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## Preliminary validation of the scale of sense of community in online courses

Vittore Perrucci<sup>a\*</sup>, Alessandra Coscarelli<sup>b</sup>, Giulia Balboni<sup>c</sup>, Stefano Cacciamani<sup>d</sup>

<sup>a</sup> University of Valle d'Aosta

<sup>b</sup> University of Torino

<sup>c</sup> University of Pisa

<sup>d</sup> University of Valle d'Aosta

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### Abstract

Sense of community (SC) refers to the perception of similarity and strong interdependence with others, and the feeling of being a member of a stable group. In online courses, the SC is decisive for the academic success and the satisfaction of students. According to the McMillan and Chavis model, the SC made up of four dimensions: (1) Membership (defined by sub-dimensions Boundaries, Emotional safety, Sense of belonging, Personal investment, Common symbol system), (2) Influence (Power of member to influence the community and Community's power to influence members), (3) Personal fulfilment and integration of needs, and (4) Shared emotional connection (Contact, Quality of Interaction, Closure to events, Shared valent event, Emotional investment, Effect of honor and humiliation on community members, Spiritual bond). Despite their potential advantages, there are few questionnaires used for the evaluation of the SC in online course and none able to measure all the dimensions of McMillan and Chavis model. For this purpose, the Scale of Sense of Community in online Courses (SSCC) has been developed according to McMillan and Chavis model. Internal consistency and convergent/discriminant validity of the scale were investigated: 321 students of universities online courses completed the SSCC, another scale of SC, and a scale assessing a construct in relation to SC. The SSCC was shown to be reliable and valid in discriminating SC from other similar constructs. Further research is necessary to investigate the factor structure of the SSCC. Theoretical and methodological issues in using SSCC in the future are also presented and discussed.

*Keywords:* Sense of community, online courses, convergent validity, discriminant validity, psychometric properties;

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\* Vittore Perrucci

E-mail address: [v.perrucci@univda.it](mailto:v.perrucci@univda.it)

## 1. INTRODUCTION

In recent years the implementation of online courses in University education programs has grown quickly both in North America (American Federation of Teachers [AFT], 2001) and in Europe (Cantoni and Esposito, 2004). This increase is mainly due to the advantages that the Internet provides in terms of easy access to information resources and interactive tools. As a matter of fact, the use of digital technologies has allowed overcoming the spatial and temporal boundaries of the class: students can attend virtual classes without moving from home, saving time and money. However, in reducing face-to-face contact, students are more exposed to isolation and alienation (Morgan and Tam, 1999; Rovai 2002) and more at the risk of encountering academic failure and premature dropout than traditional students (Besser and Donahue, 1996; Rovai and Wighting, 2005).

As supported by many authors, learning models based on collaborative interactions between students, such as the Community of Inquiry (Garrison and Anderson, 2002) and the Knowledge Building Community (Scardamalia and Bereiter, 1999), may enhance the opportunities of success of an online course both in terms of quality of learning and student satisfaction. These models support the creation of a virtual community in which students can learn and work together (Brown and Campione, 1990; Lord and Lomicka, 2008). In this perspective, learning is conceived as a socially situated process in which students' interactions aim to build new knowledge. This activity will produce benefits both for the individual and the members of the community (Cacciamani and Ligorio 2010; Scardamalia and Bereiter, 2006).

According to Rovai (2002), feelings experienced by members of online learning communities could be expressed through the concept of Sense of Community (SC).

SC is typically used to describe perception of similarity and strong interdependence with others, and feeling of being a member of a stable group in territorial communities (Sarason, 1986). Nevertheless, the construct can be studied in relation to contexts other than the ones that define geographical communities.

According to Davidson and Cotter (1991), SC carries the willingness to maintain the interdependence with the other group members by giving to or doing for others what is expected of them.

