and Time Pressure, (4) Involvement with College Activity, (5) Emotional Satisfaction, and (6) Class Communication. The validation instruments for this cross-validation study included the Concentration, Self-Testing, Study Aids, and Time Management scales from the Learning and Study Strategies Inventory (LASSI), the Time Organization and Study Environment Management subscale of the Motivated Strategies for Learning Questionnaire (MSLQ), the College Adjustment Questionnaire (CAQ), the Rosenberg Self-Esteem Scale (RSES), and the Student Propensity to Ask Questions (SPAQ) scale.

This study answers the following research questions: 1.) Are the CLEI scales reliable measures of the constructs they purport to assess? 2.) Are the CLEI scales valid measures of the dimensions they purport to assess? 3.) What are the CLEI scales attributes for this sample, and how do they compare with those from an earlier normative sample? 4.) How are the CLEI scales

related to one another? 5.) Are the CLEI scales gender neutral? and 6.) Does the CLEI differentiate between students who are successful and those who may be at risk?

Finally, this study cross-validates the CLEI. The reason for a cross-validation study of new scales is to demonstrate that these new measures actually measure what they purport to assess. Without cross validation, we would have to rely on a scale's face validity, which is a comparatively weak method of assessing validity.

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Approved by:

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## **DEDICATION**

This dissertation is dedicated to my parents Mary and Sam Yeager. Thank you for always believing in me.

## **Chapter 1 – Introduction**

This study examines the validity of the College Learning Effectiveness Inventory (CLEI). The CLEI is a new instrument designed to assess issues that college students face that affect their performance, including academic success and persistence (Newton, Kim, Wilcox, & Yeager, 2007). The CLEI serves diagnostic and prescriptive functions. Academic advisors, counselors and others whose work involves supporting student success and retention can use the CLEI to assess an individual student's strengths and weaknesses.

Student assessment is important because many students have trouble adapting from high school to their first year of college. Freshmen pass through three entry phases – separation, transition, and incorporation (Tinto, 1993). Some students are so overwhelmed that they do not successfully complete their freshman year. Gardner and Siegel (2001) cite data from ACT that indicates that 28% of students in public, four-year colleges and universities fail to continue beyond their first year in college. Freshmen and other students such as transfer, returning adults, and those who are underprepared are also at risk. Underprepared students lack the ability to compete successfully with other students at the same institution (Ender & Wilkie, 2000). Steele and McDonald (2008) stated that “underprepared students may or may not be ready for the academic challenges that they will encounter in their transition to college” (p. 171). Central to this readiness issue is “the scope of the difference between high school and college-level work in terms of pace, amount, and expectations” (Steele & McDonald, 2008, p. 171).

After assessment, a counselor can use test results to work with students. Interventions can be custom designed to address each student's weaknesses, build on strengths, and enhance academic success.

The major objectives for creating the CLEI were to:



1. Develop a series of clearly defined and operationalized questions that a student could use to measure his/her thoughts, feelings, and behaviors related to academic pursuits;
2. Include a positive to negative continuum that reflects how the item content might support or interfere with academic pursuits;
3. Utilize an online survey format for ease of access, user-friendly administration, and rapid retrieval of results;
4. Provide students completing the inventory with immediate feedback in the form of an individualized profile showing his/her strengths and weakness;
5. Provide information for advising and counseling students that can be used in discussion of goals, selection of interventions, referral to relevant student services, and as a measure of progress and involvement in the change process;
6. And to utilize the CLEI as a tool for research describing relationships between variables, measures of change, and outcome comparisons (Newton et al., 2007).

Development of instruments such as the CLEI is important to college counseling.

Universities provide advising and counseling to help students achieve better academic outcomes and campus experiences. This requires identifying desirable outcomes and psychosocial factors that affect those outcomes.

College advisors and counselors have a long history of using assessment instruments to determine students' academic ability and achievement potential. To help students improve their capabilities, researchers have identified a variety of performance or outcome measures including grade point average (GPA), persistence and attrition in academic enrollment, satisfaction with

college life, and adjustment to college defined as emotional well-being, achievement of goals, and positive change over time.

Researchers have identified specific individual academic and social behaviors, or psychosocial factors, which affect student performance and development (Russell & Petrie, 1992). These psychosocial factors include student aptitudes and abilities, attitudes, motivation, study approaches, vocational interests, utilization of campus resources, and available sources of personal support whether they are utilized or not.

University advising and counseling efforts also include the use of intervention strategies to remedy student problems. Researchers have shown that intervention strategies can significantly influence student success in the classroom and the overall campus experience (Engle, Reilly, & LeVine, 2003; Halstead, 1993; Newton, 1990; Newton & Smith, 1996; Tovar, & Simon, 2006; Trombley, 2000; Yeager, 2008a). The CLEI was developed within this counseling context with the intent of assessing psychosocial issues (attitudes and behaviors) that affect academic performance. By identifying a student's specific strengths and weaknesses, the CLEI enables counselors and students to select specific interventions that focus on each student's unique problems. Completing the interventions can help the student address and remedy these problems.

### ***Statement of the Problem***

The purpose of this study is to do a cross-validation study of the CLEI. The reason for a cross-validation study of new scales is to demonstrate that these new measures actually measure what they purport to assess. Without cross validation, we would have to rely on a scale's face validity, which is a comparatively weak method of assessing validity. Hence, a researcher would have less faith in an instrument's validity and usefulness. The following paragraphs place this

effort in the context of what this author describes as a typical process of developing a new instrument.

In the process of developing a new measure, a researcher might use the following steps derived from Nunnally (1978) and extensions of his work (Nunnally & Bernstein, 1994). First, researchers identify the issues, ideas, and concepts that are theoretically and practically related to the problem they are investigating. These issues, ideas, and concepts help form the construct they wish to operationalize or measure. Second, the researcher generates questions that measure these ideas or concepts. Third, they develop a test instrument containing the questions or a questionnaire. This process involves reducing the pool of questions by logically eliminating items that were poorly worded, unclear, and duplicative. Fourth, the instrument is tested by administering it to an appropriate sample, in this case a sample of college students, to support appropriate statistical analyses. Fifth, the researcher performs a factor analysis on the overall set of questions to see if the individual scales or subscales actually exist in these data. Sixth, they calculate correlations between the new scales to determine how they relate to one another and to ensure that they actually measure separate constructs (Nunnally, 1978). Seventh, they assess the internal reliability of the scales or subscales by calculating Cronbach's alpha on each of them. Similarly, if the scales contain enough questions, they might calculate split-half reliabilities as well. Finally, the researcher assesses the validity of the scales or subscales by identifying existing measures of the same or similar concepts, and collecting data from subjects that includes the newly developed measures and the pre-existing validation scales. The researcher then assesses the correlation between the new and the validation scales. This demonstrates the degree to which these measures assess the same constructs. This dissertation contains the cross-validation portion of the CLEI development.

This question of convergent validation can be answered by using a cross-validation strategy that compares each of the CLEI scales with other previously established scales that assess the same or a similar dimension. The term “established” means that the comparison scales have demonstrated internal reliability and external validity. These comparisons are made by calculating Pearson correlations between each CLEI scale and the corresponding established scale. The results are then assessed.

This study examines a set of research questions assessing the validity of the CLEI. This includes determining the internal reliability and validity. The next section describes these research questions and the reasons for them.

### ***Research Questions***

Six research questions are described in this section and answered later in this research.

1. Are the CLEI scales reliable measures of the constructs they purport to assess? This is a question of internal reliability. It is important because the validity and usefulness of a scale are constrained by its internal reliability. If a scale does not consistently measure a construct, then it cannot be expected to have high validity coefficients (Nunnally, 1978).
2. Are the CLEI scales valid measures of the dimensions they purport to assess? This is important because it addresses the usefulness of the new scales. It requires assessing the construct validity of the scales. Construct validity is assessed using convergent or concurrent validity and discriminant or divergent validity. These are methods of measuring whether the scales assess what they purport to measure. All of these terms are defined on pages 6-8.

3. What are the CLEI scales attributes for this sample, and how do they compare with those from an earlier normative sample? This question addresses the issue of consistency across different samples. A valid measure should demonstrate consistency across samples.
4. How are the CLEI scales related to one another? This is important because measures of separate constructs should measure different things and not overlap.
5. Are the CLEI scales gender neutral? In general, scales should discriminate or measure something, but not on the basis of external factors such as gender, race, age, and year in college. If a measure does give differential results based on gender, then this should be taken into account while interpreting results. This is a question of bias versus actual measurement of differences.
6. Does the CLEI differentiate between students who are successful and those who may be at risk? This is a question of predictive validity. A test that can predict student outcomes, such as grade point average, should be more useful for counseling purposes than one that cannot predict those outcomes.

### *Definitions*

A variety of terms that relate to validity are used in this study. The discussion of validity can be confusing because different terms may mean the same thing. These synonyms are identified and defined in this section. The terms used in this study are validity, face validity, internal reliability, construct validity, convergent validity, discriminant validity, and predictive validity.

In general, the term *validity* refers to whether a test actually measures what it intends to measure (Nunnally, 1978).

*Face validity* is the simplest and most imprecise form of validity. If a test has face validity, it means that it appears to be valid or to measure what it claims to measure (Nunnally & Bernstein, 1994). Face validity is “the mere appearance that a measure has validity” (Kaplan & Saccuzzo, 1997, p. 1320). It is imprecise because it is based on the judgment of individual observers, and their conclusions may differ. It is not statistically based.

*Internal reliability* refers to the consistency of the measures composing a scale. Internal reliability asks if questions measure the same thing or not. It can be statistically assessed using Cronbach’s alpha coefficient and split-half reliability (Cortina, 1993; Nunnally, 1978).

*Construct validity* asks if a test adequately measures the underlying construct. The question of construct validity can be addressed investigating its convergent validity and its discriminant validity. The question of construct validity can also be addressed using predictive validity (Nunnally, 1978).

*Convergent validity*, which is also called criterion or concurrent validity, focuses on the relationship between a new construct measure under development and a criterion measure (an established measure of the same domain) collected concurrently. Convergent validity exists when the correlation between the new construct measure and an established criterion measure is sizeable (Nunnally, 1978).

*Discriminant* or divergent validity focuses on test scores and behaviors that should be unrelated to one another. Discriminant validity is demonstrated when results of tests measuring different domains correlate at low levels (Churchill & Iacobucci, 2002, p. 413). Convergent validity is addressed more often than discriminant validity (Nunnally, 1978).

*Predictive validity* is a form of criterion validity that refers to how well the scores on a test or scale are related to a predicted behavior. A test might be used to predict behavior with the

expectation that people who score high on a test will score high on a predicted behavior. The specified behavior is a criterion (Nunnally, 1978).

### *Limitations*

This study had multiple limitations. First, the results were based on a sample of 180 Kansas State University students. The study could be improved by using data from a more diverse population of students from multiple campuses. According to a study by Kansas State University, the student body under represents people of color and other minorities in the populations of Kansas and the United States (Kansas State University Profile, 2008).

Second, students at Kansas State University are primarily traditional students 18 to 22 years old. Including non-traditional, older students would improve the representativeness of this study.

Third, the Kansas State University student body contains relatively few international students (Kansas State University Profile, 2008). The sample used in this study could not answer the question of how students from other cultural backgrounds will respond to the CLEI or to the validation instruments. Including more international students might extend the usefulness of this study.

Fourth, the college involvement scale of the CLEI did not yield accurate results for off-campus and online students (Newton et al., 2007). An alternative measure could be developed to assess involvement of these students. Some students at Kansas State University take both on-campus courses and online classes. The author wonders how these students' scores were affected, or how they differ from students living on campus, in a fraternity/sorority house, in Manhattan, or commuting from outside of Manhattan.

Fifth, this validation study used a set of established instruments that were carefully selected because they assess the same or similar dimensions to those in the CLEI. The instruments used in this study included the Learning and Studies Strategies Inventory (LASSI), Motivated Strategies for Learning Questionnaire (MSLQ), Crombag College Adaptation Questionnaire (CCAQ), Rosenberg Self-Esteem Scale (RSES), and Student Propensity to Ask Questions Scale (SPAQ). Citations for these instruments are provided in the research methods chapter. Other instruments exist that measure the same and other similar dimensions. The use of other measures in conducting a validation study such as this might yield different results.

Finally, this study used version three of the CLEI. Development of the CLEI is discussed in Chapter 2. As a new instrument, the CLEI is a work in progress. Further refinements will almost certainly improve the instrument. With this objective, a variety of suggestions for future research are offered.



## **Chapter 2 – Literature Review**

This chapter contains four major sections. The first section places assessment instruments, such as the CLEI, in an advising/counseling context of student assessment. The next section describes theoretical roots underlying the development of the CLEI. The third section describes the development of the second and third versions of the CLEI. Material on the second version of the CLEI (62 questions) includes subsections detailing data collection and factor analysis of these data. The subsection describing development of the third version of the CLEI (50 questions) describes the confirmatory factor analysis used to produce the third version, factor analysis of this third or 50-question version of the CLEI, CLEI scale definitions and interpretation, CLEI scale attributes, and psychometric properties.

The final section of this chapter covers administration and appropriate use of the CLEI. It focuses on administration and use of the CLEI including subsections on administration of the CLEI, appropriate use of the CLEI, scoring procedures, CLEI user qualifications, and CLEI sample profile interpretations.

### ***The Advising/Counseling Context of Student Assessment***

College counselors, academic advisors, and other professional support personnel have a long history of using assessment to determine students' academic ability and achievement potential. In an effort to improve these processes, researchers have identified a variety of performance or outcome measures including grade point average, persistence and attrition in academic enrollment, satisfaction with college life, adjustment to college defined as emotional well-being, achievement goals, and positive change over time on specified criteria (Allan, 1996; Nightingale & O'Neil, 1994; Otter, 1995).

Investigators have identified specific individual behaviors and aspects of the learning environment, or psychosocial factors, which affect student performance and development. A study by Russell and Petrie (1992) that influenced development of the CLEI drew multiple factors together in a single model that identified psychosocial factors affecting student academic adjustment and success.

Subsequent research on these psychosocial factors includes examination of academic, individual/personal, social, and environmental variables such as aptitudes and abilities, attitudes, motivation, study approach, vocational interests, utilization of campus resources, and sources of personal support that are available and whether or not they are utilized (Angelo, 1993; Astin, 1993; Chemers, Hu, & Garcia, 2001; Davidson & Beck, 2006; Friedlander, Reid, Shupak, & Cribbie, 2007; Lahmers & Zulauf, 2000; Macan, Shanhani, Dipboye, & Phillips, 1990; Pascarella & Terenzini, 1991; Pascarella et al., 1996; Russell & Petrie, 1992; Strange, 1994; Tinto, 1993). Other studies of the effects of psychosocial variables on student performance and outcomes have examined a large number of different factors including the impact of academic self-esteem, efficacy, and confidence (Chemers, Hu, & Garcia, 2001; Friedlander, Reid, Shupak, & Cribbie, 2007; Lent, Brown, & Larkin, 1984; Zajacova, Lynch, & Espenshade, 2005); time utilization (Lahmers & Zulauf, 2000; Macan, Shahani, Dipboye, & Phillips, 1990; Nonis & Hudson, 2006); strategic organization and study (VanZile-Tamsen, 2001); stress and emotional factors (Davidson & Beck, 2006; Pritchard & Wilson, 2003); student involvement with campus life (Anaya, 1996; Cooper, Healy, & Simpson, 1994); motivation and task relevance (Bong, 2004; VanZile-Tamsen, 2001), and communication in the classroom (Aitken & Near, 1993; Cayanus, 2005; Cunconan, 1996; Dillon, 1986; Kendrick & Darling, 1990; Littlejohn, 1995;

Martin, Mottet, & Myers, 2000; Pearson & West, 1991; Potter & Emanuel, 1990; Van der Meij, 1989; Van der Meij & Dillon, 1994; West & Pearson, 1994).

Researchers have shown that specific psychosocial factors can be directly influenced through intervention strategies (Engle, Reilly, & LeVine, 2003; Halstead, 1993; Newton, 1990; Newton & Smith, 1996; Tovar & Simon, 2006; Trombley, 2000; Yeager, 2008a). Understanding the relationships between certain psychosocial variables and successful outcomes provides an opportunity for developing educational and supportive strategies. This knowledge enables advisors, counselors and other academic services personnel with relevant training in assessment and intervention to make a significant difference in student success in the classroom and the overall campus environment (Kuh, 1997; Liddell, Hubbard, & Werner, 2000; Payne, 2008; Schonewise & Weichel, 2007; Wolf, 2007).

The CLEI was developed to provide counselors and other student services personnel with practical assessment instruments that effectively and efficiently produce usable, informative assessments of relevant psychosocial variables for individual students (Newton, Kim, Wilcox, & Yeager, 2007).

### ***Theoretical Roots of the CLEI***

Theories help us understand “the world and its processes; and thereby inform our practice” (Komives, Woodard, & Associates, 1996, p. 151). This quote aptly describes Newton and colleagues’ effort to develop the CLEI. According to Newton (2009), Russell and Petrie’s (1992) model identifying factors affecting student academic adjustment and success provided an initial theoretical inspiration for development of the CLEI. The following paragraphs describe Russell and Petrie’s model identifying factors affecting student academic adjustment and

success. That summary is followed by a comparison showing alignment of Russell and Petrie's dimensions with CLEI questions found in version two of that instrument.

Russell and Petrie's (1992) purpose in developing their model was to identify domains or factors that need to be "systematically evaluated to assess the student's strengths and weaknesses" (p. 486). Their intent was to enable more complete assessment of these dimensions so that significant material would not be overlooked. They believed that more complete assessments would enable more accurate and effective counseling, and interventions that would result in greater student improvement. They focused primarily on factors that can be changed or that a counselor could influence in order to help students overcome problems.

Russell and Petrie (1992) identified academic, social/environmental, and personality factors that help explain academic outcomes. Academic and social/environmental factors are examined here because these dimensions were used in developing the CLEI. Assessment of personality factors is a separate, well-developed field of study and practice with a variety of established and widely used measures. The effort to develop the CLEI did not include development of new personality measures, so personality factors are not examined here.

