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The Classroom and School Community Inventory: Development, refinement, and validation of a self-report measure for educational research

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Abstract

The development and validation of an instrument designated as the Classroom and School Community Inventory (CSCI) are described. Scores on both the classroom form and the school form of the CSCI possess strong content validity, construct validity, internal consistencies, and 2-week test–retest reliability. Using a sample of 341 traditional and online students, confirmatory maximum likelihood factor analysis with oblique rotation provides empirical support for the conceptual distinctions between the latent dimensions of social community and learning community in both forms and for the existence of classroom and school communities as separate but related constructs. The two factors of the classroom form account for 70.73% of the variance in the data, and the two factors of the school form account for 63.54% of the variance.

Keywords: School climate; Sense of community; Scale development; Distance education; Higher education

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1. Introduction

Distance education has burgeoned over the past decade and it continues to expand. Tabs (2003), writing for the U.S. National Center for Educational Statistics, reports that for the 2000–2001 academic year, there were an estimated 3,077,000 enrollments in all distance education courses offered by U.S. postsecondary 2- and 4-year institutions. Among these schools, the majority (90%) report that they offer Internet courses using the anytime, anywhere delivery method known as asynchronous learning networks (ALNs). Substantial research evidence (e.g., Allen & Seaman, 2003; Russell, 1999; Shachar & Neumann, 2003) suggests that such courses can be as effective and, in some cases, superior to equivalent face-to-face instruction.

However, not all educators are enamored with distance education in general and e-learning in particular. Zemsky and Massy (2004, p. B6) write:

> Five years ago, e-learning was everybody's buzz, offering the promise of a trillion-dollar market wrapped around the prospect of learning anytime, anywhere. All that is gone, replaced by a pervading sense of disappointment. In fact, e-learning is increasingly the butt of bad jokes, as in, 'Can you imagine telling your children to go to their rooms and study college for four years?' The cynics have had a field day, claiming that e-learning has been just one more fad, little more than a reprise of the dot-coms' bursting bubble, exhibiting more hype than substance.

The professional literature documents several issues regarding e-learning. One such issue is low student persistence. Frankola (2001), for example, reports dropout rates of between 20% and 50% in distance learning courses. Moreover, dropout rates tend to be higher for distance learning courses than for equivalent traditional courses (Carr, 2000).

A second issue is the lingering concern among some educators and researchers regarding whether the level of learning attainment in distance education courses is as good as in face-to-face courses (e.g., Abrami & Bures, 1996; Dellana, Collins, & West, 2000; Noble, 2002). For example, Tabs (2003) reports that 26% of U.S. postsecondary schools feel that concerns about course quality are keeping them from either starting or expanding their distance education course offerings.

The presence of issues, such as persistence and quality of learning, suggests the possible existence of factors that differentially affect student retention and learning in courses delivered traditionally and at a distance. Such factors are likely related to differences in traditional and distance education school environments, student characteristics, and instructor skills in designing and teaching at a distance. The present study focuses on the school environment.

1.1. School environment

Deal (1993) observes that the concept of a school environment is a loose concept with no agreed definition and can include both psychological and nonpsychological aspects. Educators often use this term interchangeably with school culture and school climate, although the professional literature makes a clear distinction. School culture, according to Lezotte, Hathaway, Miler, Passalacqua, and Brookover (1980), is a broad concept that includes physical attributes of the school, such as heat, light, and noise; psychological attributes such as satisfaction, morale, trust, openness, and cooperation; and institutional attributes such as norms, beliefs, and attitudes.

In contrast, Tagiuri (1968) describes school climate as the total environmental quality within the school. Hoy and Miskel (2001) define this construct as the set of internal characteristics that distinguishes one school from another and influences the behavior of people. In contrasting the two constructs, Owens (1987) writes that "organizational climate is related to, and subsumed under, organizational culture inasmuch as the perceptions of individuals in the organization reflect the values and belief systems in the environment of the organization" (p. 169). Accordingly, school culture and school climate represent overlapping viewpoints of examining the school environment. School climate is transient in nature and mostly consists of those aspects of the school environment that are consciously perceived by members of the school community, such as sense of community and quality of teaching and leadership.

Notwithstanding conceptual differences, there is general agreement that schools are complex social environments where students share beliefs, fears, values, and norms (Hofman, Hofman, & Guldemond, 2001) and where students' "cognitive and affective functioning is shaped by the characteristics of their schools and schooling" (Hofman et al., 2001, p. 172). Learning in schools takes place in social contexts both inside and outside the classroom (Hofman et al., 2001). Accordingly, both the school as a whole and the classroom can influence student achievement, attitudes, and persistence (Sergiovanni, 1994). Brodsky and Marx (2001) reinforce this notion of multiple communities within a school environment by noting: "Individuals have multiple identities and multiple roles, and these identities and roles connect them to multiple communities. Thus, an individual may likely have multiple psychological senses of community in reference to these multiple, separate communities" (p. 162).

Research regarding school effectiveness also suggests that student achievement and behavior can be influenced by the overall characteristics of the school and classroom environments (Rutter & Maughan, 2002). The concept of schools as communities, each with its own school climate and student support system, is particularly important in distance education, where persistence and learning are issues and where globally diverse groups of students will have expectations arising from their own local learning communities that may differ with the accepted norms of schools from other regions and countries. Moreover, universities are facing a future in which their student bodies will reflect the increasing size and diversity of the population in general (Cortes, 1991). Research shows that increasing the national ethnic diversity on a campus while neglecting to attend to the school climate can result in difficulties for all students (Hurtado, Milem, Clayton-Pedersen, & Allen, 1999).