Gusfield (1975) has distinguished between territorial communities based on physical space, and communities of interest based on shared interests among individuals. Communities of interest are made up by people who share ideas, values, cultural patterns, interests, but not necessarily a territory or a geographic area of common reference (Martini and Sequi, 1988). Examples of communities of interest are scholastic and working communities, political and recreational associations, and religious congregations (Chavis and Wandersman, 1990; Davidson and Cotter, 1989; Wandersman and Giamartino, 1980).

At University several studies have demonstrated the role of SC in learning communities both in traditional and virtual courses. In particular, investigations have revealed that high levels of SC among participants are associated with academic success, school motivation, participation in

academic activities, social skills, and problem-solving abilities (Bateman, 2002). On the other hand, low levels of SC are frequently associated with students' antisocial behaviors, social isolation, and dropping out (Royal and Rossi, 1996). As a result, supporting SC in online courses is important for the success of the course (Rovai, 2001). Strong SC could increase flow of information between participants, availability of supports, commitment to group goals, cooperation among members, and satisfaction for joint efforts.

In this context, online training based on the computer may be advantageous compared to other types of distance learning. This happens because online training facilitates the SC development and therefore the persistence on the course (Baym, 1995; Rovai, 2002). The use of computer, allowing the students to interact with each other, creates the conditions for collaborative learning and makes the development of a strong bond among students possible (Baym, 1995; Reid, 1995; Rheingold, 1993). The members of an online environment form a community that is independent of the physical place (Gusfield, 1975; Martini and Sequi, 1988), and in which one of the most important dimensions is "to do together" (Wellman, 1999). According to Rovai (2002), members of online communities perform behaviours that may be associated with the traditional concept of SC: pursuing shared goals (Baym, 1995; Donath, 1999), recognizing the boundaries that define who belongs or does not belong to the community (Rovai, 2002), establishing hierarchies and specific ways of interaction (Sproull and Kiesler, 1991), and sharing a common history and a common virtual meeting (Donath, 1999).

One of the most interesting and appreciated theoretical models of SC has been proposed by McMillan and Chavis (1986). These authors have developed a multidimensional model made up of four distinct interrelated dimensions (see Table 1). The first dimension, membership, concerns the person's feeling of belonging and sharing a sense of personal relatedness. Membership has five sub-dimensions: (a) boundaries, (b) emotional safety, (c) sense of belonging, (d) personal investment, and (e) common symbol system. The second dimension, influence, has two sub-dimensions concerning mutual influence (a) from individuals to the community and (b) from the community to individuals. The third dimension relates to sense of personal fulfillment and integration of needs within the community. Finally, the fourth dimension of the model is shared emotional connection, that is, the set of beliefs, history, places, and experiences shared by members of a particular community. Shared emotional connection has seven sub-dimensions: (a) contact, (b) quality of interaction, (c) closure to events, (d) shared relevant event, (e) emotional investment, (f) effect of honor and humiliation on community members, and (g) spiritual bond.

Table 1. Theoretical model of Sense of Community by McMillan and Chavis (1986): Dimensions and Sub-dimensions.

Dimension	Sub-dimension
1. Membership	a. boundaries, b. emotional safety, c. sense of belonging, d. personal investment e. common symbol system
2. Influence	a. Power of member to influence the community

	b. Community's power to influence members
3. Personal fulfilment and integration of needs	
4. Shared emotional connection	a. contact b. quality of interaction c. closure to events d. shared relevant event e. emotional investment f. effect of honor and humiliation on community members g. spiritual bond

The usefulness of SC in supporting learning in online courses depends on the availability of reliable, valid and theory-based tools. Despite their potential advantages, in literature, SC rating scales developed for online learning context are few (Rovai 2002; Rovai and Wighting, 2005) and none is based on all the dimensions of McMillan and Chavis model. In this way, there is a risk of losing important information for the planning of interventions to facilitate the growth of the SC. For these reasons, the Scale of Sense of Community in online Courses [SSCC] (Perrucci, Balboni & Cacciamani, 2008; Perrucci, Cacciamani, Coscarelli & Balboni, 2009) has been recently developed according to the SC model suggested by McMillan and Chavis.

