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Construction and validation of a classroom climate scale: a mixed methods approach

Verónica López[1] · Javier Torres-Vallejos[2] · Paula Ascorra[1] ·
Boris Villalobos-Parada[4] · Marian Bilbao[3] · René Valdés[1]

Abstract Students' perceptions of their classroom climate have been found to relate significantly to students' learning outcomes. The purpose of the present study was to construct an instrument for assessing elementary-school students' perceptions of classroom climate, based on a previous instrument that was being used in Chile by a public national school mental health program as a tool for aiding teachers in improving classroom management, but which showed poor psychometric properties. We used a six-staged mixed-methods approach to construct relevant items and dimensions based on this measure and by adapting previously-existing scales. Item development included participatory construction of items involving program officials, focus groups with students, and a pilot study. The final version was administered to a sample of 6813 elementary-school students. Results showed adequate reliability and construct validity, convergent validity with school climate, and divergent validity with peer victimisation. When consequential validity was explored through semi-structured interviews with program officials and school administrators, we found that the instrument was being used as a tool for helping teachers to improve their school climate and management skills. We discuss the importance of constructing instruments using a mixed-methods approach.

Keywords Classroom climate · Measurement · Mixed methods · Validity

✉ Verónica López
veronica.lopez@pucv.cl

[1] Pontificia Universidad Católica de Valparaíso and Center for Research in Inclusive Education, Valparaíso, Chile

[2] Universidad Tecnológica de Chile INACAP, Santiago, Chile

[3] Universidad de Santiago de Chile, Santiago, Chile

[4] Departamento de Psicología, Universidad de Playa Ancha, Valparaíso, Chile

Introduction

Classroom climate can be understood as characteristics of the environment inside the classroom that are perceived. In other words, the context where the learning processes occur or, the particular 'personality' that is experienced as result of the dynamics that take place (Çengel and Türkoğlu 2016; Kaufmann et al. 2016; Rowe et al. 2010; Rubie-Davies et al. 2016). In this sense, it is a space for not only academic learning, but also for social learning of individuals (Çengel and Türkoğlu 2016; Johnson 2006; Rowe et al. 2010).

There have been multiple studies of the multidimensionality of aspects of classroom climate and its influence in the student's life (Hughes and Coplan 2017; Rowe et al. 2010; Rubie-Davies et al. 2016; Wang and Degol 2016). The literature shows that an important aspect of classroom climate involves the relationships among individuals: with the teacher and between peers. Indeed, classroom climate is the key context that facilitates or complicates the learning process; when this environment is supportive, caring and positive for the students, their learning tends to be more significant (Çengel and Türkoğlu 2016; Rubie-Davies et al. 2016).

Classroom climate has been associated with both cognitive and affective outcomes (Charalampous and Kokkinos 2017). Cognitive aspects are linked with motivation, academic results and achievement (Rowe et al. 2010; Çengel and Türkoğlu; 2016; Rubie-Davies et al. 2016; Hughes and Coplan 2017), student development and engagement with the activities of the class (Rowe et al. 2010; Wang and Degol 2016). On the other hand, affective outcomes involve wellbeing, a sense of belonging with the school and, when it is positive, a decrease in behavioural problems, victimisation and depression (Charalampous and Kokkinos 2017; Hawker and Boulton 2000; López et al. 2012; Wang and Degol 2016).

Dimensions involved in the assessment of classroom climate

Considering the previously-mentioned aspects, classroom climate involves the following dimensions that are part of our instrument.

Peer relationships

Peer relationships are some of the principal determinants classroom climate because their quality has been linked to decreased aggression and victimisation (Spangler-Avant et al. 2011; Wang and Degol 2016). In this sense, when students experience warm, kind and helpful relationships with their peers, they tend to feel more optimistic, show greater belonginess to their school, and experience a higher satisfaction with life (Çengel and Türkoğlu 2016; Wang and Degol 2016). Rubie-Davies (2015) demonstrated that, when students rotate seats across the classroom, they create new relationships with their classmates and are likely to form new types of friendships (Rubie-Davies et al. 2016). As part of the assessment of peer relationships, many instruments assess classroom cohesion (Fraser 2012; Fraser et al. 1982). In peer relations research, classroom cohesion is conceptualised as the "structural integration within the group that connects and links individuals to each other" (Bukowski and Sippola 2001, p. 359).

