Promoting professionalism through preservice teachers' collaboration

Inmaculada García-Martínez , José Luis Ubago-Jiménez , José María Fernández-Batanero & Ramón Chacón-Cuberos

Promoting professionalism through preservice teachers' collaboration

Inmaculada García-Martínez [a], José Luis Ubag o-Jiménez [b], José María Fernández-Batanero [c] and Ramón Chacón-Cuberos [d]

[a]Department of Pedagogy, University of Jaén, Jaén, Spain; [b]Department of Didactics of Musical, Plastic and Corporal Expression, University of Granada, Granada, Spain; [c]Department of Didactic and Educational Organization, University of Sevilla, Sevilla, Spain; [d]Department of Educational Research and Diagnostic Methods, University of Granada, Granada, Spain

ABSTRACT

The professionalism of teachers through collaboration has become increasingly important in the last years. This paper describes the process of designing and validating a questionnaire for the analysis of future Primary and Pre-school teachers' collaboration patterns. The psychometric properties of the scale were obtained from the analysis of the validity of content (expert judgement and pilot test to 293 students of Primary Education and Pre-school Education at a Spanish university and from construct (factor analysis) and relia-bility (Cronbach Alpha), obtaining appropiate results (KMO = 0.89; CFI = 0.91; GFI = 0.95; AGFI = 0.96; SMSR = 0.05). Four factors were identified in the questionnaire on collaboration and shared profes-sional learning: Assertiveness and personal willingness to work together, Group Cohesion, Leadership Capacity and Group Awareness. The results obtained are consistent with empirical stu-dies carried out on the teachers' willingness towards collaboration, ongoing training and teacher professional development.

Introduction

The professionalisation of teachers has become a growing concern in education (Martín-Romera and García-Martínez 2018). Assuming the impact of teaching practices on student learning, the focus is on how to promote pedagogical renewal and exchange processes through the establishment of a mutual collaboration and enrichment culture (Hargreaves & O´Connor, 2018). In the field of pre-service teacher education, issues such as the European Higher Education Area convergence involve a new understanding of teaching, based on competencies (Cárdenas-Rodríguez, Terrón-Caro, and Monreal-Gimeno 2015). The constant changes within society and specifically in the field of teach-ing, together with social globalisation trends, call for instructive approaches that ensure the acquisition of professional skills required by stude7nts (Hilt, Riese, and Søreide 2019) for their future professional development. These issues demand meaningful design and development of learning processes for substantially different motivations of diverse

students. On this path, the development of multidisciplinary projects is key as a result of strong and effective teaching coordination (García-Martínez and Martín-Romera 2019).

In spite of the impact of establishing competencies into educational programmes, the risk involved in standardising education for the most disadvantaged groups should not be neglected (Gremigni 2019). In this regard, it is pertinent to focus on those more pragmatic and social competencies, especially the so-called interpersonal competencies such as the development of communicative skills, active listening and dialogue. Encouraging these desirable qualities will ensure the training of people who are able to engage and work together towards a common goal (Louis 2007). In other words, if the aim is to promote social skills in the society, to avoid denaturing processes, it is advisable to provide them with the necessary tools for the configuration and success of collaborative teams, as well as for the achievement of group goals (Hassanien 2006).

The collaboration in the educative sphere implies a high level of commitment and involvement with the school in which they work. To achieve it, internal processes of change must be implemented in order to affect the traditional school culture (Tyak & Tobin, 1994). It is not a matter of implementing a new school culture and processes of pedagogical renovation without thinking. Instead, it requires a reflection and a determination on behalf of all of the actors involved to become a cohesive group oriented towards improvement. In addition, shared modalities of working not only bring benefits for a competent teaching staff, but also benefit students to fully develop as active members of the knowledge society. In this regard, many studies have pointed to the benefits of encouraging collaborative work for students (Alonso-Ferreiro 2018). An improvement in the training of students, strengthening social relationships between peers, promoting respect, tolerance, a shared collaborative culture, collaboration, trust and co-responsibility for the acquisition of group goals. Several studies advocate the complementarity between team work and individually developed work, to ensure the success of group goals. This combination makes learning built by students deeper and more persistent, as well as meaningful, in order to promote the acquisition and performance of professional skills, where collaborative skills contribute significantly. The construction of conditions suitable for promoting collaborative work, as well as preliminary training in these working modalities, is crucial to guarantee their effectiveness (Gremigni 2019).

Other point to be taken into account is the decision to use homogeneous and heterogeneous groupings. This is exemplified in the research developed by Jarauta (2014) in which collaborative seminars were designed from heterogeneous groups made up according to students' preferences. It was found that participants positively saw the heterogeneous grouping, as they considered it provided them different approaches on how to face tasks, set aside any prejudices regarding some colleagues and create affective and relational bonds, while avoiding the Isolation of some students when homogeneous groups were constituted or by students' own preference. However, some participants in the study were disappointed with heterogeneous grouping, pointing out 'the lack of accomplishment of tasks by some components and a particular difficulty in demanding more involvement from team members they did not know' (Jarauta 2014, 293). Nevertheless, focusing on promoting collaborative work among pre-service teachers is the right path to follow if we want teachers develop collaborative practices in schools.

Collaborative work approach

Numerous contributions have been made on 'collaborative work' and 'shared professional learning' in the field area of research. Starting from the theory of social interdependence, several authors believe that collaboration is promoted when there is a positive interdependence between the individual's purposes (Carpenter 2018). In this theory, cooperation arises in the interaction between group members, which promotes and supports each group member's goals (Seidmann 2015).

Obviously, working cooperatively implies the existence of a group of people who learn, cooperate and interrelate around common objectives (Lehraus 2015). Other studies have identified it as an educational methodology, supported by small working groups, generally heterogeneous, that interact to improve their own learning and other people' learning. Other authors as Torrelles, Coiduras, Isus, Carrera, Paris and Cela (2011) understand it as the personal attitude and collaboration of people towards others, when they have to face group activities, which requires the exchange of information to solve the difficulties that appear in order to achieve group improvement and development. Several studies (Lozančić, Basta & 'Herbetar, 2019; Vesterinen et al. 2017) certify how cooperation between teachers and even with the family is vitally essential to achieve the educational improvement. Therefore, the competence of collaborative work implies the existence of several people who work together to achieve common goals. In this regard, it could be stated that working collaboratively 'implies contributing to something in order to achieve a shared objective' (Jarauta 2014, 284). Nevertheless, although collaborative work and teamwork are sometimes used interchangeably, these two concepts have different meanings. Teamwork is related to a moderately homogeneous group of people who work together to achieve common goals, where usually there is an equal distribution of tasks, with certain cumulative features and where the responsibility usually falls on one or two members of the group. Authors such as Ibarra-Sáiz and Rodríguez-Gómez (2011) consider that teamwork implies integration and collaboration in a participative and effective way with other members of the group in order to achieve common objectives. However, collaborative work includes a deeper working level, producing a genuine growth in the knowledge and professionalisation of each individual (Stevenson, Hedberg, O'Sullivan & Howe, 2016), while establishing relationships of collegiality, respect and trust among the members of the group, establishing a working environment suitable for the successful achievement of the objectives proposed (Harney, Hogan, Broome, Hall & Cormac, 2015). The last one places the responsibility and leadership on the whole membership and not on a minority. This study uses the term interprofessional collaboration, understood as the collaboration between several individuals with different professional backgrounds and common goals of solving joint tasks (Reeves et al. 2010). From this perspective, the concept also implies the integration of the knowledge and skills of different professionals (Hynek, Malmberg-Heimonen, and Tøge 2020).