Tinto (1987) focuses on school community when he suggests that: "the more central one's membership is to the mainstream of institutional life, the more likely, other things being equal, is one to persist" (p. 123). Tinto also maintains that students require academic, social, and personal support from the school. This support, whatever its form, needs to be readily available and connected to other parts of the students' total school experience. Beneficial educational outcomes are also supported by Astin's (1984) theory of involvement, which suggests that students learn more when they are more involved in both the academic and social aspects of the school experience. Astin defines involvement as both the quantity and quality of the physical and psychological energy that students invest in the college experience. True involvement, according to Astin, requires the investment of energy in academic pursuits, relationships, and activities related to the campus as students build a sense of school community. Consequently, learning has important social and cognitive dimensions and occurs most effectively when the school provides a positive social environment with a strong sense of community.

When enrolled in distance education programs, student participation in institutional life is often limited and may consist of infrequent residencies with little face-to-face contact with other students, professors, and administrators, thus limiting the true involvement of distance students in institutional life. Consequently, there is a concern among some educators that distance education does not promote community (Brown & Duguid, 1996). Their rationale is that on-campus experiences are needed to provide students with the language, customs, and artifacts that make online communities possible and that, without these experiences, effective communities cannot form online. According to Astin's (1984) theory of involvement, such limitations can lead to decreased satisfaction with the entire college experience as well as decreased rates of student retention. In particular, Astin (1996) found negative outcomes associated with forms of involvement that "either isolate the student from peers or remove the student physically from the campus" (p. 126). He listed characteristics of noninvolvement as including "... attending part-time, being employed off campus, [and] being employed full-time" (p. 126). Attending college at a distance is, therefore, consistent with Astin's view of noninvolvement. The challenge for distance educators, therefore, is to determine how best to nurture a sense of community among learners who are physically separated from each other, their teachers, and their school campus in order to help foster student persistence and learning.

1.2. Psychological sense of community

The modern emphasis on psychological sense of community originated in 1974 when psychologist Seymour Sarason described this construct as the "overarching value" of community psychology and defined it as "the perception of similarity to others, an acknowledged interdependence by giving to or doing for others what one expects from them [and] the feeling that one is part of a larger dependable and stable structure" (Sarason, 1974, p. 157). More recently, researchers have elaborated and built on this definition. Glynn (1981), for example, identifies homogeneity, interdependence, shared responsibility, and common goals and values as essential elements of sense of community. These elements have obvious linkages to the school climate construct as described by Owens (1987). If one views school climate as the school's personality, then sense of community can be viewed as one way to characterize or measure that personality.

McMillan and Chavis (1986) synthesized much of the early literature on community when they defined generalized sense of community as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (p. 9). McMillan (1996) views sense of community as "a spirit of belonging together, a feeling that there is an authority structure that can be trusted, an awareness that trade and mutual benefit come from being together, and a spirit that comes from shared experiences that are preserved as art" (p. 315). He describes trade as the benefit community members derive from one another and from the community. A community economy based on shared intimacy is a social economy, in which the medium of exchange is self-disclosure. He writes that at the outset, it is important that trades are of approximately equal value and that self-disclosures are at the same level. Once fair trading becomes an established practice in its history, the community will evolve to a stage where members give for the joy and privilege of giving, and no longer keep score. He asserts that a community is in a state of grace when it transcends such scorekeeping and members begin to enjoy giving for its own sake.

In a review of the literature, Hill (1996) concludes that there is disagreement about the specific dimensions that make up psychological sense of community and suggests that this disagreement is

because "some significant percentages of these aspects of psychological sense of community differ from setting to setting" (p. 433). One setting, which is the focus of the present study, is the school, to include the nontraditional virtual educational settings one encounters in ALN programs. Royal and Rossi (1997) describe such a community as a learning environment where teamwork is prevalent, diversity is incorporated, and individuals care about, trust, and respect each other and share a vision for the future of the school, a common sense of purpose, and a common set of values.

Based on the general descriptions of community derived from the professional literature (e.g., Glynn, 1981; McMillan, 1996; Royal & Rossi, 1997; Sarason, 1974), one can theorize that members of school communities should feel that they belong and feel safe at the school, they trust others, they have ready access to others at the school, and they feel that they are supported by the school. They should also believe that they matter to other students and to the school; that they have duties and obligations to each other and to the school; and that they possess a shared faith that their educational needs will be met through their commitment to the shared goals and values of other students at the school.

Included in this school community framework are two underlying dimensions, which one can label social community and learning community (Rovai, 2002). Social community, derived primarily from the work of McMillan and Chavis (1986) and McMillan (1996), represents the feelings of the community of students regarding their spirit, cohesion, trust, safety, trade, interdependence, and sense of belonging. Learning community, on the other hand, consists of the feelings of learning community members regarding the degree to which they share group norms and values and the extent to which their educational goals and expectations are satisfied by group membership. Learning community, therefore, is closely related to the work of Glynn (1981) and Royal and Rossi (1997), who argue that common goals and values are essential elements of community; and Strike (2004), who theorizes that normation (i.e., the willingness of students to internalize group-shared expectations) is an important aspect of a learning community. According to Strike (2004, pp. 221–222):

> Community begins in learning the norms of those who care for and about us, and ends in caring for and about those whose norms we share... people begin to internalize the norms of communities because someone cares about them enough to share something they value. Normation begins with caring and belonging, not reasoning and not nature.