Teacher–student interactions

Teachers play many simultaneous roles in the classroom. Although they are not the only factor involved in the construction of classroom climates, they do play an important role in it (Rubie-Davies et al. 2016; Wubbels and Brekelmans 1998). They are especially relevant in creating emotional and social support of all students, which includes forming good relationships with students and encouraging positive relationships among students themselves (Bozkurt and Ozden 2010; Pianta and Hamre 2009; Pianta et al. 2012). Teachers' emotional support includes teachers showing respect and warmth for students, expressing personal care, empathy and positivity through humour, altruism and affinity (Kaufmann et al. 2016), as well as focusing on safety, encouragement and acceptance (Hughes 2002; Hughes and Coplan 2017; Roeser et al. 2000; Rubie-Davies et al. 2016). When students experience positive and warm relationships with their teachers, they are more likely to respect the rules of their classroom (Rubie-Davies et al. 2016; Wang and Degol 2016) and become more motivated and engaged within a learning-oriented environment (Kaufmann et al. 2016).

Teachers' orientation towards learning

Another important role of classroom teachers is the effective monitoring or management of lessons, student behaviour and instructional support. This involves expanding students' thinking, reasoning and problem-solving skills (Pianta and Hamre 2009; Pianta et al. 2012). Teachers' roles and the quality of the pedagogical classroom interaction have received increased attention in educational research. Particularly relevant is teachers' instruction and feedback for student learning (Allen et al. 2013; Muijs and Reynolds 2010; Wubbels et al. 2015), including classroom organisation and instructional support (Allen et al. 2013). Teachers' classroom organisation, or monitoring, refers to setting clear behavioural expectations, redirecting minor misbehaviour and using positive strategies concerning school work, learning, relationships and behaviour (Emmer and Stough 2001). Successful teachers appear to monitor both students' school work as well as their behaviour carefully, including bullying-related behaviour (Allen 2010; Roland and Galloway 2002). Teachers' instructional support refers to connecting academic skills to students' experiences and real-life situations, as well as conceptualising and supporting students' academic development and engagement in school (Ascorra and Crespo 2004; Black and Wiliam 2009; Pianta et al. 2012).

Physical environment

Wang and Degol (2016) identify the relevance of the physical environment for the students' lives and their experience at the school. In this sense, two aspects are fundamental in terms of adequacy: (a) environmental adequacy and (b) availability of resources. Environmental adequacy involves elements such as lighting and heating conditions, quality of building, cleanliness and acoustics. In this sense, Çengel and Türkoğlu (2016) also highlight the acoustic factor as fundamental for a positive classroom climate, because noise or interferences leads to complaints and warnings from teachers. Indeed, in their research, classrooms with negative climate experienced less noise because the interactions between peers were limited and controlled. Availability of resources is related to both the technological and physical resources of

the school (Oakes and Saunders 2002; Wang and Degol 2016). Both dimensions are relevant because they represent appropriate learning conditions for the students and working conditions for teachers that influence students satisfaction, engagement and effectiveness, as well as their academic achievement (Wang and Degol 2016).

Recently, several instruments have been developed to assess classroom climate, including the Classroom Observation Scale (Hughes and Coplan 2017), Students' Perceptions of their Classroom Psycho-social Climate (CPSC), What Is Happening In this Class?—WIHIC (Charalampous and Kokkinos 2017), Student Personal Perception of Classroom Climate—SPPCC (Rubie-Davies et al. 2016); Connected Classroom Climate Inventory—CCCI (Sağkal et al. 2015), Social Classroom Climate Scale (Calderón et al. 2016) and Student Personal Perception of Classroom Climate—SPPCC (Rowe et al. 2010).