Review of existing instruments regarding teacher collaboration

Regarding the scales developed on collaborative work or other similar ones, we found that they were diverse among different social fields. One of the oldest and most comprehensive questionnaires is the one designed by Rosenstein (1994) called 'The Team

Screening Questionnaire'. Despite belonging to the organisational field, this instrument includes seven components (communication, team orientation, team leadership, monitoring, feedback, backup behaviour, and coordination) to assess the level of teamwork. Within the educational area, another instrument for evaluating collaboration is Teacher Efficacy for Inclusive Practices (TEIP), developed by Sharma, Loreman, and Forlin (2012) is inspired by the theory of Bandura. The TEIP questionnaire identifies the following 'three factors that underlie the data for 18 items in the TEIP scale, namely: efficacy to use inclusive instructions (EII), efficacy in collaboration (EC) and efficacy in managing behaviour (EMB)' (Park, Dimitrov, Das & Gichuru, 2016, 4). Its purpose was to measure preservice teacher's trend to develop effective inclusive practices in the classroom. Emphasising the significant role played by collaborative work in achieving this goal. More specifically for group work, the Groupwork Skills Questionnaire (GSQ) is aimed at analysing the students' teamwork capacity. Namely, it evaluates the outcome of the assignment, as well as the actions to be taken to achieve it, interpersonal skills (the contributions made to ensure group dynamics) and teamwork skills (Cumming et al. 2014). A key element in the assessment and effectiveness of teamwork is team members' attitude. An example of this is the Questionnaire on Attitudes towards Learning Teams (CACTE) developed by Mendo-Lázaro et al. (2017), composed of 12 items with 5 response options. They rated their degree of agreement from 1 (completely disagree) to 5 (completely agree). Its purpose is to measure university students' attitudes (in their study, teaching and social education students) to working as a team, considering the academic and social dimensions. Others have focused on factors strongly linked to collaborative work among teachers. This is the case of 21st century Skills Teaching Scale, by Jia et al. (2016). Authors based on Costa and Cogan-Drew's (2009) theory, carried out a pilot study with preservice teachers and inservice teachers to validate the scale, aimed at measuring teaching confidence in six areas: information literacy, collaboration, communication, innovation and creativity, problem solving and responsible citizenship through 16 items in the Collaborative Knowledge Practices Questionnaire. Strongly linked to the teacher's professionalism through encouraging reflective practices, there is the Survey of Reflective Practice: A Tool for Assessing Development as a Reflective Practitioner, developed by Murphy and Ermeling (2016). Its purpose is to test teachers' reflective ability by identifying feedback among teachers through collaboration. Another similar scale to the one presented in this paper is the Analysis of Cooperative Work in Higher Education (ACWHE), which is intended to analyse the methodology of cooperative work in university students (García-Cabrera, González-López, and Mérida-Serrano 2012).

Emphasising the need for an instrument to assess collaborative work among future teachers

Based on the needs described and the benefits of teacher collaboration, it is necessary to determine the most influential factors in teacher collaboration (González, De la Garza, and De León 2017). Sharing experiences allows professionals to establish a common goal to improve the development of their professional practice. In contrast to other questionnaires, this research focuses on the strengths and weaknesses arising from joint work among teachers. Likewise, the questionnaire also helps to determine the awareness of belonging to a group and cohesion, essential aspects for collaborative work. It has been

possible to observe the existence of several scales for the measurement of factors related to cooperative work in higher education contexts. Nevertheless, there is little clarity about the development of instruments that determine the patterns of collaborative work specifically in students who will be future teachers. Therefore, it is necessary to develop a scale for this purpose, as well as the verification of its reliability and validity through the analysis of its psychometric properties. The Exploratory Factor Analysis (EFA) represents the main method of analysis to determine the psychometric properties of a scale according to Beavers, Lounsbury, Richards and Huck (2013). Factor analysis allows checking the relationship patterns between a group of observable variables, which are grouped into a set of dimensions or factors that interrelate them (Henson and Roberts 2006). Thus, the AFE is determined as a set of statistical tests that allow checking the sample adequacy – KMO Test-, the contrast of the null hypothesis – Bartlett´s Test of Sphericity-, the level of adjustment of the scale – Goodness of Fit Index- or the factorability of matrices -bivariate correlations-, among other (Beavers et al. 2013; Marsh, Guo, Dicke, Parket, & Craven, 2019). Thus, AFE allows to verify the reliability and validity of a scale that in this case will involve collaborative work patterns.

Method

This research describes how to design and validate a questionnaire to analyse 'future teacher collaboration patterns' based on the theoretical framework developed. In addition, it is useful to know the perceptions of future teachers on their professional development, mainly on those issues concerning their personal willingness to work together, leadership capacity, group awareness and the establishment of a common understanding about the educational school. In this regard, this study's specific objectives are aimed:

- To analyse the psychometric properties and validity of the instrument 'Questionnaire on Collaboration and Shared Professional Learning (QCSPL)'.
- To study the construct validity of the 'Questionnaire on Collaboration and Shared Professional Learning (QCSPL)'.
- Examine the reliability of the 'Questionnaire on Collaboration and Shared Professional Learning (QCSPL)'.

For this purpose, a descriptive and exploratory study was carried out, based on a sample of 293 responses from future teachers of Primary and Pre-school Education at a Spanish University. Requests to collaborate in the investigation were made through different university subjects. In all cases, the potential participants were informed about the research scope, and requested their informed consent.

Context and participants

National and international education policy points to the importance of developing competent, involved and conscientious teachers with improved teaching practices (OECD 2018). In the Spanish context, the qualification to become teacher extends over 4 years, in accordance with the European Higher Education Area (Stage 2020). Likewise, access qualifications to the degree are excessively low in comparison with

other degrees. This, added to the growing number of functions and expectations placed on teachers, requires the professionalisation of future teachers, providing them with all necessary tools for their subsequent professional performance. The present research arose from the need to examine this capacity in future primary education teachers. For this purpose, a sample of 293 students from the Primary Education degree in several Andalusian universities was obtained. Regarding the sex of the participants, 68.3% were women (n = 200) and 31.7% men (n = 93). The average age of the participants was M = 21.87; DT = 2.852. Likewise, the distribution by university corresponds to 23.9% (n = 70) of students belonged to University of Jaén, 11.2% (n = 33) were from University of Granada, 33.8% (n = 99) from University of Cádiz and 31.1% (n = 91) from University of Málaga.*Procedure*

For the construction of the questionnaire, the following phases were followed: a) review of the literature and identification of the concept/attitude to be measured, b) elaboration of the first version of the instrument and formulation of the reactions, c) application of the instrument to the 'expert judgement' technique for its evaluation, d) development of the final version of the instrument, and e) pilot test and obtention of the reliability index. These phases are the usual ones for the construction of instruments of this type (Albert-Gómez 2006).