The aim of the present study was to verify the internal consistency and convergent/discriminant validity of the SSCC in relation with tests assessing SC or other constructs that are in relation to SC (i.e., perceived social support and social identity). In particular, convergent and discriminant validity was tested by investigating whether the correlation coefficients among the scores of 321 university online students on the SSCC and on another scale of SC were lower than the corresponding correlation coefficients among the scores obtained by the same participants on the SSCC and on scales measuring perceived social support and social identity.

## 2. METHOD

### 2.1 Participants

Three hundred and twenty-one students (49 male; 272 female) following online courses provided by several Italian Universities were randomly divided into two groups within each course: G1 ( $n = 157$ ) and G2 ( $n = 164$ ) (see Table 2).

Table 2. Characteristics of all participants and of G1 and G2 groups: Number (N) of Males (M) and Females (F), Mean age (M) and Standard Deviation (SD).

Participants	G1	G2	Total
Gender (N): M-F	31-126	18-146	49-272
Age (yrs): M (SD)	29.73 (11.43)	27.10 (9.60)	28.38 (10.60)

## 2.2 Instruments

The SSCC was developed by the Authors according to a scientific four-step process.

The first step was centered on the review of the literature about SC.

In order to identify the relevant publications, three research strategies were adopted: (1) computer-assisted searches in psychological and educational scientific literature databases (e.g., Winspears) with English and Italian keywords (e.g., sense of community, online courses, e-learning); (2) searches

in all the recent issues (2000–2007) of relevant journals that include publications on sense of community, online learning, and questionnaires for students (e.g., *Journal of Community Psychology*, *The Internet and Higher Education*, *Educational and Psychological Measurement*); (3) identification of potentially useful manuscripts and texts in the references of the studies analyzed.

Moreover, a database of Knowledge Forum (Scardamalia, 2002) of the University of Valle d'Aosta was opened. Knowledge Forum (KF) is online environment for collaborative work. KF is on common database where the users can write notes (written tests) with either graphs or mages. Every authorised user can connect to the database, read somebody else's notes, and insert some new ones that can be connected to the others through some links. In this way, a place for all the documents that was always accessible by all the research group members was available.

The collected studies were classified according to the following topics: (1) theoretical models of Sc and (2) scales of SC. For each manuscript, the kind of community reference was indicated: geographic communities vs. communities of interest.

Based on topic-one manuscripts, we decided to use the McMillan and Chavis (1986) model as a theoretical reference for the construction of the questionnaire. This model is the primary theoretical reference in the majority of the studies (Tartaglia, 2006).

Based on topic-two manuscripts, we decided to select five questionnaires on SC: the Classroom Community Scale (Rovai 2002); the Italian Scale of Sense of Community (Prezza, , Costantini, Chiarolanza & Di Marco, 1999); the Sense of Community Scale (Davidson and Cotter, 1986); The Sense of Community Index (Perkins, Florin, Rich, Wandersman, & Chavis, 1990) and a questionnaire developed for the assessment of SC in associations (Obst, Zinkiewicz, & Smith, 2002).

In the second step, a preliminary set of items was arranged. Each item of the five scales selected was classified by two independent judges according to the dimensions an sub-dimensions of the McMillan and Chavis model. Because of the low agreement index (Cohen's  $K = .39$ ), only the items for which there was fully agreement among judges were selected. Moreover, when necessary, items were adapted to the context of the online learning community. New items were written in order to have at least five items for each dimension and sub-dimension of the McMillan and Chavis model. Then, all the items were evaluated and modified in agreement by three judges in order to be written with a consistent, understandable, and unequivocal language. A four-point Likert scale was prepared to be used as a rating system for each item: 4 = Strongly agree; 3 = Agree; 2 = Disagree; 1 = Strongly disagree. Similar to other questionnaires (Rovai, 2002), a neutral answer was not included in order

to obtain the students' real degree of agreement and to avoid potential sources with the confounding "any answer." Then, two independent judges verified the applicability of the arranged Likert scale for each item and, when necessary, modified items.