However, most existing instruments that assess students' perceptions of classroom climate do not consider infrastructure-architectural conditions. However, in developing countries such as Chile, this dimension is not always guaranteed and therefore should not be taken for granted because it impacts the social and emotional learning environment. For example, a classroom situated alongside a very noisy street, with broken windows and no air conditioning in summer or heating in winter, produces both acoustic as well as situations that might detrimentally affect learning, peer relations and teacher–student relations.

Classroom climate as a tool for teacher counseling

As described above, classroom climate plays an important role in academic achievement, outcomes and emotional support for students (Çengel and Türkoğlu 2016; Hughes and Coplan 2017; Rowe et al. 2010; Rubie-Davies et al. 2016). The assessment of classroom climate can provide teachers with valuable information for improving their classroom management practices (Bozkurt and Ozden 2010). For instance, if teachers assess their relationship with students and analyse how empathic, altruist, motivating and caring they are, they will also be able to improve their professional practice and performance (Hughes and Coplan 2017).

In this study, we sought to improve an instrument aimed at measuring classroom climate that was being used by a Chilean public school program called *Skills for Life Program* (*Programa Habilidades para la Vida*). Skills for Life (SFL) is one of the largest school-based mental health programs in the world; it screened and provided services to more than 1,000,000 students in Chile over the past decade. The intervention developed by SFL is based on the three-tiered model recommended by the World Health Organisation: mental health promotion for all students, parents and teachers; preventative interventions for children screened as being at risk; and referrals to community professionals for children who already are seriously impaired. SFL professionals—mainly psychologists and social workers—administer a self-constructed instrument to measure classroom climate and use it, along with data gathered from classroom observations, to inform teachers about their classroom climate and classroom management skills, within the context of sessions aimed at improving classroom conditions for all students.

Method

Design

Because the aim was to construct an instrument for assessing elementary students' perceptions of classroom climate, we used a mixed-methods sequential design (Johnson and Onwuegbuzie 2004) that would be both psychometrically sound and ecologically useful in order to inform teachers and school counselors as part of an ongoing public school effort to improve classroom management practices. The design included the following stages: (1) analysis of the psychometric properties of the existing SFL instrument; (2) content analyses of the items and dimensions of the existing instrument, proposing new phrasing of some items, and incorporation of new items and dimensions, together with the SFL program officials; (3) content analyses with elementary students; (4) pilot study; (5) large-scale administration; and (6) on-site assessment of the use of the instrument on behalf of program officials and school administrators. Overall, this design was aimed at ensuring an adequate process of item construction and testing for reliability and construct, convergent, divergent and consequential validity. Consequential analysis is understood as the potential and actual use of testing (Messick 1989; Shepard 1993). In this study, we were interested in evaluating the actual use of the instrument, on behalf of SFL professionals, as a tool for helping teachers to improve classroom climate and classroom management.

Participants

At stage 1, 591 grades 5–7 students from one commune of Chile answered the existing SFL instrument. All students attended schools in which the SFL Program was present. At stage 2, 47 SFL officials working at the commune level directly with schools and 5 program officials working at the national level re-evaluated and adapted items in the existing SFL instruments that they considered should be kept in the new instrument. At stage 3, 78 grade 5–8 students from one private subsidised school participated in focus groups. At stage 4, 151 grade 5–8 students, who were enrolled in 2015 in a subsidised private school in the commune of Valparaíso, Chile, participated in the pilot study. This sample constituted 90.4%. At stage 5, 6,813 students from 5 communes in Chile (all 5th to 8th graders in 2015 from municipal schools that were part of SFL Program) participated in the final administration. The error margin was 1.18% and the confidence level was 95% (see Table 1). Finally, at stage 6, 54 SFL program officials, who had been in charge of administering the classroom climate scale to elementary students in its final and validated version and using it as a tool for counseling teachers on classroom climate and classroom management practices, and 54 commune-level municipal educational administrators acted as key informants on the actual use of the instrument for the purposes of the public program.

