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Secondary Student Perceptions of Classroom Quality:

Instrumentation and Differences Between Advanced/Honors and Nonhonors Classes

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This article describes the initial development and psychometric evaluation of an instrument for use with secondary students to measure various perceptions about class activities. The instrument—Student Perceptions of Classroom Quality (SPOCQ)—focuses on meaningfulness, challenge, choice, self-efficacy, and appeal, constructs central to learning and deeply rooted in gifted education. The article reports content and construct validity evidence, reliability estimates, and demographic group comparisons from a diverse national sample of students in grades 7–12 (N = 7,411). The article also details differences between advanced and general education students' perceptions of their classroom environments. SPOCQ can be useful to those interested in classroom research, as well as those aiming to improve teaching and learning by considering students' perceptions of class activities.

The persistent push for statewide and national educational standards is accompanied by a steadily increasing emphasis on improving test scores. This intense focus often overshadows the original missions of education (e.g., developing student potential as lifelong learners and productive members of a diverse society). Although student beliefs are associated with achievement and may be useful outcomes of schooling in their own right, they tend to be peripheral in a pervasive climate of accountability and standardized testing. As a result, some believe that quality education has suffered (e.g., Eisner, 2001; Popham, 2001). Popham suggested regularly measuring educationally significant student affect to help teachers make instructional decisions, as well as to help judge the effectiveness of curriculum and instruction. Accordingly, psychometrically sound affective instruments are needed.

This study builds on previous work in which an instrument, My Class Activities, was developed to assess 3rd- through 8th-grade students' perceptions of their class activities (Gentry & Gable, 2001). It also expands a pilot study that developed the basis for a new instrument (Gentry & Springer, 2002). Although student perceptions about school have been tied to school success and achievement, measurement of their perceptions has been infrequent, due partly to the lack of suitable instrumentation (Gable & Wolf, 1993; Haladyna & Thomas, 1979, Popham, 2001).

The instrument introduced in this study, Student Perceptions of Classroom Quality (SPOCQ), assesses student perceptions of the following constructs: meaningfulness, challenge, choice, self-efficacy, and appeal. These constructs are important educational outcomes related to student achievement; consequently, the need for such instrumentation is clear. SPOCQ may be used in the school-improvement process to assess current perceptions, evaluate classroom quality, set goals and measure progress, and conduct educational research. Further, in schools that have honors or advanced classes, student perceptions of these classes and comparisons of their perceptions with those of general education students can provide insight concerning whether, and how, honors/advanced classes differ from general classes.

Constructs

Appeal, challenge, choice, meaningfulness, and academic self-efficacy comprise the theoretical basis upon which SPOCQ was constructed, and each has been shown to be central to learning. Following are operational definitions and a brief overview of representative literature supporting each construct.

Appeal

Appeal combines interest and enjoyment and indicates a pleasant, safe, and satisfying learning environment that encourages smiles, positively engages students, and reflects their preferences for topics and activities.

Providing learning experiences that are engaging and enjoyable is essential to effective educational practices (Csikszentmihalyi, 1990; Dewey, 1933; Renzulli, 1994). For many years, theorists have advocated using interests to engage students in learning (Dewey, 1916; Renzulli, 1978; Schiefele, 1991; Whitehead, 1929). Whitehead suggested that there could be no "mental development" without interest, whereas Schiefele described interest as a directive force that influences motivation and performance within specific content areas. Interest is tied to motivation, and motivation is tied to learning; therefore, studying interests should lead to insights that improve teaching and learning (Deci & Ryan, 1985, 1992; Schiefele; Tobias, 1994).

Challenge

Challenge involves rigor, depth, and complexity and is at the intersection of content, process, product, and audience. Optimal challenge is based on individuals, engaging them in effective learning.