However, communities do not necessarily require the geographical proximity of their members, as one encounters in a traditional school setting. Rheingold (1993) defines virtual communities as "social aggregations that emerge from the [Internet] when enough people carry on... public discussions long enough with sufficient human feeling, to form personal relationships in cyberspace" (p. 5). In order for online students to develop a strong sense of community, it is crucial that the learner feels part of a learning community where his or her contributions add to a common knowledge pool and where a community spirit is fostered through social interactions. Moller (1998) encourages the development of communities in ALN courses. She writes that: "the potential of asynchronous learning can only be realized by designing experiences and environments which facilitate learning beyond the content–learner interaction. To that end, it becomes necessary to create learner support communities" (pp. 115–116). Wegerif (1998) found the social dimension of online learning to be an important predictor of the success of the distance learner. He concludes that forming

a sense of community is a necessary first step for collaborative learning, without which students are likely to be unwilling to take the risks involved in learning.

1.3. Measuring school community

A review of the literature reveals that there are a limited number of self-report instruments available that purport to measure school environment, and most of the instruments located by the authors were developed with the K-12 school setting in mind. Moreover, the content assessed by these instruments varies greatly, reflecting the variety of definitions for the construct being measured. For example, the Charles F. Kettering Scale: School Climate Profile (Kettering, 1987) evaluates respect, trust, high morale, opportunity for input, continuous academic and social growth, cohesiveness, school renewal, and caring. The Tennessee School Climate Inventory (Butler & Rakow, 1995), on the other hand, evaluates order, leadership, environment, involvement (parents and community), instruction, expectations, and collaboration (Stolp, 1994). Stern (2001) developed the Organizational Climate Index that provides a profile of the school based on development and control. The Campus Atmosphere Scale (Lounsbury & DeNeui, 1995) assesses students' feelings about sense of community on campus, while Rovai (2002) developed the Classroom Community Scale (CCS), which evaluates sense of community in a classroom setting. However, there is no evidence to suggest the extent to which this instrument or the Campus Atmosphere Scale can distinguish between classroom and school communities.

The instruments identified above were designed with specific goals in mind, such as evaluating a school's readiness for individualizing instruction or gathering perceptions regarding school discipline. What is missing is an instrument that measures the psychological sense of community construct on a schoolwide basis that can be used in a variety of settings and educational levels, to include distance education, and that can discriminate between classroom and school communities. The present study responds to this problem.

1.4. Purpose

Various researchers (e.g., Calvino, 1998; Hill, 1996; Sonn, Bishop & Drew, 1999) identify the need for extensive research in a variety of settings to understand fully sense of community. Accordingly, the purpose of this study is to draw from the CCS (Rovai, 2002), and its two subscales of social community and learning community, as well as the Campus Atmosphere Scale (Lounsbury & DeNeui, 1995) in order to develop and field-test an efficient and psychometrically sound instrument that is able to measure sense of community in classroom and school settings and to discriminate between classroom and schoolwide communities. The intent of the authors is to develop and validate the Classroom and School Community Inventory (CSCI), consisting of a sum scale for each of two forms: (a) a classroom form largely derived from the CCS (Rovai, 2002), and (b) a school form. The need for such an instrument is particularly important for research in distance education programs, where student persistence (e.g., Carr, 2000; Frankola, 2001) and learning (e.g., Abrami & Bures, 1996; Dellana et al., 2000; Noble, 2002) are lingering issues. Additionally, a major limitation of current distance education research is the lack of analysis regarding how involvement theory applies to distance learners. Additional research is needed to address the impact of noninvolvement on the educational outcomes of distance education students and, if appropriate, to determine how to increase the involvement of distance education students in institutional life. An instrument that measures sense of community in school settings will help facilitate this research.

2. Methodology

2.1. Participants

The four schools contributing participants to the present study are located in the Metropolitan Hampton Roads region of the state of Virginia. This is largely an urban region with a population in excess of 1.5 million. Study participants (N=341) were obtained from an independent middle school (grades 7 and 8; n=57), an independent high school (grades 9–12; n=127), and undergraduate and graduate students from two universities (n=157). All middle and high school students were enrolled in traditional programs, while university students where enrolled in either traditional (n=101) or fully online (n=56) programs at either an independent university (n=84) or a state university (n=73). Out of the 325 participants who identified their gender and race, 228 (70%) were females and 97 (30%) were males; 38 (12%) were African American, 11 (3%) were Asian/Pacific Islander, 247 (76%) were Caucasian, 10 (3%) were Hispanic, and 19 (6%) classified themselves as others. All university students were education majors, explaining the greater percentage of females in the study.

2.2. Instrumentation

The CCS (Rovai, 2002) and the Dean Alienation Scale (Dean, 1961) were used in the present study in order to help evaluate the validity of the CSCI. The first instrument, the CCS, is an existing self-report questionnaire consisting of 20 self-report items that examine community within the classroom setting. Items include "I feel isolated in this course and I feel that this course is like a family." Following each item is a five-point Likert scale of potential responses: strongly agree, agree, neutral, disagree, and strongly disagree. Scores on each item can range from 0 to 4, with higher scores reflecting a stronger sense of classroom community. Total instrument scores can range from 0 to 80, and each subscale can range from 0 to 40. The instrument produces two subscales: social community and learning community. Rovai (2002) reports that Cronbach's coefficient α for the overall scale is 0.93. Reliability coefficients for social community and learning community are 0.92 and 0.87, respectively.