Instruments, measures and data-collection techniques

At stage 1, the SFL How Do I Perceive my Classroom scale was used. The National Head Department of the SFL Program created this 12-item student self-reported instrument by using as theoretical basis the construct of school social climate as developed in Chile by Arón and Milicic (1999). Although Arón and Milicic's (1999) proposal involves 'positive' and 'toxic' climate at the school level, the SFL instrument was intended to measure

Table 1 Number of participants in pilot study (Stage 4, $N = 151$) and final study (Stage 5, $N = 6813$) by class and gender

Descriptor	Pilot study		Final study	
	N	$\%$	N	$\%$
School grade				
4	24	15.9		
5	27	17.9	1658	24.3
6	31	20.5	1807	26.5
7	40	26.5	1753	25.7
8	29	19.2	1595	23.4
Gender				
Male	77	51.0	3095	45.4
Female	74	49.0	3718	54.6

classroom climate. The theoretical dimensions were: physical environment, teacher–student interactions, peer relations, and extracurricular activities. A 5-point frequency response scale (1 = always and 5 = almost never) was used.

At stage 2, nine (9) items of the above SFL instrument were adapted to comply with item construction standards. Additionally, items were added from a Spanish version of the My Class Inventory (Anderson 1973; Fraser et al. 1982) that was adapted and validated in Chile by Ascorra and Cáceres (2001). The original instrument has 32 items covering five dimensions (difficulty, satisfaction, competition, cohesion, friction). The Spanish version of Villar and Villar (1992), adapted by Ascorra and Cáceres (2001), has 25 items covering 4 dimensions: satisfaction (alpha reliability, $\alpha = 0.63$), cohesion ($\alpha = 0.63$), friction ($\alpha = 0.76$), and competition/orientation towards learning ($\alpha = 0.61$). This instrument was relevant for constructing items for the dimension of peer relationships.

Another source of items was the Inventory of Behaviours Depicting Teacher's Pedagogical Role (Ascorra et al. 2003), which defines teachers' pedagogical role as a "series of socially legitimized practices that establish the limits and possibilities of the actions deployed by teachers, and the positions they adopt in the school context" (Ascorra and Crespo 2004). The instrument identifies a proactive, agency-based professional position, as opposed to a reproductive, passive position ($\alpha = 0.85$ for the full scale). Factor analysis showed a four-dimensional structure with two factors referring to teachers' methods (use of group methods and methods adapted to students' diverse needs). The remaining factors involved teachers' professional role: self-reflexive skills and communication of high expectations to students. However, further analyses with different samples revealed that the items grouped in two main dimensions: teaching methods (12 items, $\alpha = 0.93$) and professional role (9 items, $\alpha = 0.91$). This instrument was relevant in the construction of items for the dimensions of teacher–student interactions, and teachers' orientation towards learning.

Items also were based on Velásquez's (2010) Classroom Climate Scale, which was based on existing instruments (Brand et al. 2003; Fraser et al. 1982; Griffith 1999; Moos and Trickett 1987; Wubbels and Brekelmans 1998). This 33-item Likert-type instrument measures cohesion, competition, cooperation, decision making, belongingness, achievement orientation, rule reinforcement, discipline, teacher´s support, and disciplinary harshness (α between 0.47 and 0.76 and test–retest reliability between 0.51 and 0.78). We used 12 items for constructing items for the dimensions of peer relationships, teacher–student interactions and teachers' orientation towards learning.

At stage 3, we conducted nine (9) focus groups involving 5th–8th graders from a school from the commune of Valparaíso. Each group had 8–10 students. The objective of this technique was to analyse the level of understanding of items and their pertinence to the classroom climate construct and to the respective dimension. Thereafter, we obtained a first version of the scale with 36 items, which was applied at the same school to 151 other students from the same grades.