Important in any discussion of challenge is Vygotsky's (1962) premise that children show preferences for tasks that are slightly beyond their abilities; thus, intellectual development requires personally difficult tasks. Challenge is intrinsic, associated with positive affective perceptions that incline the learner to engage in the task (Pintrich & Schrauben, 1992). Besides learning, a consequence of personal challenge is a willingness to persevere (Baird & Penna, 1996). The need for challenge in America's schools is widely recognized, yet challenge seems to be lacking in many classrooms, leading to yawning and frustrated students who do not reach their potentials (Feldhusen & Kroll, 1991; Goodlad, 1984). Using appropriately challenging curricula with effective instructional methods can substantially enhance learning.

Choice

Choice involves empowering students to direct and make important decisions about their learning.

Providing students with choices in education has been identified as a motivational tool that encourages learning (Bloom, 1985; Dewey, 1916; Gardner, 1991; Goodlad, 1984) and increases motivation in adolescents (Ames, 1992; Deci & Ryan, 1985; Eccles & Midgley, 1989). Choice, according to Glasser (1996) and Deci (1995), is important in encouraging student motivation, achievement, autonomy, decision making, and self-regulated learning. Allowing students to make choices in their learning results in a greater sense of ownership and personal involvement in the educational process. Csikszentmihalyi et al. (1993) argued that perceived choice might be the most important pathway to the intrinsic rewards of schooling.

Meaningfulness

When content and methods have relevance to students' lives and are significant, important, connected, and worth caring about, then meaningfulness has been achieved.

Optimal learning takes place when topics are relevant, meaningful, interesting, and appeal to the imagination (Bransford, Vye, Kinzer, & Risko, 1990) and when learners connect their prior experiences and knowledge to new information (Piaget, 1970; Wittrock, 1985). Meaningful learning, in which these connections are made, is in many ways more effective than rote learning (Ausubel, Novak, & Hanesian, 1978). Considering how learning can be made meaningful to students is an important aspect of quality education.

Academic Self-Efficacy

Academic self-efficacy reflects students' perceived confidence in performing important classroom learning behaviors.

Efficacy beliefs about particular behaviors have some causal influence on those behaviors (Bandura, 1997). It is therefore an important educational goal for students not just to perform well on achievement measures, but also to have confidence in pursuing specified knowledge or skills. And on a metalevel, it also makes sense to instill efficacy beliefs about learning generally so that students think of themselves as capable of becoming proficient in various academic content areas.

These constructs assessed by SPOCQ form the basis for many curricular and instructional differentiation efforts (Renzulli, Leppein & Hays, 2000; Tomlinson, 1995, 1999). Historically, incorporating these constructs has been advocated in designing learning experiences for gifted students, and it has frequently been suggested that gifted education pedagogy be extended to improve general education practices (Tomlinson & Callahan, 1992; U.S. Department of Education, 1993). The application of gifted education know-how to general education is supported by a wide variety of

research on human abilities (Bloom, 1985; Gardner, 1983; Renzulli & Reis, 1997; Sternberg, 1997). One means of assessing educational reform efforts is to consider school through the eyes of the students whom reform is meant to serve. Dependable assessment of student perceptions of classroom quality can provide valuable insights concerning educational opportunities for all students.

Methods

Participants and Sampling Procedures

A purposive sample reflecting rural, urban, and suburban middle schools (n = 12) and high schools (n = 14) from across the United States was sought using the NRG/GT collaborative school district database. The sample included 7,411 students from 26 schools in 7 states (Connecticut, Florida, Michigan, Minnesota, New York, Texas, and Wisconsin) and 1 foreign country. Of the 26 schools, several were nontraditional schools: an American school in Poland, a private prep school, a magnet school for the gifted, and a regional vocational center. Fifty percent of the sample was female. The students were from varied ethnic backgrounds, including Caucasian (67%), African American (12%), Hispanic American (8%), Asian American (5%), Native American (3%), and Other (6%). When compared to national data on race from the 2000 census, our sample approximated the diversity that currently exists in the United States. As reported by the U.S. government in 2002, the U.S. population consisted of the following percentages by race: White non-Hispanic (69%), Hispanic (13.5%), Black (13%), Asian and Pacific Islanders (4%), American Indians and Pacific Islanders (1%), and more than one race (2.4%; U.S. Census Bureau, 2004).