The Dean Alienation Scale (Dean, 1961) was used to operationalize alienation, a construct Dean describes as consisting of feelings of social isolation, powerless, and normlessness with society at large. This self-report instrument consists of 24 items such as "the future looks very dismal" and "people's ideas change so much that I wonder if we'll ever have anything to depend on." Following each item is a five-point Likert scale of potential responses: strongly agree, agree, uncertain, disagree, and strongly disagree. Participants check the place on the scale that best reflects their feelings about the item. Scores are computed by adding points assigned to each of the five-point items based on a scoring scheme that ranges from a low of 1 to a high of 5. Higher scores represent higher levels of alienation. The scale can range from 24 to 120. Dean (1961) reports that split-half internal consistency reliability is 0.78.

2.3. Procedures

The first step was development by the authors of a preliminary set of 40 items to measure school community. In the next step, a panel of four university faculty at two universities who conducted

previous research in the psychological sense of community construct was asked to evaluate each item on a semantic differential scale anchored by totally relevant (a score of 5) to totally not relevant (a score of 1). All items receiving at least one score of 3 or lower or two scores of 4 were removed from the set. Study participants were then measured on the revised set of school community measures consisting of 32 items as well as the CCS and the Dean Alienation Scale described above. In each instance, the CCS was given first followed by the school community items and then the Dean Alienation Scale. Participants completed the instruments either in class or online, depending on whether they were enrolled in a traditional or distance education program. Students received no incentives for volunteering to participate in this study. Scores for each form are computed by adding points assigned to each of the items. Items are reverse-scored where appropriate to ensure the least favorable choice is always assigned a value of 0 and the most favorable choice is assigned a value of 4.

The factor structure of the revised set of school community items was then evaluated for simple structure, parsimony, and psychological meaningfulness using maximum likelihood factor analysis with direct oblimin rotation. Items were retained for further analysis if they had a loading of 0.30 or higher on a factor, and if the factor loading was at least 0.15 higher than loadings on other factors. As the result of this analysis, the set of school community items was refined to a shorter version consisting of 20 items.

Next, a follow-on confirmatory factor analysis was conducted using a pooled set consisting of the 20 school community items along with the 20 items that comprise the CCS in order to confirm the factor structures of both instruments and to ensure items loaded unambiguously on either the classroom or school scales. The criterion used to evaluate simple structure was that each item loaded unambiguously on only one factor with a loading of 0.60 or higher. Ambiguous items from both scales were eliminated. Additionally, item reliability was conducted based on the internal consistency (Cronbach's α) of each form in order to determine the impact on form reliability if each item, in turn, was deleted. Items not consistent with the rest of the scale were removed. The result of this analysis is a parsimonious solution consisting of 10 classroom community and 10 school community five-point Likert scale items, divided into two forms (see Appendix A). The total possible scores for each form range from 0 to 40, with higher scores reflecting stronger sense of community. Subscale scores can range from 0 to 20.

2.4. Research design and data analysis

The present study uses a quantitative methodology to establish the extent of the validity and reliability of the CSCI, consisting of classroom community and school community forms, among students in traditional and online learning environments. Confirmatory maximum likelihood factor analysis of the data is conducted to examine construct validity and to determine the dimensionality of the CSCI. An oblique rotation (i.e., direct oblimin), which allows some correlation between factors, is used in order to achieve a more interpretable simple structure. The rationale for using an oblique rotation is that the underlying dimensions of sense of community are likely to be correlated.

Reliability analysis is conducted using Cronbach's coefficient α in order to establish the internal consistency characteristics of both forms of the scale. Finally, instrument stability is evaluated using pretest and posttest measurements with a 2-week interval between measurements. The specific procedures used for each analysis are described in greater detail in Section 3 below.

3. Results

The results presented below pertain to the CSCI, as described in Section 2 above, which consists of 10 classroom community and 10 school community items, divided into the classroom form and the school form. The classroom form possesses a Flesh–Kincaid grade level score of 5.9 and Flesh reading ease score of 73.9. The Flesch–Kincaid grade level score rates text on a U.S. grade school level, and the Flesh reading ease score rates text on a 100-point scale; the higher the score, the easier it is to understand the text (Flesch, 1948). The school form possesses a Flesh–Kincaid grade level score of 5.8 and a Flesh reading ease score of 74.5. The pooled means (with standard deviations in parentheses) for classroom community as measured by the classroom form (scores can range from 0 to 40), as well as the social community and learning community subscales, were 30.57 (5.62), 15.49 (3.31), and 15.08 (4.03), respectively. The results for school community and its two subscales using the school form were 27.35 (5.99), 12.52 (4.20), and 14.83 (3.22), respectively. Additionally, means and standard deviations for classroom community as measured by the CCS, which can range from 0 to 80, as well as its two subscales of social community and learning community, were 59.85 (11.35), 30.19 (5.56), and 29.58 (7.67), respectively. Alienation, as measured by the Dean Alienation Scale, was 65.79 (11.95) based on a scale that can range from 14 to 120. Descriptive statistics for subpopulations are displayed in Table 1. These statistics were not based on representative samples. Rather, participants were from two universities and two independent schools.

