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Building a Common Project by Promoting Pedagogical Coordination and Educational Leadership for School Improvement: A Structural Equation Model

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Abstract: Leadership and teaching practices are the most important factors that affect student learning. Many studies have pointed out the combination of both of them in a common project as a guarantee to achieve school improvement. The present study sets out to define and contrast an explanatory model of pedagogical coordination as a function of management leadership, collaborative working, setting common goals, participation in decision making, involvement of teaching staff and professional development of teachers, in a sample of pedagogical leaders from secondary schools. A final sample of 547 participants from Granada and Jaen (Spain) was obtained. An instrument adapted from the DLI questionnaire (Hulpia 2009) was administered. Path analysis was conducted, which displayed good model fit for all considered indices (χ^2 = 10.937; df = 2.187; $p < 0.001$; CFI = 0.998 TLI = 0.993; GFI = 0.994; RMSEA = 0.047). The main result was the identification of positive relationships between all dimensions of the questionnaire. It can be concluded that management plays a key role in the establishment of common goals at the school. Another important finding was that collaborative conditions should be present to favour the involvement and professional growth of the teacher. In summary, the existence of all of these conditions leads to high levels of all indices of pedagogical coordination in the examined secondary schools.

Keywords: pedagogical coordination; management leadership; middle leaders; teacher professional development; secondary education; SEM

1. Introduction

Pedagogical coordination incorporates organisational and curricular aspects (Harris and Jones 2017; Leithwood 2016). The types of management and leadership exercised to this end exert a direct influence on the consolidation of a strong and efficacious pedagogical coordination throughout the secondary school (García-Martínez and Martín-Romera 2019). Coordinative actions are considered to result from the presence of a collaborative working climate within which clearly defined goals and educational outcomes, set by the management team, operate. In this regard, the promotion of teaching practices oriented towards collaboration and encouraging feedback are promoted. In the same sense, a continued desire on the part of the teachers to develop themselves professionally in the pursuit of raising the quality of teaching and learning processes is also important. All of the above result in

greater involvement of the teacher in the pedagogical decision-making of the school and a substantial improvement in the professional development of the teacher (Hallinger and Heck 2010; Harris 2014; Hokka and Eteläpelto 2014; Stevenson et al. 2016; Wingrave and McMahon 2015).

Along the same lines, it has been proposed that pedagogical leadership influences the quality of educational processes, which are a notable aspect of the professional performance of staff. Depending on the type of leadership perpetrated by management, its high position at the top of the organisational pyramid means that certain dynamics and actions will be learned and adopted at the school. To an even greater extent than the heroic modalities of leadership, the distribution of management leadership throughout the organisation is one of the main focuses of current research (Anderson and Sun 2017; Malloy and Leithwood 2017). Through distributing or delegating management leadership, management empowers other key figures in the school. For example, the presence of shared leadership inspires the development of shared projects geared towards scholarly improvement. Taking this perspective, figures such as the heads of studies or the heads of department assume leadership functions and act as a link between the management team and the rest of the staff. When focused towards common objectives, staff work together to ensure their achievement. From this emerges commitment, collaboration, and shared professional learning due to the exchange of practices, participation, and involvement of the majority in overcoming challenges. Studies such as that conducted by Boylan (2018) have identified a tight relationship to exist between teaching practices and professional learning, positioning the teacher as a crucial cog in scholarly improvement with distributed leadership being the best route towards achieving it. Thus, as has been suggested through international policies (Díaz-Delgado and Garcia-Martinez 2019; Egido 2015; OCDE 2009), it is imperative to place emphasis on the importance of teachers' involvement in setting the agenda for development, interacting with peers, and evolving and testing their own responses to pedagogic challenges (Boylan 2018, p. 88).

In these circumstances, the department acts as the backbone of coordination, providing ideal conditions for secondary teachers to develop their professional abilities. Further, an exchange of experiences takes place in the classroom with collaborative working emerging between all actors. This ultimately translates into better professional development of teachers (Fullan 2010; Hargreaves and Fullan 2012).