Design and Data Gathering

This study used a one-time survey administration conducted in group settings by contact persons who followed a set of standardized instructions and who informed students that their individual responses would be anonymous. Student names were not collected. Surveys were administered in the early spring and late fall of 2001. Students completed a short biographic section that included a question concerning whether the course in which they completed the survey was an advanced, Advanced Placement, or honors course and answered 38 SPOCQ items using a 5-point Likert response scale (with responses ranging from *strongly disagree* to *strongly agree*). Surveys were collected by contact persons and administered in classroom groups, coded, and optically scanned into a database for analyses. Other biographic data included subject area, community type, students' letter grades in the course, whether the student received any special services, grade level, gender, and ethnic group. A copy of the complete instrument is included in Appendix B.

Data Analyses and Results

Validity Evidence for Content Interpretation

In a previous study, content validity was examined through a review of the literature and by using 22 content experts who rated items written for each construct. SPOCQ was then pilot tested with 500 high school students, and construct validity was examined using exploratory factor analysis; factors representing the expected constructs of appeal, challenge, choice, and meaningfulness were derived with internal consistency estimates ranging from .80 to .84 (Gentry & Springer, 2002). Based on findings from the pilot study, revisions were made to the instrument. These revisions included reformatting the instrument into an optically scannable form, adding demographic items, adding space on the scannable form for student identification numbers, minor rewording of 10 items, adding a scale of items to assess self-efficacy, and adding 4 attribution items. The present confirmatory study extended this work by examining the construct validity and reliability evidence for data obtained from a sample of middle and high school students.

Validity Evidence for Construct Interpretation: Confirmatory Factor Analysis

From a structural equation viewpoint, construct validity assesses how hypothesized constructs explain covariation among responses to the items. Whereas support for validity based on item content (i.e., content validity) is judgmental in nature, the examination of the validity of the score interpretations (i.e., construct validity) is empirically based on data obtained from the respondents.

Because the constructs had received previous exploratory factor analytic support and had a strong theoretical basis, we used AMOS 5 (Arbuckle, 2003) to perform a confirmatory factor analysis (CFA) to assess how well the data fit the hypothesized model. CFA has stronger requirements than exploratory factor analysis. In particular, one must specify the number of hypothesized factors and say in advance which items belong on which factors. Perhaps more important is that, unlike earlier methods, CFA does not try to avoid dealing with measurement error, but instead considers it in developing the factor loadings (see the "e" terms on the right of Figure 1).

For our CFA, we created item parcels—random subsets of relevant items (see Little, Cunningham, Shahar, & Widaman,

2002). Item parcels are far more reliable than their constituent items, and they dramatically simplify the complete CFA. Overall model fit was examined, as well as each dimension's ability to explain the variation in its respective parcels. One popular fit index is Bentler's Comparative Fit Index (CFI), which estimates how much better the proposed model is compared to the worst possible model. CFI values of at least .95 represent good fit. A second useful fit index is the root mean square error of approximation (RMSEA), with values of .08 representing adequate fit and .05 representing good fit.

The CFA results were very strong, with a CFI of .997 and an RMSEA of .051 (.90 confidence interval = .048–.055). Standardized factor loadings were as expected, with values ranging from .71 to .90. Figure 1 shows the CFA model with the standardized loadings. The double-headed arrows on the left of the figure show sizeable intercorrelations among the factors. A second-order factor model (which analyzes these correlations among factors) was constructed, with the idea that a single overall construct was responsible for five subconstructs (appeal, etc.). Because the first-order model (see Figure 1) is nested within the second-order model, a chi-square comparison of the two models was possible. That test result showed a dramatic difference between the two models (χ^2 = 146.5, *df* = 5, $p < .001$), with the second-order model showing far worse fit than the one depicted in Figure 1. In short, the original model was the preferred one, despite the overlap among constructs. We return to this issue in the Discussion section.