An original questionnaire was prepared, based on the main findings obtained in the specialised literature on these two constructs (Hargreaves and Fullan 2012; Andy and O'Connor 2018). The first version of the questionnaire had 60 items and the final version 44 items.

Every measuring instrument must have two basic characteristics: content validity and reliability. In order to obtain the first one, the 'expert judgement' technique is usually used. And for the second, different procedures are used: stability measurement, alternative or parallel forms method, split halves method, Cronbach alpha coefficient, and Kuder-Richardson coefficient Formula 20. KR-20; the two first ones require applying the questionnaire more than once to the same group, the fifth is used for dichotomous options, and the third and fourth ones are used especially for Likert scales. The most powerful and flexible application is the Cronbach one (O'Dwyer and Bernauer 2014).

The suitability of the 'expert judgement' will depend on the suitability of the selected expert. For this purpose, the criteria to be used are diverse: the expert's link with the selected subject-matter, or his or her experience and professional expertise (Brill, Bishop, and Walker 2006). This research followed a double selection process. In the first place, people with the following characteristics were selected: professional experience in the educational use of collaborative work techniques, experience in the use of didactic strategies aimed at improving school performance. And secondly, the expert competence coefficient was applied for its definitive selection. This coefficient is calculated 'from the opinion shown by the expert on his level of knowledge about the research problem, as well as from the sources that allow him to argue the criteria established … The coefficient is obtained by applying the following equation: $K = \frac{1}{2}(Kc + Ka)$' (Cabero-Almenara and Barroso-Osuna 2013, 29). Where, Kc is equal to the coefficient of knowledge or information that the expert has about the subject or problem raised and Ka is the argumentation coefficient or justification of the experts' criteria. This equation enables to obtain a score between 0 and 1: it is adopted as criteria that people who do not get a higher score than 0.7 are not considered in the research as experts.

Submission of the questionnaire to the opinion of experts

In order to ensure good ratings of validity and reliability, it is considered that the experts have to be people with extensive experience in teaching collaboration, skills and teaching professional development. Also, it was important that they were working in institutions different from the authors' universities, to avoid possible evaluation biases. It was also considered desirable that they be full professors from public universities and members of an international network. Following the choice of these criteria, 25 candidates emerged to be the experts to evaluate the questionnaire drawn up. Despite the number of experts who were initially sent the questionnaire was 25 out of which only 18 completed it. Once the Coefficient of Expert Competence was applied, 4 people did not obtain a score of 0.7 or higher and were eliminated. The final sample of experts consisted of 14. 16 (88.8%) who were asked if they had taught contents/subjects related to didactics throughout their professional experience and mainly instructional strategies regarding student collaboration and/or participated in any research or innovation project related to teaching strategies and skills answered affirmatively. Likewise, 13 (7.2) indicated that they had carried out or participated in some publication related to didactic strategies of collaborative work. Most of the judges indicated that the questions were correct and their comprehension and writing level was high.

Data analysis

The basic descriptives -average, asymmetry, variation and kurtosis- were analysed through IBM SPSS® software version 24.0. The exploratory factorial analysis (AFE) was performed through FACTOR Analysis® 9.3.1 software using the main components and varimax rotation method. The reliability of the overall scale and the factors obtained were determined through the Cronbach alpha coefficient, setting the reliability index at 95%. The level of correlation between the different factors was determined through Pearson's bivariate correlations.

Results

Table 1 shows the descriptive analysis of the different items included in the questionnaire on Collaboration and Shared Professional Learning. The main dispersion tests, including asymmetry and kurtosis, are considered in order to determine the normality of the data. In this regard, it proceeds to remove a total of nine items: I.6, I.8, I.9, I.20, I.21, I.38, I.40, I.44, I.49 by obtaining a score equal to or higher than two in these statistics as established by Schmider, Ziegler, Danay, Beyer and Büher (2010).

Table 2 reveals the psychometrical properties of evaluating the 60 item Collaboration and Shared Professional Learning (CAPC) scale through the use of the rotated factor matrix and the load dimensions of the different factors through the use of FACTOR Analysis® 9.3.1. (Lorenzo-Seva and Ferrando 2006). Bartlett's statistic revealed an excellent adjustment [8691.157; df = 1326; p < 0.001], while the Kaiser-Meyer-Olkin (KMO) test score was acceptable [KMO = 0.894]. Likewise, the four-factor solution developed explained 51.02% of the variance, reflecting an adequate percentage. First, a total of 12.76 and a variance percentage of 28.36% were obtained for the initial eigenvalues. Subsequently,

Table 1. Basic scale descriptives.

	M	DT	V	A	K		M	DT	V	A	K
I.1	3.88	0.844	0.713	−0.499	−0.231	I.31	3.16	0.881	0.777	0.111	−0.421
I.2	3.99	0.717	0.514	−0.542	0.822	I.32	2.17	0.991	0.982	0.615	−0.080
I.3	3.21	0.926	0.857	−0.035	−0.177	I.33	3.40	0.949	0.901	−0.329	−0.352
I.4	2.62	1.035	1.071	0.036	−0.710	I.34	3.25	1.001	1.001	−0.323	−0.034
I.5	2.47	1.226	1.503	0.272	−1.117	I.35	3.84	0.771	0.594	−0.575	0.506
I.6	4.09	0.721	0.519	−1.350	4.519	I.36	3.26	0.998	0.996	−0.318	−0.460
I.7	4.22	0.629	0.395	−0.532	1.472	I.37	3.57	0.844	0.712	−0.383	0.185
I.8	1.27	0.761	0.580	3.121	9,367	I.38	3.83	0.864	0.747	−1.322	2.474
I.9	1.42	0.801	0.641	2.129	4.305	I.39	1.93	1.071	1.146	0.997	0.300
I.10	3.51	0.813	0.662	0.077	−0.304	I.40	1.61	0.856	0.732	1.543	2.305
I.11	3.34	0.789	0.622	0.209	−0.113	I.41	3.61	0.823	0.678	−0.237	0.113
I.12	3.65	0.926	0.858	−0.451	0.060	I.42	3.65	0.800	0.640	−0.373	0.371
I.13	1.98	0.956	0.914	0.853	0.179	I.43	1.52	0.805	0.648	1.537	1.814
I.14	1.74	0.914	0.835	1.099	0.674	I.44	1.39	0.701	0.492	1.990	4.148
I.15	2.27	1.119	1.252	0.471	−0.661	I.45	2.85	0.918	0.843	0.256	−0.249
I.16	3.45	0.812	0.659	−0.292	0.394	I.46	3.47	1.002	1.004	−0.156	−0.662
I.17	3.60	0.750	0.563	−0.127	−0.010	I.47	3.54	0.765	0.585	−0.468	0.467
I.18	3.54	0.930	0.865	−0.434	0.006	I.48	2.61	1.003	1.006	−0.205	−0.683
I.19	1.71	0.893	0.797	1.106	0.312	I.49	2.76	1.532	2.347	0.212	−1.489
I.20	1.34	0.687	0.472	2.436	6,546	I.50	2.99	1.202	1.445	−0.593	−1.147
I.21	1.34	0.687	0.472	2.563	8,171	I.51	2.53	1.482	2.195	0.325	−1.403
I.22	2.24	1.376	1.893	0.642	−1.030	I.52	3.77	0.776	0.602	−0.199	−0.342
I.23	1.99	1.027	1.055	0.963	0.439	I.53	2.99	1.095	1.199	−0.586	−1.026
I.24	3.96	0.741	0.549	−0.234	−0.133	I.54	2.69	1.495	2.235	0.388	−1.310
I.25	3.97	0.714	0.509	−0.468	0.663	I.55	3.00	1.019	1.038	−0.561	−0.536
I.26	4.03	0.707	0.499	−0.273	−0.277	I.56	2.74	1.614	2.604	0.211	−1.599
I.27	2.90	1.194	1.425	0.144	−0.899	I.57	3.85	0.696	0.484	−0.464	0.808
I.28	3.38	0.845	0.715	−0.117	0.107	I.58	2.61	1.233	1.519	−0.219	−1.521
I.29	3.63	0.869	0.755	−0.620	0.385	I.59	2.52	1.589	2.525	0.451	−1.418
I.30	3.97	0.716	0.513	−0.288	−0.146	I.60	3.69	0.853	0.727	−0.499	0.345