The academic factors in Russell and Petrie's (1992) model include aptitude and ability, study skills, test anxiety, academic motivation, self-efficacy, expectations and attribution. Aptitude and ability are dimensions that can be measured in a variety of well-established ways and were not used in the development of the CLEI, so they are not examined here. To support use of study skills in their model, Russell and Petrie (1992) identified and summarized studies reporting positive relationships between study skills and academic outcomes (GPA) by Allen, Lerner, and Hinrichsen (1972); Brown and Nelson (1983); Bruch, Pearl, and Giordano (1986); Gadzella, Ginther, and Williamson (1987); Capella, Wagner, and Kusmierz (1982); Mathiasen

(1985); Lin and McKeachie (1970); and Naveh-Benjamin, McKeachie, and Lin (1987).

Similarly, to support use of test anxiety, they summarized studies linking test anxiety to negative academic outcomes (GPA) such as Brown and Nelson (1983); Bruch, Pearl, and Giordano (1986); and Naveh-Benjamin, McKeachie, and Lin (1987).

According to Russell and Petrie (1992) academic motivation is a predictor of positive academic outcomes (GPA). They based this conclusion on studies by Baker and Siryk (1984); Edward and Waters (1981), and Neumann, Finaly, and Reichel (1988), and on other studies identifying commitment to difficult goals as a predictor of higher GPA (Hollenbeck, Williams, & Klein, 1989).

Use of self-efficacy in Russell and Petrie's (1992) model was based on the work of Bandura (1977; 1982) who defined perceived self-efficacy as "a person's judgments of how well one can execute courses of action required to deal with prospective situations" (1982 p. 122). Russell and Petrie (1992) cited a variety of studies linking self-efficacy to positive academic outcomes (GPA, goal achievement), and career outcomes including Lent, Brown, and Larkin (1984; 1986; 1987); Lent and Hackett (1987); Hackett and Lent (1992); Multon, Brown, and Lent (1991); and O'Brien, Brown, and Lent (1990).

Russell and Petrie's (1992) use of effort attribution is derived from Weiner's model of achievement motivation (1979; 1985), which assumes that individuals try to identify and control the causes of their successes and failures during achievement of tasks. Weiner (1985) noted that, "When success or failure is attributed to ability or effort, it is seen as an internal attribution" which an individual can change (p. 491). Effort or strategy attributions are reported to positively affect academic outcomes (GPA). For instance, Clifford (1986) found that "strategy attributions enabled the student to turn failure experiences into problem-solving situations, as the person

seeks to identify more effective strategies for the future” (p. 491), and predicted effort has been linked to academic outcomes (GPA) (Platt, 1988).

The social/environmental factors in Russell and Petrie’s (1992) model included life stress and social support, campus environment, work involvement, family variables, and academic environment. Using life stress or experiencing negative events in life exclusive of health-related events in their model is justified by their review of studies reporting a negative relationship between life stress and academic outcomes (GPA). These studies included Harris (1973); DeMeuse (1985); Wildman (1978); and Lloyd, Alexander, Rice, and Greenfield (1980).

Social support from peers and family is included in Russell and Petrie’s (1992) model. This is based on their review of studies reporting positive effects of social support on physical and psychological health (Brown, Alpert, Lent, Hunt, & Brady, 1988; Cohen & Hoberman, 1983; Cutrona, 1986; Sarason, Sarason, Potter, & Antoni, 1985; Thoits, 1982). Also, they summarized a study that reported a positive link between social support and quality of academic life (Okun, Sandler, & Baumann, 1988). They did not summarize studies linking social support to academic outcomes (GPA), because they reported that such studies did not exist.

Campus environment is included in Russell and Petrie’s (1992) model because student experience with their environment has been linked to academic success (educational aspiration and staying in school). They based these expectations on Pascarella’s study of student residences (1985). Pascarella (1985) reported that students living on campus had higher satisfaction with college, self-esteem, educational aspirations, and were more likely to remain in school than were commuter students. Another aspect of campus environment is easy access to faculty. Pascarella (1985) reported that easy access to faculty resulted in higher levels of academic aspiration. Living on campus fostered individual academic self-governance (Janosik, Creamer, & Cross,

1988). Student involvement in campus activities, programs, and extra-curricular activities on campus had positive effects on students including higher self-esteem, academic achievement, and evaluations of their academic experience (Evanoski, 1988; Feltz & Weiss, 1984; Huebner & Corazzini, 1984).

Work involvement is necessary for many students and it enables them to support themselves and go to college at the same time. Common sense and some research suggest that too much time spent working may interfere with student's college adjustment and academic success (Lyons, Krachenberg, & Henke, 1986; Henke, Lyons, & Krachenberg, 1987).

Russell and Petrie (1992) identified a wide range of family variables that may impact student academic success including socioeconomic status, family structure, transition to college, and birth order. Family income and parents' education level affected whether a student chose to go to college (Carpenter & Western, 1982; Manski & Wise, 1983). Parents who attended college tended to assume that their children would go to college, were more helpful during the application process, and provided more monetary support during college than parents who did not attend college (MacDermott, Conn, & Owen, 1987). This affected need for financial aid and need to work. It is clear that some families encourage and support their student in terms of going to, working through, and completing college, while others do not. This is an important issue that can have significant impact on student adaptation and success in college.

Russell and Petrie (1992) believed that there was a positive relationship between the academic environment and student performance. They based this conclusion on studies of the academic environment that focused on variables such as values fit and student perceptions of university services. One study examined student perceptions of the fit between student values and those of their college or university. A good fit or congruence positively affected the student's

likelihood of staying in college (Taylor & Whetstone, 1983). Another study by Kleeman and Richardson (1985) examined student perceptions of important university services. They reported that perceptions of programs and services for students, program offerings, and the quality of research and teaching affected student performance.

Russell and Petrie's model identified factors affecting student academic adjustment and success. How the factors identified in Russell and Petrie's model align with the dimensions found in version two of the CLEI is detailed in Appendix A.

### ***Development of the College Learning Effectiveness Inventory (CLEI)***

The sequential evolution of the CLEI is summarized in Table 1. Development of the CLEI began in 1999 under the direction of Professor Fred Newton at Kansas State University. Initially, three experienced professional counseling staff agreed that the six categories of behavior identified by Russell and Petrie (1992) were important to academic success. These categories included motivation, self-concept, study habits, emotions, support, and involvement. Newton and his team undertook the task of developing measures of these constructs. They generated a pool of more than 300 items or statements to use as potential measures of these behaviors.



Table 1  
*Timeline for Development of the CLEI*

1992	Russell and Petrie (1992) identified six constructs.
1999	Newton and colleagues generated 300 potential questions to measure the six constructs.
2001	Panel of professional judges reduced 300 potential questions to 144 for the first-generation CLEI.
Approximately 5 years, 2001-2006	First-generation CLEI with 144 questions is piloted with 500 students. It is a paper and pencil test scored by a counselor.
2006-2007	Data from these years are factor analyzed to create the second-generation CLEI with 62 questions. The CLEI is now an online test with immediate scoring and feedback.
2007	Confirmatory factor analysis is used to reduce the questions to 50 to create the third-generation CLEI.
2008-2009	This cross-validation study of the 50-question, third-generation CLEI.

A panel of nine expert judges (individuals with experience and credentials related to student learning) assessed these items. Three criteria were used in this assessment process: (1) clarity and relevance to college students, (2) accurateness and goodness of fit to the operational definitions of the categories, and (3) placement of the item on a five-point Likert scale (a score of “1” was a very high positive behavior and “5” was a very low negative behavior). During this assessment, the panel of judges removed non-discriminating, duplicative, and invalid questions. This process reduced the initial pool to 144 items covering the six categories.

The first-generation CLEI contained 144 questions. It was piloted with over 500 students involved in academic assistance groups from 2001 to 2005. At the end of the pilot phase, 2005, Newton and his colleagues reviewed the first version of the CLEI. They found it to be a useful tool for counseling and advising students about their academic problems and how to remedy those issues. However, they also identified problems and limitations of the CLEI. Based on their

experience and student feedback, they concluded that the inventory contained too many items, some were redundant, it took too much time to complete, and the scales needed stronger psychometric properties (Newton et al., 2007).

### ***Development of the Second Version of the CLEI***

This section describes development of the second version of the CLEI. This includes a description of the process used to reduce the number of items in the first version of the CLEI to 62 in the second version; factor analysis was used to support that data reduction effort. There are five subsections within this part of the study of the CLEI. They cover the development of the second version of the CLEI, CLEI scale definitions and interpretation, CLEI scale attributes and psychometric properties, and CLEI administration and use.

Newton and his colleagues inspected the 144 items and reduced that number to 62 by removing overlapping and unclear items. To refine the scale, researchers collected additional data and factor analyzed it to identify scales within the 62-item version of the CLEI.

Data on demographic variables were collected to support use of the instrument in student advising and counseling as well as validation studies of the CLEI. These demographic variables were gender, age, year in school, overall GPA, academic major, ethnic identity, and residence type.

The second and subsequent versions of the CLEI were administered online. Online administration of the CLEI and its scoring is processed through the Kansas State Comprehensive Assessment Tools (K-CAT). K-CAT is a not-for-profit organization under the Kansas State Research Foundation that provides a server and distribution process for the CLEI. After students complete the CLEI, they immediately receive a profile identifying their relative strengths and weaknesses.

***Second generation data collection.*** A sample of 597 Kansas State University undergraduate students was used to develop the second generation of the CLEI during the academic years 2006 ( $n = 298$ ) and 2007 ( $n = 299$ ). This sample is referred to as the first sample. Students took the CLEI online. The questions are not psychologically sensitive and the terminology does not reflect concern for pathology or danger. The CLEI study was approved by the Committee for Research Involving Human Subjects under the University Research Compliance Office at Kansas State University.

All undergraduate classes were represented in the sample. More than half of the participants were freshmen (51.4%), 12.4% were sophomores, 16.4% were juniors and 19.8% were seniors. More than two-thirds of the participants were women ( $n = 405$ , 67.8%). The average age of the participants was 21.21 years ( $SD = 4.33$ ), with a range of 17 to 56 years. More than half of these students lived off campus (55.3%).

Most participants were white/Caucasian (86.6%). Of the other respondents, 3.4% were Hispanic/Latino American, 3.0% were African American/Black, 1.5% were Asian American, 0.3% were Native American, 0.2% were international, and 4.9% chose “other.” Racial percentages do not add to 100% because of rounding.

More than two-thirds of these students self-reported having an overall GPA of 3.0 or above. Just over 33% had a GPA of 3.5 or above (33.9%), while 32.9% had a GPA between 3.0 and 2.4; 21.7% were between 2.5 and 2.9; 6.5% were between 2.0 and 2.4; and 5% had a GPA below 2.0.

***Second generation factor analysis.*** A factor analysis was performed on the 62 items in the CLEI. This resulted in a second-generation CLEI, which consisted of six scales. This 62-question assessment tool measured individual attitudes and behaviors that may impact academic

performance. This instrument is described in detail in the “Administration and Scoring Manual for the College Learning Effectiveness Inventory (CLEI)” (Newton, Kim, Wilcox, & Yeager, 2007).

At this point, the CLEI manual entitled “Administration and Scoring Manual for the College Learning Effectiveness Inventory (CLEI)” (Newton et al., 2007) was developed. Material from that manual and a second edition of it is used in the rest of this chapter. Material taken directly from the manual is quoted and cited, and this practice is followed even when the text is edited to fit the needs of this study. Material that has been re-written and revised for this study is neither quoted nor cited.

### ***Development of the third version of the CLEI Confirmatory Factor Analysis***

This section describes the development of the third version of the CLEI. It also contains material describing the factor structure of the 50-item CLEI, CLEI scale definitions and interpretation of the CLEI scales, scale attributes and psychometric properties.

The third version of the CLEI resulted from a confirmatory factor analysis (CFA) on data for the 62-item version of the CLEI. This reduced the number of questions from 62 to 50. A factor analysis on data using the 50-item version of the CLEI was subsequently performed.

To determine whether the six factors of the CLEI from the first sample adequately represented the structure in the 62 questions, a confirmatory factor analysis was conducted on a second sample ( $n = 292$ ) using an unweighted, least squares estimate and correlated errors within scales estimation. The confirmatory factor analysis reduced the total number of questions in the CLEI from 62 to 50. This reduced the number of questions defining some of the scales. Seven fit indices were used to determine the data fit of the hypothesized model: chi-square (Satorra-Bentler Scaled Chi-Square), normed fit index, goodness-of-fit index, adjusted goodness-of-fit

index, root mean square residual, root mean square error of approximation residual, and comparative fit index (Kim, 2008). Overall fit indices indicated that the CFA for the six CLEI scales resulted in a generally acceptable fit (Table 2). The 50-question CLEI is the third version of the instrument.

Table 2  
*Overall Fit Indices of the Confirmatory Factor Analysis on the Six Scales of the CLEI*

	$\chi^2$	Df	NFI	GFI	AGFI	RMSR	RMSEA	CFI
Independence Model	22,447.46**	1,225						
Fit Statistics	1.898.62**	1,118	.92	.92	.90	.08	.05	.96

$n = 292$

NFI = normed fit index, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, RMSR = root mean square residual, RMSEA = root mean square error of approximation residual, and CFI = comparative fit index.

\*\* $p < .01$ .

***Third Version of the CLEI - Factor Analysis of the 50 CLEI Items.*** A second factor analysis was performed on the 50 items in the CLEI using a principle components extraction with Kaiser Normalization followed by a promax rotation. This analysis identified six factors. Summaries of the factor loadings for each of the scales can be found in Appendix B.

***CLEI Scale Definitions and Interpretation.*** Newton et al., (2007) defined the six scales of the CLEI:

(1) Academic Self-Efficacy (ASE scale, 14 items): Items on this scale reflect an expression of confidence in academic ability, awareness of effort toward study, and expectations of success in college attainment. High scorers have expectations to succeed and accomplish important outcome goals. Low scorers are more likely to feel uncertain about possible achievement and what the future may hold.

(2) Organization and Attention to Study (OAS scale, 8 items): This scale reveals the organization of tasks and structuring of time to set goals, plan, and carry out necessary academic activity. High scorers are likely to use effective organizational planning and time management skills to achieve academic success. Low scorers are more likely to avoid planning strategies and lack focus of attention in providing self-direction.

(3) Stress and Time Pressure (STP scale, 6 items): This scale reflects how a student copes with the pressures of time, environmental concerns, and the academic demand that impacts academic study. High scorers manage the pressures of academics without reactions such as being overwhelmed, procrastination, or avoidance. Low scorers display symptoms of stress and do not believe they can catch up with the demands they experience.

(4) Involvement with College Activity (ICA scale, 9 items)\*: Involvement is defined by this scale as belonging to organizations and participating in activities. High scorers belong to organizations and participate in activities including formal or informal gatherings of friends and classmates within the campus environment. Low scorers are more isolated and less likely to have social contact or engagement with campus activities. *Note:* This scale will not provide accurate information for students who are involved in predominantly commuter or distance education programs.

(5) Emotional Satisfaction (ES scale, 7 items): This scale reflects the degree of interest and emotional response to academic life including people and the campus educational environment. High scorers express reactions such as

encouragement, interest, and positive anticipation, while low scorers are more likely to express discouragement, negative reactions, and a sense of being overwhelmed.

(6) Class Communication (CC scale, 6 items): Communication includes both verbal and non-verbal efforts to engage in class activity. High scorers are assertive and active with written and oral communication with instructors and in-class. Low scorers show reluctance and uncertainty on how to express and assert their ideas (Newton et al., 2007, p. 10).

***CLEI Scale Attributes and Psychometric Properties.*** This section describes the attributes of the CLEI scales, including means and standard deviations, inter-scale correlations, and the internal reliability of each scale as measured by Cronbach’s alpha. Means and standard deviations for each of the CLEI scales appear in Table 3.

Table 3  
*Scale Statistics: Means, Standard Deviations*

	Number of Items	Mean	SD
Academic Self-Efficacy	14	4.40	0.51
Organization and Attention to Study	8	3.06	0.60
Stress and Time Pressure	6	3.04	0.73
Involvement with College Activity	9	3.40	0.69
Emotional Satisfaction	7	3.62	0.58
Class Communication	6	3.34	0.64

*n* = 597

Inter-item correlations of the CLEI scales are included in Table 4. Overlap between the scales is relatively small. The largest interscale relationship is between Academic Self-Efficacy and Emotional Satisfaction, which correlate at the 0.56 level, meaning they share 31.36% of their variance (the coefficient of determination,  $r^2 = 0.3136$ ). This should not be a surprise given the expectation that academic self-efficacy might result in some emotional satisfaction.

Alternatively, since correlations are not directional, a researcher might expect that emotional satisfaction helps a student attain academic self-efficacy.

Table 4  
*Scale Statistics: Inter-scale Correlation Coefficients*

	ASE	OSA	STP	ICA	ES	CC
Academic Self-Efficacy	1.00					
Organization and Attention to Study	.45**	1.00				
Stress and Time Pressure	.26**	.41**	1.00			
Involvement with College Activity	.43**	.35**	.18**	1.00		
Emotional Satisfaction	.56**	.51**	.38**	.38**	1.00	
Class Communication	.39**	.36**	.32**	.35**	.47**	1.00

*n* = 597

The internal consistency of the six scales was examined by using SPSS to calculate Cronbach's alpha for each scale (see Table 5). Scores for five of the six scales had reliabilities that were adequate, ranging from .71 to .87 (Nunnally, 1978). The Class Communication scale had marginal reliability.

Table 5  
*CLEI Scale Statistics: Internal Reliability/Cronbach's Alpha*

Scale	Cronbach's alpha
Academic Self-Efficacy	.87
Organization and Attention to Study	.81
Stress and Time Pressure	.77
Involvement with College Activity	.81
Emotional Satisfaction	.72
Class Communication	.68

*n* = 597

### ***CLEI – Administration and Use***

This subsection focuses on the administration and use of the CLEI. It presents material on administration of the CLEI, including appropriate use, scoring procedures, user qualifications, and sample profiles and interpretations. This section's content focuses on administration and use



of the CLEI including subsections on administration of the CLEI, appropriate use of the CLEI, scoring procedures, CLEI user qualifications, and CLEI sample profile interpretations.