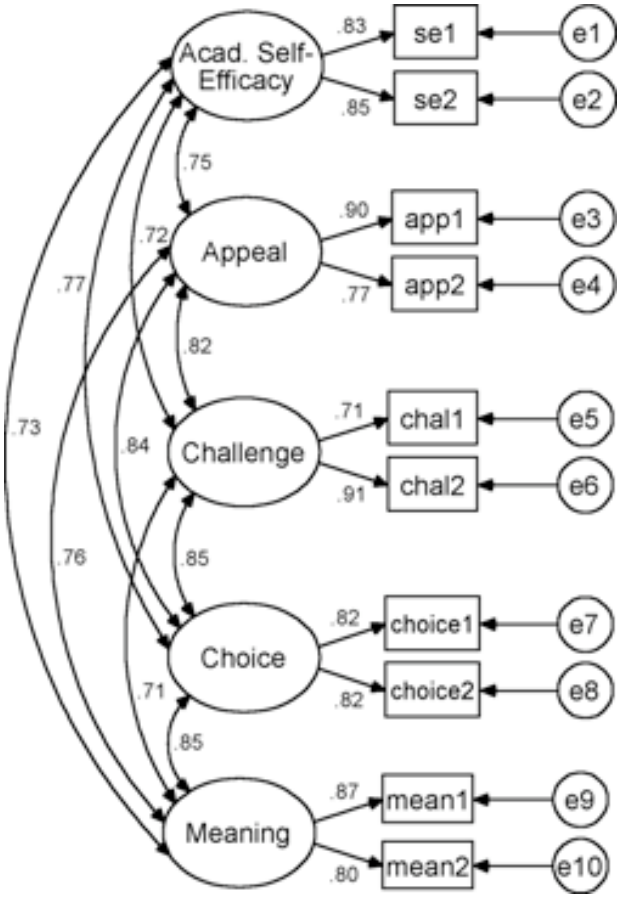

Figure 1. Confirmatory factor model (*N* = 7,411)

Internal Consistency Reliability Estimates

We used SPSS v. 12 to generate descriptive statistics and alpha reliability coefficients. Alpha estimates for the constructs were as follows: appeal (.85), challenge (.81), choice (.81), meaningfulness (.81), and academic self-efficacy (.82). Table 1 presents item analysis and alpha internal consistency reliability information.

Group Comparisons

These analyses were arranged to give convergent and discriminant validity evidence. The first analysis aimed at convergent information: Student group information should be associated with SPOCQ scores. Specifically, we predicted that students in advanced, AP, or honors classes would show higher SPOCQ subscale scores than their peers in general education classes. SPOCQ constructs represent a theoretical constellation of classroom motivation behaviors, which is verified by subscale intercorrleations (see Appendix A). SPOCQ subscale intercorrleations demanded a multivariate approach, specifically a discriminant function analysis (DFA) to assess group differences among the SPOCQ subscales (appeal, challenge, choice, self-efficacy, meaningfulness).

Of the 7,411 students in the sample, 6,218 were included in this group comparison, with 1,193 students eliminated due to missing data. The DFA showed significant group separation (Wilks' λ = .95, χ^2 = 281.93, *df* = 5, $p < .001$), with an $R^2_{canonical}$ of .05, a small but practically significant effect, according to Cohen (1988). Three of the subscales—challenge, appeal, and meaning—were statistically significant predictors of group status. Jackknifed classifications showed 55.0% correct classifications for the general education students and 64.4% correct for the advanced/honors students. DFA results are summarized in Table 2.

