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Transformational leadership and the learner-centred teaching approach

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Adopting learner-centred teaching approaches is important to advance student performance in Mexican rural communities, which have historically been disadvantaged. Yet, little research exists on the factors that might promote the use of this teaching approach. In the study reported on here we examined the associations between principals' transformational leadership, school climate, teacher commitment to learners, and learner-centred teaching practices. In total, 174 teachers were selected from 26 tele-secondaries in the state of Tabasco, Mexico. A structural equation model was calculated. Results do not provide evidence to support a direct association between transformational leadership and the use of learner-centred teaching. However, an indirect relationship was found between the effects of school climate and teacher commitment. These findings indicate that enhancing school climate and teachers' commitment through a transformational leadership style are key to foster an environment for learner-centred teaching.

Keywords: leadership; rural education; school climate; school principal; teaching

Introduction

Despite governmental efforts, educational gaps are greater in disadvantaged communities in Mexico, especially in rural locations (National Institute for the Evaluation of Education [INEE for its Spanish acronym], 2019b). Rural communities in Mexico not only face poverty and high rates of school dropouts, but the alarming issue of the potential academic lag of rural learners compared with their peers from urban communities. This condition is especially concerning for a country where about 24.5% of its population lives in rural areas (National Institute of Statistic and Geography [INEGI for its Spanish acronym], 2019).

The Mexican government strives to provide its citizens with the knowledge and skills needed to continue with higher secondary education, but with limited results. Additionally, providing lower secondary education to the 11th largest population in the world has proven to be unaffordable and difficult for a country that has about 200,000 rural and far-flung communities (National Population Council [CONAPO by its Spanish acronym], 2014). In 1968, the Mexican government launched the tele-secondary project as an effort to expand educational coverage across the country. Although the tele-secondary system has gone through various reforms to improve its educational plans and programmes, the performance of tele-secondary students on standardised tests is still poorer than students from regular schools (INEE, 2019a; Wolff, De Moura Castro, Navarro & García, 2002).

Meanwhile, as the country continues striving to figure out the factors that might improve educational effectiveness, Lewis, Boston and Peterson (2017) highlight that globalisation has shifted what is expected and necessary from educators to advance learners into 21st century requirements. In other words, the end goals are shifting and evolving at the same time that educators in the country are trying to figure out how to meet them and close academic lag as well. Although the literature suggests that learner achievement depends on multiple factors (Gilar-Corbi, Miñano, Veas & Castejón, 2019; Murillo Torrecilla & Román Carrasco, 2011), the adoption of learner-centred teaching approaches in classrooms has proven to be a determinant factor influencing overall learner performance in a number of studies (Cordero & Gil-Izquierdo, 2018; Lazarides & Buchholz, 2019; Witziers, Bosker & Krüger, 2003).

Whereas international studies have provided consistent evidence that demonstrate the potential positive effects of learner-centred teaching on learner performance, domestic education policy had to evolve. Recently, the Mexican government not only endorsed, but also required the adoption of learner-centred teaching strategies in classrooms (Gobierno de México, 2019). However, its adoption at a policy level cannot ensure implementation by itself. In fact, what still remains unclear is how Mexican teachers will engage in this kind of teaching (Bonilla-Ruiz, 2020). Undeniably, Mexican schools must transform themselves into institutions capable of educating individuals to face the changing social, political, and economic conditions of a globalised world. Nevertheless, this paradigm shift requires steady efforts from at least two of the main school stakeholders: principals and teachers.

Background

The tele-secondary system was created to complement rather than replace traditional lower secondary school in Mexico. It was launched in 1968 by the Mexican government as a means to extend lower secondary education to rural and isolated communities across the country (Wolff et al., 2002). Typically, learners who enrol in this educational system come from disadvantaged backgrounds (Secretary of Public Education [SEP by its Spanish acronym], 2010). While the northern states enrol less than 10% of tele-secondary learners, between 39% and 45% come from the states of Zacatecas, Veracruz, Hidalgo, Tabasco, and Puebla (INEE, 2005). Currently, 18,754 tele-secondaries serve 1.43 millions of Mexican learners, representing 21.4% of all junior secondary learners in the country (Navarro-Sola, 2019). The tele-secondary system became quite important for some states, such as Tabasco, which currently has 17 municipalities and about 285 small communities. This state is considered as highly marginalised. About 30% of its population has only attended primary education (INEGI, 2015). Tabasco currently ranks 9th of 32 states in terms of marginalisation in the country. To reduce these social gaps, the Mexican government has built 453 tele-secondary schools to educate Tabasqueños children. Nowadays, these institutions represent 59.8% of public educational institutions in the state (INEE, 2018a).

The system uses television to provide a full, 3-year secondary education to learners who, for a wide variety of reasons, would not otherwise have access to schooling beyond the sixth grade. The tele-secondary model is pretty simple; lessons corresponding to grades 7 to 9 are delivered through television programmes that were planned and prepared by specialised teachers (INEE, 2018b). Tele-secondaries may have either a principal that acts as a leader of a tiny and small staff or has principals with the dual mission of teaching and principal activities. While in the past, a pioneer model was used in response to a growing school-age population and a rising demand for education at a lower education level (Shapiro & Trevino, 2004), its effects have not reduced educational lag in Mexican rural communities.