At an organisational level, management sits at the apex of the school hierarchy. However, a large disparity in their functions and challenges leads them to tackle purely pedagogical questions in other coordination bodies. In Spain, the Technical Team of Pedagogical Coordination (TTPC) acts as the most important organisation in the management of pedagogical issues. This organisation is formed by members of the management team of schools (management and head of studies) and the heads of department. In fact, if schools are viewed through the lens of a functional pyramid, secondary schools in the Spanish context are arranged into didactic departments. In this way, the department heads are positioned as links between the management team and the teachers belonging to that department (Cutanda-López and González-González 2015; Seobi and Wood 2016). Dissimilarities seen between the relevant bodies for pedagogical coordination found in secondary education, together with the different dispositions of "figures of power" at different levels of the organisation, make it important to precisely assess the capacity of leaders. Similarly, the link between shared pedagogical leadership and the overriding professional fabric of the school will produce an improvement in the quality of learning (Boylan 2018; Grootenboer 2018; Liu et al. 2016).

In this way, good pedagogical coordination will favour the integration of groups committed to collaborative working and, at the same time, will optimise their professional development (Javadi et al. 2017). Sharing concerns and professional practices allow individuals to evolve as teachers and to avoid falling into routine or improvisation (Hauge et al. 2014). Being part of a teaching team will also increase the opportunities for educational research, which in turn helps to provide answers to professional uncertainties and unknowns (Wahlstrom and Louis 2008).

The organisational abilities drawn from those schools at which management promotes autonomy and shifts power onto the staff open the door to further shifts towards decentralisation. Through this,

these schools offer their staff opportunities for active involvement and participation in the processes of decision making at the school (Bjôrk and Blase 2009). Indirectly, establishing clear objectives for the school and encouraging the assumption of responsibilities on the part of the various educational players will avoid task repetition and ensure more efficient use of the resources available in the school (Seobi and Wood 2016).

Thus, the scientific literature proposes a need to better understand the factors that influence scholarly improvement and how these factors can be combined to achieve this. Taking into account the existing consensus in the literature regarding pedagogical leadership, teacher collaboration, and the establishment of a shared project to achieve school improvement, it is necessary to clarify how these factors are combined in the Spanish context. Thus, the objectives of this study are the following: (1) to define and contrast an explanatory model of pedagogical coordination in secondary education; and (2) to analyse the existing relationships between management leadership, collaborative working, setting shared goals and participation in decision-making, and to consider their impact on teacher involvement and professional development of teachers through structural equation analysis.

2. Method

2.1. Design and Participants

This descriptive cross-sectional study was delivered to members of the TTPC and heads of department from secondary schools in Jaen and Granada.

For calculating the sample, random sampling stratified at the school level was conducted, with 181 secondary schools in the cities of Jaen and Granada being invited to participate voluntarily. At the end of the process, agreement to participate was obtained from 90 schools (approximately 50% of the invited population). However, large heterogeneity was noted in the level of participation between schools. As a result, in order to achieve greater power from the included sample, an approximate calculation regarding the number of participants belonging to each school was made. For the estimation of the mean, an average population of 18 participants per school was determined, producing an estimated overall population of 3709 (N = 3983). It must be highlighted that the data collection process could not employ individual monitoring to guarantee that the same individual would not complete measures more than once in order to avoid data duplication. Notwithstanding, the sample size reported in the present study did provide adequate power for the developed model to be tested, with sampling error being no greater than 4%. The final sample consisted of 547 participants, with 54.1% being male and 45.9% being female. With regards to age, the mean age of participants in the sample was 47.31, with males generally being older than the mean (48.78), and females being generally younger (45.60). Two large groups were distinguished from within the participants of the present study: the management team (management and head of studies), which represented 32.91% (N = 180) of the sample, and the personnel assigned to pedagogical coordination (area coordinators and department heads) who formed 67.09% (N = 367) of the sample.

2.2. Adaptation of the Questionnaire

The adaptation to Spanish of the Distributed Leadership Inventory in educational leaders was done through three phases:

The first was to translate into Spanish the original questionnaire developed by (Hulpia et al. 2009). The translation was realised by 8 experts in the educational leadership field, forming part of an international leadership network. The original questionnaire only evaluates the leadership of the principals. Secondly, the experts decided that it would be interesting to learn about the possibilities of the leadership of other leading figures in secondary schools, such as heads of studies and department heads. Therefore, the first 13 items of the original questionnaire were tripled. Third, the questionnaire was administered to 53 secondary school leaders in the city of Seville. The aim of this stage is to find the wrong items and potential errors in the items' comprehension and redaction. Once the final test

was obtained, it was administered to 547 educational leaders of secondary schools in the cities of Jaen and Granada. All secondary schools in the two cities were contacted, and, finally, 565 answers were obtained. A total of 18 questionnaires were excluded as they were not properly completed.