A multivariate analysis of variance was conducted using type course (traditional university, online university) as the independent variable and total scores on the two CSCI forms as the dependent

Table 1
Sizes, means, and standard deviations for subpopulations measured using the CSCI

Subpopulations	*n*	Total	Social community	Learning community
Classroom form				
Traditional university	101	31.15 (5.66)	16.53 (2.69)	14.61 (4.50)
Online university	56	29.52 (5.43)	13.59 (3.49)	15.93 (2.87)
Traditional high school	127	30.41 (5.95)	15.16 (3.74)	15.25 (2.87)
Traditional middle school	57	30.26 (6.01)	15.20 (3.96)	15.06 (3.01)
Females	228	30.40 (5.48)	15.55 (3.26)	14.85 (4.17)
Males	97	27.08 (5.40)	12.67 (3.42)	14.42 (2.71)
African American	38	31.57 (5.01)	15.50 (2.89)	16.07 (3.08)
Caucasian	247	29.79 (5.65)	15.38 (3.38)	14.41 (4.31)
School form				
Traditional university	101	28.65 (5.65)	12.75 (3.88)	15.90 (3.10)
Online university	56	25.73 (5.94)	9.50 (3.95)	16.23 (2.78)
Traditional high school	127	26.92 (6.09)	13.12 (4.08)	13.80 (3.04)
Traditional middle school	57	27.61 (6.04)	13.77 (4.01)	13.84 (3.13)
Females	228	27.69 (5.62)	12.51 (4.22)	15.18 (2.86)
Males	97	25.86 (6.65)	12.23 (4.33)	13.63 (3.69)
African American	38	27.32 (5.00)	11.69 (3.49)	15.63 (3.23)
Caucasian	247	27.40 (5.94)	12.72 (4.19)	14.68 (3.14)

N=341. Only 325 participants divulged information about their gender and ethnicity.
Total community scores can range from a low of 0 to a high of 40; social and learning community scores can range from a low of 0 to a high of 20. Higher scores reflect stronger sense of community. Standard deviations are enclosed in parentheses.

Table 2
Correlation matrix of instrument scores

Measures	1	2	3	4	5	6	7	8	9	10
(1) CSCI CF total	–	0.71	0.82	0.62	0.42	0.63	0.95	0.68	0.91	−0.40
(2) CSCI CF social community		–	0.16	0.61	0.59	0.38	0.62	0.88	0.29	−0.38
(3) CSCI CF learning community			–	0.36	0.10	0.57	0.79	0.31	0.95	−0.31
(4) CSCI SF total				–	0.86	0.74	0.50	0.46	0.41	−0.43
(5) CSCI SF social community					–	0.29	0.27	0.38	0.13	−0.29
(6) CSCI SF learning community						–	0.56	0.35	0.57	−0.50
(7) CCS total							–	0.80	0.90	−0.47
(8) CCS social community								–	0.46	−0.43
(9) CCS learning community									–	−0.41
(10) Alienation										–

$p<0.05$. ns=not significant.
CF=classroom form; SF=school form; CCS=Classroom Community Scale (Rovai, 2002).

variables. Using Wilks' Λ as the criterion, the traditional university group scored higher than the online university group [$\Lambda=0.94$, $F(2,154)=4.62$, $p=0.01$, $\eta^2=0.06$]. Using analysis of variance procedures on each dependent variable as post-hoc test, the groups differed significantly on only school community [$F(1,155)=9.26$, $p=0.003$, $\eta^2=0.06$].

Table 3
Descriptive statistics for CSCI items

Item	*M*	S.D.
Classroom form		
(1) I feel that students in this course care about each other	3.26	0.72
(2) I feel that I receive timely feedback in this course	2.98	1.10
(3) I feel connected to others in this course	3.06	0.86
(4) I feel that this course results in only modest learning	2.66	1.11
(5) I trust others in this course	3.09	0.77
(6) I feel that I am given ample opportunities to learn in this course	3.13	0.87
(7) I feel that I can rely on others in this course	3.00	0.78
(8) I feel that my educational needs are not being met in this course	3.02	1.09
(9) I feel confident that others in this course will support me	3.07	0.74
(10) I feel that this course does not promote a desire to learn	3.29	0.77
School form		
(1) I have friends at this school to whom I can tell anything	2.55	1.27
(2) I feel that this school satisfies my educational goals	3.04	0.79
(3) I feel that I matter to other students at this school	2.63	0.91
(4) I feel that this school gives me ample opportunities to learn	3.08	0.79
(5) I feel close to others at this school	2.69	0.96
(6) I feel that this school does not promote a desire to learn	3.12	0.83
(7) I regularly talk to others at this school about personal matters	2.01	1.22
(8) I share the educational values of others at this school	2.70	0.88
(9) I feel that I can rely on others at this school	2.65	0.89
(10) I am satisfied with my learning at this school	2.89	0.91

Negatively worded items were reverse scored. Scores can range from a low of 0 to a high of 4. Higher scores reflect stronger sense of community.

Table 2 presents the correlations between the two CSCI forms, the CCS and the Dean Alienation Scale. As expected, each form of the CSCI was inversely related to the Dean Alienation Scale. Internal consistency estimates of reliability were also calculated for the CSCI using Cronbach's coefficient α. Reliability for the classroom form and school form were 0.84 and 0.83, respectively. Additionally, internal consistency coefficients for the social community and learning community subscales of the classroom form were 0.90 and 0.87, respectively, and for the school form the coefficients were 0.85 and 0.82, respectively. Stability estimates were calculated using Pearson r correlation coefficients and a 2-week interval between pretest and posttest measurements. Stability for each CSCI form was .91.