During stage 4, we used a pilot version of a 36-item scale which sought to measure the same four dimensions as the final version. The final version used at stage 5 contained 24 items measuring four dimensions: physical environment; teacher–student interactions; peer relationships; and orientation towards learning and high expectations. Students were asked: "How do you usually feel in your classroom? Please, indicate with an X the answer that best reflects your answer for each phrase". We used a Likert scale with 4 choices (1 = "I completely disagree", 2 = "I disagree", 3 = I agree", and 4 = "I completely agree").

We also administered several instruments to assess related measures that would allow us to test for convergent and divergent validity. We used Benbenishty and Astor´s (2005) 18-item School Climate Scale, as adapted and validated in Chile by López et al. (2014), to measure clear and fair school norms (4 items, $\alpha = 0.69$), norms about school violence (3 items, $\alpha = 0.69$), students' participation in school (3 items, $\alpha = 0.62$) and teacher social support (8 items, $\alpha = 0.89$).

The School Victimization Scale (SVS) (Furlong et al. 1991) was modified for use in Israel (Benbenishty and Astor 2005) and later adapted to fit the Chilean context. It comprises 27 items that ask about the frequency of violent episodes at the school during the previous month, by classmates, ranging from (1) never during this month to (3) three or more times this month. It evaluates the physical (8 items, $\alpha = 0.71$), verbal (7 items, $\alpha = 0.73$), social (3 items), cyber (3 items, $\alpha = 0.79$) and sexual (5 items, $\alpha = 0.66$) dimensions of victimisation.

Finally, at stage 6, qualitative assessment included non-participatory observations at classroom and school sites, interviews and a PowerPoint presentations designed by the SFL officials to answer the following questions: "How was the instrument used as part of a school-wide monitoring system? What were the strengths and weaknesses of its use?"

Procedure

During stage 1, we analysed the psychometric properties of the exiting instrument as part of a PhD course on exploratory and confirmatory factor analyses at the Pontificia Universidad Católica de Valparaíso and taught by the first author with the authorisation of the SFL Program. At stage 2, participatory content analyses and proposals for new phrasing of old items and new items and dimensions were developed as part of the annual meeting of the SFL Programs officials in Santiago, Chile. Officials were given psychometric information on the previous existing instrument and asked to rate new each item based on (a) relevance, (b) pertinence and (c) students' estimated reading comprehension. Findings were discussed and, afterwards, new items were included. All new items belonged to the dimension of physical environment.

At stage 3, and based on work conducted by the research team, we defined an instrument with 36 items that encompassed four dimensions: the Physical environment with 7 elements (e.g. "My classroom is clean and tidy"); Teacher–student interactions with 15 elements ("In my class, teachers make us follow the rules"); Peer relationships with 8 items ("In my class, we all get along fine"); and Orientation towards learning with 6 items ("Our

teachers encourage us to ask when there is something we do not understand"). We conducted focus groups with students in order to check the degree to which the questions were understood and whether they were pertinent in terms of the classroom climate construct.

This instrument was administered at stage 4 to the sample of 151 students. Based on these results, the instrument was shortened to 24 items, which was considered the final version. This final version was administered to 5th–8th graders in 5 communes of the country during 2015. At this stage, we confirmed the factorial structure of the 24-item scale.

Finally, at stage 6, we conducted on-site assessment of the use of the instrument on behalf of SFL program officials and school administrators in 54 communes of the country where it was being implemented starting in 2016. This stage was part of the qualitative evaluation of the school climate monitoring system, which included the assessment of classroom climate for the purposes of giving feedback and counseling teachers on classroom climate and management. The evaluation was performed by the research team and was authorised by the national SFL Head Department.

Ethical considerations

IRB was obtained from the first author´s institution. Informed consent was obtained from students' parents and guardians. Additionally, in stages 3 and 4, students' participation was voluntary. All instruments contained the answers "I don't know" and "I don't want to answer" as options, but these were chosen by less than 2% of students in all administrations.