2.3. Measuring Instrument

The factors considered in the present study were estimated using a validated measure adapted from the Distributed Leadership Inventory (DLI Questionnaire) designed by Hulpia (2009). This measure that categorises responses into two parts has been previously described as follows: The first part focuses on the leadership functions of the members of leadership team; the second part focuses on the characteristics of the leadership team (Hulpia et al. 2009, pp. 1017–18).

The questionnaire in its original version was structured according to 5 dimensions: support, supervision, participative decision making, cooperation within the leadership team and organizational commitment. The DLI consists of 39 items overall. One of these is control which presents five response options ranging from 0 to 4 and has attained elevated internal consistency indices for all of its dimensions (Hulpia et al. 2009). With regards to Cooperation dimension of the leadership team, confirmatory analysis obtained the following values: χ^2 = 138.098 (df = 35; $p < 0.001$), CFI = 0.978, TLI = 0.972, SRMR = 0.026, RMSEA = 0.056 and Cronbach's α: 0.93. The Support dimension and the Leadership supervision dimension identified differences between head teachers, deputy head teachers and teaching leaders, with the following scores being obtained:

- Head teachers: χ^2 = 353.840 (df = 64; $p < 0.001$), CFI = 0.960, TLI = 0.952, SRMR = 0.042, RMSEA = 0.069
- Deputy head teachers: χ^2 = 361.794 (df = 64; $p < 0.001$), CFI = 0.957, TLI = 0.948, SRMR = 0.047, RMSEA = 0.070
- Teaching leaders: χ^2 = 390.001 (df = 64; $p < 0.001$), CFI = 0.943, TLI = 0.931, SRMR = 0.044, RMSEA = 0.073 Cronbach's α support: 0.91 (teaching leaders); 0.93 (head teachers, deputy head teachers)
- Cronbach's α for supervision: 0.79 (teaching leaders); 0.83 (head teachers); 0.85 (deputy head teachers)

Further, this same questionnaire has also been validated and adapted for use in primary education in Chile by López-Alfaro and Gallegos-Araya (2015). In the process of adaption and validation, this study reduced the number of items though scores for internal consistency remained elevated. The authors stated the questionnaire is an adaption of the original DLI scale, consisting of a scale composed of 42 items rated on a Likert scale (López-Alfaro and Gallegos-Araya 2015, p. 6). It is distributed according to six scales: cooperation of leadership teams (10 items, α = 0.93), support from the head teacher (10 items, α = 0.93), support from the management team (10 items, α = 0.91), supervision from the head teacher (3 items, α = 0.83), supervision from the management team (3 items, α = 0.79) and participation in the decision-making process (6 items, α = 0.93).

The validation and adaptation conducted for the use of the DLI questionnaire in the Spanish context produced a measure that is composed of four subdimensions: management, head of studies, head of department and functioning of the school.

Table 1 shows confirmatory factor analysis according to the groupings of the questionnaire, attained the following dimensions: management leadership (Management), leadership of the head of studies (head of studies), leadership of the head of department and management of the head of department (head of department), and school functioning, job satisfaction and leadership identity.

A high level of reliability is found for all of the dimensions of the questionnaire, with 0.84 being the lowest value obtained for Cronbach's alpha. With regards to the parameters of model fit, good fit can be concluded with GFI values being close to or higher than 0.90, AGFI values being consistently higher than 0.90 and RMSR values varying between 0.038 and 0.059.

Table 1. Dimensions of the questionnaire—reliability and model fit.