The set of 10 classroom community items and 10 school community items consists of equal numbers of social community and learning community items. On each form, oddly numbered items pertain to social community and evenly numbered items concern learning community. Descriptive statistics for items from each form are displayed in Table 3. Table 4 is a correlation matrix of items. It reveals that most test items are correlated with each other, with intraform correlations showing stronger correlation coefficients than interform correlations. Scores on all 20 items were analyzed using maximum likelihood factor analysis with direct oblimin rotation. The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.88—a meritorious value suggesting that none of the CSCI items violated the factor analysis assumption of no multicollinearity. Additionally, Bartlett's test of sphericity was significant ($p<0.001$), providing evidence that the analyzed data do not produce an identity matrix and are thus approximately multivariate normal and acceptable for maximum likelihood factor analysis.

Table 4
Intercorrelations for classroom form (CF) and school form (SF) items

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(1) CF-1	–	ns	0.69	ns	0.61	ns	0.66	ns	0.62	0.15	0.37	0.21	0.34	0.13	0.46	ns	0.32	0.41	0.47	0.22
(2) CF-2		–	ns	0.43	0.15	0.63	ns	0.59	ns	0.56	ns	0.36	0.17	0.36	ns	0.28	ns	0.30	ns	0.43
(3) CF-3			–	0.16	0.60	0.13	0.73	0.16	0.68	0.20	0.46	0.30	0.45	0.19	0.55	0.16	0.37	0.36	0.49	0.31
(4) CF-4				–	ns	0.63	0.13	0.54	0.12	0.61	0.15	0.29	0.18	0.28	0.20	0.23	ns	0.16	0.20	0.39
(5) CF-5					–	0.13	0.65	ns	0.65	0.17	0.35	0.26	0.37	0.23	0.42	0.15	0.21	0.41	0.45	0.30
(6) CF-6						–	0.11	0.60	0.15	0.70	ns	0.44	0.19	0.45	0.13	0.37	ns	0.32	0.16	0.54
(7) CF-7							–	0.11	0.79	0.23	0.47	0.26	0.51	0.16	0.60	ns	0.36	0.41	0.61	0.23
(8) CF-8								–	ns	0.63	ns	0.35	0.10	0.39	ns	0.31	ns	0.25	ns	0.46
(9) CF-9									–	0.25	0.36	0.32	0.44	0.20	0.50	0.20	0.30	0.36	0.52	0.30
(10) CF-10										–	ns	0.50	0.16	0.43	0.22	0.44	ns	0.38	0.21	0.54
(11) SF-1											–	ns	0.48	ns	0.67	ns	0.69	0.11	0.37	ns
(12) SF-2												–	0.29	0.57	0.20	0.47	ns	0.44	0.28	0.65
(13) SF-3													–	0.31	0.69	0.26	0.40	0.42	0.62	0.26
(14) SF-4														–	0.20	0.49	ns	0.33	0.30	0.59
(15) SF-5															–	0.16	0.62	0.30	0.58	0.18
(16) SF-6																–	ns	0.36	0.24	0.45
(17) SF-7																	–	ns	0.36	ns
(18) SF-8																		–	0.46	0.49
(19) SF-9																			–	0.31
(20) SF-10																				–

$p<0.05$. ns=not significant.

Table 5
Pooled social community CSCI items, maximum likelihood factor loadings using direct oblimin rotation, and communalities

Items	F_1	F_2	F_3	F_4	h^2
Classroom form					
(1) I feel that students in this course care about each other	0.78	0.03	0.43	−0.22	0.61
(3) I feel connected to others in this course	0.82	0.16	0.51	−0.29	0.67
(5) I trust others in this course	0.75	0.14	0.38	−0.30	0.57
(7) I feel that I can rely on others in this course	0.89	0.16	0.58	−0.24	0.82
(9) I feel confident that others in this course will support me	0.85	0.17	0.46	−0.31	0.72
School form					
(1) I have friends at this school to whom I can tell anything	0.45	0.05	0.74	−0.11	0.56
(3) I feel that I matter to other students at this school	0.49	0.19	0.82	−0.42	0.73
(5) I feel close to others at this school	0.59	0.16	0.89	−0.34	0.82
(7) I regularly talk to others at this school about personal matters	0.35	0.05	0.70	−0.04	0.50
(9) I feel that I can rely on others at this school	0.60	0.17	0.77	−0.38	0.67

Extracted factors: F_1—classroom social community; F_2—classroom learning community; F_3—school social community; F_4—school learning community.

Three criteria were used to determine the number of factors to extract: the scree plot, the Kaiser–Gutman Rule, and psychological meaningfulness. In the present study, the scree plot and the Kaiser–Gutman Rule provided evidence that the hypothesis of unidimensionality was not supported since four factors possessed eigenvalues of 1.00 or greater. An examination of the structure and pattern coefficients suggested that the four-factor solution has good simple structure and could be meaningfully interpreted as classroom social community, classroom learning community, school social community, and school learning community, despite the consequence of using an oblique rotation that produced more ambiguous item loadings. Factor structure statistics are displayed in two tables for ease of reading. Table 5 lists only the social community items from both forms and Table 6

Table 6
Pooled learning community CSCI items, maximum likelihood factor loadings using direct oblimin rotation, and communalities