Note that, although many analysts study the structure coefficients (labeled "loadings" in Table 2), they are univariate and can be highly misleading. The standardized coefficients, by comparison, are fully multivariate and represent unique associations between each dimension score and the discriminant function. For example, choice, with the second largest load-

Table 1

SPOCQ: Response Percentages and Alpha Reliability Estimates Grades 7–12 (*n* = 7,411)

		Response Percentage								
Construct	Item	1	2	3	4	5	Mean	*SD*	Corrected *r* w/ Construct	Alpha Reliability
Appeal	3	7	15	21	43	14	3.43	1.02	.65	.85
	9	15	23	32	25	5	2.83	1.12	.65	
	19	18	24	33	21	4	2.68	1.12	.66	
	20	10	18	34	32	6	3.07	1.07	.42	
	25	7	12	21	45	15	3.49	1.10	.65	
	26	18	26	30	21	5	2.68	1.34	.65	
	31	13	15	24	33	15	3.22	1.25	.61	
Challenge	4	5	12	26	46	11	3.46	1.00	.56	.81
	8	5	13	20	48	15	3.54	1.06	.55	
	11	6	15	22	42	16	3.48	1.10	.33	
	15	5	12	22	50	11	3.49	1.00	.61	
	18	9	17	29	34	10	3.20	1.10	.56	
	27	5	12	28	46	10	3.44	0.98	.52	
	33	9	15	28	38	11	3.26	1.11	.64	
Choice	1	5	13	30	45	6	3.35	0.95	.52	.81
	5	4	10	26	44	15	3.56	0.99	.45	
	6	3	6	23	56	13	3.71	0.85	.40	
	12	7	22	27	36	7	3.15	1.06	.66	
	16	5	13	24	44	14	3.50	1.04	.62	
	17	8	15	24	40	13	3.38	1.11	.58	
	22	5	13	29	41	13	3.44	1.02	.54	
Meaning	7	4	9	25	48	14	3.61	0.96	.58	.81
	10	4	9	26	46	16	3.61	0.99	.64	
	13	4	12	24	47	13	2.53	1.00	.62	
	24	7	18	32	34	9	3.22	1.06	.59	
	29	8	17	31	36	8	3.20	1.06	.57	
Self-Efficacy	2	4	11	24	52	10	3.54	0.94	.45	.82
	14	5	12	27	45	12	3.48	1.00	.51	
	21	5	12	26	45	13	3.49	1.03	.61	
	23	7	14	20	38	20	3.50	1.17	.54	
	28	10	15	25	37	13	3.28	1.16	.56	
	30	6	12	27	43	12	3.44	1.03	.55	
	32	7	14	28	41	10	3.35	1.04	.50	
	34	8	13	24	40	15	3.43	1.12	.48	

Table 2

DFA Results for Honors vs. Nonhonors Students on Constructs and Items

Variable	Standardized Coefficient	Loading	Multivariate Partial F-ratio	Mean (SD) Honors Students (n = 1,863)	Mean (SD) Other Students (n = 4,355)
Appeal	-.31	.33	10.07*	3.16 (0.81)	3.03 (0.83)
Challenge	1.37	.89	228.35*	3.63 (0.66)	3.34 (0.72)
Choice	0.00	.43	0.00	3.54 (0.65)	3.40 (0.70)
Meaningfulness	-.41	.28	16.17*	3.50 (0.64)	3.41 (0.73)
Self-efficacy	.01	.32	0.01	3.52 (0.65)	3.45 (0.71)

* significant at $p < .001$

ing, seems to be useful in distinguishing honors from general education students. However, a glance at its standardized coefficient and its significance test shows that choice is completely irrelevant in the company of the other scores.

Finally, two of the standardized coefficients show negative signs, contrary to their simple correlations with the discriminant function. This is an outcome of using predictor variables that are highly correlated. In this instance, it is more useful to inspect the absolute magnitude of the coefficient, rather than the direction of the association.