***Administration of the CLEI.*** Because the CLEI is administered online, students are given a password to complete it. Most students complete the inventory in 10 to 15 minutes. The CLEI is scored automatically upon completion. Results are provided immediately to students in a profile showing individual and normative scores for each of the six scales, as well as a brief interpretative summary. Students can print their results. It is recommended that students work with an advisor, counselor, or other professional staff member who is familiar with the CLEI so the results can be used most effectively. An advisor or counselor can obtain a score sheet for a student that contains raw item and scale scores in addition to the profile.

The following descriptions of the scoring procedure, raw mean scores, *t* scores, appropriate use, user qualifications, and sample profile interpretations are from Newton et al. (2008).

***Appropriate Use of the CLEI.***

1. As an assessment tool that helps students become aware of attitudes and behaviors that affect their learning and studying.
2. As an organizing assessment that identifies specific areas in which each student could benefit most from interventions.
3. To develop specific interventions designed to remediate weaknesses and capitalize on strengths.
4. As a pre-post measure to determine the effectiveness of specific interventions, and to determine if additional interventions are needed.

5. As a counseling or psycho-educational strategy for college orientation, advising, educational development, and learning skills programs (Newton et al., 2007).

**Scoring Procedures.** According to the CLEI Manual (Newton et al., 2007), Scoring is generated automatically online and results provided immediately to the student in the form of a profile chart. An individual profile displays an individual's mean raw scores and *t* scores for each of the six scales. Prior to calculating individual scores, all items in a negative continuum are transformed to reverse scores (i.e., a score of 1 is transformed to a score of 5, score 2 to 4, score 4 to 2, score 5 to 1).

**Raw Mean Scores.** The purpose of providing an individual raw mean score for each of the six scales is to provide an interpretation that demonstrates an individual's profile of high and low scores indicating strengths and weaknesses from an intrapersonal perspective. The mean score for each scale can vary from 1.0 (lowest possible score) to 5.0 (highest possible). A low score reflects a negative response to the attributes of the scale, and a high score represents a positive response to the attributes of the scale. A raw mean score will fall somewhere between these two extremes. A score of 3.0 is the mid-point and any score between 2.6 and 3.4 is more neutral and less likely to reflect a strength or weakness. A mean score of 3.5 or above indicates a more positive response pattern and is an area of personal strength. A scale score of 2.5 or below reflects more negative responses or potential areas of weakness (Newton et al., 2008).

***t* scores.** An individual student's mean raw score for each scale is compared with average scale scores generated by a normative sample, and *t*

scores are calculated for each of the six scales. Means and standard deviations of scores from the normative sample are used to transform an individual student's mean scores into *t* scores for each of the scales using the following formula:

$$t \text{ score} = 10 * [(Individual \text{ Mean} - Normative \text{ Mean}) / SD \text{ of Normative Score}] + 50.$$

*t* scores are interpreted using a mean of 50 and a standard deviation of 10. Sixty-eight percent of the normative group falls between  $t = 40$  and  $t = 60$ ; 96% falls between  $t = 30$  and  $t = 70$ ; and 99% falls between  $t = 20$  and  $t = 80$ .

Typically, *t* scores for each scale are distributed in a normal bell curve. This means more students cluster around the middle or average score of 50 with fewer students as the scores move away from the middle. There is one exception to this rule when interpreting the Academic Self-Efficacy scale. The majority of students rate their responses positively on this scale. As a result, a score around 50 or slightly below may still reflect a high positive self rating (Newton et al., 2008).

### ***CLEI – User Qualifications.***

The CLEI is designed as an easy-to-use tool that identifies the pattern and potential meaning of a student's self-report on personal behaviors, attitudes, and feelings toward academic activity. It can be an information source for students to view their own motivations and approaches to academic activity. Definitions, examples, and suggestions for follow-up options are provided on the profile screen. The CLEI may also be used as a source of input for advising or counseling students on their approach to learning. For best results, it is recommended that students consult with a professional counselor who can help them make appropriate use of their CLEI results (Newton et al., 2007).

***CLEI – Sample Profiles and Interpretations.***

Profiles from the CLEI may be best used to stimulate discussion with the student. One approach is to examine the individualized summary while noting the position of scale scores from high to low. Figures 1, 2, and 3 illustrate profile charts for three students.

*Example Profile A.* The profile chart A (Figure 1) is for a female student, who is a sophomore, majoring in Business/Marketing with a GPA of 3.0 to 3.4 on a 4.0- scale. Her two highest scores are in Academic Self-Efficacy and Involvement with College Activity, with a mid-range score in Class Communication. Her lower scores are in Emotional Satisfaction, Organization and Attention to Study, and Stress and Time Pressure. These scores indicate that she is a confident and outgoing student who is likely to be very active on campus and engaged in her college experience. However, these results also suggest that her strengths may create problems such as being pressed for time, feeling pressure to become more organized, and worrying about academics (Newton et al., 2008).

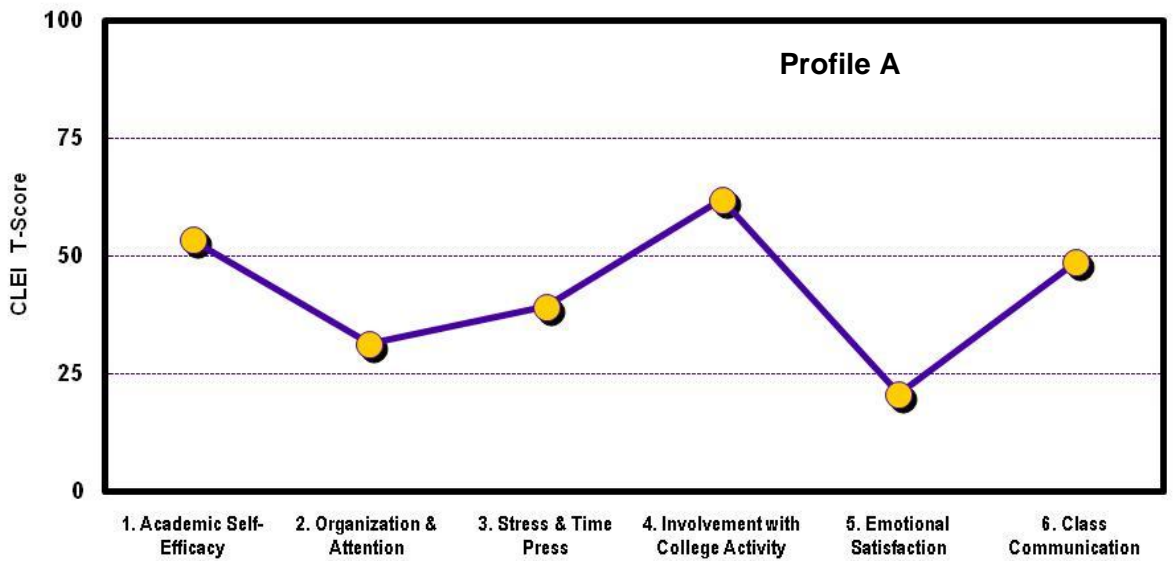


Figure 1. *Example Profile Chart A.*

*Example Profile B.* The profile chart B (Figure 2) is for a female student, who is a junior, majoring in elementary education with a GPA of 2.5 to 2.9 on a 4.0-scale. The student's profile is marked by low scores in Organization and Attention to Study, Stress and Time Pressure, and Involvement with College Activity. The student is in the mid-range on the Academic Self-Efficacy and Emotional Satisfaction scales. The reason for stress and time pressure, lack of organization and attention to study, and low activity level may reflect the presence of some situational stressor occurring at this time in her life. In some cases, it might be family issues, the need to work extra hours to meet financial obligations, or a personal problem that is interfering with college life. Is this a source of situational stress in her life? Or, does she have a history of anxiety or stress when preparing her assignments or when performing tasks? Exploring these contrasting scores with the student could help to identify possible solutions or

result in referral to the appropriate service or support program on campus (Newton et al., 2008).

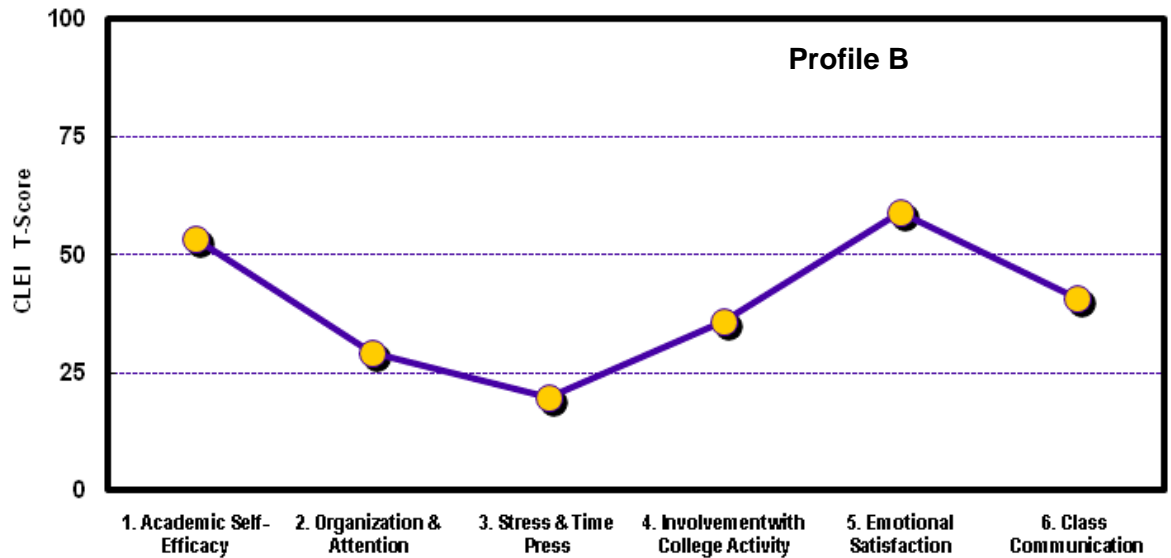


Figure. 2. Example Profile Chart B.

*Example Profile C.* This sophomore, male student is struggling in college with a grade point average below 1.9. The profile shown in Figure 3 indicates flat and below average scores across five of the scales (1, 2, 4, 5, and 6). Scale 3 indicates a fairly average amount of stress or time pressure on the individual. This suggests several possibilities to explore. One area might be competing involvement in work, family, or other activity unrelated to college that distracts the student from sufficient engagement to succeed in academic work. Another possibility could reflect uncertainty as to whether college is desired or necessary to achieve his personal goals. Career planning, personal decision-making, or more

exploration could be important for this student to find a successful niche (Newton et al., 2008, p. 14).

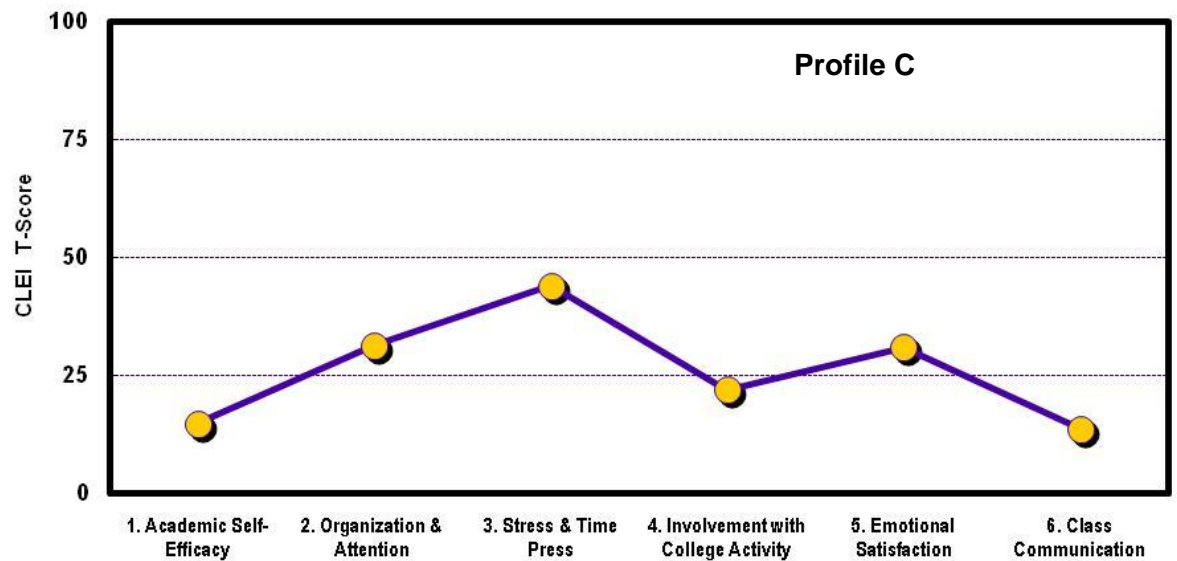


Figure 3. *Example Profile Chart C.*

This chapter has described the CLEI and its development. This began by placing the CLEI in an advising/counseling context of student assessment and describing the theoretical roots underlying development of the CLEI. The process of developing and refining successive versions of the CLEI was then explained. The final section of this chapter focused on administration, appropriate use, scoring procedures, user qualifications, and sample CLEI profile interpretations. New instruments like the CLEI need to be validated to support their use. The next chapter describes the methodology that is used to validate the CLEI scales.

### **Chapter 3 – Methodology**

This chapter describes the methodology employed in this dissertation. Chapter sections explicate the validation instruments used in this study, the data collection process, the sampling method used to gather data, research questions and analytic approaches used to answer those questions, and the statistics employed in those analyses. These topics are discussed in detail within each section.

#### ***Validation Study***

One purpose of this dissertation is to examine the construct validity of the CLEI. Construct validity examines if a test adequately measures the underlying construct. The question of construct validity can be addressed using convergent validity and discriminant validity.

Convergent validity focuses on the relationship between two tests that are intended to measure the same domain. Convergent validity is demonstrated when scores for tests measuring similar domains are related to one another.

Discriminant validity focuses on test scores and behaviors that should be unrelated to one another. Discriminant validity is demonstrated when scores for tests measuring different domains are unrelated to one another. Study of convergent and discriminant validation analyses require use of cross-validation instruments.

#### ***Survey Instruments***

This study used two survey instruments. The first survey contained the CLEI and demographic variables and is in Appendix C. The second survey contained the validation scales and those scales are in Appendixes D through I.



### ***Validation Scales***

The measures used for validation purposes were selected in consultation with Professor Fred Newton. The reason for their selection is that most of these scales are widely known and often used to assess factors that affect college student learning and academic success, which are similar to the issues assessed by the CLEI. Most of these instruments have been validated multiple times in earlier studies.

The validation instruments for this cross-validation study included the Concentration, Self-Testing, Study Aids, and Time Management scales from the Learning and Study Strategies Inventory (LASSI), the Time Organization and Study Environment Management subscale of the Motivated Strategies for Learning Questionnaire (MSLQ), the College Adjustment Questionnaire (CAQ), the Rosenberg Self-Esteem Scale (RSES), and the Student Propensity to Ask Questions (SPAQ) scale. Each of these instruments is described in detail in the following sections starting with the Learning and Study Strategies Inventory.

***Learning and Study Strategies Inventory.*** The LASSI is a widely used instrument designed to assess the learning strategies and attitudes of college students (Weinstein & Palmer, 2002; Weinstein, Schulte, & Palmer, 1987). The LASSI consists of 10 scales, and each measures a different learning component.

The ten scales and the Cronbach's alpha for each are as follows:

1. Attitude – the student's interest and motivation to succeed in college and willingness to perform the tasks necessary for academic success ( $\alpha = .72$ ).
2. Motivation – the degree to which the student accepts the responsibility for performing those tasks through self-discipline and hard work ( $\alpha = .81$ ).

3. Time Management – the extent to which the student creates and uses schedules to manage effectively his or her responsibilities ( $\alpha = .86$ ).
4. Anxiety – the degree of a student’s anxiety when approaching academic tasks ( $\alpha = .81$ ).
5. Concentration – the ability of the student to focus his or her attention and avoid distractions while working on school-related tasks such as studying ( $\alpha = .84$ ).
6. Information Processing – the ability to process ideas by mentally elaborating on them and organizing them in meaningful ways ( $\alpha = .83$ ).
7. Selecting Main Ideas – the magnitude of the student’s ability to determine the important information in a learning situation ( $\alpha = .74$ ).
8. Study Aids – the student’s ability to use or develop study aids that help the learning process ( $\alpha = .68$ ).
9. Self-Testing – the student’s awareness of the importance of self-testing and reviewing when learning material and use of those practices ( $\alpha = .75$ ).
10. Test Strategies – the measurement of the student’s ability to prepare effectively for an exam and reason through a question when answering it ( $\alpha = .83$ ).

Each subscale consists of 8 to 10 statements to which respondents indicate on a 1- to 5-point scale the degree to which they agree or disagree. Weinstein and Palmer (2002) believe that a profile consisting of 10 separate subscale scores should be used because they reveal more about a student than a single summated score. A variety of studies have validated the LASSI (Cano, 2006; Deming, Valeri-Gol, & Idleman, 1994; Melancon, 2002; Nist, Mealey, Simpson, & Kroc, 1990; Prevatt, Petscher, Proctor, Hurst, & Adams, 2006).

Subscales from the LASSI measuring Anxiety, Attitude, and Motivation are used to validate the Academic Self-Efficacy scale of the CLEI. The LASSI Time Management scale was used to validate the Organization and Attention scale of the CLEI. The LASSI Concentration, Self-Testing, Study Aids, and Time Management scales are used to validate the Stress and Time Pressure scale of the CLEI.

In this study, the LASSI Anxiety, Attitude, and Motivation scales were used to validate the Academic Self-Efficacy scale of the CLEI. LASSI scores were positively correlated with GPA and are successful predictors of GPA (Yip & Chung, 2002). Furthermore, in the United States, more than 1,300 colleges and universities use the LASSI to help screen and identify students who are at risk for poor academic performance (Olaussen & Braten, 1998). Copies of the Will and Self-Regulation LASSI subscales used in this study are in Appendixes D and E.

Despite the LASSI's relatively long history and extensive use, there is substantial debate in the research literature about alternative LASSI subscale structures, and different coding schemes that may be more effective than those developed by Weinstein, Schulte, and Palmer (1987).