Group of Questions	Dimensions	Items	Cronbach Alpha	GFI	AGFI	RMSR
Management	Management of leadership	1 to 13	0.958	0.891	0.954	0.050
Head of studies	Leadership of the head of studies	14 to 25	0.954	0.800	0.954	0.059
Head of department	Leadership of the head of department	26 to 35	0.940	0.986	0.937	0.048
	Management of the head of department	36 to 38	0.915			
School functioning	School functioning	39 to 56	0.968	0.874	0.977	0.038
	Job satisfaction	57 to 61, 64	0.859			
	Leadership identity	62 and 63	0.840			

2.4. Procedure

The first step was to contact all schools in the cities of Jaen and Granada via telephone and through institutional mail. However, due to the low response rate achieved, a researcher from the study team proceeded to visit each school and personally invited them to participate. During this visit, the expectations and objectives of the study were explained to the management teams, and schools were informed that they would receive feedback on relevant findings should this be requested. Schools were also given the opportunity to complete measures in paper format or online using the Google tool, Google forms. Once consent to participate in the study was received from the schools, data collection using the previously described questionnaires was conducted, taking place between January and April 2018. Eighteen questionnaires were discarded as responses were found to be extreme outliers (Marôco 2010). The present study followed the principles set out in the statement of the Declaration of Helsinki relating to research studies.

2.5. Data Analysis

The statistical software package IBM SPSS ® (IBM Corp, Armonk, New York, NY, USA.), version 24.0 for Windows was used to conduct basic descriptive analysis. The Program IBM AMOS ® 23 (IBM Corp, Armonk, New York, NY, USA) was used to construct the structural model and examine associations between the included factors. Following the development of the theoretical model, path analysis was conducted that considered associations of the variance matrix through structural equation analysis. The variables included in this model are endogenous and observable, thus being pictorially represented using squares.

Model fit was calculated in order to establish the compatibility of the proposed model with the empirical data obtained. Adequacy of model fit was established according to the goodness of fit criteria described by Marsh (2007, p. 785). When considering chi-squared analysis outcomes, non-significant values associated with p indicate good model fit. Values for confirmatory fit index (CFI) analysis will be considered acceptable if greater than 0.90 and excellent if greater than 0.95. Similarly, parameters for the index of non-normalised fit, also known as the Tucker–Lewis index (TLI), are acceptable when they are higher than 0.90 and are considered to be excellent when they exceed 0.95. Goodness of fit indices (GFI) that are closer to 1 are considered to show better fit, with good fit being concluded when values are higher than 0.90. Finally, values for root mean square error approximation (RMSEA) will be considered to be excellent when lower than 0.05 and are considered acceptable if lower than 0.08.

3. Results

The structural equation model proposed in Figure 1 revealed good fit for all indices. Chi-squared analysis showed a significant p-value ($\chi^2 = 10.937$; df = 2.187; $p < 0.001$). However, it should be noted

that this index does not permit standardised interpretation and, for this reason, other standardised indices of model fit that are less sensitive to sample size were also used. Comparative fit index (CFI) analysis produced a value of 0.998, being excellent. Tucker–Lewis index (TLI) analysis produced a value of 0.993, while the value resulting from goodness of fit index (GFI) analysis was 0.994. Root mean square error approximation (RMSEA) analysis produced a value of 0.47.