Table 2. Psychometric properties adjustment indexes.

Index	Score
Barlett's Sphericity Test (Chi-Square)	86,941.157
Degrees of Freedom (DF)	1326
Significance	0.001
Kaiser-Meyer-Olkin (KMO) Test of Sampling Adequacy	0.894
Comparative Fit Index (CFI)	0.912
Goodness of Fit Index (GFI)	0.952
Adjusted Goodness of Fit Index (AGFI)	0.960
Standardised-Root-Mean Residual (SMSR)	0.053

the value of the variance of each factor is determined as follows for the sums of extraction of squared charges: [Factor 1: 28.36; Factor 2: 37.32; Factor 3: 44.85; Factor 4: 51.02]. Specifically, Muñoz-Cantero et al. (2019) and Reio and Shuck (2015) establish that the rotated factors must explain at least 40% of the variance of the original variables, being recommended to obtain values of 60%. Thus, an acceptable variance is observed with a percentage of 51.02%. Other adjustment coefficients are also used to contrast the reliability of the analysis performed. The Comparative Adjustment Index (CFI) obtained an appropiate score of 0.91. While the Adjustment Goodness Index (GFI) and the Adjusted Adjustment Goodness Index (AGFI) obtained excellent scores of 0.95 and 0.96 accordingly. As well, the Residual Average Square Root (SMSR) obtained a value of 0.053 reflecting an appropriate value. Therefore, and based on these adjustment coefficients, a good adjustment can be established for the scale items.
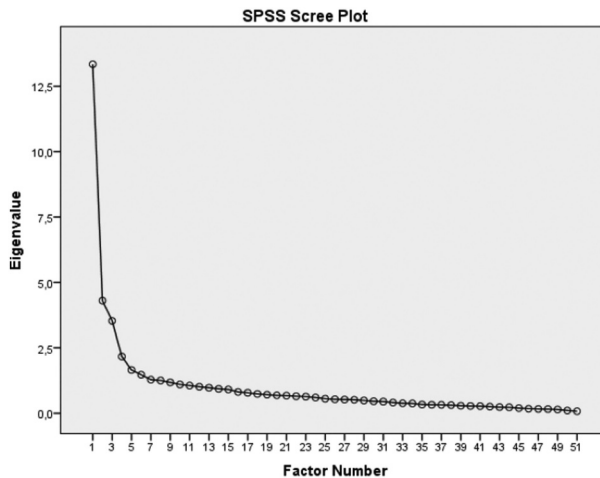
Figure 1. SPSS scree plot of the eigenvalues and factors.

Figure 1 shows the SPSS Scree Plot of the factor loads, demonstrating a rotated solution of four factors. In addition, table 3 shows the rotated matrix of the scale factors. It was composed by four factors (Factor 1. Factor 2. Factor 3 and Factor 4). Factor 1 (Assertiveness and personal willingness to work together) comprised eighteen items [I.17; I.18; I.52; I.2; I.25; I.24; I.16; I.30; I.26; I.57; I.1; I.35; I.12; I.29; I.41; I.3; I.28; I.46], Factor 2 (Group Cohesion) brought together ten items [I.58; I.53; I.56; I.25; I.16; I.30; I.26; I.57; I.1; I.35; I.12; I.29; I.41; I.3; I.28; I.46], the Factor 2 (Group Cohesion) brought together ten items [I.58; I.53; I.56; I.56; I.35].I.59; I.51; I.54; I.55; I.48; I.7], Factor 3 (Leadership capacity) was linked to a total of ten items [I.36; I.33; I.45; I.11; I.37; I.4].I.31; I.34; I.47; I.10] and Factor 4 (Group awareness) which comprises a total of seven items [I.15; I.23; I.14; I.13; I.32; I.39; I.27]. As a result, from the total of 60 items that made up the initial scale and the nine that were subsequently removed, we had to delete a total of six additional items due to lower factorial loads than 0.400 [I.5; I.19; I.22; I.42; I.43; I.60] (Lorenzo-Seva and Ferrando 2006). Then, it was verified the global scale internal consistency with the deleted items through Cronbach alpha coefficient, achieving a higher reliability than the data obtained without removing these items and denoting an appropriate overall score [$\alpha = 0.848$]. Also, acceptable scores are obtained for the internal consistency (Cronbach alpha) of each factor even though they gather a limited number of items [Factor 1 (Assertiveness and personal willingness to work together) = 0.905; Factor 2 (Group Cohesion) = 0.743; Factor 3 (Leadership Capacity) = 0.826; Factor 4 (Group Awareness) = 0.679].

The correlations between the factors of the scale are shown in table 4. Factor 1 (Assertiveness and personal willingness to work together) correlated positively and directly with Factor 2 (Group cohesion) [$r = 0.522$; $p < 0.01$] and Factor 3 (Leadership capacity) [$r = 0.617$; $p < 0.01$]; in both cases an average correlation strength is shown. Likewise, Factor 2 (Group cohesion) correlated positively with Factor 3 (Leadership capacity) [$r = 0.682$; $p < 0.01$] and negatively with Factor 4 (Group awareness) [$r = -0.573$; $p < 0.01$], also with an average correlation strength for both correlations. Finally, Factor 4 (Group Awareness)

Table 3. Rotated component matrix.