For discriminant validity evidence, we predicted no association between either gender or grade level and SPOCQ scores. Here, using a two-way MANOVA, we investigated whether there were gender differences, whether differences existed by grade level, and whether there was an interaction of gender by grade level on the various SPOCQ scores. The gender effect was significant (Wilks' $\lambda = .99$, $F = 13.94$, $df = 5,5996$, $p < .001$), as was grade level ($\lambda = .96$, $F = 9.24$, $df = 25,22276$, $p < .001$), and the gender by grade interaction ($\lambda = .99$, $F = 2.69$, $df = 25,22276$, $p < .001$). Although each effect was statistically significant, examination of effect sizes reveals that the significance was a function of sample size and not of practical interest. Girls averaged higher on all scales, with an effect size of $\eta^2_{partial} = .01$; that is, gender accounted for only 1% of the total SPOCQ score variation, a trivial effect according to Cohen (1988). Grade level and interaction effects were even smaller ($\eta^2_{partial} = .008$ and .002, respectively), and thus not pursued further.

Discussion

With current national and local pressures for standards, measurable achievement, and basic skills for all, it is important to remember that academic success, learning, and perceptions of accomplishment extend far beyond what is measured by standardized or standards-based achievement tests. The SPOCQ represents an attempt to recognize and assess some of the classroom dimensions that form the foundation of learning, motivation, and healthy affect.

Data analyses indicated strong psychometric support for internally consistent, valid score interpretations from a large sample of secondary students concerning their perceptions of classroom quality. Although the five subdimensions of the SPOCQ are substantially correlated, we argue that the constructs represent a coordinated constellation of beliefs that students use in their appraisals of what school is all about. There is no special reason to think that perceptions about, say, appeal and choice should be independent, since most classroom activities pertain to both simultaneously. But, neither are appeal and choice the same thing, and choice likely has a strong influence on appeal (which may underlie the correlation between the two).

It was notable in our data that students who responded to SPOCQ concerning an advanced, AP, or honors course indicated more endorsement of the challenge and meaningfulness scales than general course students. As an evaluative measure of a sample of honors courses, these results suggest that students enrolled in these courses tend to find them personally challenging and meaningful. However, their perceptions of appeal, choice, and self-efficacy were the same as those of students in nonhonors courses. Further, students in the advanced, AP, and honors courses were more likely than the other students to attribute good grades to both their hard work (Q36) and their ability (Q37). They also were more confident about plans to attend college, but it is noteworthy that most students in general plan to attend college, with the mean of the honors students at 4.70 and the mean of the other students at 4.35 on the 5-point scale. These findings are stable across grade levels. Although a statistically significant main effect for gender differences existed, it was the result of an overpowered study

(from a very large *N*); examination of effect size indicated that this difference was trivial and warranted no further follow-up concerning individual scale differences.

In summary, considering students' perceptions of constructs linked to learning and motivation has the potential to expand the definition of school improvement and enhance student achievement. Ultimately, SPOCQ should be valuable to those engaged in research on school improvement—in both general and gifted education—by providing them a means to assess constructs central to effective education.