In the third step, the field test of items arranged was verified challenging two groups of experts. The first group (n = 10) had experts of online courses and/or social psychology. They were asked to verify item content validity, classifying each of them according to the dimensions and sub-dimensions provided by McMillan and Chavis. The second group (n = 11) had experts in development of questionnaires. They were asked to evaluate, through open questions, clarity of scale instructions and of each item and usefulness of Likert scale. Taking into account the responses of the first group of experts, items for which there was almost 60% agreement among judges in the classification and with the minimum of answer variance were selected. Of these, items which had higher agreement were used in order to have four items for each dimension and sub-dimension of the model. For eight sub-dimensions, four items with such proprieties were not available; therefore new items were written. Then, some items were retyped in order to have two in positive and two in negative form. Finally, taking into account the judgments of the second group of experts, scale instructions and few items were retyped in order to have, for every sub-dimensions, all the four items in a personal or impersonal form, or two items in personal form and two items in impersonal form.

In the last step, the final version of SSCC was prepared. The items were sorted according to the following criteria (i.e., Manganelli Rattazzi, 1990): (1) moving from general to detailed content (e.g., effect of training on professional career vs. language used in the course); (2) moving from concrete to abstract content (e.g., make questions vs. motivation to learn); (3) moving from events located in the past to events located in the future (e.g., opportunities to attend an online course vs. effects of online courses on own professional training); and (4) equal distribution of positive and negative items. Moreover the first two items of the questionnaire were chosen among the others for their particular agreeableness.

The SSCC is based on the fifteen sub-dimensions provided by the McMillan and Chavis model. The scale consists of 60 items, four for each sub-dimensions. Each item is rated on a four-point Likert scale (1 = Strongly disagree to 4 = Strongly agree).

The Classroom Community Scale (CCS; Rovai 2002) is based on two dimensions of SC: feelings of belonging and feelings related to learning. Both dimensions consist of 10 items rated on a five-point Likert scale (1 = totally disagree to 5 = totally agree).

The Italian Scale of Sense of Community (ISSC; Prezza et al., 1999) measures four dimensions of SC: sense of belonging and emotional connection, needs and influences, social climate, and pleasantness of the environment in territorial communities. In this investigation, a preliminary 21-item version of the scale was used rated on a four-point Likert scale from strongly disagree to strongly agree (Prezza et al., 1999).

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet & Farley, 1988), measures support and help from three different sources: family, friends, and a very

significant person. It consists of 12 items rated on a six-point Likert scale (1 = very much disagree to 6 = very much agree).

Social Identity Questionnaire (SIQ; Cameron, 2004) assesses individual social identity according to three factors: cognitive centrality to group identification, positive feelings related to the group, and perception of similarity to the other members. Because of the duration of the online courses considered in the study, only the second and the third factor were measured; each of them is composed by eight items rated on a seven-point Likert scale (1 = very much disagree to 7 = very much agree).

All the scales were adapted to the context of online learning courses and translated into Italian when necessary.

### **2.3 Procedure**

In the second half of each course, all the participants were asked to fill out the SSCC and another two scales measuring SC and one of other two constructs close to SC. In particular, G1 participants also completed the ISSC and MSPSS, whereas G2 participants filled out the CCS and SIQ.

The questionnaires were self-administered in an online environment by using Google doc. The SSCC was always completed first. The order of filling out the other two questionnaires (i.e., ISSC and MSPSS for G1; CCS and SIQ for G2) was balanced.

## **3. RESULTS AND DISCUSSION**

The internal consistency of the SSCC, assessed by the Cronbach's alpha coefficient, was .92, excellent according to the *European Federation of Psychologists' Associations* (EFPA, 2008) criteria.