	Factor 1	Factor 2	Factor 3	Factor 4
I.17	0.759			
I.18	0.677			
I.52	0.639			
I.2	0.616			
I.25	0.606			
I.24	0.598			
I.16	0.585			
I.30	0.581			
I.26	0.565			
I.57	0.564			
I.1	0.564			
I.35	0.562			
I.12	0.552			
I.29	0.529			
I.41	0.468			
I.3	0.435			
I.28	0.431			
I.46	0.429			
I.58		0.847		
I.53		0.839		
I.56		0.787		
I.50		0.772		
I.59		0.744		
I.51		0.724		
I.54		0.667		
I.55		0.657		
I.48		0.581		
I.7		0.493		
I.36			0.703	
I.33			0.686	
I.45			0.620	
I.11			0.584	
I.37			0.568	
I.4			0.545	
I.31			0.521	
I.34			0.496	
I.47			0.454	
I.10			0.454	
I.15				0.695
I.23				0.647
I.14				0.585
I.13				0.513
I.32				0.453
I.39				0.436
I.27				0.416
Internal consistency	**α = 0.905**	**α = 0.743**	**α = 0.826**	**α = 0.679**

Table 4. Pearson's bivariate correlations of scale factors.

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1	0.522**	0.617**	−0.027
Factor 2		1	0.582**	−0.573**
Factor 3			1	0.001
Factor 4				1

**Statistically significant correlations at level $p < 0.01$

failed to reveal statistically significant differences with Factor 1 (Assertiveness and Personal Willingness to Work Together) and Factor 3 (Leadership Capacity).

Discussion

After the analyses performed, four factors were identified in the questionnaire on collaboration and shared professional learning: Assertiveness and personal willingness to work together, Group Cohesion, Leadership Capacity and Group Awareness.

Assertiveness and personal willingness to work in groups are desirable qualities in any profession. In the case of pre-service teachers, this is especially important, given that teaching performance is the most influential factor in school success García-Martínez and Martín-Romera 2019). Meanwhile, emerging research trends such as collaborative professionalism (Brown, Hartwell, and Thomas 2018) affirm that professional teaching performance is much better when they are committed to working collaboratively. Thus, it has been found that most of the consulted studies guarantee the relevance of personal willingness towards work together (Lillo 2018; Torrelles et al. 2011). These factors are not only decisive at the university stage. They will become increasingly important when they are employed at schools in the future. Extensive research such as that contextualised in professional learning communities (García-Martínez and Martín-Romera 2018) has placed commitment and involvement as key factors in ensuring success for shared common goals. Likewise, there has been a relationship between teachers' professional capital (Hargreaves and Fullan 2012), communities of practice (Kezar and Gehrke 2017) and professional learning communities (Stoll et al. 2006), being the last ones contributing to optimise teachers' professional performance. Contextualised in higher education, it has been shown that there are differences between students' motivation to work collaboratively, depending on group purposes and group configuration. In addition, students were also motivated to work collaboratively, especially when it involved heterogeneous groups (Hassanien 2006). Summarising, it can be stated that cooperative work groups arise to face the growing complexity of society, so as well as happening in the world of work, are increasingly becoming stronger in the educational field (Jarauta 2014). In most cases, a willingness to work in groups, embodied in a willingness to advance beyond the mere tasks assigned, are the key to achieving group success and acquiring goals (Stevenson et al. 2016; Wingrave and McMahon 2015).

Leadership has also been identified as an important factor in establishing a successful collaborative working group. Once identified as the second factor of school improvement (Day et al. 2010), just after teaching performance, it has been shown that it plays an important role in providing suitable conditions to establish sharing and communication processes among school members (Harris & Jones, 2017), creating opportunities for shared professional learning (Hallinger and Liu 2016; Mifsud 2017). This factor not only affects school organisational structure, but it also influences how the school develops a collective identity (Hargreaves & O'Connor, 2018). Specifically, shared leadership (Carpenter 2018) and the delimitation of roles within the group will ease the identification of the potentialities of each one, as well as their weaknesses that will give rise to greater help to those who need it most in particular points, reducing the resistances they may have with respect to their beliefs and 'knowledge'. Consequently, the possible cognitive conflicts that may exist are overcome, as well as achieving greater group cohesion. Likewise, the establishment of shared leadership in work teams implies a greater commitment of group members towards the task to be carried out, while improving the group's effectiveness (Rodríguez-Molina and Gairín 2017; Akbari, Hesam-Kashani & Hooshmand-

Chaijan, 2016). As a result of the previous points, it has been shown that groups where leadership is defined, the results are greater than those where leadership is missing or not well defined (Harris 2014). With regard to the delimitation of roles, the knowledge of each group member about their functions, obligations and opportunities contributes to the group's best performance (Gronn 2009).

In relation to group awareness, learning processes are merely social. Numerous studies attest that students need to exchange their perceptions when working cooperatively for the achievement of common goals. Communication is essential for creating such exchanges, as well as providing feelings of ownership and working towards group goals (Anderson, Guerreiro, and Smith 2016). In addition, it has been shown that students need feedback from cooperative learning teammates so that their confirmation or challenge to self-impression can be considered in the development of personal development (Simon & Campbell, 2012). However, despite the fact that most studies observe that students are more involved in learning and in carrying out tasks required for the achievement of common objectives, reviews such as that developed by Revelo-Sánchez, Collazos-Ordóñez, and Jiménez-Toledo (2018) note the need to train students in this methodology, as well as the importance for teachers to increasingly transfer their responsibility for successful group objectives to students. Assuming students have some deficiencies for teamwork implies that it is necessary to develop experiences to foster those collaboration skills among them (Häkkinen et al. 2019). With regard to candidate teachers, it seems advisable to detect whether such difficulties exist and encourage shared learning situations in order to enable their professional growth. In this regard, some studies have highlighted such deficiencies and have developed experiences aimed rather to mitigate these difficulties. An example of this is the study conducted by Fombona-Cadavieco, Iglesias-Martínez and Lozano-Cabezas (2016), in which they found that university students tend to have a good conception about collaborative work, although they do not tend to perceive this as teaching competence. In addition, they identified disagreement and non-commitment as the main difficulties when working collaboratively. Closely related to group awareness is the prevalence of common goals. As for shared understanding, numerous studies indicate that teachers should encourage their professionalism through a positive attitude and commitment to the school in which they work (Andy and O'Connor 2018). Therefore, focusing on those attitudes and actions that enable teacher coordination (García-Martínez and Martín-Romera 2019), by students of Teaching as future teachers, is a path for determining their effectiveness in collaborative work competence (Cárdenas-Rodríguez, Terrón-Caro, and Monreal-Gimeno 2015). In this regard, it has been found that students who work collaboratively, develop communication and management skills that enable them to plan and organise their different tasks around a common goal, without the need for an external facilitator. Moreover, other studies found that from collaborative work, students strengthened the affective bonds between them, giving way to new relationship patterns based on reciprocity, collaboration and cooperation, which not only gave them the opportunity to be mutually enriching, but also encouraged them to work together, finding solutions to the obstacles found throughout their learning process, focusing on a joint group vision (Lillo 2018). Similarly, other international studies have highlighted the relevance of having a shared purpose for group success, considering it 'as the first dimension in facilitating and developing teamwork, which arises when team members have a similar understanding of their team's main objectives and take steps to

ensure that the team focuses on collective objectives' (Akbari, Hesam-Kashani & Hooshmand Chaijan, 2016, 547).