*Motivated Strategies for Learning Questionnaire.* The Time Organization and Study Environment Management subscale of the MSLQ instrument was used to validate the Organization and Attention to Study scale of the CLEI. The MSLQ was developed to assess a student's motivation and learning strategies (Pintrich, Smith, Garcia, & McKeachie, 1991; 1993). As originally developed, the MSLQ contained 81 items measuring 15 scales: six motivation scales (Intrinsic Motivation, Extrinsic Motivation, Task Value, Control of Learning Beliefs, Self-Efficacy for Learning and Performance, and Test Anxiety); five learning strategies scales (Rehearsal, Elaboration, Organization, Critical Thinking, Metacognitive Self-Regulation); and

single, multi-item scales assessing Time and Study Environments Management, Effort Regulation, Peer Learning, and Help Seeking. The version of the MSLQ used in this study is the 40-question, online version currently used by the University of Michigan and the University of Arizona for diagnostic and advising purposes (Pintrich, Smith, Garcia, & McKeachie, 1991).

The scales included in the 40-item version were three motivation scales including Intrinsic Motivation (three items), Task Value (four items), and Test Anxiety (four items). Four learning strategies scales were included consisting of the Critical Thinking (four items), Elaboration (four items), Metacognitive Self-Regulation (nine items), and Organization (three items) scales. The Time Organization and Study Environment Management (six items), and Effort Regulation (three items) scales were also included.

The MSLQ's Time Organization and Study Environment Management scale was used to validate the Organization and Attention to Study scale of the CLEI because they are similar constructs. This was a good fit because of the common focus on time management, and the fact that component questions are similar across the two scales and overlap. Possible responses are: 1 = "Never," 2 = "Rarely," 3 = "Sometimes," 4 = "Often," and 5 = "Always." According to MSLQ literature, the scale score is computed by reverse coding negatively worded items and then computing the mean of the items that make up the scale. The MSLQ used in this study is included in Appendix F.

***Crombag College Adaptation Questionnaire.*** The CAQ was used to validate the CLEI Involvement with College Activity scale. The CAQ assesses how well students have adjusted to college or university life (Crombag, 1968). The CAQ consists of 18 questions. Crombag (1968) reported that the CAQ has relatively high internal consistency ( $\alpha = .89$ ), and others have reported similar results in more recent studies, including  $\alpha = .83$  (van Rooijen, 1986), and  $\alpha = .84$  (Beyers

& Goossens, 2002). Respondents answer each question on a 5-point, Likert-type scale indicating how much each statement applies to them. The response categories are: 1 = “Not Applicable,” 2 = “Rarely Applicable,” 3 = “Neutral,” 4 “Somewhat Applicable,” and 5 = “Very Applicable.” Statements refer to the respondent’s course of study, social contacts, way of life at the university, and how much he or she likes being a student. Sample items include: “I am very pleased with the course of my studies,” “I made many friends here,” and “I find it very difficult to adjust to student life” (reverse scored). Vlaander and van Rooijen (1981) showed that scores on the CAQ were not influenced by social desirability and that high scores on the scale were associated with lower levels of depression. The CAQ used in this study is included in Appendix G.

***The Rosenberg Self-Esteem Scale (RSES)***. The RSES was used to validate the Emotional Satisfaction scale of the CLEI. The RSES (Rosenberg, 1965; 1979) is the most widely used measure of global self-esteem, which is the respondent’s perceived self-worth. The scale has 10 questions. Half of the questions are positively worded and half are negatively worded. The RSES was originally developed as a Guttman Scale, but has more recently been used with a Likert-response format and scored as a summated Likert scale because that is easier to code and just as reliable (Hagborg, 1993; Kaplan & Pokorny, 1969; McCarthy & Hoge, 1982; Pullmann & Allik, 2000; Shahani, Dipboye, & Phillips, 1990). Researchers have used different numbers of response points or alternative response categories. For example, Rosenberg (1965) used four response points and several researchers followed his lead (Hagborg, 1993; Kaplan & Pokorny, 1969; McCarthy & Hoge, 1982). Other researchers have used five response points (Pullmann & Allik, 2000) or six response points (Shahani, Dipboye, & Phillips, 1990). This does not appear to have affected scale reliability. Following Rosenberg’s (1965) example, respondents in this study choose one of the following four answers: 1= “Strongly Disagree,” 2 = “Disagree,” 3 = “Agree,”

and 4 = “Strongly Agree.” Negatively worded questions are recoded so that a high score is the positive score on all questions. The RSES has acceptable alpha coefficients in the studies previously mentioned. Multiple studies indicated that the internal reliability of the RSES is acceptably high, with reported alpha coefficients of .84 (Pullmann & Allik, 2000).

Some studies reported a unidimensional structure for the RSES scale (Fleming & Courtney, 1984; Hensley & Roberts, 1976; Marsh, 1996; Pullmann & Allik, 2000; Rosenberg, 1965). Other researchers found that the positively and negatively worded items loaded onto different factors called self-confidence and self-deprecation (Carmines & Zeller, 1979; Dobson, Goudy, Keith, & Powers, 1979; Hensley & Roberts, 1976; Shahani, Dipboye, & Phillips, 1990). Goldsmith (1986) found that dimensionality varied with age and other characteristics.

In this study, the 10 items in the RSES scale were factor analyzed to determine if they defined one or two separate factors. If two factors or separate subscales existed, these separate subscales were created and named “self-confidence” and “self-deprecation,” and included in the analysis. If appropriate, all three possible scale structures were included as follows: the original 10-item scale, the 5-item self-confidence scale, and the 5-item self-deprecation scale. The RSES used in this study is included in Appendix H.

***Student Propensity to Ask Questions Scale.*** The SPAQ scale was used to validate the Class Communication scale of the CLEI. The SPAQ scale was developed by Cunconnan (1996) and revised by Cayanus (2005). It consists of 12 questions such as “I like to ask questions in class,” and “I rarely ask questions in class.” Six questions are positively worded and six are negatively worded. Respondents are asked to indicate their agreement with their beliefs and feelings about their own behavior on a scale ranging from 1 = “Strongly Disagree,” 2 = “Disagree,” 3 = “Neutral,” 4 = “Agree,” and 5 = “Strongly Agree.” Negatively worded questions

are reversed for scoring. Cayanus (2005) reported high internal reliability for the SPAQ scale with an alpha of .92. The SPAQ scale is included in Appendix I.

Table 6 summarizes how these instruments were compared with the CLEI's Academic Self-Efficacy, Organization and Attention to Study, Stress and Time Pressure, Involvement with College Activity, Emotional Satisfaction, and Class Communication scales.

Table 6  
*CLEI Scales' Validating Scales*

CLEI Scale	Validating Scales
Academic Self-Efficacy	LASSI Anxiety LASSI Attitude LASSI Motivation
Organization and Attention to Study	LASSI Time Management MSLQ Time/Study Environment Management
Stress and Time Pressure	LASSI Concentration LASSI Self-Testing LASSI Study Aids LASSI Time Management
Involvement with College Activity	Crombag College Adaptation Questionnaire
Emotional Satisfaction	Rosenberg Self-Esteem Scale
Class Communication	Student Propensity to Ask Questions Scale

LASSI = Learning And Study Strategies Inventory, MSLQ = Motivated Strategies for Learning Questionnaire

## ***Data Collection and Analysis***

This section describes the sampling method, how students were asked to participate, and the data collection process. It also describes the research questions with the analytic approaches used to answer each of them and the data analysis techniques used to determine the results.

### ***The Sampling Method***

The sampling method consisted of asking students who were enrolled in undergraduate classes at Kansas State University to participate in this research study. The researcher asked professors she had met in the College of Education if she could ask students enrolled in their courses to participate in the research project. Presentations were made to 16 different classes. The intent was to obtain a sample of students enrolled in freshman through senior years that included students with a wide range of academic ability.

The goal was to approach as many classes as needed to ask approximately 400 students to participate. That number was based on the assumption that half of the students might participate, resulting in a sample of approximately 200 students. In fact, 180 students participated, but only 160 of the approximately 400 students who were asked to participate actually completed all the parts of both surveys. That is a 40% response rate. Partial data were collected from the other 20 students who either filled out one or the other of the two surveys, but not both, or who failed to supply identification numbers needed to link responses to the two instruments together.

### ***How Students Were Asked To Participate***

When students were asked to participate in the study, they were given basic information to fully inform them about what was expected of them. First, they were told about the CLEI, what it assesses, and its use in helping students. They were told that they had the opportunity to help improve the CLEI. Second, they were told that there were two parts to the survey, or two



separate online instruments to complete: one containing the CLEI, and the other containing the validation instruments. They were informed that they would have to supply their student identification number so their responses to each instrument could be matched with one another. Third, students were told that they could personally benefit from completing the CLEI because they would receive online feedback and their results could help them identify their strengths and weaknesses. Next, they were told that the purpose of the survey was to validate the CLEI, not to gather information about them for analysis. They were assured that their responses to the study would be confidential and that they would not be identified in reporting the results. Finally, they were told that their participation was completely voluntary. Their instructors told them that they would be given five extra credit points for participating in the study.

One way to increase survey participation is to use incentives and this survey provided multiple appeals and incentives (Dillman, 2000; Ryu, Couper, & Marans, 2004). First, students had the opportunity to participate in a project designed to help students like them. This gave them the opportunity to do something good. Second, they would receive their results from the CLEI, which could help them improve their academic performance. Third, they had the opportunity to benefit from extra credit points. A monetary incentive might have been more effective (Ryu, Couper, & Marans, 2004) than the opportunity to do something good, to receive feedback, or to earn extra credit points, but funds were not available.

The study was approved by the Committee for Research Involving Human Subjects under the University Research Compliance Office at Kansas State University. The letter of approval is included Appendix J.

### ***Data Collection Process***

Data were collected using the Internet-based K-State Online Survey system. Two separate instruments were created to gather data. The first instrument contained the CLEI and demographic questions. The second instrument contained the cross-validation instruments. Results were combined into a single data set using student identification numbers to match responses from the survey instruments. Incomplete responses were not included in the analysis.

### ***Research Questions and Analytic Approaches Used To Answer Them***

1. Are the CLEI scales reliable measures of the constructs they purport to assess? This is a question of internal reliability. It is important because the validity and usefulness of a scale are constrained by its internal reliability. If a scale does not consistently measure a construct, then it will not have high validity coefficients (Nunnally, 1978). Why assess reliability? Without reliability, research results using the scale are not replicable, and replicability is a fundamental component of the scientific method. Without reliability, there would be a random relationship between the items comprising a scale. For Likert-format scale items, like the CLEI, reliability is measured using Cronbach's alpha, which is based on the average correlation among the variables included in each scale. Split-half reliability could also be assessed, but that technique is not used here because Cronbach's alpha is a better measure (Nunnally, 1978; Nunnally & Bernstein, 1994).
2. Are the CLEI scales valid measures of the dimensions they purport to assess? This is important because it addresses the usefulness of the new scales. It requires assessing the construct validity of the scales. Construct validity is assessed using convergent validity and discriminant validity. These are assessments of whether the scales assess

what they purport to measure. This question can be answered by using a cross-validation strategy comparing each CLEI scale with other established scales that assess the same or a similar dimension. The term “established” means that the comparison scales have demonstrated internal and external validity. These comparisons are done by calculating Pearson correlations between each CLEI scale and the established scale.

3. What are the CLEI scales’ attributes for this sample, and how do they compare with those from an earlier sample? This addresses the issue of consistency across different samples. A valid measure should demonstrate consistency across samples. This question can be answered by examining the descriptive statistics and frequencies of the CLEI for this sample and comparing them with the data from an earlier study of the CLEI (Newton et al., 2007).
4. How are the CLEI scales related to one another? This is important because measures of separate constructs should measure different things. If the CLEI scales measure different dimensions, then their inter-relationships should be relatively small. This expectation can be tested by examining the inter-scale correlations. These inter-scale correlations can be compared with those reported in an earlier study of the CLEI (Newton et al., 2007).
5. Are the CLEI scales gender neutral and are they neutral across years of college? Scales should measure something, but not on the basis of external factors such as gender, race, age, and year in college. If a measure does give differential results based on gender, then this should be taken into account when interpreting results. This is a question of bias versus actual measurement differences. If the CLEI scales are to be

used with general populations of college students, then the scores on the scales should not differ across gender groups. This can be tested using  $t$  tests between the groups.

6. Does the CLEI differentiate between students who are successful and those who may be at risk? This is a question of predictive validity. A test that can predict student outcomes, such as grade point average, should be more useful for counseling purposes than one that cannot predict those outcomes. If the CLEI scales are to be used for diagnostic purposes, then they should differentiate between students who have low or high grade point averages. This can be tested by using regression analysis with CLEI scores as predictors of grade point averages.

### ***Data Analyses***

A variety of statistical analyses were used in this study. All analyses were done using the Statistical Package for the Social Sciences (SPSS). Appropriate statistics were used to answer each question. The intent was to use statistics that are appropriate to each task. For example, descriptive statistics (means and standard deviations) and percentages were used to describe the sample demographic data. Also, descriptive statistics were used to describe responses to the CLEI and to the validation instruments.

Cronbach's alpha (1951) was calculated for the CLEI and for each of the validation scales. Cronbach's alpha is a commonly used test of the internal reliability among a group of items that are combined to form a single scale. Cronbach's alpha is "a reflection of how well the different items complement each other in their measurement of different aspects of the same variable or quality" (Litwin, 1995, p. 24). Alpha can range from 0.0 to 1.00. The higher the alpha, the more confident a researcher can be of the internal consistency of the items measuring the same thing. Nunnally (1978) indicated that 0.7 is an acceptable reliability coefficient, and

that lower thresholds are sometimes used. Similarly, Litwin (1995) stated that “levels of .70 or more are generally accepted as representing good reliability” (p. 24). A second measure of internal reliability is the split-half method. This method is available in SPSS and was used for each scale examined in this study.

Pearson correlations ( $r$ ) was used to measure the relationship between each of the CLEI scales and the well-established scales used to cross-validate the CLEI scales.  $t$  tests were used to test for differences between groups, such as men and women. Multiple regression analysis was used to determine how well CLEI scores predict grade point averages.

Validation of the CLEI scales should support their use as a means of assessing student strengths and weaknesses in academic self-efficacy, organization and attention to study, stress and time pressure, involvement with college activity, emotional satisfaction, and class communication. All of these issues affect a student’s ability to fit into campus life and achieve academic success. This exploratory study’s results should be useful in refining the CLEI for future use. Future research can expand on this study by building on the study’s limitations and answering the questions for future research that this study created.

## Chapter 4 – Results

### *Description of the Respondents*

The sample contained responses from 180 Kansas State University undergraduate students, although all of them did not answer every question resulting in an effective  $n$  of 175 cases. The average age of the participants was 22.44 ( $SD = 4.74$ ), with an age range of 19 to 49 years. In this sample, 73.1% were women ( $n = 117$ ). A majority of the participants were seniors (61.9%), 33.1% were juniors, and 3.8% were sophomores. There were no freshmen among the respondents. Most students who participated in this study had a cumulative GPA of greater than or equal to 3.0 (77.9%). Reported overall grade point averages were: 3.5 and above (39.9%), 3.0 to 3.4 (38.0%), and 2.5 to 2.9 (20.3%). None of the participants reported a GPA below 2.5. Ethnically, most of the participants were Caucasian (93.1%). Ethnic group membership consisted of Hispanic/Latino American or Mexican/Mexican Americans (2.4%), African Americans (1.2%), Asian/Pacific Islander (1.2%), Native American/Alaskan Native (1.2%), and multiracial (0.6%). A majority of the students lived off campus (83.8%), 4.4% lived on-campus, and 8.8% lived at fraternity or sorority houses. Implications of these sample characteristics for this study or its results are discussed in the findings and in the concluding chapter.

#### ***Question 1: Are the CLEI scales reliable measures of the dimensions they purport to assess?***

This question can be answered using Cronbach's alpha to assess the internal validity of each scale. When items are used to form a scale, they need to have internal consistency. The items should all measure the same thing, so they should be correlated with one another. Cronbach's alpha is a useful coefficient for assessing the internal consistency of factors extracted from dichotomous and multi-point formatted questionnaires, such as Likert scales. Cronbach's alpha ranges from 0 to 1.0, and the higher the score, the more reliable the scale. Nunnally (1978)

indicated that 0.7 is an acceptable reliability coefficient and that lower thresholds are sometimes used in the literature.

### ***Internal Reliability of CLEI Scales***

This section contains two analyses answering the question. First, it reports analyses of the internal reliability of each scale using the data collected for this study. Second, it examines how these results compare with results from earlier studies of the internal reliability of the CLEI scales.

In this study, the CLEI Academic Self-Efficacy scale consisted of 14 questions and had a Cronbach's alpha of .844 (see Table 7). This exceeded the minimal standard of .70 for Cronbach's alpha, meaning that this scale had an acceptable level of internal reliability (Nunnally, 1978; Nunnally & Bernstein, 1994).

The CLEI Organization and Attention to Study scale contained eight questions. This scale had a Cronbach's alpha of .774, so this scale had an acceptable level of internal reliability.

The CLEI Stress and Time Pressure scale consisted of six questions and a Cronbach's alpha of .724. Consequently, this scale had an acceptable level of internal reliability.

The CLEI Involvement with College Activity scale contained nine items. It had a Cronbach's alpha of .654, therefore, this scale had a marginal level of internal reliability.

The CLEI Emotional Satisfaction scale had seven questions. Its Cronbach's alpha was .719; hence, this scale had an acceptable level of internal reliability.

The CLEI Class Communication scale consisted of six questions and had marginal internal reliability with a Cronbach's alpha of .667. Four of the six scales had an acceptable level of internal reliability. Two had marginal reliability – the Involvement with College Activity and Class Communication scales.

Table 7

*Number of Questions and Cronbach's alphas for the CLEI Based on Results of Earlier Factor Analysis and Confirmatory Analysis*

CLEI Scale	Number of Questions	Cronbach's Alpha
Academic Self-Efficacy	14	.844
Organization and Attention to Study	8	.774
Stress and Time Pressure	6	.724
Involvement with College Activity	9	.654
Emotional Satisfaction	7	.719
Class Communication	6	.667

***How do these results compare with alpha coefficients from other CLEI samples?***

It is important to know how these results compared with those from another sample because it can place them in a larger context. Newton and his colleagues (2007) reported results from a sample of 597 K-State students, which are compared with results for this study in Table 8.

Newton et al.'s (2007) results or alpha coefficients were similar, although slightly larger in size for five of the six scales. For Newton, all of the scales except Class Communication had acceptable levels of internal reliability with an alpha coefficient of .70 or higher.