Correlations between the SSCC and the other scales of SC, ISSC and CCS, were equal to .84 and .79 respectively ( $p < .01$ ), both excellent according to the EFPA criteria. Correlation coefficients were high enough to suppose that the three instruments measure the same construct but not too high to presume an overlap between the aspects measured by these instruments and hence the futility of developing a new scale of SC.

Correlations between the SSCC and the other scales of close but distinct constructs, MSPSS and SIQ, were equal to .57 and .73 respectively ( $p < .01$ ). In order to ensure that correlations between the SSCC and the SC scales were higher than those between the SSCC and the scales measuring related but distinct constructs, each correlation coefficient obtained between the SSCC and the SC scale was compared with the corresponding coefficient obtained between the SSCC and the related construct scales by means of *t difference* (Chen and Popovich, 2002).

The correlation between the SSCC and the ISSC was significantly higher than the corresponding correlation between the SSCC and the MSSPS ( $t_{(154)} = 6.58$ ;  $p < .01$ ). On the contrary, the correlation between the SSCC and the SIQ was not statistically lower than the corresponding correlation

between the SSCC and the CCS scores ( $t_{(161)} = .63$ ). This result may be due not to lack of discriminant validity of the SSCC, also supported by the results achieved by the comparison with the MSPSS. On the contrary, it may be due to the fact that social identity, as measured by the SIQ, appears to be a dimension of SC rather than a distinct but related construct. After all, the SIQ investigates aspects, such as positive feelings linked to being part of a group or perception of similarity to other community members, which are in common with the SC construct. Therefore, it is plausible to suppose that the high correlation found between SSCC and SIQ is a result of a theoretical overlap between the two constructs, probably emphasized by the adaptation of the SIQ items to the online context and by the Authors' choice of using only two of the three dimensions of the scale.

Further investigations regarding the factor structure of the SSCC and therefore the relations among the sub-scales of the two scales could probably clarify the relationship between the two constructs.

#### 4. CONCLUSION

The aim of this investigation was to verify the internal consistency and convergent/discriminant validity of the SSCC in relation to tests assessing SC or other constructs that are in relation to SC. The SSCC, ISSC or CCS, both scales of SC, and MSPSS or SIQ, scales of perceived social support and of social identity, were administered to two groups of 157 and 164 Italian students of University online courses.

The SSCC seems a reliable and valid instrument to measure SC and discriminate it from similar constructs.

In fact, the internal consistency of the SSCC, measured by Cronbach's alpha coefficient, was excellent. Moreover, concerning convergent and discriminant validity, the correlations observed between the SSCC and the other scales of SC were high enough to suppose that the SSCC measures SC, but not too high to presume an overlap of the different instruments and hence the futility of developing the SSCC.

In online courses, the use of the SSCC can be used for planning interventions. In our opinion, separation between objective and subjective factors influencing the perceived SC gives more opportunities to design online courses that are truly accessible to all students and intervene in the best way on the single individual when the case.

Given this distinction, the SSCC can be helpful in two different ways.

First, it may be crucial for the early detection of low level of SC and, consequently, reorganization of courses may be realized to allow the improvement of SC in all students. However, to this purpose, further investigation is needed to identify the educational and organizational conditions that can effectively support SC.



In particular, it will be possible to identify the organizational conditions that can effectively support the development of the SC. Examples are the modality of interaction (asynchronous vs. asynchronous and synchronous communication), the features of the context (courses completely online vs. blended), the representation of the identity of participants in the online environment (only textual vs. with multimedia); the organization of the work (with vs. without roles to face the tasks; high vs. low interdependence among participants), and style of tutoring (instructor vs. facilitator). All this information could be very useful for targeted interventions in planning online courses able to improve the SC among the students.

Second, the SSCC may be used also to investigate if all dimensions of the SC are really being developed by every single student, and this could be more useful, where the case, to intervene at individual level.

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