Data analysis

In stages 1 and 4, we calculated Cronbach's alpha reliability, descriptive statistics and correlations using the software SPSS 21.0. We also performed exploratory factor analysis with maximum likelihood and oblimin rotation. At stage 5, we analysed construct validity through confirmatory factor analysis (CFA) using Amos 21.0. The following indicators of fit were considered: Chi squared to test the hypothesis that the unrestricted model fits the covariance matrix and the correlations of the model; comparative fit index (CFI) to compare the hypothesised model with a model in which the correlations between variables equal zero; root-mean-square error of approximation (RMSEA) to check for values under 0.80, which would imply that the model offers a reasonable fit; Tucker-Lewis index (TLI) and incremental fit index (IFI) to check for values close to 0.95, an indication of good fit. Later, using SPSS 21.0, we calculated Cronbach's alpha to indicated scale reliability. We also analysed the convergent and divergent validity of the model using school climate and peer victimisation as variables, respectively, using Pearson's correlation coefficient. Focus group and semi-structured interviews were analysed using content analysis.

Results

Psychometric properties and content analyses of the existing instrument

Some major difficulties emerged. First, an instrument to measure classroom climate was constructed on the basis of the school climate construct. While both constructs are closely related, the focus and coverage of the analysis are different. Second, although the instrument was theoretically considered to measure four dimensions, two of these dimensions

only had one item each, which made it impossible to study its construct validity or dimensionality. Third, the following lexical difficulties were observed in the construction of some items: items that expressed more than one idea; and items that contained double negatives. Fourth, exploratory factor analysis showed a two-dimensional structure that explained a small percentage of the variance (23.8%). The communalities and factor loadings were low for both dimensions (< 0.30).

Participatory proposing of new items

The participatory proposal of new items with the SFL professionals revealed that revisions failed to meet the expectations of the program officers, in the sense that for them, classroom climate in Chilean classrooms encompassed the physical environment. Therefore, and once the pros and cons were analysed, we (the research team and SFL National professionals) opted to add the following items: "In my classroom, there is enough light to work in classes", "We can listen well to the teacher and classmates anywhere in the room", "In my classroom there is enough space to work in classes", "In my classroom the temperature is adequate to work in classes, all year round" and "We can see the board well from anywhere in the room". These five items were included in the 36-item pilot version. Because of space limitations, this pilot version is not presented but can be obtained by contacting the first author.

Student content analyses

Results from the focus groups revealed difficulties in item construction as perceived by students. First, some items were irrelevant (e.g. "In my classroom, the temperature is adequate to work in class, year round"). Second, some items seemed redundant (e.g. item 8 "Our teachers tell us that we can learn, even if sometimes we get poor grades" with item 9 "Our teachers tell us that even if we learn in different ways, we can all learn" and item 10 "Our teachers us tell us that each one of us has different learning skills"). Because this last item was also considered long and confusing, we modified it to read "Our teachers tell us that we can all learn, even if at different paces". Third, some items were considered very infrequent or unlikely (e.g. "In my class, our teachers take into account the suggestions we make about class activities and grading"). Fourth, some were not considered pertinent to the classroom reality (e.g. "In my class, we like to stay together" was modified to "In my class, we like to spend time together").

Reliability

The 36-item scale that was administered to 151 4–8 grade students showed adequate internal consistency. Cronbach's alpha was 0.93 for the full scale ranged and between 0.75 and 0.86 for the subscales (physical environment 0.75, teacher–student interactions 0.78, peer relationships 0.86 and teachers' orientation towards learning 0.80). Descriptive statistics allowed to discard those items out of mean range, as well those with high standard deviations. Also, we discarded items which correlated highly with each other, while considering the research team's qualitative criteria previously detailed. These findings, together with students' suggestions, allowed us to eliminate items, leading to the final version of 24 items.

The internal consistency of the final 24-item scale was adequate (physical environment 0.81, teacher–student interactions 0.79, peer relationships 0.87, teacher's orientation to learning 0.84). Correlations between the items and the full scale were between 0.53 and 0.67. On the other hand, all correlations between items and their respective dimensions ranged between 0.48 and 0.70 (see Table 2).