How can these results be reconciled? This comparison reinforced the conclusion that four of the six CLEI scales including Academic Self-Efficacy, Organization and Attention to Study, Study and Time Pressure, and Involvement with College Activity have acceptable levels of reliability. Emotional Satisfaction may have an acceptable level of reliability and demonstrated this in one of two samples. In contrast, Class Communication had marginal reliability.

These differences reflect the fact that scores are reliable, not tests or scales, and that score reliability changes across samples (Henson, 2001; Thompson & Vacha-Haase, 2000). A test is neither reliable nor unreliable for the following reason:

Reliability is a property of the scores on a test for a particular population of examinees.... Thus, authors should provide reliability coefficients of the scores



for the data being analyzed even when the focus of their research is not psychometric. Interpreting the size of observed effects requires an assessment of the reliability of the scores. (Wilkinson and the APA Task Force on Statistical Inference, 1999, p. 596)

Table 8  
*CLEI Scales' Comparison of Internal Consistency Across Samples*

CLEI Scale	Cronbach's Alphas	
	This Study <i>n</i> = 160	Prior Study <i>n</i> = 597
Academic Self-Efficacy	.844	.871+
Organization and Attention to Study	.774	.806
Stress and Time Pressure	.724	.775
Involvement with College Activity	.654	.787
Emotional Satisfaction	.719	.675
Class Communication	.667	.637

+ = Larger of two Cronbach alphas.

Reliability and validity are related. Specifically, a measure may be reliable or internally consistent without being valid, but it cannot be valid without being reliable.

Reliability is a necessary but not sufficient condition for validity (Nunnally, 1978).

***Question 2: Are the CLEI scales valid measures of the dimensions they purport to assess?***

This question can be answered using cross validation with scales assessing similar constructs that were developed by other researchers. Existing measures similar to each of the CLEI scales were identified to validate the CLEI scales. Given his background in counseling and experience using diagnostic instruments, Professor Fred Newton suggested a variety of scales for cross validation. The author's familiarity with communication research enabled her to identify the SPAQ as a suitable measure for validation of the CLEI Class Communication scale. Each of these measures had to have an acceptable level of internal reliability and a reasonable claim to external validity to qualify for use in this study.

This section of the chapter has three parts. The first focuses on the construct validity of the CLEI scales by assessing their relationship with selected validation measures. The second, part of this section examines the relationships between the CLEI scales and the measures used to validate the other CLEI scales. The expectation examined by doing this is that the CLEI scales will have stronger relationships with their validation scales than with the other measures. The third part of this section examines the Rosenberg Self-Esteem Scale (RSES)'s relationship with the CLEI Emotional Satisfaction (ES) scale and with the other CLEI scale in further detail.

### **Construct Validity of Original CLEI Scales**

The CLEI Academic Self-Efficacy scale had construct validity. Its Pearson correlations with the LASSI subscales for Will consisting of Attitude, Motivation, and Anxiety were .528, .462, and .244 (significant at the .01 level), respectively (see Table 9).

The CLEI Organization and Attention to Study scale had construct validity. Its Pearson correlations with the LASSI subscale for Time Management was .755 and its correlation with the MSLQ subscale for Time and Study Environment Management was .359 (both significant at the .01 level).

The CLEI Stress and Time Pressure scale had construct validity. Its Pearson correlations with the LASSI subscales for Self-Regulation consisting of Concentration, Time Management, and Self-Testing were .493, .465, and .210 respectively (Table 9). The first and second of these correlations were statistically significant at the .01 level, and the third was significant at the .05 level. The CLEI Stress and Time Pressure scale was not validated by the LASSI Self-Regulation Study Aids subscale. The correlation was .155 and not statistically significant.

The CLEI Involvement with College Activity scale appeared to have marginal construct validity because its Pearson correlation with the CAQ was .309 (significant at the .01 level).

The CLEI Emotional Satisfaction scale appeared to have marginal construct validity due to the fact that its Pearson correlation with the RSES was .255 (significant at the .01 level).

The CLEI Class Communication scale had construct validity based on the fact that its Pearson correlation with the SPAQ was .528 (significant at the .01 level).

Five of the CLEI scales received reasonable cross-validation support and one did not. The CLEI Academic Self-Efficacy received support from two of three scales, Organization and Attention to Study from two of two scales, and Stress and Time Pressure from two of four scales. Involvement with College Activity and Class Communication also seemed to have acceptable levels of construct validity. However, the Emotional Satisfaction did not because it had a low correlation with the RSES.

Lack of adequate validation of the CLEI Emotional Satisfaction scale may have several causes. The choice of the RSES could be based on an incorrect belief that these scales would be related. Second, the results were specific to this sample and another sample might produce different results. A third possibility is that the CLEI Emotional Satisfaction scale needs further development.

Table 9  
*CLEI Scales' Validating Scales and Pearson Correlations Based on Results of Earlier Factor Analyses*

CLEI Scale	Validating Scales	Pearson Correlation
Academic Self-Efficacy	LASSI Anxiety	.244**
	LASSI Attitude	.528**
	LASSI Motivation	.462**
Organization and Attention to Study	LASSI Time Management	.755**
	MSLQ Time/Study Environment Mgmt.	.359**
	LASSI Concentration	.493**
Stress and Time Pressure	LASSI Self-Testing	.210*
	LASSI Study Aids	.155
	LASSI Time Mgmt.	.465**
Involvement with College Activity	CAQ	.309**

Emotional Satisfaction	RSES	.255**
Class Communication	SPAQ	.528**

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\*\* Significant at the .01 level or better.

\* Significant at the .05 level or better.

LASSI = Learning And Study Strategies Inventory, MSLQ = Motivated Strategies for Learning Questionnaire, CAQ = Crombag College Adaptation Questionnaire, RSES = Rosenberg Self-Esteem Scale, SPAQ = Student Propensity to Ask Questions Scale

### *Correlation of the CLEI Scales with All the Validation Scales*

This second set of analyses in this cross-validation section focuses on the relationships between each of the CLEI scales and the measures used to validate the other CLEI scales. The expectation is that the CLEI scales will have stronger relationships with their validation scales than with the other measures.

The Academic Self-Efficacy scale was validated by the LASSI Attitude and Motivation subscales ( $r = .528$  and  $r = .462$ , respectively, significant at the .01 level or better) (Table 10). These relationships were larger than those between the Academic Self-Efficacy and other validation variables. The Academic Self-Efficacy also correlated significantly with CAQ and RSES ( $r = .431$ , significance  $> .01$ , and  $r = .445$ , respectively, significant at the .01 level or better). The relationship between Academic Self-Efficacy and other scales were smaller, including the LASSI Time Management, Concentration, and Anxiety subscales ( $r = .362$ ,  $r = .346$ , and  $r = .244$  respectively), and the MSLQ Time and Study Environment Management scale ( $r = .215$ ).

The CLEI Organization and Attention to Study was validated by the LASSI Time Management and the MSLQ Time and Study Environment Management subscales ( $r = .754$  and  $r = .359$ , respectively, significant at the .01 level or better). The Organization and Attention to Study scale also correlated significantly with the LASSI Concentration, Attitude, Self-Testing, Motivation, and Study Aids scales ( $r = .711$ ,  $r = .468$ ,  $r = .460$ ,  $r = .431$ , and  $r = .350$ , significant

at the .01 level or better, respectively). All of these relationships were weaker than that between the Organization and Attention to Study scale and the LASSI Time Management subscale. The strong relationship between Organization and Attention to Study scale and the LASSI Concentration subscale may reflect that concentration is a study skill necessary for organization and paying attention while studying.

The CLEI Stress and Time Pressure scale was validated by the LASSI Concentration and Time Management subscales ( $r = .465$  and  $r = .440$ , respectively, significant at the .01 level or better). These relationships were larger than between the Stress and Time Pressure scale and other validation variables. Stress and Time Pressure also correlated significantly, but at lower levels with the LASSI Anxiety, Attitude, and Motivation subscales, MSLQ Time and Study Environment Management subscale, CAQ, and RSES.

The CLEI Involvement with College Activity scale was validated by the CAQ ( $r = .309$ , significant at the .01 level or better). This relationship was stronger than between the Involvement with College Activity scale and the other validation instruments. Involvement with College Activity also correlated significantly with the LASSI Study Aids subscale ( $r = .273$ , significant at the .01 level or better).

The CLEI Emotional Satisfaction scale was related to the RSES scale ( $r = .255$ , significant at the .01 level or better). The CLEI Emotional Satisfaction scale correlated more strongly with the LASSI Attitude scale ( $r = .495$ , significant at the .01 level) than with the RSES. Emotional Satisfaction also correlated significantly with the LASSI Concentration, Motivation, and Time Management subscales ( $r = .368$ ,  $r = .341$ , and  $r = .303$ , respectively, significant at the .01 level or better), and with the CAQ ( $r = .373$ , significant at the .01 level or better). Smaller

correlations existed between the Emotional Satisfaction and the LASSI Anxiety, Self-Testing, and Study Aids subscales.

The CLEI Class Communication scale was validated by the SPAQ scale ( $r = .528$ , significant at better than the .01 level). This correlation was larger than that between the Class Communication and any of the other validation variables. The Class Communication also correlated significantly with the LASSI Anxiety subscale ( $r = .401$ , significant at the .01 level or better). This may be due to the fact that both the CLEI Class Communication scale and the LASSI Anxiety subscale contain several questions referring to anxiety. The Class Communication also correlated significantly with the CAQ ( $r = .361$ ), the LASSI Time Management and Concentration subscales ( $r = .328$  and  $r = .310$ , respectively). All correlations in this paragraph are significant at the .01 level or better.

Five of the six CLEI scales correlated at higher levels with their selected cross validation scales than with measures used to validate the other CLEI scales. Exceptions existed such as the high correlation between the CLEI Organization and Attention to Study and the LASSI concentration subscale. Even so, the Organization and Attention to Study and LASSI Concentration relationship was smaller than that between Organization and Attention to Study and the LASSI Time Management subscale. The relationship between the CLEI Emotional Satisfaction scale and the RSES was weaker, and weaker than that between Emotional Satisfaction and the LASSI Attitude subscale.

Table 10  
*CLEI Scales and Validation Scales Correlations, Based on the Previously Existing Factor Analyses*

Validation Scale	CLEI Scales					
	ASE	OAS	STP	ICA	ES	CC
<b>LASSI</b>						
Anxiety	<u>.244</u> **	.176*	.214**	.060	.255**	.401** R
Attitude	<u>.528</u> ** C	.468**	.250**	.151	.495** C	.245**
	R					
Motivation	<u>.462</u> ** R	.431**	.226**	.155	.341**	.190*
Concentration	.346**	.711** R	<u>.465</u> ** C	.136*	.368**	.310**
Self-Testing	.138	.460** R	<u>.190</u> *	.110	.207*	.177*
Study Aids	.077	.350** R	<u>.153</u>	.273**	.206*	.171*
				C		
Time Mgmt	.362**	<u>.754</u> ** C R	<u>.440</u> **	.141	.303**	.328**
<b>MSLQ</b>						
Time & Study Environment Mgmt	.215**	<u>.359</u> ** R	.181* C	.022	.193*	.137
<b>CAQ</b>						
	.431** R	.163*	.176*	<u>.309</u> ** C	.373**	.361**
<b>RSES</b>						
	.445** R	.260**	.220**	.165	<u>.255</u> **	.264**
<b>SPAQ</b>						
	-.074	.012	-.145	.153	.212**	<u>.528</u> ** R C

\*\* Significant at the .01 level or better.

\*Significant at the .05 level or better.

Expected validation relationships are underlined

C = Largest correlate in column, R = Largest correlate in row

ASE = Academic Self-Efficacy, OAS = Organization and Attention to Study, STP = Study and Time Pressure, ICA = Involvement with College Activity, ES = Emotional Satisfaction, CC = Class Communication, LASSI = Learning and Study Strategies Inventory, MSLQ = Motivated Strategies for Learning Questionnaire, CAQ = Crombag College Adaptation Questionnaire, SPAQ = Student Propensity to Ask Questions Scale, RSES = Rosenberg Self-Esteem Scale

## *Exploring Validating Scale Dimensions*

***Rosenberg Self-Esteem Subscale Analysis.*** Because the RSES did not adequately validate the CLEI Emotional Satisfaction scale, the RSES is examined in further detail. As indicated in the section of the methods chapter covering the validation measures, earlier studies reported that the RSES had questions that formed two factors containing either the positively or the negatively worded questions. Given this fact, the data in this study were factor analyzed to determine whether or not a similar split would occur. The factor analysis used an orthogonal rotation of all factors with eigenvalues greater than or equal to 1.0 for ease of interpretation. Two factors were obtained explaining a total of 70.605% of the variance in the data. The rotated factor loadings are shown in Table 11 and clearly demonstrate that there are two factors in these data. This was consistent with earlier studies that found two factors among college students and older, better educated persons.

Table 11  
*Rosenberg Self-Esteem Scale Factor Analysis*

Variables	Component 1	Component 2
On the whole, I am satisfied with myself.	.810	.167
At times, I think I am no good at all.	.270	.813
I feel I have a number of good qualities.	.848	.140
I am able to do things as well as most other people.	.864	.240
I feel I do not have much to be proud of.	.395	.700
I certainly feel useless at times.	.078	.818
I feel that I am a person of worth, at least on an equal plane with others.	.786	.330
I wish I could have more respect for myself.	.177	.793
All in all, I am inclined to feel that I am a failure.	.533	.626
I take a positive attitude toward myself.	.758	.397

Extraction method: Principal Component analysis.

Rotation method: Varimax rotation with Kaiser normalization. Rotation converged in 3 iterations.



Each of the two separate RSES subscales was created by summing their five component questions and averaging them. To name these subscales, the author followed the lead of earlier researchers who investigated this phenomenon. The positive items were named Self-Confidence (RSES-SC), and the negative items were named Self-Depreciation (RSES-SD). Self-Confidence had a mean of 3.35 and a standard deviation of 0.598. The scale ranged from 1 to 5 and the median was 20. Thirty-seven cases had a score of 5. Self-depreciation had a mean of 3.19 and a standard deviation 0.681. The scale ranged from 1 to 5. Twenty-eight cases had a score of 5. The correlation between the self-confidence and self-depreciation scales was .602 and was significant at the .01 level. The corresponding coefficient of determination was .3624, which meant that they were somewhat interrelated or shared 36.24% of their variance. The correlations between these scales and their 10-question parents were .880 for Self-Confidence ( $r^2 = .7744$ ), and .909 for Self-Depreciation ( $r^2 = .8263$ ). These subscales overlapped.

The correlations between the RSES subscales for Self-Confidence and Self-Depreciation are shown in Table 12. The RSES was selected because it was considered to be a measure that would validate the CLEI Emotional Satisfaction scale. These scales are inter-related, but the relationships were small. The Emotional Satisfaction scale's coefficient of determination with RSES Self-Confidence was .047, meaning that these variables shared less than 5% of their variance. This was slightly smaller than the relationship reported between the original 10-item RSES and CLEI Emotional Satisfaction scale.

Emotional Satisfaction's relationship with RSES Self-Depreciation was also small, even if it was slightly larger than the relationship with RSES Self-Confidence. The coefficient of determination was .100, meaning that these variables explain 10% of the variance in one another.

This was slightly smaller than the relationship reported between the original 10-item RSES and CLEI Emotional Satisfaction scale.

The RSES subscales were more related to Academic Self-Efficacy than anything else. Academic Self-Efficacy and Self-Confidence had a coefficient of determination of .122, while Academic Self-Efficacy and Self-Depreciation had a coefficient of determination of .195 (see Table 12).

The CLEI Emotional Satisfaction scale was not validated by exploring the relationship between the Emotional Satisfaction scale and the RSES.

Table 12  
*Relationships Between the Rosenberg Self-Esteem Subscales and the CLEI Scales (Correlations and Coefficients of Determination)*

CLEI Scale	Self-Confidence ( $r/r^2$ )	Self-Depreciation ( $r/r^2$ )
ASE	.349** / .122	.442** / .195
OAS	.213** / .045	.251** / .063
STP	.164* / .027	.227** / .052
ICA	.177* / .031	.122 / .015
ES	.275** / .076	.317** / .100
CC	.307** / .094	.175* / .031

\*\* Significant at the .01 level

\*Significant at the .05 level

ASE = Academic Self-Efficacy, OAS = Organization and Attention to Study, STP = Study and Time Pressure, ICA = Involvement with College Activity, ES = Emotional Satisfaction, CC = Class Communication

### ***Question 3: What are the CLEI scales attributes?***

The means and standard deviations of the CLEI in this study were similar in size to those in a normative sample of 879 undergraduate students (Newton et al., 2008) (see Table 13).

Results were similar for male and female students in this and the normative sample as well (see Tables 14 and 15). All of the means for the female students in this sample and in the CLEI

normative sample were nearly identical. Three are identical and the largest difference is three one-hundredths of a point (.03).

Table 13

*Means and Standard Deviations Comparing Sample Results with the CLEI Normative*

*Sample: All Students*

CLEI Scales	Sample	CLEI Normative Sample*
Academic Self-Efficacy	4.52 / .40	4.40 / .50
Organization and Attention to Study	3.21 / .49	3.10 / .59
Stress and Time Pressure	2.97 / .62	3.07 / .68
Involvement with College Activity	3.50 / .47	3.46 / .64
Emotional Satisfaction	3.72 / .47	3.64 / .56
Class Communication	3.50 / .53	3.42 / .62

\*(Newton et al., 2008, 24)

Table 14

*Means and Standard Deviations Comparing Sample Results with the CLEI Normative*

*Sample: Male Students Only*

CLEI Scales	Sample	CLEI Normative Sample*
Academic Self-Efficacy	4.29 / .44	4.25 / .51
Organization and Attention to Study	3.17 / .48	3.03 / .60
Stress and Time Pressure	2.95 / .65	3.16 / .68
Involvement with College Activity	3.44 / .41	3.41 / .67
Emotional Satisfaction	3.55 / .41	3.55 / .55
Class Communication	3.57 / .49	3.41 / .64

\*(Newton et al., 2008, 24)

Table 15

*Means and Standard Deviations Comparing Sample Results with the CLEI Normative*

*Sample: Female Students Only*

CLEI Scales	Sample	CLEI Normative Sample*
Academic Self-Efficacy	4.58 / .37	4.54 / .43
Organization and Attention to Study	3.21 / .51	3.18 / .57
Stress and Time Pressure	2.98 / .62	2.98 / .67
Involvement with College Activity	3.50 / .47	3.51 / .60
Emotional Satisfaction	3.73 / .47	3.73 / .55
Class Communication	3.44 / .52	3.44 / .59

\*(Newton, et al., 2008, 24)

***Question 4: How are the CLEI scales related to one another? Do they assess independent dimensions?***

The Academic Self-Efficacy scale was significantly correlated with each of the other CLEI scales shown in Table 16. These correlations were small, but statistically significant. Academic Self-Efficacy shared 23.43% of the variance with Emotional Satisfaction and 19.27% with Organization and Attention to Study. There was some overlap between these dimensions – about 20%. The relationship with Class Communication was 10.11%, Involvement in Campus Activity is 7.95% and Stress and Time Pressure is 6.35%. These were low levels of overlap, meaning that these scales assessed different dimensions.