Items	F_1	F_2	F_3	F_4	h^2
Classroom form					
(2) I feel that I receive timely feedback in this course	0.11	0.70	0.03	−0.45	0.50
(4) I feel that this course results in only modest learning	0.11	0.74	0.16	0.13	−0.34
(6) I feel that I am given ample opportunities to learn in this course	0.12	0.85	0.05	−0.54	0.73
(8) I feel that my educational needs are not being met in this course	0.11	0.75	0.04	−0.45	0.57
(10) I feel that this course does not promote a desire to learn	0.25	0.82	0.09	−0.57	0.70
School form					
(2) I feel that this school satisfies my educational goals	0.34	0.46	0.22	−0.87	0.77
(4) I feel that this school gives me ample opportunities to learn	0.21	0.46	0.17	−0.75	0.57
(6) I feel that this school does not promote a desire to learn	0.17	0.40	0.17	−0.62	0.40
(8) I share the educational values of others at this school	0.47	0.33	0.39	−0.60	0.46
(10) I am satisfied with my learning at this school	0.34	0.58	0.09	−0.80	0.69

Extracted factors: F_1—classroom social community; F_2—classroom learning community; F_3—school social community; F_4—school learning community.

Table 7
Classroom form CSCI items, maximum likelihood factor loadings using direct oblimin rotation, and communalities

Items	F_1	F_2	h^2
Social community			
(1) I feel that students in this course care about each other	0.77	0.05	0.60
(3) I feel connected to others in this course	0.82	0.17	0.68
(5) I trust others in this course	0.75	0.15	0.56
(7) I feel that I can rely on others in this course	0.89	0.17	0.79
(9) I feel confident that others in this course will support me	0.86	0.19	0.73
Learning community			
(2) I feel that I receive timely feedback in this course	0.04	0.71	0.50
(4) I feel that this course results in only modest learning	0.12	0.72	0.52
(6) I feel that I am given ample opportunities to learn in this course	0.12	0.85	0.73
(8) I feel that my educational needs are not being met in this course	0.11	0.75	0.56
(10) I feel that this course does not promote a desire to learn	0.24	0.83	0.69

Extracted factors: F_1—classroom social community; F_2—classroom learning community.

shows only the learning community items. The factor loadings are expressions of the correlation of the item with the factor based on the direct oblimin rotation. Additionally, the estimates of the communalities (h^2) displayed in these two tables reflect the percent of variance in a given item explained by the four-factor solution. Overall, the four maximum likelihood factors accounted for a substantial 70.50% of the variance in the data.

The factor structure of each form was also evaluated separately (see Tables 7 and 8) using maximum likelihood factor analysis with direct oblimin rotation. For each form, a highly interpretable two-factor solution was obtained representing social community and learning community. All items had salient loadings on the expected factor. The two factors of the classroom form accounted for 70.73% of the variance in the data (Table 7) and the two factors of the school form accounted for 63.54% of the variance (Table 8).

Table 8
School form items, maximum likelihood factor loadings using direct oblimin rotation, and communalities

Items	F_1	F_2	h^2
Social community			
(1) I have friends at this school to whom I can tell anything	0.76	0.08	0.60
(3) I feel that I matter to other students at this school	0.73	0.43	0.59
(5) I feel close to others at this school	0.90	0.30	0.82
(7) I regularly talk to others at this school about personal matters	0.70	0.09	0.51
(9) I feel that I can rely on others at this school	0.63	0.45	0.48
Learning community			
(2) I feel that this school satisfies my educational goals	0.19	0.77	0.60
(4) I feel that this school gives me ample opportunities to learn	0.19	0.72	0.52
(6) I feel that this school does not promote a desire to learn	0.16	0.61	0.37
(8) I share the educational values of others at this school	0.31	0.60	0.38
(10) I am satisfied with my learning at this school	0.16	0.80	0.65

Extracted factors: F_1—school social community; F_2—school learning community.

4. Discussion

Distance education is an important resource for providing access to education beyond geographic boundaries. The role of educational institutions and educators involved in distance education is to provide students a learning environment that encourages critical reflection and knowledge construction (Palloff & Pratt, 1999). Although early research focused on media comparison studies, researchers have become more interested in examining how the characteristics of different distance education school environments promote the construction of knowledge as well as student persistence and satisfaction. Research suggests a strong sense of community is related to increased persistence of students in online programs, as well as to increased information flow, learning support, group commitment, collaboration, and learning satisfaction (e.g., Dede, 1996). Accordingly, the purpose of the present study was to develop and field-test a self-report instrument that provides operational measures of classroom community and school community in both traditional and distance education environments. The evidence used in this study was based on data from graduate and undergraduate traditional and distance education students attending two different universities, one private and the other public, as well as students from two independent schools, grades 7–12.

In evaluating the validity of the CSCI, the authors first assessed both forms of the instrument as having high face validity because items appeared to be practical, pertinent, and related to the purpose of the instrument. As evidence of content validity, the instrument's items were evaluated by a panel of four experts as possessing high content validity. Additionally, concurrent validity was evaluated by determining the CSCI's ability to vary indirectly with a measure of an opposite construct. Both forms of the instrument were related in the expected directions to Dean Alienation Scale scores, a theoretically inversely related measure.

Research results provide support for the conceptual distinctions between sense of community in classroom and school learning environments (Brodsky & Marx, 2001; Sergiovanni, 1994; Strike, 2004). In the present study, when items from the classroom form and school form of the CSCI were pooled and analyzed as a set using factor analysis procedures, four factors were extracted: classroom social community, classroom learning community, school social community, and school learning community. These results provided empirical support for the notion that students have multiple psychological senses of community in reference to multiple communities within a school environment.