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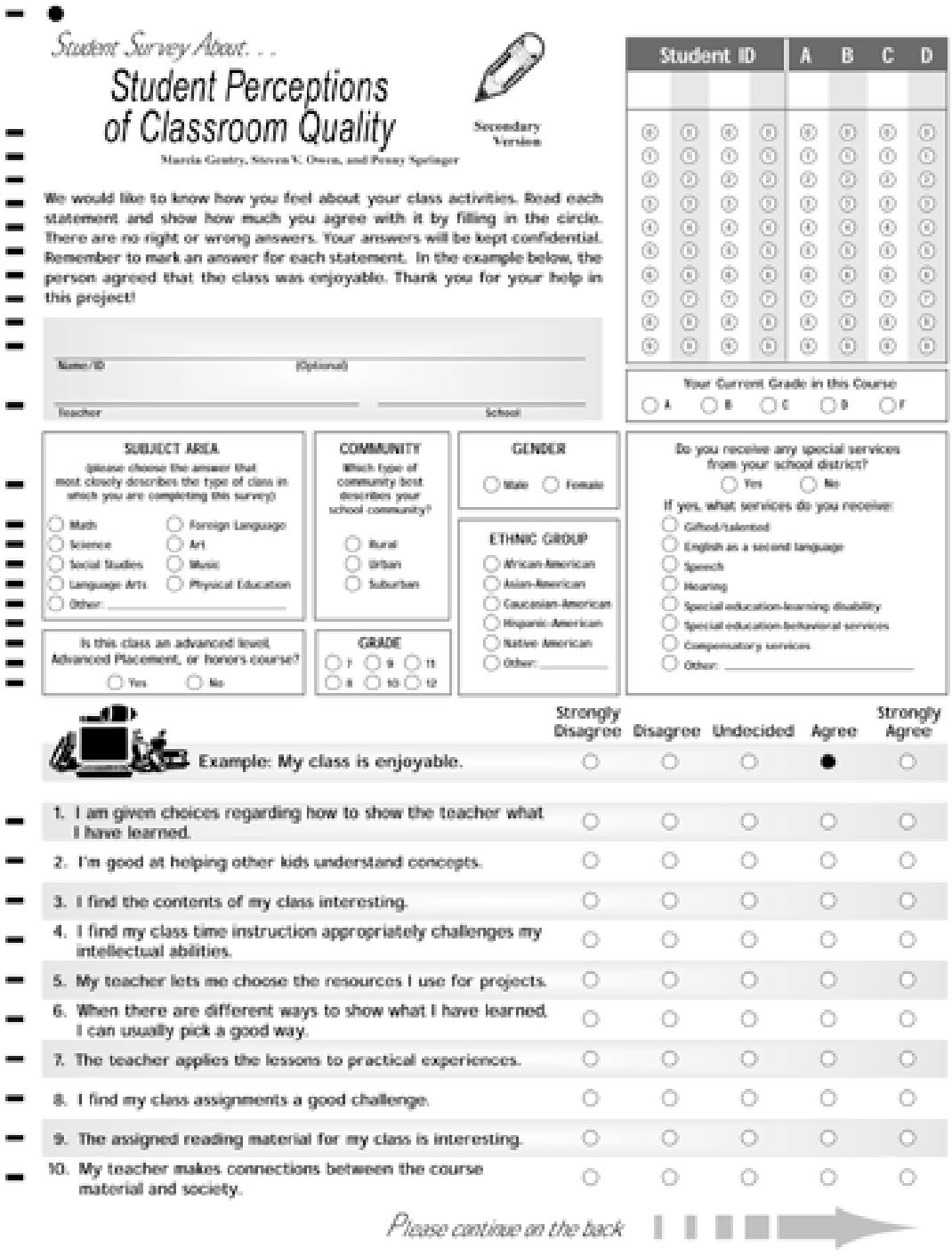
Appendix A
Subscale Intercorrelations

	Self-Efficacy	Choice	Appeal	Challenge	Meaningfulness
Self-Efficacy	1.000				
Choice	0.622	1.000			
Appeal	0.624	0.687	1.000		
Challenge	0.565	0.692	0.673	1.000	
Meaningfulness	0.659	0.735	0.700	0.660	1.000

Appendix B
Student Perceptions of Classroom Quality (SPOCQ)



Student Survey About. . .

Student Perceptions of Classroom Quality

Secondary Version

Marcia Gentry, Steven V. Owen, and Penny Springer

We would like to know how you feel about your class activities. Read each statement and show how much you agree with it by filling in the circle. There are no right or wrong answers. Your answers will be kept confidential. Remember to mark an answer for each statement. In the example below, the person agreed that the class was enjoyable. Thank you for your help in this project!