There was reason to expect the Organization and Attention to Study scale would be positively related to Academic Self-Efficacy. For most students, Organization and Attention to Study is necessary for academic success (Edwards, 1992). Similarly, there was reason to expect that Academic Self-Efficacy would be positively related to Emotional Satisfaction. Those who do well academically are more likely to feel better about college than those who do not (Boss, 1994).

The Organization and Attention to Study Scale correlated significantly with Stress and Time Pressure, Involvement with College Activity, Emotional Satisfaction, and Class Communication. The relationships with Stress and Time Pressure and Emotional Satisfaction explained 24.3% and 20.23% of the variance, respectively. There was some degree of overlap between these dimensions. We might expect that Organization and Attention to Study would be related with Stress and Time Pressure and with Emotional Satisfaction to some extent (Palmer, Donaldson, & Stough, 2002). Failure to properly manage time is a cause of stress, and stress affects emotional satisfaction (Strickland & Galimba, 2001). The relationships between

Organization and Attention to Study Scale and Involvement with College Activity and Class Communication were much smaller, explaining only 4.41% and 9.30% of the variance, respectively. These were low levels of overlap, which means that these scales assessed different dimensions.

Stress and Time Pressure correlated significantly with Emotional Satisfaction and Class Communication. The relationships were small and explained only 8.12% and 4.44% of the variance, respectively. Stress and Time Pressure did not correlate significantly with Involvement with College Activity. These were low levels of overlap, meaning that these scales assessed different dimensions.

Involvement with College Activity correlated significantly with Emotional Satisfaction and with Class Communication. These relationships explained 8.58% and 8.88% of the variance, respectively. These low levels of overlap mean that these scales assessed different dimensions.

Emotional Satisfaction was significantly correlated with Class Communication. This relationship explained 31.36% of the variance. Clearly these dimensions overlap somewhat. Emotional Satisfaction might be expected to be related to Class Communication given that Emotional Satisfaction involves friendships and support relationships with others and Class Communication reflects both ability and willingness to interact with others.

Only 4 of the 15 correlations between CLEI scales explained more than 20% of the variance, and another explained 19.27%. These relationships occurred where there was reason to expect relationships to exist. For example, Organization and Attention to Study Scale and Stress and Time Pressure were expected to be related (Strickland & Galimba, 2001). Failure to manage time properly should result in stress (Strickland & Galimba, 2001). Academic Self-Efficacy should affect Emotional Satisfaction because academic success would lead to satisfaction with

college (Boss, 1994). Likewise, the Organization and Attention to Study Scale might be expected to be related to Academic Self-Efficacy (Boss, 1994). Emotional Satisfaction might be expected to be related to Class Communication given that Emotional Satisfaction involves friendships and supportive relationships and Class Communication reflects ability and willingness to interact with others (Jaasma & Kooper, 1999). Most of the relationships indicated low levels of overlap. These results supported the conclusion that the CLEI scales measure independent dimensions.

Table 16  
*CLEI Scale Inter-Correlations*

CLEI Scale	ASE	OAS	STP	ICA	ES	CC
ASE	1.0	.1927	.0635	.0795	.2343	.1011
OAS	.439**	1.0	.2430	.0441	.2025	.0930
STP	.252**	.493**	1.0	.0190	.0812	.0445
ICA	.282**	.210**	.138	1.0	.0858	.0888
ES	.484**	.450**	.285**	.293**	1.0	.3136
CC	.318**	.305**	.211**	.298**	.560**	1.0

\*\*Significant at the .01 level (two-tailed).

Pearson correlations ( $r$ ) in lower left quadrant, Coefficients of determination ( $r^2$ ) in upper right quadrant.

ASE = Academic Self-Efficacy, OAS = Organization and Attention to Study, STP = Study and Time Pressure, ICA = Involvement with College Activity, ES = Emotional Satisfaction, CC = Class Communication

***Question 5: Are the CLEI scale gender neutral and are they neutral across years in college?***

In general, scales should measure something, but not on the basis of external factors such as gender, race, age, and year in college. If a measure does give differential results based on gender or year in college, then this should be taken into account while interpreting results. This is a question of bias versus actual measurement differences. If the CLEI scales are to be used with general populations of college students, then the scores on the scales should not differ across gender groups. This can be tested using  $t$  tests between the groups.

One such difference has been identified. Off-campus students and on-campus students respond differently to the CLEI Involvement with College Activity scale (Newton et al., 2007). This difference was the result of where individuals live, the travel time involved in coming to campus to participate in events, and accessibility. Because this difference is known, it can be taken into account while interpreting Involvement with College Activity results.

The scores of men and women did not differ significantly on Organization and Attention to Study, Stress and Time Pressure, Involvement with College Activity, Emotional Satisfaction, and Class Communication (see Table 17). In contrast, men and women differed significantly on Academic Self-Efficacy. Women scored 0.2874 points higher than men. This might be explained based on higher average grade point averages of women in entering classes of freshmen and in college (Malin, Bray, Dougherty, & Skinner, 1980). This might also be explained by the fact that women have higher persistence and graduation rates than men (Buchmann, 2009; Clare, 2009). The CLEI scales did not seem to differ based on gender, except where a difference might be expected.

Table 17

*Comparison of Means by Gender, t-test*

Scale	Male	Female	<i>t</i> *	Significance
ASE	4.2929	4.5803	-3.667	.001
OAS	3.1719	3.2091	-0.418	.677
STP	2.9500	2.9823	-0.273	.786
ICA	3.4361	3.4995	-0.806	.423
ES	3.5464	3.7332	-2.404	.019
CC	3.5708	3.4381	1.445	.153

\* *t*-tests are two-tailed because no directional hypothesis was used.

Male = 40, Female = 113

ASE = Academic Self-Efficacy, OAS = Organization and Attention to Study, STP = Study and Time Pressure, ICA = Involvement with College Activity, ES = Emotional Satisfaction, CC = Class Communication

Similar differences based on race were not computed because only 6.9% of the respondents were people of color. In addition, some of these individuals were of Asian background. Grouping those of Asian descent with people of color is inappropriate because they usually are expected to perform in a manner similar to Whites (Goyette & Xie, 1999).

Students were tested to see if there were differences between juniors and seniors on the CLEI scales. Other college levels were not included in the analysis because of an insufficient number of cases. Juniors and seniors did not differ significantly on Organization and Attention to Study, Stress and Time Pressure, Involvement with College Activity, Emotional Satisfaction, and Class Communication (see Table 18). In contrast, juniors had significantly higher scores on the Academic Self-Efficacy scale than seniors with a difference of 0.14 points.

One potential explanation for this difference is based on the difference on Emotional Satisfaction reported for gender. This difference may reflect that the junior class contained a higher proportion of women (81.5%) than in the senior class (71.7%). Because women have significantly higher levels of Academic Self-Efficacy than men, it is reflected in the difference in



Academic Self-Efficacy between classes. The CLEI scales did not seem to differ based on class level except where a difference might be expected.

Table 18  
*Comparison of Means for Juniors and Seniors, t-tests*

Scale	Junior	Senior	<i>t</i> *	Significance
ASE	4.59	4.45	2.121	.036
OAS	3.31	3.14	1.823	.071
STP	3.05	2.91	1.289	.200
ICA	3.52	3.45	.840	.402
ES	3.77	3.65	1.506	.135
CC	3.49	3.46	.380	.705

\* *t*-tests are two-tailed because no directional hypothesis was used.

Juniors = 52, Seniors = 94

ASE = Academic Self-Efficacy, OAS = Organization and Attention to Study, STP = Study and Time Pressure, ICA = Involvement with College Activity, ES = Emotional Satisfaction, CC = Class Communication

***Question 6: Does the CLEI differentiate between students who are successful and those who may be at risk?***

This is a question of predictive validity. A test that can predict student outcomes such as grade point average should be more useful for advising and counseling purposes than one that cannot predict those outcomes. If the CLEI scales are to be used for diagnostic purposes, then they should differentiate between students who have low grade point averages and those with high grade point averages. This can be tested by using regression analysis with CLEI scores as predictors of grade point averages.

A multiple regression analysis was conducted using GPA as the dependent variable and the CLEI scales as independent variables. Stepwise regression was used so that the independent variables would enter the analysis starting with the CLEI variable that explained the most variance in the dependent variable or GPA. Academic Self-Efficacy was the only variable to enter the equation, and it explained 13.8% of the variance in GPA ( $F = 25.050$ , significant at the

.000 level). This led to the conclusion that Academic Self-Efficacy was a weak predictor of GPA for this sample.

Because there was a small but significant gender difference on Academic Self-Efficacy, two additional multiple regression analyses were performed – one for males and one for females. For males, the Emotional Satisfaction scale was the only significant predictor of GPA. It explained 17.5% of the variance in GPA for men ( $F = 9.071$ , significance = .005). Academic Self-Efficacy did not explain a significant amount of the variance in GPA for men, nor did any of the other CLEI scales. In contrast, for women, Academic Self-Efficacy explained 13.9% of the variance in GPA ( $F = 18.869$ , significance = .000).

These results indicated that Emotional Satisfaction was more important for men than Academic Self-Efficacy. Emotional Satisfaction components included variables assessing the quality of the student's interaction with their professors and how they feel about their courses and college.

Also, these results indicated that Academic Self-Efficacy was more important for women than any other CLEI variable, including Emotional Satisfaction. Academic Self-Efficacy includes ability, desire, expectations of success, completing assignments, and value placed on education. This might be the result of women seeing education as a key to a successful and better life and learning that they have to work hard to be academically successful.

### *Summary of Results*

In this study, most (four of six) of the scales had an acceptable level of internal reliability, including the Academic Self-Efficacy, Organization and Attention to Study, Stress and Time Pressure, and Emotional Satisfaction scales. Two others had marginal reliability, including the Involvement with College Activity and Class Communication scales. Comparison of these results with those from an earlier study reinforced the conclusion that four of the six CLEI scales including Academic Self-Efficacy, Organization and Attention to Study, Stress and Time Pressure, and Involvement with College Activity had acceptable levels of reliability. Emotional Satisfaction may have an acceptable level of reliability and demonstrated this in one of two samples. In contrast, Class Communication had marginal reliability.

In this study, five of the CLEI scales received reasonable cross-validation support and one did not. Specifically, the Academic Self-Efficacy received support from two of three scales, Organization and Attention to Study from two of two scales, and Stress and Time Pressure from two of four scales. Involvement with College Activity and Class Communication seemed to have acceptable levels of construct validity. However, the Emotional Satisfaction did not because it had a low correlation with the Rosenberg Self-Esteem Scale.

Five of the six CLEI scales correlated at higher levels with their selected cross-validation measures than with scales used to validate the other CLEI scales. Exceptions existed, such as the high correlation between the CLEI Organization and Attention to Study and the LASSI Concentration subscale. Even so, the Organization and Attention to Study and LASSI Concentration relationship was smaller than that between Organization and Attention to Study and the LASSI Time Management subscale. The relationship between the CLEI Emotional

Satisfaction scale and the RSES was smaller, and smaller than that between Emotional Satisfaction and the LASSI Attitude subscale.

The means and standard deviations of the CLEI were similar in size to those in a normative sample of 879 undergraduate students (Newton et al., 2008). Results were similar for male and female students in this and the normative sample as well. All of the means for the female students in this sample and in the CLEI normative sample were nearly identical.

The CLEI scales measured separate dimensions. Only 4 of the 15 correlations between CLEI scales explained more than 20% of the variance and another explained 19.27%. These relationships occurred where there was reason to expect relationships to exist. For example, Organization and Attention to Study Scale and Stress and Time Pressure were expected to be related (Devlin & Gray, 2007; Smedley, Myers, & Harrell, 1993). Failure to manage time properly should result in stress (Strickland & Galimba, 2001). Academic Self-Efficacy should affect Emotional Satisfaction because academic success would lead to satisfaction with college (Kuh & Hu, 2001; Thomas & Galambos, 2004). Likewise, the Organization and Attention to Study scale was expected to be associated with Academic Self-Efficacy. Emotional Satisfaction was expected to be related to Class Communication because Emotional Satisfaction involves friendships and supportive relationships and Class Communication reflects both ability and willingness to interact with others (Potter & Emanuel, 1990). Most of the relationships indicated low levels of overlap. These results supported the conclusion that the CLEI scales measure independent dimensions.

In this study, the CLEI scales did not suffer from gender bias. They differed based on gender only where a difference might be expected. Also, the CLEI scales did not demonstrate bias based on class level except where a difference might be expected.

Some of the CLEI scales may be useful predictors of academic performance. Academic Self-Efficacy was a predictor of grade point average for this sample. This relationship held true for women, but not for men.

## **Chapter 5 - Summary, Conclusions, and Recommendations**

This chapter contains three sections. The first is a summary of the results and conclusions. It is followed by sections focusing on the limitations of this study, and several suggestions for future research.

### **Summary of the findings and conclusions**

The author recruited a sample of Kansas State University undergraduates to assess the validity of the CLEI. The CLEI is a new instrument designed to assess issues that college students face that affect their performance, including academic success and persistence. Academic advisors, counselors, and others whose work involves supporting student success and retention can use the CLEI to assess individual student's strengths and weaknesses. Development of instruments such as the CLEI is important because universities provide advising and counseling to help students achieve better academic outcomes and campus experiences. Instruments such as the CLEI need to have appropriate psychometric properties to provide accurate information that can be useful in advising and counseling. This study described those properties as it examined the answers to each of the research questions.

#### ***Question 1. Are the CLEI scales reliable measures of the constructs they purport to assess?***

This is a question of internal reliability. It is important because the validity and usefulness of a scale are constrained by its internal reliability. If a scale does not consistently measure a construct, then it cannot be expected to have high validity coefficients (Nunnally, 1978).

This study indicated that four of six of the CLEI scales had an acceptable level of internal reliability with an alpha coefficient of .70 or higher. These were the Academic Self-Efficacy, Organization and Attention to Study, Stress and Time Pressure, and Emotional Satisfaction

scales. Two others, the Involvement with College Activity, and Class Communication scales, had marginal reliability.

The pattern of these results was similar to that reported in an earlier study in which five of the six scales had acceptable levels of internal reliability, including Academic Self-Efficacy, Organization and Attention to Study, Stress and Time Pressure, Involvement with College Activity, and Emotional Satisfaction scales. Only the Class Communication scale had marginal reliability in that sample (Newton et al., 2007).

***Question 2. Are the CLEI scales valid measures of the dimensions they purport to assess?***

This is important because it addresses the usefulness of the new scales. It requires assessing the construct validity of the scales. Construct validity was assessed using convergent validity and discriminant validity. These are methods of measuring whether the scales assess what they purport to measure.

Five of the CLEI scales received cross-validation support, and one did not. Specifically, the Academic Self-Efficacy received support from two of three cross-validation scales, Organization and Attention to Study from two of two scales, Stress and Time Pressure from two of four scales, Involvement with College Activity from one scale, and Class Communication from one scale and all seemed to have acceptable levels of construct validity. However, the Emotional Satisfaction did not. This may have reflected the choice of the RSES as a cross-validation measure. Use of alternative measures might yield better results.

Five of the six CLEI scales correlated at higher levels with their selected cross-validation measures than with measures used to validate the other CLEI scales. This was not true of the relationship between the CLEI Emotional Satisfaction scale and the RSES. Additional research will have to be done to validate the CLEI Emotional Satisfaction scale.

***Question 3. What are the CLEI scales attributes for this sample, and how do they compare with those from an earlier, normative sample?***

This addresses the issue of consistency across different samples. A valid measure should demonstrate consistency across samples.

The means and standard deviations of the CLEI in this study were similar in size to those in a normative sample of 879 undergraduate students (Newton et al., 2008). Results were similar for male and female students in this and the normative sample as well. All of the means for the female students in this sample and in the CLEI normative sample were nearly identical. Three were identical and the largest difference was three one-hundredths of a point (.03).

***Question 4. How are the CLEI scales related to one another?***

This is important because measures of separate constructs should measure different things and not overlap. The CLEI scales should measure separate dimensions.

Only 4 of the 15 correlations between the CLEI scales explained more than 20% of the variance and another explained 19.27%. These relationships occurred where there was reason to expect them to exist. Most of the relationships indicated low levels of overlap. These results supported the conclusion that the CLEI scales measure independent dimensions.

***Question 5. Are the CLEI scales gender and year in college neutral?***

In general, scales should discriminate or measure something, but not on the basis of external factors such as gender, race, age, and year in college. If a measure does give differential results based on gender, then this should be taken into account while interpreting results. This is a question of bias versus actual measurement of differences.



In this study, the CLEI scales did not suffer from gender bias. They differed based on gender only where a difference might be expected. Also, the CLEI scales did not demonstrate bias based on class level except where a difference might be expected.

***Question 6. Does the CLEI differentiate between students who are successful and those who may be at risk?***

This is a question of predictive validity. A test that can predict student outcomes, such as GPA, should be more useful for counseling purposes than one that cannot predict those outcomes.

Some of the CLEI scales may be useful predictors of academic performance. Academic Self-Efficacy was a predictor of GPA in this study. This relationship held true for women but not for men.