Conclusions

Firstly, it is possible to highlight the efficiency shown by the method followed for the construction of the diagnostic instrument: review of the literature, development of a first version of the instrument, testing the first version of the instrument using the expert judgement procedure, and obtaining the reliability index. In addition, the study provides an instrument for analysing future Primary and Pre-school teachers' collaboration patterns, whose references are lacking in the literature. Its application will make it possible to identify such knowledge and establish more specific training plans for it, and reconsider the training curricula for future teachers.

We know that teacher collaboration is a desirable quality in the teaching staff, which does not arise at random. Fostering it from initial training reduces the resis-tance they tend to have to work collaboratively with their colleagues. Providing the tools, they need to develop good practices and improve their professionalism, while ensuring suitable organisational conditions for these practices to arise, is the path to follow to achieve this. The investigation carried out has shown the factors included within the collaborative work competence, which contribute to developing shared professional learning. The factors identified are consistent with specialised studies in teacher professional development, school improvement and teacher training areas. This paper has also identified limitations that should be mentioned in order to improve future projects. A relatively small sample of only 293 students could be insufficient to generalise these results to other contexts. Thus, extending the sample and even validating the instrument designed for other contexts would be a realistic approach to carrying out a comprehensive analysis of teacher training trends towards collaboration. Only through an exhaustive analysis of this situation will it be possible to design approaches that seek greater teacher professionalisation. In addition, it can be pointed out as a limitation the fact that the group of experts was made up only of teachers and not of students. It is evident that the students do not have a deep knowledge about the scale validation process, but it would have been interesting to know their opinion on the issues raised since they have a closer contact with the reality of the classroom and the real problems associated with collaborative work in the classroom.

Definitively, it is emphasised that a reliable instrument is available in terms of its construct validity, content and reliability, capable of knowing the future teachers' perceptions towards collaboration. A questionnaire to be used for research purposes, because collaborative work, leadership capacity, group awareness and the establishment of a common understanding of the school have an effective impact on improving educational achievement.

References

Akbari, M., S. Hesam-Kashani, and M. Hooshmand Chaijani. 2016. "Sharing , Caring , and Responsibility in Higher Education Teams." *Small Group Research* 47 (5): 542–568. doi:10.1177/1046496416667609.

Albert-Gómez, M. J. 2006. *La Investigación Educativa. Claves Teóricas*. Madrid: McGraw-Hill.

Alonso-Ferreiro, A. 2018. "Aprendizaje Basado en Proyectos para el desarrollo de la Competencia Digital Docente en la Formación Inicial del Profesorado." *Revista Latinoamericana de Tecnología Educativa* 17 (1): 9–24. doi:10.17398/1695-288X.17.1.9.

Anderson, R. C., M. Guerreiro, and J. Smith. 2016. "Are All Biases Bad? Collaborative Grounded Theory in Developmental Evaluation of Education Policy." *Journal of Multidisciplinary Evaluation* 12 (27): 44–57.

Andy, H., and M. T. O'Connor. 2018. *Collaborative Professionalism: When Teaching Together Means Learning for All*. Thousand Oaks, CA: Corwin Press.

Beavers, A. S., L. John., W. Richards, K. Jennifer., S. W. Huck, and G. J. Skolits. 2013. "Practical Considerations for Using Exploratory Factor Analysis in Educational Research." *Practical Assessment, Research, and Evaluation* 18 (1): 6–13.

Brill, J. M., M. J. Bishop, and A. E. Walker. 2006. "The Competencies and Characteristics Required of an Effective Project Manager: A Web-Based Delphi Study." *Education Technology Research and Development, ETR&D* 54 (2): 115–140. doi:10.1007/s11423-006-8251-y.

Brown, B., A. Hartwell, and C. Thomas. 2018. "Interdisciplinary Design Teams of Pre-service and In-service Teachers: Issues with Collaboration." *The Canadian Journal of Action Research* 19 (1): 3–21.

Cabero-Almenara, J., and J. M. Barroso-Osuna. 2013. "The Use of Expert Judgment for Assessing ICT: The Coefficientof Expert Competence." *Bordón, Revista De Pedagogía* 65 (2): 25–38. doi:10.13042/brp.2013.65202.

Cárdenas-Rodríguez, R., M. T. Terrón-Caro, and M. C. Monreal-Gimeno. 2015. "An Interdisciplinary or a Multidisciplinary Approach at the University Level. Challenges for Teaching Coordination." *Bordón* 67 (3): 167–183. doi:10.13042/Bordon.2015.67309.

Carpenter, D. 2018. "Intellectual and Physical Shared Workspace: Professional Learning Communities and the Collaborative Culture." *International Journal of Educational Management* 32 (1): 121–140. doi:10.1080/02602938.2014.957642.

Costa, J. P., and D. Cogan-Drew. 2009. *Six Skills that Form the Foundation for 21st Century Success*. Litchfield: Education connection.

Cumming, J., C. Woodcock, S. J. Cooley, M. J. G. Holland, and V. E. Burns. 2014. "Development and Validation of the Groupwork Skills Questionnaire (GSQ) for Higher Education." *Assessment & Evaluation in Higher Education.* doi:10.1080/02602938.2014.957642.

Day, C., P. Sammons, D. Hopkins, A. Harris, K. Leithwood, G. Qing, and E. Brown. 2010. *10 Strong Claims about Successful School Leadership*. Nottingham: National College for Teaching and Leadership.

Fombona-Cadavieco, J., M. J. Iglesias-Martínez, and I. Lozano-Cabezas. 2016. "Collaborative Work in Higher Education: A Professional Competence for Future Professors." *Educacao & Sociedade* 37 (135): 519–538.

García-Cabrera, M. D. M., I. González-López, and R. Mérida-Serrano. 2012. "Validation of Evaluation Questionnaire ACWHE. Analysis of Cooperative Work in Higher Education." *Revista de Investigación Educativa* 30 (1): 87–109. doi:10.6018/rie.30.1.114091.

García-Martínez, I., and A. Martín-Romera. 2018. "(Re) Defining Teacher Professionalization Form Different Views." *Profesorado. Revista De Currículum Y Formación Del Profesorado* 22 (1): 1–5.

García-Martínez, I., and A. Martín-Romera. 2019. "Promoting the Pedagogical Coordination through the Middle Leadership in Secondary Education. A Systematic Review." *Bordón. Revista De Pedagogía* 71 (2): 55–70. doi:10.13042/Bordon.2019.67324.

González, R. M., C. H. De la Garza, and M. E. De León. 2017. "Technical School Boards: A Space for Collaboration in Assessing Teaching Practice in Basic Education." *Revista Electrónica De Investigación Educativa* 19 (3): 24–32. doi:10.24320/redie.2017.19.3.1272.

Gremigni, E. 2019. "Alternating School-Work Pathways in Italy. Some Remarks on The" Competence Society." *Partecipazione e conflitto* 12 (1): 217–238.