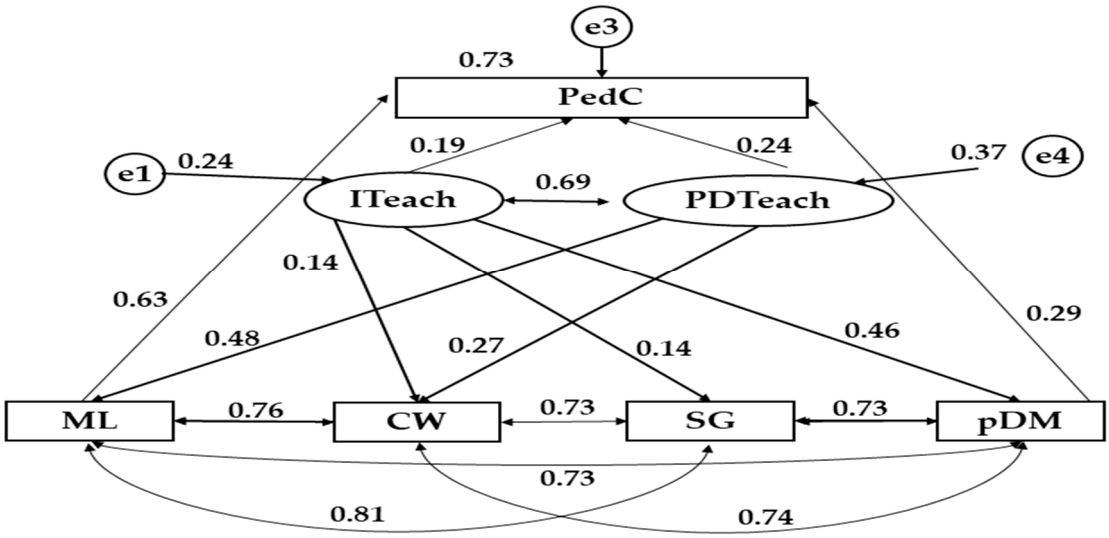

Figure 1. Theoretical model. Note: ML, management leadership; CW, collaborative working, SG, shared goals; pDM, participation in decision making; ITeach, involvement of teaching staff; PDTeach, professional development of teachers; PedC, pedagogical coordination.

Further, strong associations are seen between the variables describing management leadership, collaborative working, shared goals and participation in decision making, with obtained values varying between 0.73 and 0.81. In addition, Figure 1 shows a moderate association between management leadership and pedagogical coordination, with a value of 0.63 being obtained. The leadership exercised by management was also found to impact upon the professional development of teachers, with a value of 0.37 being obtained. The collaborative work dimension was found to lightly influence the involvement of teaching staff dimension (0.14) and moderately influence the professional development of teachers dimension (0.48). The variable describing shared goals was found to weakly impact on the involvement of the teaching staff (0.27). With respect to the factor describing participation in decision making, moderate influences were observed on both the involvement of teaching staff (0.46) and on the variable describing pedagogical coordination (0.37). Finally, the involvement of teaching staff variable revealed a moderate-to-strong impact upon the professional development of teachers variable, with a value of 0.69 being produced. As can be seen, the developed model outlines positive and significant ($p < 0.05$) associations between all of the included variables.

Table 2 shows strong relationships between the variables of management leadership, collaborative work, shared goals, and participation in decision-making, obtaining scores ranging from 0.735 to 0.812. Likewise, it has been observed how the shared goals are associated significantly with collaborative work at the $p < 0.005$ level (r = 0.733). Management leadership obtains statistically significant differences with participation in decision making at p-level <0.005 (r = 0.731) and with collaborative work (r = 0.757). There are also statistically significant differences at $p < 0.005$ associated with participation in decision-making with collaborative work (r = 0.735) and with shared goals (r = 0.726).

Table 2. Significant associations for the included variables.

	Estimate	SE	CR	P.	Estimate
SG ← ML	0.297	0.020	14.502	***	0.812
pDM ← ML	0.317	0.023	13.572	***	0.731
CW ← pDM	0.287	0.021	13.603	***	0.733
CW ← ML	0.341	0.025	13.621	***	0.735
SG ← CW	0.340	0.025	13.513	***	0.726
CW ← ML	0.273	0.020	13.877	***	0.757

Note: *** Significance at level $p = 0.001$. ML, management leadership; CW, collaborative working, SG, shared goals; pDM, participation in decision making; ITeach, involvement of teaching staff; PDTeach, professional development of teachers; PedC, pedagogical coordination.

Likewise, Table 3 shows direct relationships between shared goals and the involvement of teaching staff at $p < 0.005$ level (r = 0.272). Regarding the associations between participation in decision making and involvement of teaching staff and pedagogical coordination, the statistically significant differences are shown at $p < 0.005$ (r = 0.455; r = 0.370), respectively. The associations between management leadership and professional development of teachers (r = 0.144) and pedagogical coordination (r = 0.294) are also found. There are statistically significant differences between collaborative work and the professional development of teachers (r = 0.483). Finally, there are also statistically significant differences between the involvement of teaching staff and the professional development of teachers (r = 0.294). Finally, no significant differences were observed between collaborative work and the involvement of teaching staff, as well as between the involvement of teaching staff and pedagogical coordination.

Table 3. Standardised regression weights.