***Limitations***

This study had multiple limitations. First, the results are based on a sample of 180 Kansas State University students. The study could be improved by using data from a more diverse population of students from multiple campuses. For example, according to a study by Kansas State University, the student population under represents people of color and other minorities in the populations of Kansas and of the United States (Kansas State University Profile, 2008). Second, students at Kansas State University are primarily traditional students in the age range of 18 to 22 years old. Including non-traditional and older students would improve the representativeness of this study.

Second, the data used in this study included very few freshmen and sophomore students. Because freshmen and sophomores are more likely than juniors and seniors to be vulnerable to academic problems and dropout, the CLEI could be used to identify their problems. This

information could then be used by counselors to help freshmen and sophomores adapt their behaviors in appropriate ways. Unfortunately, these questions cannot be addressed directly without collecting additional data from students at those levels.

Third, the Kansas State University student body contains relatively few international students (Kansas State University Profile, 2008). The sample used in this study did not answer the question of how students from other cultural backgrounds will respond to the CLEI or to the validation instruments. Including more international students might extend the usefulness of this study.

A major limitation of this study was that it did not use a random sample in which all students in the population had an equal chance of participating. Students in 16 different classes in the College of Education were asked to participate with the intent of including students from all four years in college and from every level of academic performance. Unfortunately, this amounts to a convenience sample. The researcher's efforts to work with advisors to include students who were on academic probation or in the open-option program were not successful.

Finally, data collection could be improved. Participation in the survey was voluntary. Students were guaranteed anonymity and confidentiality. Data were gathered without use of typical incentives such as a monetary reward. Instead, instructors agreed to give students who participated 5 extra credit points to be included in calculating their class grade. Whether a reward consisting of 5 extra credit points granted after a subject has completed the survey instrument is as effective as a monetary reward given to all subjects in advance or at the point when they are offered the opportunity to participate in a study whether they complete the survey or not is an open question. For research methodologists, it is a question worthy of exploration.

### *Additional Research Questions*

A variety of additional research questions are suggested that could be useful ways of further developing the CLEI. These suggestions focus on adding questions to the CLEI, use of an alternative methodology to develop new questionnaire items, use of additional or alternative validation measures to validate the CLEI, use of the CLEI to predict academic success (grade point average, academic persistence, graduation), and examining the potential impact intervening variables such as social desirability and honesty that can affect the accuracy of CLEI survey responses and in turn the usefulness of the results.

#### *Developing New Items for the CLEI*

Developing new items to add to the CLEI scales is a natural step in the evolution of the CLEI. As a new assessment instrument, the CLEI is a work in progress. According to Nunnally (1978), measures that are going to be used for diagnostic purposes need to have higher internal consistency than the minimal .70 level. Nunnally's suggestion is relevant to the CLEI because it is used for advising and counseling. The size of an alpha coefficient is affected by effect sizes (average item intercorrelation and dimensionality), and the number of items in a scale (Henson, 2001). Only one CLEI scale, Academic Self-Efficacy with 14 items, has more than 10 items to measure it. The other CLEI scales may be improved by adding additional questions to them so that each is defined by 10 or more items. Thus, Organization and Attention to Study would need two items, Stress and Time Pressure would need four, Involvement with College Activity would need one, Emotional Satisfaction would need three, and Class Communication would need four.

Another rationale for adding additional items to the CLEI is provided by Newton, Kim, Wilcox, and Yeager (2007). They pointed out that graduate students and distance-learning

students (off-campus and on-campus students) may respond differently to items on the CLEI Involvement with College Activity and Class Communication scales.

### ***Alternative Methodologies for New Item Development***

An alternative methodology for developing new items for the CLEI might be effective. The first version of the CLEI was developed by asking a panel of experts to suggest items measuring the dimensions of interest. An alternative empirical approach towards developing new items for the CLEI scales may be more effective. Specifically, students demonstrating a range of academic success can be interviewed and asked about their behaviors, perceptions, and attitudes. These qualitative results can be analyzed to identify common themes and questions can be developed from these themes. The complete methodology for this approach was developed and its efficacy demonstrated by Yeager (2008b).

### ***Alternative Validation Methods***

Another step in refining the CLEI is using alternative validation methods. This validation study used well-established instruments that were carefully selected because they assess the same or similar dimensions to those in the CLEI. Other instruments measure the same and similar dimensions. Because the CLEI is a new instrument, additional cross-validation studies should be done using other instruments in order to better validate the CLEI. Such instruments might include the Student Readiness Inventory, and the Student Adaptation to College Questionnaire.

### ***The Student Readiness Inventory***

The Student Readiness Inventory (SRI) (Le, Casillas, Robbins, & Langley, 2005; Robbins, Allen, Casillas, Peterson, & Le, 2006) contains 10 scales measured by 10 to 12 items each. The SRI contains 108 items. This instrument is an appropriate validation scale for the CLEI because its scales have high levels of reliability (all alphas are greater than .80), and all

scales have been cross-validated. The SRI's scales, which are explained in the following paragraphs, measure similar dimensions to those assessed in the CLEI.

*Academic Discipline* reflects the amount of effort a student puts into schoolwork and the degree to which he or she sees himself or herself as hardworking and conscientious. *Academic Self-Confidence* reflects the extent to which a student believes he or she can perform well in school. *Commitment to College* reflects a student's commitment to staying in college and getting a degree. *Communication Skills* reflects how attentive a student is to others' feelings and how flexible he or she is in resolving conflicts with others. *Emotional Control* reflects how a student responds to strong feelings and how he or she manages those feelings. *General Determination* reflects the extent to which a student strives to follow through on commitments and obligations. *Goal Striving* reflects the strength of a student's effort to achieve objectives and goals. *Social Activity* reflects how comfortable a student feels meeting and interacting with other people. *Social Connection* reflects a student's feelings of connection and involvement with the college or school community. *Study Skills* reflects the extent to which a student believes he or she knows how to assess an academic problem, organize a solution, and successfully complete academic assignments. (ACT, 2006; Robbins, Allen, Casillas, Peterson, & Le, 2006).

### ***The Student Adaptation to College Questionnaire***

The Student Adaptation to College Questionnaire (SACQ) is a self-administered questionnaire developed by Baker and Siryk (1984; 1989) to assess student adjustment to college. The instrument measures four dimensions of student adjustment including Academic Adjustment (adapting to the demands of the university, 23 items), Social

Adjustment (interpersonal experiences at the university including making friends, and joining groups, 18 items), Personal-Emotional Adjustment (whether the student experience general psychological distress, 15 items), and Institutional Attachment (degree of commitment to the university as an institution, 14 items). In addition, these subscales are combined to provide a single score that measures overall adjustment.

All four subscales of the SACQ are psychometrically sound with alpha coefficients greater than .80. Validity has been demonstrated using a variety of measures including academic motivation, GPA, attrition, election to an honor society, involvement in social activities, membership in a fraternity or sorority, depression, loneliness, psychological separation from parents, and use of psychological services (Baker & Siryk, 1989; Chartrand, 1992; Dahmus, Bernardin, & Bernardin, 1992; Montgomery & Haemmerlie, 1993; Napoli & Wortman, 1998). The instrument has been used successfully with European and Chinese students (Beyers & Goossens, 2002; Tao, Dong, Pratt, Hunsberger, & Prancer, 2000; Jou & Fukada, 1995). Subscales have been successfully adjusted to fit unique testing situations by removing items that do not fit unique situations (Beyers & Goossens, 2002).

### ***Internalism-Externalism (I-E)***

Because self-control or self-regulation affect willingness to engage in actions assessed by each of the CLEI scales, the researcher expects that measures of locus of control, self-control or self-regulation would correlate significantly with each of the CLEI scales.

The concept of locus of control of reinforcement refers to a person's belief about control over life events. Some people, who are referred to as *internals*, feel personally responsible for the things that happen to them. What happens to them depends on their own behaviors and is controllable. Other people feel that their outcomes in life are determined by forces beyond their

control such as luck, fate, or powerful others, or as unpredictable because of the great complexity of the forces surrounding them (Elliot, 1997; Findley & Cooper, 1983; Phares, 1976; Rotter, 1972; Rotter, 1975). These people are referred to as *externals*.

A positive relationship between locus of control beliefs and achievement is logical because if success is positively valued, people who feel more able to control outcomes should exert more effort. Internals and externals react differently to success and failure. Internals take pride in positive outcomes and feel shame when bad outcomes occur. In contrast, externals experience less intense emotions (Phares, 1976). This difference should increase the relative attractiveness of the success experience for the internal. In addition, many studies have associated internal locus of control beliefs with behaviors that affect the probability of attaining success including educational success (Findley & Cooper, 1983).

One way to measure I-E is to use Rotter's Internalism-Externalism scale (Rotter, 1966; 1990). Unfortunately, this measure has methodological problems (Rotter, 1975; Duttweiler, 1984). A better measure of relative internality is the Internal Control Index (ICI), (Duttweiler, 1984) which has good psychometric properties (Cronbach's alpha = .85). The 28-item ICI uses a Likert-type scale in which people have to state whether they would rarely, occasionally, sometimes, frequently, or usually behave as specified by each of 28 statements. Similar alpha coefficients have been reported in a variety of other studies (Benda, Toombs, & Peacock, 2006; Harris & Parrish, 2006; Lind & Otte, 2006; Smith, 1997).

### ***Questions on the Use of the CLEI***

Additional research questions that focus on the use of the CLEI are appropriate because the intent is to use the CLEI for advising and counseling. It is important to know if CLEI scores predict academic success (overall GPA, grades in specific courses, and graduation from college).

Researchers can take that idea a step further and investigate if CLEI scores add anything to predictions of academic success above what traditional predictors such as high school GPA and SAT scores predict.

Those topics can fuel future research to demonstrate the utility of the CLEI. If the CLEI scales are useful diagnostic instruments, then they should identify students who are at risk of dropping out. This would be particularly useful in counseling college freshmen who are most at risk of dropping out (Murtaugh, Burns, & Schuster, 1999). This can be tested by determining how well CLEI scores predict persistence, but that would require a different kind of sample than the one used in this study. It would be an appropriate extension of this study and an ideal focus for a future research project.

Where a student lives and takes courses may affect results on the CLEI Involvement with Campus Activity scale. Graduate students and distance-learning students may respond differently to the Involvement with College Activity and the Class Communication scales (Newton et al., 2007). This difference is the result of where individuals live, travel time involved, and accessibility. Relevance may also be an issue. Because differences exist, they can be taken into account while interpreting Involvement with College Activity results. The author wonders how these students' scores are affected, or how they differ from students living on campus, in a fraternity/sorority house, in Manhattan, or commuting from outside of Manhattan. In this study, there were insufficient numbers of students in these subgroups to test these differences. Differences of this kind are exacerbated by the growing use of online and distance-education courses. This limitation suggests a need to refine the CLEI so that it can be used to adequately assess this segment of the student population. The answer to this question is not as easy as on-campus and off-campus versions because on campus and close to campus may amount to the



same thing. Commuting to class from across town and from out of town are more difficult issues. The author's experience was that commuting to Manhattan from Wichita precluded participation in many on campus activities. This is a topic that deserves further research.

### ***Intervening Variables***

Intervening variables may affect the accuracy of survey results, such as social desirability. Social desirability can affect any self-report measure and the researcher sees this in the statements that students make everyday. Perhaps social desirability is a naturally occurring aspect of human behavior as we interact with others: a method of establishing and defending our self-image (Goffman, 1959).

Social desirability may affect the accuracy of CLEI scores because students might be tempted to portray themselves positively, fake good responses, or overstate (exaggerated claiming) their positive responses to questions on the CLEI and GPA. One way to assess this would be to administer the Crowne-Marlowe instrument that measures social desirability (King & Bruner, 2000) and assess its relationship with CLEI scores. In addition, there is some evidence that it is not true that online surveys, such as the CLEI, reduce social desirability effects (Lautenschlager & Flaherty, 1990).

Honesty is another mechanism that may affect the accuracy of survey responses and social desirability. Honesty can be assessed by gathering data on each responding student's actual GPA. The actual GPA could be compared with the GPA the student reported in the demographic section of the survey. The degree of accuracy or inaccuracy might indicate a level of honesty. Regardless of the measure of social desirability or honesty, researchers might expect that social desirability and honesty would affect a student's answers to the CLEI.

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## APPENDIX A

### RELATIONS OF THE RUSSELL AND PETRIE ACADEMIC AND SOCIAL/ENVIRONMENTAL FACTORS WITH THE CLEI QUESTIONS

#### *Relations of the Russell and Petrie Academic and Social/Environmental Factors with the CLEI Questions*

Russell and Petrie's Academic Factors	CLEI Questions
Study skills	6. I devise ways to organize information that helps me to memorize and retain it. OAS 31. I break big assignments into manageable pieces. OAS 4. I am aware of the assignments that are due in the next week. ASE 7. I plan in advance to prevent becoming overwhelmed with assignments at the last minute. STP 28. I turn in assignments only partially completed. * ASE 5. I do not turn in assignments. * ASE 16. I get annoyed and aggravated when I am given assignments. * ES 8. I avoid speaking in class. * CC 33. I ask questions in class. CC
Test anxiety	44. I dread the thought of getting test results in certain classes. * CC
Academic motivation	26. I have goals that I want to achieve by being in college. ASE 43. I have high academic expectations of myself. ASE 27. I see connections between my classes and my career goals. ES 49. I question why I need a degree for the career I want to pursue. * 47. Gaining knowledge is important to me. 14. I like my courses. ES 18. I hate school, but I know I have to do it. * ES
Self-efficacy	23. I believe that I have the ability to complete college. ASE 24. I believe it is possible for me to make good grades. ASE 42. I doubt that I can make the effort to finish college.* ASE 50. I am determined to do what it will take in order to succeed with my goals. ASE

	46. I cannot seem to express my ideas on paper very well. * CC
	35. I avoid classes in which participation is required. * CC
	22. I am too uncertain or embarrassed to find assistance. * CC
Effort attribution	2. I organize my time so that I have plenty of time to study. OAS
	30. I make study goals and keep up with them. OAS
	1. I wait to study until the night before the exam. * OAS
	51. I cannot get into studying even if there is nothing else to do. * OAS
	48. I find myself daydreaming when I study. * OAS
	25. I find my attention wandering in class. * OAS
	36. I feel there are so many things to get done each week that I am stressed. * STP
	13. I have symptoms of stress from all of the pressure I have been under since coming to college.* STP
	3. I do not seem to have time to get everything done that I need to do. * STP
	32. It seems as though I am playing catch-up. * STP
Russell and Petrie's Social/Environmental Factors	
Social support	9. I participate in social activities on campus. ICA
	29. I know someone with whom I can study. ICA
	10. I belong to a study group. ICA
	15. I consider college to be a great time in my life. ICA
	41. My friends have good study habits.
	17. I enjoy being a student here. ICA
Campus environment	11. I belong to an organized club on campus. ICA
	34. I participate in activities put together by the university. ICA
	40. I have friends here at school. ICA
	39. My instructors show interest in me. ES
	12. I am discouraged with how I am treated by my instructors. * ES
	19. I know people I can talk to who encourage me about what I am learning. ES
Work environment	
Family variables	21. My family cares how I do academically. ASE

38. Family members criticize me because I am not a great student. \* ASE

20. People in my community value a college education.

37. My living situation distracts me from my studies. \* STP

ASE = Academic Self-Efficacy, OAS = Organization and Attention to Study, STP = Study and Time Pressure, ICA = Involvement with College Activity, ES = Emotional Satisfaction, CC = Class Communication

## APPENDIX B

### FACTOR LOADINGS OF THE CLEI SCALES

Scale 1: Academic Self-Efficacy	Factor Loadings						
	1	2	3	4	5	6	$h^2$
23. I believe that I have the ability to complete college.	<b>.73</b>	.18	.09	.06	.19	.03	.64
26. I have goals that I want to achieve by being in college.	<b>.73</b>	.00	.24	.04	.14	.10	.55
43. I have high academic expectations of myself.	<b>.70</b>	.21	.27	.05	.05	.11	.58
24. I believe it is possible for me to make good grades.	<b>.69</b>	.15	.10	.01	.12	.17	.56
28. I turn in assignments only partially completed.*	<b>.64</b>	.17	.01	.07	.16	.10	.43
42. I doubt that I can make the effort to finish college.*	<b>.59</b>	.06	.06	.04	.06	.13	.47
50. I am determined to do what it will take in order to succeed with my goals.	<b>.58</b>	.14	.21	.00	.23	.05	.52
5. I do not turn in assignments.*	<b>.58</b>	.24	.08	.04	.33	.11	.45
21. My family cares how I do academically.	<b>.57</b>	.09	.04	.13	.06	.15	.34
38. Family members criticize me because I am not a great student.*	<b>.56</b>	.05	.08	.17	.06	.23	.45
4. I am aware of the assignments that are due in the next week.	<b>.48</b>	.28	.03	.05	.16	.08	.30
47. Gaining knowledge is important to me.	<b>.46</b>	.12	.25	.05	.36	.03	.42
49. I question why I need a degree for the career I want to pursue.*	<b>.44</b>	.06	.04	.14	.23	.00	.34
20. People in my community value a college education.	<b>.41</b>	.06	.08	.19	.20	.19	.34

Items are ordered by the size of coefficients to facilitate interpretation. Items with a negative continuum for raw scores that need to be reversed before creating scale scores are marked with an asterisk.

$n = 597$  (KSU Undergraduate Students in Fall 2006 and Spring 2007)

$h^2 =$  Communality estimates.

Primary or the largest factor loadings are in bold type.



Scale 2: Organization and Attention to Study	Factor Loadings						
	1	2	3	4	5	6	$h^2$
2. I organize my time so that I have plenty of time to study.	.15	<b>.66</b>	.08	.12	.05	.22	.54
30. I make study goals and keep up with them.	.09	<b>.66</b>	.06	.19	.09	.08	.54
1. I wait to study until the night before the exam.*	.05	<b>.61</b>	.02	.03	.08	.02	.38
31. I break big assignments into manageable pieces.	.01	<b>.55</b>	.13	.15	.10	.09	.39
51. I cannot get into studying even if there is nothing else to do.*	.04	<b>.54</b>	.20	.09	.16	.11	.52
48. I find myself daydreaming when I study.	.09	<b>.48</b>	.29	.17	.26	.03	.48
25. I find my attention wandering in class*	.16	<b>.44</b>	.38	.16	.29	.00	.51
6. I organize class information in a way that helps me retain and apply it later.	.25	<b>.34</b>	.03	.11	.05	.00	.26

Items are ordered by the size of coefficients to facilitate interpretation. Items with a negative continuum for raw scores that need to be reversed before creating scale scores are marked with an asterisk.