Construct validity

Results from the final administration (N = 6813, 24-item version) using confirmatory factor analysis with second-order maximum likelihood and four factors showed a good fit for the model ($\chi^2 = 5252.346$, $df = 248$, $p < 0.001$; DFI = 0.92; RMSEA = 0.05; TLI = 0.92; IFI = 0.92) (Fig. 1).

Convergent and divergent validity

In order to test the convergent and divergent validity of the classroom climate scale, we correlated both the total and subscale scores, with students' scores on the school climate and peer victimisation instruments. Theoretically, we anticipated that classroom climate would correlate positively with school climate and negatively with peer victimisation. As expected, results showed that correlations between classroom climate and school climate were high and positive ($r = 0.72$) while those with peer victimization were medium and negative ($r = -0.15$). The same situation was found for all dimensions of the construct (see Table 3).
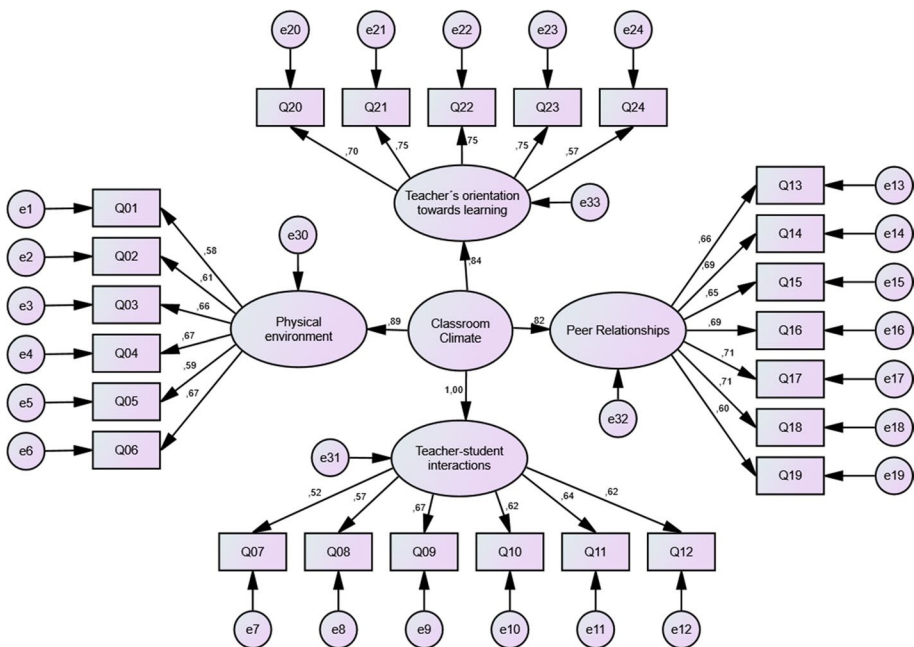

Fig. 1 Confirmatory factor analysis of the classroom climate scale

Table 2 Descriptive statistics and correlations of items with subscales and full scale. *Source*: Own elaboration

Item	M	SD	Corrected item-subscale correlation	Corrected item-total correlation
Physical environment				
My classroom is clean and tidy	1.50	0.93	0.51	0.56
In my classroom, there is enough light to work during class	2.30	0.81	0.55	0.54
We can hear the teacher and other classmates clearly from anywhere in the classroom	1.95	0.93	0.60	0.61
In my classroom, there is enough room to work during class	2.20	0.82	0.62	0.59
We can see the whiteboard clearly from any place in the classroom	1.92	0.91	0.54	0.53
I like my classroom	2.05	0.96	0.58	0.64
Teacher–student interactions				
In my class, it is easy for teachers to maintain students' good behavior and order during lessons	1.41	0.94	0.48	0.54
In my class, students help deciding good climate and discipline rules for the classroom	1.62	0.92	0.53	0.58
In my class, teachers make us follow the rules and obey their orders	2.12	0.81	0.60	0.65
In my class, when a student does not follow a rule, teachers take measures	2.15	0.84	0.54	0.59
We can give our opinion about how to organize the classroom (decoration, layout, seat display, etc.)	2.10	0.87	0.55	0.62
In my class, we try to get organized to carry out activities we are interested in (raffles, trips, parties, etc.)	2.09	0.88	0.54	0.61
In my class, we like to spend time together	1.86	0.92	0.63	0.61
I feel good and comfortable in my class	2.14	0.87	0.63	0.67
Peer relationships				
During class, we can talk and participate without being teased or insulted by our classmates	1.59	0.94	0.63	0.61
In my class, we all get along with each other	1.64	0.94	0.68	0.60
In my class, each student is accepted and valued by who he/she is	1.76	0.95	0.68	0.63
Among classmates, we help one another when somebody needs it	1.96	0.87	0.66	0.67
When there is a conflict in the class, we sort it out by talking	1.58	0.99	0.57	0.57
Teacher's orientation towards learning				
Our teachers tell us why we cannot do certain things	2.23	0.80	0.64	0.62