	Estimate	SE	CR	*P*	Estimate
iTeach ← CW	0.142	0.045	3.175	0.001	0.138
iTeach ← SG	0.278	0.044	6.357	***	0.272
iTeach ← pDM	0.391	0.037	10.614	***	0.455
PDTeach ← ML	0.147	0.039	3.729	***	0.144
PDTeach ← CW	0.460	0.038	12.279	***	0.483
DPDoc ← iTeach	0.271	0.032	8.594	***	0.294
PedC ←Iprof	0.109	0.40	2.734	0.006	0.103
PedC← PDTeach	0.280	0.42	6.741	***	0.244
PedC← pDM	0.337	0.036	9.430	***	0.370
PedC← ML	0.285	0.042	6.717	***	0.244

Note: *** Significance at level $p = 0.001$. ML, management leadership; CW, collaborative working, SG, shared goals; pDM, participation in decision making; ITeach, involvement of teaching staff; PDTeach, professional development of teachers; PedC, pedagogical coordination.

4. Discussion

The present study reports the outcomes produced from conducting a multi-group structural equation analysis examining the associations between management leadership, collaborative working, working towards shared goals and participation in decision making, with the involvement of teaching staff and professional development of teachers. Further, findings are considered in the context of their relationship with an influence on pedagogical coordination. The developed path model achieved good fit indices. This suggests that it forms a consistent explanatory model of the measured data, which is capable of facilitating a better understanding of the pedagogical coordination construct based on the examined relationships between educational leadership, promotion of a culture of collaboration and teacher involvement.

Similarly to the model presented in the present study, previous studies such as that conducted by Liu et al. (2016) developed a scale capable of evaluating leadership focused on learning and trust of teaching staff. This scale was based on instruments that had been previously developed to estimate

instructional leadership, transformational leadership and distributed leadership (Goldring et al. 2009; Hallinger and Murphy 1985; Leithwood et al. 2010; Walker and Ko 2011; Yu et al. 2002). The resulting scale identified four factors that deal with the vision of learning constructed by leaders in schools and the model we proposed to explain pedagogical coordination in schools. Their factors provide information pertaining to the support provided by leaders under the conditions imposed by the normal learning climate, management, organisation and participation of leaders in the promotion of school programs, and the way in which management promotes and capitalises on opportunities for professional learning of personnel.

Findings from the present study corroborate those reported by Piyaman et al. (2017), who developed a model of teaching leadership. This model contemplated factors such as leadership centred on learning, professional learning of teachers, trust and teacher agency. In aligning this model with the one produced in the present study, the additional variable of trust refers to teaching collaboration, in that it deals with the extent to which teachers are positively disposed towards working with their colleagues towards common objectives that coincide with the school's vision. It also relates to perceptions of teacher involvement and professional development of teaching staff, as reported by the present model. According to the authors of this previous model, trust results in a willingness to engage with colleagues in collaborative activities that foster exchange and shared learning. When these varied facets of trust describe professional relationships in the school environment (...), teachers are more likely to cooperate, collaborate, and engage in professional learning (Piyaman et al. 2017, p. 720). Another variable that can be seen to recur throughout analyses included in previous studies is that of teacher agency. This variable corresponds to the fusion of shared goals, participation in decision making and involvement of teaching staff that is described in the present study. A number of similarities can also be seen between the model previously proposed by Piyaman et al. (2017) and the present model, although different terminology is again used. While the previously reported model centres on the teacher's role as an agent of change, the present model shifts the focus onto the relationships that are produced in a school characterised by a strong sense of belonging and clearly defined educational objectives. The present model moves beyond placing emphasis on the teacher as an educational agent and expands interest into the staff at their disposal and the social fabric formed when personnel unite to achieve a solid and efficacious pedagogical coordination in all teaching and learning processes.

There are other studies that they have joint educational leadership with curricular matters. An example is the one conducted by Albashiry et al. (2016), which related educational leadership capacity with curricular management, the availability of resources, time and space, and above all, staff management. According to this previous study, coordinating the various and complex curriculum-development activities is an important curriculum–leadership task as there are many variables affecting curriculum work such as people, space, time, and products (Albashiry et al. 2016, p. 402). In this regard, teachers themselves also have a role to play in the achievement of scholarly improvements. In fact, teachers' activities constitute a form of adaptive leadership involving innovating and organising professional development within arenas of leadership through the processes of mobilising, brokering and the creation of networks (Boylan 2018, p. 86).