$n = 597$  (KSU Undergraduate Students in Fall 2006 and Spring 2007)

$h^2 =$  Communality estimates.

Primary or the largest factor loadings are in bold type.

Scale 3: Stress and Time Pressure	Factor Loadings						
	1	2	3	4	5	6	$h^2$
36. I feel there are so many things to get done each week that I am stressed.*	.29	.01	<b>.86</b>	.12	.08	.06	.64
13. I have symptoms of stress from all of the pressure I have been under since coming to college.*	.18	.10	<b>.76</b>	.15	.13	.02	.55
3. I do not seem to have time to get everything done that I need to do.*	.04	.16	<b>.66</b>	.12	.21	.08	.45
32. It seems as though I am playing catch-up.*	.01	.33	<b>.63</b>	.12	.12	.01	.53
37. My living situation distracts me from my studies.*	.09	.06	<b>.52</b>	.04	.06	.07	.33
7. I plan in advance to prevent becoming overwhelmed with assignments at the last minute.	.02	.14	<b>.39</b>	.03	.15	.19	.25

Items are ordered by the size of coefficients to facilitate interpretation. Items with a negative continuum for raw scores that need to be reversed before creating scale scores are marked with an asterisk.

$n = 597$  (KSU Undergraduate Students in Fall 2006 and Spring 2007)

$h^2 =$  Communality estimates.

Primary or the largest factor loadings are in bold type.

Scale 4: Involvement with College Activity	Factor Loadings						$h^2$
	1	2	3	4	5	6	
9. I participate in social activities on campus.	.06	.00	.09	<b>.77</b>	.05	.27	.60
11. I belong to an organized club on campus.	.06	.06	.09	<b>.66</b>	.13	.24	.49
34. I attend events such as concerts, plays, speakers, or athletic contests as a part of the college experience.	.10	.11	.10	<b>.64</b>	.01	.24	.49
29. I know someone with whom I can study.	.06	.11	.22	<b>.61</b>	.05	.00	.43
40. I have friends here at school.	.37	.18	.23	<b>.56</b>	.09	.03	.54
10. I belong to a study group.	.29	.32	.05	<b>.55</b>	.01	.09	.41
15. I consider college to be a great time in my life.	.24	.13	.20	<b>.44</b>	.28	.07	.54
41. My friends have good study habits.	.20	.08	.24	<b>.43</b>	.04	.18	.33
17. I enjoy being a student here.	.29	.06	.13	<b>.38</b>	.32	.05	.55

Items are ordered by the size of coefficients to facilitate interpretation. Items with a negative continuum for raw scores that need to be reversed before creating scale scores are marked with an asterisk.

$n = 597$  (KSU Undergraduate Students in Fall 2006 and Spring 2007)

$h^2 =$  Communality estimates.

Primary or the largest factor loadings are in bold type.

Scale 5: Emotional Satisfaction	Factor Loadings						
	1	2	3	4	5	6	$h^2$
14. I like my courses.	.01	.21	.03	.04	<b>.65</b>	.17	.47
39. My instructors show interest in me.	.05	.05	.05	.05	<b>.65</b>	.13	.47
18. I hate school, but I know I have to do it*	.00	.20	.09	.10	<b>.47</b>	.24	.48
27. I see connections between my classes and my career goals.	.18	.17	.13	.09	<b>.44</b>	.03	.38
12. I am discouraged with how I am treated by my instructors*	.16	.24	.32	.23	<b>.40</b>	.66	.46
19. I can talk with people who provide encouragement to me about what I am learning.	.08	.16	.03	.29	<b>.34</b>	.01	.35
16. I become overwhelmed when I think of my assigned class requirements*	.01	.17	.23	.20	<b>.32</b>	.13	.33

Items are ordered by the size of coefficients to facilitate interpretation. Items with a negative continuum for raw scores that need to be reversed before creating scale scores are marked with an asterisk.

$n = 597$  (KSU Undergraduate Students in Fall 2006 and Spring 2007)

$h^2 =$  Communality estimates.

Primary or the largest factor loadings are in bold type.

Scale 6: Class Communication	Factor Loadings						
	1	2	3	4	5	6	$h^2$
8. I avoid speaking in class*	.14	.10	.29	.26	.25	<b>.74</b>	.56
33. I ask questions in class.	.14	.10	.29	.26	.25	<b>.55</b>	.50
46. I cannot seem to express my ideas on paper very well*	.15	.18	.16	.07	.13	<b>.52</b>	.33
35. I avoid classes in which participation is required*	.19	.08	.07	.09	.07	<b>.51</b>	.33
44. I dread the thought of getting test results in certain classes*	.12	.10	.27	.02	.16	<b>.44</b>	.41
22. I find it difficult to get the assistance I need for my academic success*	.23	.02	.17	.02	.05	<b>.39</b>	.36

Items are ordered by the size of coefficients to facilitate interpretation. Items with a negative continuum for raw scores that need to be reversed before creating scale scores are marked with an asterisk.

$n = 597$  (KSU Undergraduate Students in Fall 2006 and Spring 2007)

$h^2 =$  Communality estimates.

Primary or the largest factor loadings are in bold type.

## APPENDIX C

### COLLEGE LEARNING EFFECTIVENESS INVENTORY SCALES

Please answer the following questions to the best of your ability.

1. Never
2. Rarely
3. Sometimes
4. Usually
5. Always

#### **Academic Self-Efficacy scale**

23. I believe that I have the ability to complete college.
26. I have goals that I want to achieve by being in college.
43. I have high academic expectations of myself.
24. I believe it is possible for me to make good grades.
28. I turn in assignments only partially completed. \*
42. I doubt that I can make the effort to finish college.\*
50. I am determined to do what it will take in order to succeed with my goals.
5. I do not turn in assignments. \*
21. My family cares how I do academically.
38. Family members criticize me because I am not a great student. \*
4. I am aware of the assignments that are due in the next week.
47. Gaining knowledge is important to me.
49. I question why I need a degree for the career I want to pursue. \*

20. People in my community value a college education.

### **Organization and Attention to Study scale**

2. I organize my time so that I have plenty of time to study.

30. I make study goals and keep up with them.

1. I wait to study until the night before the exam. \*

31. I break big assignments into manageable pieces.

51. I cannot get into studying even if there is nothing else to do. \*

48. I find myself daydreaming when I study. \*

25. I find my attention wandering in class. \*

6. I devise ways to organize information that helps me to memorize and retain it.

### **Stress and Time Pressure scale**

36. I feel there are so many things to get done each week that I am stressed. \*

13. I have symptoms of stress from all of the pressure I have been under since coming to college.\*

3. I do not seem to have time to get everything done that I need to do. \*

32. It seems as though I am playing catch-up. \*

37. My living situation distracts me from my studies. \*

7. I plan in advance to prevent becoming overwhelmed with assignments at the last minute.

### **Involvement with College Activity (ICA) Scale**

9. I participate in social activities on campus.

11. I belong to an organized club on campus.

34. I participate in activities put together by the university.

29. I know someone with whom I can study.

- 40. I have friends here at school.
- 10. I belong to a study group.
- 15. I consider college to be a great time in my life.
- 41. My friends have good study habits.
- 17. I enjoy being a student here.

**Emotional Satisfaction scale**

- 14. I like my courses.
- 39. My instructors show interest in me.
- 18. I hate school, but I know I have to do it. \*
- 27. I see connections between my classes and my career goals.
- 12. I am discouraged with how I am treated by my instructors. \*
- 19. I know people I can talk to who encourage me about what I am learning.
- 16. I get annoyed and aggravated when I am given assignments. \*

**Class Communication scale**

- 8. I avoid speaking in class. \*
- 33. I ask questions in class.
- 46. I cannot seem to express my ideas on paper very well. \*
- 35. I avoid classes in which participation is required. \*
- 44. I dread the thought of getting test results in certain classes. \*
- 22. I am too uncertain or embarrassed to find assistance. \*

\* Indicates items in a negative continuum that need to be re-coded to reverse scores: 1 to 5, 2 to 4, 4 to 2, and 5 to 1.



## APPENDIX D

### LASSI (WILL SCALE)

Please answer the following questions to the best of your ability.

- 1- Very much typical of me
  - 2- Fairly typical of me
  - 3- Somewhat typical of me
  - 4- Not very typical of me
  - 5- Not at all typical of me
- 
1. I get discouraged because of low grades.
  2. I feel very panicky when I take an important test.
  3. When I am taking a test, worrying about doing poorly interferes with my concentration.
  4. I worry that I will flunk out of school.
  5. Even when I am well prepared for a test, I feel anxious.
  6. When I am studying, worrying about doing poorly in a course interferes with my concentration.
  7. Courses in certain subjects, such as math, science, or a foreign language, make me anxious.
  8. I get so nervous and confused when taking an examination that I fail to answer questions to the best of my ability.
  9. I am able to study subjects that I do not find interesting.
  10. I only study subjects I like.
  11. I have a positive attitude about attending my classes.

12. I would rather not be in school.
13. I do not care about getting a general education; I just want to get a good job.
14. I dislike most of the work in my classes.
15. I do not care if I finish college as long as I have a good time.
16. In my opinion, what is taught in my courses is not worth learning.
17. I set high standards for myself in school.
18. When work is difficult, I either give up or study only the easy parts.
19. Even if I am having difficulty in a course, I can motivate myself to complete the work.
20. Even if I do not like an assignment, I am able to get myself to work on it.
21. I set goals for the grades I want to get in class.
22. Even when I don't like a course, I work hard to get a good grade.
23. I am up to date in my class assignments.
24. Even when study materials are dull and uninteresting, I manage to keep working until I finish.
25. I concentrate fully when studying
26. Because I don't listen carefully, I don't understand some course material.
27. I find it difficult to maintain my concentration while doing my course work.
28. My mind wanders a lot when I study.

## APPENDIX E

### LASSI (SELF-REGULATION SCALE)

Using the following scale please answer the following questions to the best of your ability.

1 - Very much typical of me

2 - Fairly typical of me

3 - Somewhat typical of me

4 - Not very typical of me

5 - Not at all typical of me

1. I find it hard to pay attention during lectures
2. I am very easily distracted from my studies.
3. I end up “cramming” for every test.
4. If I get distracted during class, I am able to refocus my attention.
5. I try to identify potential test questions when reviewing my class material.
6. When preparing for an exam, I create questions that I think might be included.
7. I review my notes before the next class.
8. I stop periodically while reading and mentally go over or review what was said.
9. I test myself to see if I understand what I am studying.
10. To help make sure I understand the material, I review my notes before the next class.
11. To check my understanding of the material in a course, I make up possible test questions and try to answer them.
12. After a class, I review my notes to help me understand the information that was presented.

13. My underlining is helpful when I review text material.
14. If there is a web site for my textbook, I use the information provided there to help me learn the material.
15. I go to the college learning center for help when I am having difficulty learning the material in a course.
16. When they are available, I attend review sessions for my classes.
17. I use special study helps, such as italics and headings that are in my textbook.
18. When I am having trouble with my coursework, I do not go to the instructor for help.
19. I try to find a study partner or a study group for each of my classes.
20. If I am having trouble studying, I ask another student or the instructor for help.
21. I find it hard to stick to a study schedule.
22. When I decide to study, I set aside a specific length of time and stick to it.
23. When it comes to studying, procrastination is a problem for me.
24. I put off studying more than I should.
25. I spread out my study times so I do not have to “cram” for a test.
26. I do not have enough time to study because I spend too much time with my friends.
27. I set aside more time to study the subjects that are difficult for me.
28. I find that during lectures I think of other things and don't really listen to what is being said.

## APPENDIX F

### MOTIVATED STRATEGIES FOR LEARNING QUESTIONNAIRE

Please answer the following questions to the best of your ability.

1. Never
  2. Rarely
  3. Sometimes
  4. Often
  5. Always
- 
1. I try to change the way I study in order to fit the course requirements and instructor's teaching style.
  2. I make sure I keep up with the weekly readings and assignments for this course.
  3. When I take a test I think about how poorly I am doing compared with other students.
  4. When reading for this class, I try to relate the material to what I already know.
  5. When I study the readings for this course, I outline the material to help me organize my thoughts.
  6. When a theory, interpretation, or a conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.
  7. When I become confused about something I'm reading for this class, I go back and try to figure it out.
  8. I usually study in a place where I can concentrate on my coursework.
  9. I work hard to do well in this class even if I don't like what we are doing.

10. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.
11. I think the course material in this class is useful for me to learn.
12. When I take tests I think of the consequences of failing.
13. When I study for this course, I write brief summaries of the main ideas from the readings and the concepts from the lectures.
14. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.
15. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.
16. I like the subject matter of this course.
17. Before I study new course material thoroughly, I often skim it to see how it is organized.
18. When I study for this class, I set goals for myself in order to direct my activities in each study period.
19. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.
20. I rarely find time to review my notes or readings before an exam.
21. I have an uneasy, upset feeling when I take an exam.
22. I try to understand the material in this class by making connections between the readings and the concepts from the lectures.
23. When I study for this course, I go over my class notes and make an outline of important concepts.
24. I try to play around with ideas of my own related to what I am learning in this course.

25. When studying for this course I try to determine which concepts I don't understand well.
26. I find it hard to stick to a study schedule.
27. Even when course materials are dull and uninteresting, I manage to keep working until I finish.
28. Understanding the subject matter of this course is very important to me.
29. I feel my heart beating fast when I take an exam.
30. I try to apply ideas from course readings in other class activities such as lecture and discussion.
31. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.
32. I ask myself questions to make sure I understand the material I have been studying in this class.
33. I have a regular place set aside for studying.
34. In a class like this, I prefer course material that really challenges me so I can learn new things
35. I am very interested in the content area of this course.
36. I treat the course material as a starting point and try to develop my own ideas about it.
37. If course materials are difficult to understand, I change the way I read the material.
38. I make good use of my study time for this course.
39. When course work is difficult, I give up or only study the easy parts.
40. If I get confused taking notes in class, I make sure I sort it out afterwards.

## APPENDIX G

### CROMBAG COLLEGE ADAPTATION QUESTIONNAIRE

Please answer the following questions to the best of your ability.

1. Not applicable
  2. Rarely applicable
  3. Neutral
  4. Somewhat Applicable
  5. Very Applicable
- 
1. I am very satisfied with the course of my studies.
  2. Sometimes I want to give it all up.
  3. I often ask myself what I am doing here.
  4. I would prefer to study somewhere else.
  5. I made many friends here.
  6. I do not feel very at home at the University.
  7. I never feel bored here.
  8. Sometimes I feel discouraged here.
  9. I find life as a student very pleasant.
  10. Sometimes I feel rather lonely.
  11. Sometimes I do not know what to do with my time.
  12. I find it hard to get used to life here.
  13. What I miss here is someone to talk to freely from time to time.
  14. I am very satisfied with my way of life.



15. If I feel blue, my friends will help me to get out of it.
16. I find it very difficult to adjust to student life.
17. I am glad that I came to study here.
18. I feel very much at home here.

## APPENDIX H

### ROSENBERG SELF ESTEEM SCALE

Please answer the following questions to the best of your ability.

6. Strongly Agree
  7. Agree
  8. Disagree
  9. Strongly Disagree
- 
1. On the whole, I am satisfied with myself.
  2. At times, I think I am no good at all.
  3. I feel I have a number of good qualities.
  4. I am able to do things as well as most other people.
  5. I feel I do not have much to be proud of.
  6. I certainly feel useless at times.
  7. I feel that I am a person of worth, at least on an equal plane with others.
  8. I wish I could have more respect for myself.
  9. All in all, I am inclined to feel that I am a failure.
  10. I take a positive attitude toward myself.

## APPENDIX I

### STUDENT PROPENSITY TO ASK QUESTIONS SCALE

Please answer the following questions to the best of your ability.

1. Strongly Agree
  2. Agree
  3. Neutral
  4. Disagree
  5. Strongly Disagree
- 
1. I like to ask questions in class
  2. I rarely ask questions in class.
  3. I enjoy assuming the role of question-asker during class discussions.
  4. I usually don't voluntarily ask questions in class.
  5. I would rather listen than ask a question in class.
  6. I always ask questions in class if possible.
  7. I am usually motivated to ask questions in class.
  8. I generally ask questions in class.
  9. I don't like asking questions in class.
  10. I sometimes feel awkward in asking questions in class.
  11. I have a fear of asking questions in class.
  12. I am generally satisfied with the number of questions I ask in class.

**APPENDIX J**

**LETTER FROM KANSAS STATE UNIVERSITY OFFICE OF RESEARCH**

**COMPLICANCE**



**University Research  
Compliance Office**

203 Fairchild Hall  
Lower Mezzanine  
Manhattan, KS 66506- 1103  
785-532-3224  
Fax: 785-532-3278  
<http://www.ksu.edu/research/comply>

TO: Fred Newton  
UCS

232 ECS Bldg /

FROM: Rick Scheidt, chair

Committee on Research Involving Human Subjects

RE: Proposal Entitled, "Determining Psychometric Properties and Normative Profiles for the College Learning Effectiveness Inventory (CLEI)"

The Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is exempt from further review.

This exemption applies only to the proposal currently on file with the IRB. Any change affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Exemption from review does not release the investigator from statutory responsibility for obtaining the informed consent of subjects or their authorized representatives, as appropriate, either orally or in writing, prior to involving the subjects in research. The general requirements for informed consent and for its documentation are set forth in the Federal Policy for the Protection of Human Subjects, 45 CFR 46.116-117, copies of which are available in the University Research Compliance Office and online at <http://ohrp.osophs.dhhs.gov/humansubjects/guidance/45cfr46.htm#46.116>. In cases of remote oral data collection, as in telephone interviews, oral consent is sufficient and the researcher is required to provide the respondent with a copy of the consent statement only if the respondent requests one. The researcher must, however, ask the respondent whether he or she wishes to have a copy. The initiative in requesting a copy must not be left to the respondent. Regardless of whether the informed consent is written or oral, the investigator must keep a written record of the informed consent statement, not merely of the fact that it was presented, and must save this documentation for 3 years after completing the research.

The identification of a human subject in any publication constitutes an invasion of privacy and requires a separate informed consent.

Injuries or any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.