Moreover, the identification of separate social community and learning community dimensions of the sense of community construct in an educational setting is consistent with the results reported by Rovai (2002) in the development of the CCS. These results reflect the distinctiveness of social and learning communities in classroom and school settings. That is, each form of the instrument is able to discriminate student feelings of social community and learning community in classroom and school learning environments. The CSCI is also able to discriminate between traditional and online university students, with traditional students showing as expected a stronger sense of school community. Additionally, when items on each form were analyzed as a set, two factors were extracted: social community and learning community for both classroom and school. These results suggest the presence of two underlying latent variables that make up each form of the CSCI.

Finally, evidence exists to suggest that each form of the CSCI is reliable. Internal consistency coefficients for each form as well as for the social community and learning community subscales were acceptable. Likewise, stability estimates using a 2-week interval between pretest and posttest measurements were also acceptable.

5. Conclusion

On the basis of the foregoing discussion, the authors conclude that sufficient evidence exists to use the CSCI in educational research. Several criteria of validity were used and tell a relatively consistent story suggesting face, content, concurrent, and construct validity of CSCI scores.

However, there are study limitations. The sample used in this study consisted of participants from schools located in the same metropolitan area. Moreover, a substantially larger number of participants were enrolled in traditional face-to-face courses rather than online courses. University-level participants were all pursuing degrees in the field of education. Therefore, caution should be exercised when generalizing community scores to students at other institutions and pursuing studies in other fields. In the future, other populations and research settings could be used for the purpose of obtaining further evidence of instrument validity and reliability. Other forms of distance education, such as broadcast television, video teleconferencing, and audio teleconferencing, could also be examined. Despite these limitations, the practical implications of the CSCI are substantial. Sense of community is an important aspect of school climate. If sense of community is strong, the educational journey is likely to be both productive and satisfying for students.

Armed with an effective tool to measure sense of community in school and classroom environments, educators will be better equipped to conduct research on how best to involve distance students in institutional life, to foster classroom and school environments that promote community building, to guide systematic improvement in school and classroom environments, and, by implication, to promote increased satisfaction, levels of student learning, and persistence. Moreover, given the ability of the instrument to evaluate both social community and learning community, researchers will be able to obtain insights into the specific areas where a school may need to focus its efforts in building a strong sense of community. Despite these advantages, sense of community is a complex construct that attempts to cover diverse individuals in diverse settings.

Different settings and research questions require different research methods. The research, to date, has relied almost exclusively on surveys and quantitative methods. The diversity that underlies the nature of psychological sense of community would suggest that much could be gained by using diverse methods to study it, including qualitative approaches (Hill, 1996, p. 435).

Moreover, sense of community should not be examined in isolation. Studies that draw from a theoretical framework and evaluate relationships among several variables are more powerful than those that only focus on a single variable because findings that appear significant may indeed be spurious when considering other relevant variables in a properly specified model. Consequently, other aspects of the school climate construct also need to be examined, such as quality of teaching and academic leadership.

Appendix A

A.1. Self-report questionnaire—classroom form

Directions: Below you will see a series of statements concerning a specific course you are presently taking or recently completed. Read each statement carefully. Place an X in the parentheses to the right of the statement that comes closest to indicate how you feel about the course. You may use a pencil or pen. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are

uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. *Please respond to all items*.

	Strongly agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly disagree (SD)
(1) I feel that students in this course care about each other	(SA)	(A)	(N)	(D)	(SD)
(2) I feel that I receive timely feedback in this course	(SA)	(A)	(N)	(D)	(SD)
(3) I feel connected to others in this course	(SA)	(A)	(N)	(D)	(SD)
(4) I feel that this course results in only modest learning	(SA)	(A)	(N)	(D)	(SD)
(5) I trust others in this course	(SA)	(A)	(N)	(D)	(SD)
(6) I feel that I am given ample opportunities to learn in this course	(SA)	(A)	(N)	(D)	(SD)
(7) I feel that I can rely on others in this course	(SA)	(A)	(N)	(D)	(SD)
(8) I feel that my educational needs are not being met in this course	(SA)	(A)	(N)	(D)	(SD)
(9) I feel confident that others in this course will support me	(SA)	(A)	(N)	(D)	(SD)
(10) I feel that this course does not promote a desire to learn	(SA)	(A)	(N)	(D)	(SD)

A.2. Self-report questionnaire—school form

Directions: Below you will see a series of statements concerning life at your school at large. Read each statement carefully. Place an X in the parentheses to the right of the statement that comes closest to indicate how you feel about school life. You may use a pencil or pen. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. *Please respond to all items*.

	Strongly agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly disagree (SD)
(1) I have friends at this school to whom I can tell anything	(SA)	(A)	(N)	(D)	(SD)
(2) I feel that this school satisfies my educational goals	(SA)	(A)	(N)	(D)	(SD)
(3) I feel that I matter to other students at this school	(SA)	(A)	(N)	(D)	(SD)
(4) I feel that this school gives me ample opportunities to learn	(SA)	(A)	(N)	(D)	(SD)
(5) I feel close to others at this school	(SA)	(A)	(N)	(D)	(SD)
(6) I feel that this school does not promote a desire to learn	(SA)	(A)	(N)	(D)	(SD)
(7) I regularly talk to others at this school about personal matters	(SA)	(A)	(N)	(D)	(SD)
(8) I share the educational values of others at this school	(SA)	(A)	(N)	(D)	(SD)
(9) I feel that I can rely on others at this school	(SA)	(A)	(N)	(D)	(SD)
(10) I am satisfied with my learning at this school	(SA)	(A)	(N)	(D)	(SD)

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