According to our findings, the head of studies is the figure with the greatest responsibility for coordination in the Spanish context, while other studies have placed middle leaders as figures also capable of resolving difficult challenges (Grootenboer 2018; Piyaman et al. 2017). In this way, educational leadership provides an impetus for the professional learning of teachers (Boylan 2018). Nevertheless, the presence of other leaders in schools that make room for a culture of collaboration characterised by shared decision making and greater teacher involvement brings with it great challenges that must be tackled by the managers themselves, alongside their middle managers. Factors such as receiving professional support act as important catalysts in overcoming difficulties faced by personnel when assuming leadership functions. In fact, Albashiry et al. (2016) concluded in their study that department heads were unsuccessful in enacting the leadership functions expected of them. This

was due to a lack of professional preparation for performing a curricular leadership role, both prior to and during their time of service and a lack of support in overcoming this challenge. Amongst their main functions, importance is highlighted with regards to establishing and communicating a clear sense of direction for the academic department [...] to provide support and a structure for curriculum work [...], encouraging and motivating the department's teachers to work on curriculum development (Albashiry et al. 2016, p. 402). These are key aspects of successfully engaging teaching staff who typically deem working on a shared project to be an additional burden lacking in incentives (Azorín and Daniel 2017).

Shared professional learning and professional development are other factors that influence pedagogical coordination and have inspired an extensive variety of research studies. For example, Boylan (2018) proposed a model of professional development in which teaching leadership occupied an important place, as did an analysis of effects at the micro, meso and macro levels of management. In the same paper, it is stated that the concepts of adaptive and enabling leadership provide fine-grained conceptual tools to examine the process of leadership practice, particularly in relation to innovation, response and purpose, networking and system working. (Boylan (2018), p. 92). Similarly, when analysing leadership from an adaptive perspective, it is advised to consider these key aspects: leader as innovator, leader as responsive and purposeful, leader as networker and leader as system worker (Boylan 2018, pp. 91–92). In summary, this previously developed model shares certain similarities with the model of pedagogical coordination presented in the present study. The vision of educational leadership discussed by Boylan (2018) concurs with the establishment of shared goals, the impact of professional identity and the effects of school management, as reported in the present study. Likewise, it also possesses a vision oriented towards change, which provides opportunities to improve professional and personal capital (Fullan 2010; Hargreaves and Fullan 2012). Similar effects are contemplated in the present research, albeit indirectly. While Boylan (2018) developed a model from a population of mathematics teachers, the present study elaborated its model from the responses given by head teachers and middle leaders at secondary schools. Beyond these differences, no other notable differences are seen between this previously developed model and the present model. Further, future perspectives for research could consider conducting complementary analyses of emergent factors that facilitate improvement in schools.

De Nobile (2017) has recently developed a model of intermediate leadership in secondary schools, similar to that of the present study. This author's model centres on factors that ensure the effectiveness of these leaders, the impact of this on the management of the school and the various roles that can be assumed by leaders. Concretely, it distinguishes between entrance variables (head teacher support, professional development, school culture, enthusiasm/drive, knowledge of the curriculum, pedagogy and assessment) and exit variables (teaching quality, teachers attitudes and student outcomes) which when considered together help to respond to questions about the type of leadership role that may be assumed by middle managers (student-focused role, administrative role, organisational role, supervisory role, staff development role and strategic role).

The importance attributed to professional teaching performance and academic results was one of the main motivations behind the development of the present model, from which the overall aim was to examine pedagogical coordination. Further, contemplation of the head teacher as a source of support for school staff, development of a school culture, enthusiasm and knowledge of the curriculum, and pedagogy and evaluation are all factors considered to be important for the achievement of an efficacious pedagogical coordination. From this, a parallel model can be established that is characterised by management leadership (pedagogical), setting shared goals, the involvement of teaching staff and establishing a strong culture of collaboration. With respect to the factors denominated as outputs, these would be analogous to the variables of teacher professional development and pedagogical coordination. Both management of the relationships within the organisation and achievement of effective communication are equally seen to contribute positively from a collaborative standpoint. This is in agreement with the perspective presented in the present study regarding organisational and

curricular management. As has been previously indicated by De Nobile (2017), a degree of flexibility is highlighted by both models with regards to the selection of constructs to be studied, noting that these constructs should be considered as a starting point from which successive theoretical models can be formed. In relation to the discrepancies found between this model and the present study, this model outlined students and administrative staff as potential leaders, whereas the present model reserved this consideration exclusively for department heads and area coordinators.