Table 2 (continued)

Item	M	SD	Corrected item-sub-scale correlation	Corrected item-total correlation
Our teachers tell us that we can all learn, even if it is at a different pace	2.28	0.80	0.70	0.63
We can ask our teachers how what we learn in class is useful to us	2.24	0.77	0.70	0.62
Our teachers encourage us to ask questions when we do not understand	2.30	0.78	0.69	0.63
In my class, we try our best to do well	2.01	0.84	0.50	0.60

Table 3 Convergent and divergent validity of the Classroom Climate Scale

Scale	Correlation	
	School climate	Peer victimisation
Classroom climate (total score)	0.72**	− 0.15**
Physical environment	0.62**	− 0.14**
Teacher–student interactions	0.65**	− 0.11**
Peer relationships	0.56**	− 0.12**
Teachers' orientation towards learning	0.65**	− 0.14**

**Correlation is significant at the 0.01 level (2-tailed)

Consequential validity

Semi-structured interviews with SFL Program officials showed that, 1 year after providing the final validated 24-item version to the SFL Program, the classroom climate scale had replaced the existing instrument and was highly valued by the professionals. They acknowledged that knowing that this new instrument had adequate psychometric properties made them feel more secure in using it as a valid tool for providing teachers with feedback on their classroom climate. They used the tool during sessions with teachers to identify strengths and weakness in their classroom management skills and to counsel them on ways to improve their classroom climate and management. The professionals recognised that the physical environment dimension also allowed them and the teachers to show these results to school-level and commune-level authorities, as evidence for the need to improve classroom conditions. Semi-structured interviews with commune-level municipal school administrators showed that the instrument was effectively being used as part of a wider school climate monitoring system (López et al. 2013) and was positively valued as a tool for school improvement. "Having these tools that are validated through all the work allows taking actions to rectify those difficulties that are in the different establishments. This helps us not only in a school, but in all schools in the commune. Thus, through this survey, the head principals, the teachers were able to create remedial work to resolve this conflicting situation. Now, for us, the application of this instrument allowed us to see that there are schools that have an excellent climate and others that are very weak, but this has been tremendously a great support tool in order to search for solutions" (Head of a commune-level school administration).

Discussion

This study provides evidence that a mixed-methods approach is a feasible and relevant aspect of psychoeducational assessment. Qualitative, participatory techniques with program officials showed that understanding the professionals' need to use the instrument, as well as comprehending how they understand the construct (i.e. classroom climate), were needed to help teachers to improve classroom conditions and processes; it is a very important part of item construction, especially if the instrument is to be embedded in an ongoing public educational program implementation scheme. Likewise, focus group and

semi-structured interviews provided relevant information on construct and consequential validity, respectively. Of course, this approach is slow and sequential. The processes described in this study evolved over a period of 3 years.

Findings from this study show that the classroom climate scale has adequate psychometric properties in terms of reliability and construct, convergent, divergent and consequential validity. The consequential validity findings are relevant because they show that the scale fits the purpose for which it was designed. We hope this instrument will be tested and used in other educational contexts.

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