Gronn, P. 2009. "From Distribute to Hybrid Leadership Practice." In *Distributed Leadership. Different Perspectives*, edited by E. A. Harris, 197–218. London: Springer. doi:10.1007/978-1-4020-9737-9_11.

Häkkinen, P., T. Virtanen, A. Virtanen, P. Näykki, J. Pöysä-Tarhonen, M. Niilo-Rämä, and S. Järvelä. 2019. "Finnish Pre-service Teachers' Perceptions of Their Strategic Learning Skills and Collaboration Dispositions." *Journal of Education for Teaching* , *46*(1), 1–16. doi: 10.1080/02607476.2019.1708628

Hallinger, P., and S. Liu. 2016. "Leadership and Teacher Learning in Urban and Rural Schools in China: Meeting the Dual Challenges of Equity and Effectiveness." *International Journal of Educational Development* 51: 163–173. doi:10.1016/j.ijedudev.2016.10.001.

Hargreaves, A., and M. Fullan. 2012. *Professional Capital: Transforming Teaching in Every School*. New York: Teachers College Press.

Harney, O. M., M. J. Hogan, B. Broome, T. Hall, and C. Ryan. 2015. "Investigating the Effects of Prompts on Argumentation Style, Consensus and Perceived Efficacy in Collaborative Learning." *Springer* 10: 367–394. doi:10.1007/s11412-015-9223-1.

Harris, A. 2014. *Distributed Leadership Matters: Perspectives, Practicalities, and Potential*. ISBN: 9781-41298118-7. Thousand Oaks, CA: Corwin. doi:10.4135/9781483332574.

Harris, A., and M. Y Jones. 2017. "Middle Leaders' Matter: Reflections, Recognition, and Renaissance." *School Leadership & Management* 37 (3): 213–216. doi:10.1080/13632434.2017.1323398.

Hassanien, A. 2006. "Student Experience of Group Work and Group Assessment in Higher Education." *Journal of Teaching in Travel & Tourism* 6 (1): 17–39. doi:10.1300/J172v06n01_02.

Henson, R. K., and J. K. Roberts. 2006. "Use of Exploratory Factor Analysis in Published Research: Common Errors and Some Comment on Improved Practice." *Educational and Psychological Measurement* 66 (3): 393–416. doi:10.1177/0013164405282485.

Herbert., M., W. Guo, D. Jiesi, P. Theresa, D. Philip, and R. G. Craven. 2019. "Confirmatory Factor Analysis (CFA), Exploratory Structural Equation Modeling (ESEM), and Set-ESEM: Optimal Balance between Goodness of Fit and Parsimony." *Multivariate Behavioral Research* 55 (1): 1–18. doi:10.1080/00273171.2019.1602503.

Hilt, L. T., H. Riese, and G. E. Søreide. 2019. "Narrow Identity Resources for Future Students: The 21st Century Skills Movement Encounters the Norwegian Education Policy Context." *Journal of Curriculum Studies* 51 (3): 384–402. doi:10.1080/00220272.2018.1502356.

Hynek, K. A., I. Malmberg-Heimonen, and A. G. Tøge. 2020. "Improving Interprofessional Collaboration in Norwegian Primary Schools: A Cluster-randomized Study Evaluating Effects of the LOG Model on Teachers' Perceptions of Interprofessional Collaboration." *Journal of Interprofessional Care* 1–11. doi:10.1080/13561820.2019.1708281.

Jarauta, B. 2014. "Collaborative Learning in the University: Models and Practice." *REDU. Revista De Docencia Universitaria* 12 (4): 281–302. doi:10.4995/redu.2014.5624.

Jia, Y., Y. J. Oh, B. Sibuma, F. LaBanca, and M. Lorentson. 2016. "Measuring Twenty-first Century Skills: Development and Validation of a Scale for In-service and Preservice Teachers." *Teacher Development* 20 (2): 229–252. doi:10.1080/13664530.2016.1143870.

Jr, R., G. Thomas, and B. Shuck. 2015. "Exploratory Factor Analysis: Implications for Theory, Research, and Practice." *Advances in Developing Human Resources* 17 (1): 12–25. doi:10.1177/1523422314559804.

Kezar, A., and S. Gehrke. 2017. "Strategies for Achieving Scale within Communities of Practice Aimed at Pedagogical Reform in Higher Education." *Journal of STEM Education: Innovations and Research* 18 (1): 57–64.

Lehraus, K. 2015. "How to Integrate Cooperative Skills Training into Learning Tasks: An Illustration with Young Pupils' Writing." *International Journal of Primary, Elementary and Early Years Education* 43 (1): 55–69. doi:10.1080/03004279.2015.961716.

Lillo, S. 2018. "Acknowledging Potential in Preservice Teachers' Collaborative Practices." *Action in Teacher Education* 40 (4): 391–407. doi:10.1080/01626620.2018.1503977.

Lorenzo-Seva, U., and P. J. Ferrando. 2006. "FACTOR: A Computer Program to Fit the Exploratory Factor Analysis Model." *Behavior Research Methods* 38 (1): 88–91. doi:10.3758/BF03192753.

Louis, K. S. 2007. "Changing the Culture of Schools: Professional Community, Organizational Learning, and Trust." *Journal of School Leadership* 16 (4): 477–489. doi:10.1177/105268460601600502.

Lozančić, A. J., S. Basta, and I. Šerbetar. 2019. "Teachers' Attitudes Towards Collaboration with Parents: Development and Evaluation of the Questionnaire." *Sodobna pedagogika/Journal of Contemporary Educational Studies* 70: 136–150.

Martín-Romera, A., and I. García-Martínez. 2018. "Teaching Professionalism Today: Contributions to Professional Development. Profesorado." *Revista De Currículum Y Formación Del Profesorado* 22 (1): 7–23.

Mendo-Lázaro, S., M. I. Polo-del-Río, D. Iglesias-Gallego, E. Felipe-Castaño, and B. León-del-Barco. 2017. "Construction and Validation of a Measurement Instrument for Attitudes Towards Teamwork." *Frontiers in Psychology* 8: 1009. doi:10.3389/fpsyg.2017.01009.

Mifsud, D. 2017. "Distribution Dilemmas: Exploring the Presence of a Tension between Democracy and Autocracy within a Distributed Leadership Scenario." *Educational Management Administration & Leadership* 45 (6): 978–1001. doi:10.1177/1741143216653974.

Mi-Hwa., P., D. M. Dimitrov, A. Das, and M. Gichuru. 2016. "The Teacher Efficacy for Inclusive Practices (TEIP) Scale: Dimensionality and Factor Structure." *Journal of Research in Special Educational Needs* 16 (1): 2–12. doi:10.1111/1471-3802.12047.

Muñoz-Cantero, J. M., N. Rebollo-Quintela, J. Mosteiro-García, and C.-I. Ocampo-Gómez. 2019. "Validation of a Questionnaire of Attributions to the Detection of Coincidences in Academic Work." *RELIEVE* 25 (1): 4. doi:10.7203/relieve.25.1.13599. art.