Another similar study that can be considered was conducted by Smith et al. (2013), who followed the concept of coordination proposed by Van Deventer and Kruger (2003). These authors defined coordination as a process through which school managers try to relate people, tasks, resources, and time schedules in such a way that they are complementary as well as supplementary, and support the whole school in realizing the aims and outcomes of the school (Van Deventer and Kruger 2003, p. 123), highlighting the importance of department heads. According to these authors, these figures have a responsibility to create and support the conditions under which quality processes of teaching and learning are developed.

Along the same lines as the present study, the study developed by Heng and Marsh (2009) was conducted with the intention of making sense of the leadership role assumed by middle managers within decentralised schools oriented towards the development and innovation of professional capital. This study seeks to understand how a distributed perspective of leadership can become systematised within schools. Through a formative program, participants become consciously aware of the importance of learning abilities and capacities with regards to curricular and personal management geared towards achieving change within the institution. The authors commented on resistance being demonstrated by participants in promoting shared decision making during the program. Further, they highlighted the epistemological transformation of the role of teaching staff into that of an agent of change, which brings with it an abolition of inherited school cultures alongside conservative educational systems. Likewise, they also confer a central role upon management (and other school leaders) in the paradigmatic reconfiguration of the processes of change, leading to educational improvement and professional role development in teachers. In agreement with Heng and Marsh (2009), the position taken by these figures within the organisation gives them opportunities to contribute to meaningful conversations about shared leadership as they initiate and contribute to the development of structures and processes that in turn shape expectations for the larger school community (Heng and Marsh 2009, p. 526).

5. Conclusions

The present study produced two main conclusions. Firstly, an explanatory model was developed, providing key tools with which efficacious pedagogical coordination in secondary education can be achieved. These tools have been shown to exert a strong influence both in the scientific literature overall and in the results obtained in this study, with 547 participants from the cities of Granada and Jaen (Spain). These findings, based on the model developed, have confirmed what has been stated in the literature about how to unify leadership, teacher collaboration and the establishment of a common project to improve schools within the Spanish context. The present study provides support for a series of factors related to the educational organisation, school staff and development of a school culture, which impact upon professional capital and staff teaching. The pertinent statistical analysis conducted evaluated the emergent relationships between these factors and achieved values indicating good model fit.

In addition, the developed model compared the included variables with those used in other related studies in the field, identifying some fundamental similarities and discrepancies between models. Specifically, the majority of literature reviewed reported strong associations between management leadership and establishment of a scholarly culture in the school, which can be seen in the trend towards collaborative working dynamics, the setting of shared goals and active participation in decision making. This is corroborated by the studies of De Nobile (2017) and Piyaman et al. (2017), which identified enthusiasm/drive and teacher agency as two separate variables exerting a large influence.

Their synonyms, involvement of teaching staff and the professional development of teachers, complete the factors showing the greatest influence on school coordination.

Finally, the model developed reinforces the importance of the management and other middle leaders to manage and build organizational conditions, in order to establish a collaborative environment among teachers and promote their involvement and professionalism to achieve a common goal. Working collaboratively to achieve this common goal means working to achieve effective pedagogical coordination in secondary schools, enabling school improvement.

Limitations and Future Research

The main limitations of the present study include a lack of consideration of the emergence of student leaders as potential allies to middle managers in the improvement of pedagogical coordination. In this sense, it would be interesting to also contemplate this factor in the development of other models in the same way in which other factors have been considered. The rigidity of the sample from the present study could also present a limitation. In future studies, it would be interesting to replicate the present study whilst extending participation to wider teaching staff who do not hold a position of authority or a management role in schools. This would enrich the pedagogical vision of leadership and delve into the real possibility that other figures within the organisation are also willing to assume the responsibilities linked with it.

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