Name/ID (Optional)

Teacher School

Student ID | A | B | C | D

Your Current Grade in this Course: A B C D F

SUBJECT AREA (please choose the answer that most closely describes the type of class in which you are completing this survey)
Math, Science, Social Studies, Language Arts, Foreign Language, Art, Music, Physical Education, Other:

COMMUNITY Which type of community best describes your school community? Rural, Urban, Suburban

GENDER Male, Female

ETHNIC GROUP African-American, Asian-American, Caucasian-American, Hispanic-American, Native American, Other:

Do you receive any special services from your school district? Yes, No
If yes, what services do you receive: Gifted/talented, English as a second language, Speech, Hearing, Special education-learning disability, Special education-behavioral services, Compensatory services, Other:

Is this class an advanced level, Advanced Placement, or honors course? Yes, No

GRADE 7, 8, 9, 10, 11, 12

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Example: My class is enjoyable.	○	○	○	●	○
1. I am given choices regarding how to show the teacher what I have learned.	○	○	○	○	○
2. I'm good at helping other kids understand concepts.	○	○	○	○	○
3. I find the contents of my class interesting.	○	○	○	○	○
4. I find my class time instruction appropriately challenges my intellectual abilities.	○	○	○	○	○
5. My teacher lets me choose the resources I use for projects.	○	○	○	○	○
6. When there are different ways to show what I have learned, I can usually pick a good way.	○	○	○	○	○
7. The teacher applies the lessons to practical experiences.	○	○	○	○	○
8. I find my class assignments a good challenge.	○	○	○	○	○
9. The assigned reading material for my class is interesting.	○	○	○	○	○
10. My teacher makes connections between the course material and society.	○	○	○	○	○

Please continue on the back

Side 2

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
11. I learn best when I am challenged.	○	○	○	○	○
12. I am given lots of choices in my class.	○	○	○	○	○
13. In my class my teacher relates current issues to the material we are learning.	○	○	○	○	○
14. I am good at connecting material from this class with the real world.	○	○	○	○	○
15. This class content is an appropriate challenge for me.	○	○	○	○	○
16. I feel responsible for my learning because I am allowed to make choices in my class.	○	○	○	○	○
17. The teacher uses a variety of instructional techniques that make this class enjoyable.	○	○	○	○	○
18. I like the challenge of the projects in this class.	○	○	○	○	○
19. The material covered in my textbook is interesting.	○	○	○	○	○
20. The textbook provides examples of how the material relates to society and daily living.	○	○	○	○	○
21. I am good at answering questions in this class	○	○	○	○	○
22. I am encouraged to pursue subjects that interest me in my class.	○	○	○	○	○
23. It is pretty easy for me to earn good grades.	○	○	○	○	○
24. In my class I explore real issues that affect the world around me.	○	○	○	○	○
25. I look forward to learning new things in this class.	○	○	○	○	○
26. I find the reading material for my class a pleasure to read.	○	○	○	○	○
27. I use my critical thinking skills in my class.	○	○	○	○	○
28. I'm good at taking tests in this class.	○	○	○	○	○
29. I can relate the material discussed in my class to my daily life.	○	○	○	○	○
30. I can easily understand reading assignments for this class	○	○	○	○	○
31. I like going to my class each day.	○	○	○	○	○
32. I can usually discover interesting things to learn about in this class.	○	○	○	○	○
33. I like the way my teacher challenges me in this class.	○	○	○	○	○
34. I can express my opinions clearly in this class.	○	○	○	○	○
35. Good grades are mainly the result of my hard work.	○	○	○	○	○
36. Good grades are mainly the result of my ability.	○	○	○	○	○
37. I can improve my intelligence by working hard.	○	○	○	○	○
38. I plan to go to college.	○	○	○	○	○

01021