Murphy, D. L., and B. A. Ermeling. 2016. "Feedback on Reflection: Comparing Rating-scale and Forced-choice Formats for Measuring and Facilitating Teacher Team Reflective Practice." *Reflective Practice* 17 (3): 317–333. doi:10.1080/14623943.2016.1164681.

O'Dwyer, L. M., and J. A. Bernauer. 2014. *Quantitative Research for the Qualitative Researcher*. California: Thousand Oaks: Sage. doi:10.4135/9781506335674.

OECD. 2018. "Políticas Docentes Efectivas: Conclusiones Del Informe PISA [Effective Teaching Policies: Conclusions from the PISA Report]." *OECD* doi:10.1787/9789264301603-en.

Reeves, S., S. Lewin, S. Espin, and M. Zwarenstein. 2010. *Interprofessional Teamwork for Health and Social Care*. Oxford, UK: Wiley-Blackwell.

Revelo-Sánchez, Ó., C. A. Collazos-Ordóñez, and J. A. Jiménez-Toledo. 2018. "Collaborative Work as a Didactic Strategy for Teaching/learning Programming: A Systematic Literature Review." *TecnoLógicas* 21 (41): 115–134. doi:10.22430/22565337.731.

Rodríguez-Molina, G. A., and J. Gairín. 2017. "Influence of the Practices of Pedagogical Leadership in the Educational Pedagogical Practices: Case in Chile of the Pedagogical Technical Units." *International Journal of Educational Leadership and Management* 5 (1): 6–29.

Rosenstein, R. 1994. *The Teamwork Components Model: An Analysis Using Structural Equation Modeling*. Doctoral dissertation. Old Dominion University. Norfolk, VA. doi:10.25777/f43a-p426.

Schmider, E., M. Ziegler, E. Danay, L. Beyer, and M. Bühner. 2010. "Is It Really Robust? Reinvestigating the Robustness of ANOVA Against Violations of the Normal Distribution Assumption." *Methodology* 6: 147–151. doi:10.1027/1614-2241/a000016.

Seidmann, S. 2015. "Identidad personal y subjetividad social: Educación y constitución subjetiva." *Cuadernos De Pesquisa* 45 (156): 344–357. doi:10.1590/198053143204.

Sharma, U., T. Loreman, and C. Forlin. 2012. "Measuring Teaching Efficacy to Implement Inclusive Practices." *Journal of Research in Special Education Needs* 12: 12–21. doi:10.1111/j.1471-3802.2011.01200.x.

Simon, S., and S. Campbell. 2012. "Teacher Learning and Professional Development in Science Education." In *Second International Handbook of Science Education*, edited by B. Fraser, K. Tobien, and C. Y McRobbie, 307–321. Dordrecht: Springer International Handbooks of Education. doi:10.1007/978-1-4020-9041-7_22.

Soledad, I.-S. M., and G. Rodríguez-Gómez. 2011. "Reflections from the Perceived Competence of University Students." *Revista Electrónica Interuniversitaria De Formación Del Profesorado* 14 (4): 73–85.

Stage, A. K. 2020. "Are National University Systems Becoming More Alike? Long-term Developments in Staff Composition across Five Countries." *Policy Reviews in Higher Education* 4 (1): 68–104. doi:10.1080/23322969.2019.1702088.

Stevenson, M., H. John. G., K.-A. O'Sullivan, and C. Howe. 2016. "Leading Learning: The Role of School Leaders in Supporting Continuous Professional Development." *Professional Development in Education* 42 (5): 818–835. doi:10.1080/19415257.2015.1114507.

Stoll, L., R. Bolam, A. McMahon, M. Wallace, and S. Thomas. 2006. "Proffesional Learning Communities: A Review of the Literature." *Journal of Educational Change* 7 (4): 221–258.

Torrelles, C., J. L. Coiduras, S. Isus, X. Carrera, G. París, and J. M. Cela. 2011. "Teamwork Competence: Definition and Categorization." *Profesorado. Revista De Currículum Y Formación De Profesorado* 15 (3): 329–344.

Tyack, D., and W. Tobin. 1994. "The "Grammar" of Schooling: Why Has It Been so Hard to Change?" *American Educational Research Journal* 31 (3): 453–479. doi:10.3102/00028312031003453.

Vesterinen, O., M. Kangas, L. Krokfors, K. Kopisto, and L. Salo. 2017. "Inter-professional Pedagogical Collaboration between Teachers and Their Out-ofschool Partners." *Educational Studies* 43 (2): 231–242. doi:10.1080/03055698.2016.1277131.

Wingrave, M., and M. McMahon. 2015. "Professionalisation through Academicisation: Valuing and Developing the Industry in Scotland Early Years." *Professional Development in Education* 42 (5): 710–731. doi:10.1080/19415257.2015.1082075.

Appendix 1. Questionnaire on Collaboration and Shared Professional Learning (QCSPL)

Factor 1: Assertiveness and personal willingness to work together

1. When I have any doubts, I ask my colleagues to help me
2. I like to talk with my colleagues to achieve the best solutions together.
3. I prefer to listen when I make decisions and let others speak first.
4. I consider that brainstorming is essential to improve my point of view on any issue.
5. I concern myself when a discussion takes place within the group.
6. I am interested in the progress of my colleagues to achieve our common goals.
7. When I learn something new I tell my classmates so they also know it.
8. I feel satisfied when I help my colleagues.
9. I work together with my colleagues to achieve benefits for all.
10. I am responsible, mainly, when I work together with others because everyone depends on everyone
11. I am persistent.
12. I feel good about working in a group.
13. I fulfill the tasks assigned to me with the highest effort.
14. I seek cohesion within the group.
15. I take into account other people' opinions before I make decisions.
16. I am very creative.
17. I like to discuss the group' s common interests with my peers.

Factor 2: Group Cohesion

18. I believe that establishing and keeping turns to speak is essential to achieve effective communication.
19. I am innovative.
20. I am involved with my working group.
21. I am selfish when I interact with others.
22. I contribute for the achievement of an excellent group atmosphere.
23. I rarely agree with the opinion of most people in the group.
24. I prefer to clarify possible misunderstandings before keeping silent.
25. I am inflexible with the established work plan if it does not fit my thinking.
26. I am aware of other people' needs.
27. I usually avoid meetings with my co-workers.

Factor 3: Leadership capacity

Factor 1: Assertiveness and personal willingness to work together

28. I feel safe speaking in public.
29. I am participative.
30. I am very assertive when I express my ideas
31. I influence my colleagues.
32. I have confidence in myself.
33. I am independent.
34. I feel confident when I lead the group.
35. I am emotionally intelligent.
36. I know how to effectively address and manage my own and my colleagues' positive and negative emotions.
37. I encourage my colleagues to continue working.

Factor 4: Group Awareness

38. I feel afraid to express my opinion to others.
39. I struggle to establish social relationships.
40. I prefer to work alone.
41. I am very individualistic
42. I dislike working with partners I have no affinity with.
43. I tend to get blocked by the difficulties.
44. I am not emotionally strong.