Literature Review

While the changing policy landscape of education demands that schools raise their standards of learner achievement, school leaders' performance remains in the spotlight of academic discussion. Even though international researchers (Day, Gu & Sammons, 2016) agree on the difficulty in linking leadership and learner outcomes, scholars suggest a simple and logical way to do so. Specifically, it is argued that leadership has an indirect or mediated positive effect on learner performance through the (re)construction of a culture focused on learner development (Day, Sammons, Hopkins, Harris, Leithwood, Gu, Brown, Ahtaridou & Kington, 2009; Gu & Johansson, 2013; Hallinger & Heck, 2010; Robinson, Lloyd & Rowe, 2008; Witziers et al., 2003). Under this perspective, leaders are expected to positively influence school organisation, culture and conditions, and through these, improve the quality of teaching, learning and learner achievement as well (Hallinger & Heck 2010). Unsurprisingly, this assumption has led scholars to postulate that the principal's leadership is one of the most important factors influencing not only school climate but also learner achievement (Franken, Branson & Penney, 2018).

Although school leaders seem to be capable of influencing the whole academic context, teacher performance seems to be the most important factor while seeking learner performance improvements (Leithwood, Day, Sammons, Harris & Hopkins, 2006). In this regard, Boberg and Bourgeois (2016) assert that teacher performance is likely to be influenced by school leaders, as teachers tend to be motivated, encouraged, and inspired by the examples of their leaders. As a result, teacher performance, including teaching practices adopted in the classroom, are likely to be influenced by school leaders (Leithwood & Jantzi, 2006; Rhodes, Camic, Millburn & Lowe, 2009). Hence, if the role of a school principal is considered an important factor in ensuring the effectiveness of the school, then the principal's leadership style is essential for encouraging teachers' commitment to engage in a certain teaching style.

What is now considered effective leadership had to evolve in response to global challenges. In the past, principals acted as managers or administrators; nowadays their role has been altered by the changing nature of society, political expectations, and school organisation (Marks & Printy, 2003; Smith, 2016). Principals used to be primarily administrative managers (Valentine & Prater, 2011), but they now must be knowledgeable and skilled in collaboration practices (Leone, Warnimont & Zimmerman, 2009; Marks & Nance, 2007) to advance school performance in modern societies. In other words, principals have been required to change from transactional toward transformational leadership. Clearly, this paradigm shift has resulted in a move away from bureaucratic control toward reshaping the entire culture in schools, including teaching practices in classrooms (Hallinger & Heck, 2010; Walker & Slear, 2011). The positive influence of transformational leadership on follower outcomes and the development of a positive school environment is broadly accepted throughout the literature (Bass, 1997; Kurland, Peretz & Hertz-Lazarowitz, 2010; Robinson & Gray, 2019; Vos, Van der Westhuizen, Mentz & Ellis, 2012; Wang & Degol, 2016).

Transformational leadership has also gained support among scholars due to its positive impact on teaching commitment (Al-Mahdy, Emam & Hallinger, 2018; Bird, Wang, Watson & Murray, 2009; Liu & Werblow, 2019).

The effects of principal leadership on school climate and teacher commitment remains a crucial factor in adoption of learner-centred practices in classrooms. Additionally, overall teacher performance in classrooms has been linked by a considerable number of scholars to school climate (Brault, Janosz & Archambault, 2014; Park, JH & Lee, 2015) and teacher commitment (Imo & Ekpenyong, 2018; Ross & Gray, 2006). Therefore, the role of school climate and teacher commitment remains crucial to educational quality, as they seem to moderate teacher behaviour to align with the goals and strategies set by school leaders. Regardless of the roles of mediating variables, the vision and ultimate goal of institutions should be working together through transformational leadership that leads all stakeholders to achieve the goals set by the institutions (Lewis et al., 2017).

Transformational leadership

Transformational leadership represents the process of influencing major changes in the attitudes, beliefs, and values of the followers to a point where the goals of an organisation and the vision of the leaders are internalised. Under these conditions, followers typically achieve performance beyond what is found from other leadership styles (Bass, 1985). As a result, leaders get followers' best efforts by inspiring them to identify a vision that surpasses their own immediate self-interests (Bass, Avolio, Jung & Berson, 2003). In fact, this style has been shown to enable both leaders and followers to rise to higher levels of ethics and motivation (Khanin, 2007).

Some studies have found that high-functioning schools had transformational principals who were able to shape and focus the vision for the school and established a school culture that fostered teacher empowerment (Kurland et al., 2010; Valentine & Prater, 2011). Given that transformational leaders have staff members committed to a shared goal, these staff members are often more satisfied and committed in their teaching positions (Cohen, McCabe, Michelli & Pickeral, 2009; Vos et al., 2012).

School climate

School climate can also be defined as the atmosphere created by social relations, values, attitudes, and feelings shared by the actors of the school (Cohen et al., 2009; Dulay & Karadağ, 2017). School climate expresses the overall personality of the school. It is often associated with the behaviour of teachers, learners and other members from the educational institution. As Huang and Cornell (2016) argue, school climate reflects the quality of the academic environment. Particularly, the school climate encompasses all teachers' shared perceptions of their overall work environment at a given institution. It is possible to distinguish internal features of a school and its impact on the behaviour of its staff members (Cohen et al., 2009; Owens, 2004). In fact, school climate is seen as a useful construct for studying the characteristics of a school that positively impact learner achievement (Dulay & Karadağ, 2017).

The literature supports the role of principals as the most decisive factor in promoting a positive school climate (Franken et al., 2018; Murillo Torrecilla & Román Carrasco, 2011); the kind of leadership that principals exert remains a key component in developing and sustaining a positive school climate (Beckley, 2012; Cheema & Kitsantas, 2014).

Teacher commitment to the learner

The teacher's commitment to the learner is conceptualised as an individual's willingness to invest personal resources to the teaching task (Nir, 2002; Park, I 2005). Kangas, Siklander, Randolph and Ruokamo (2017) define it as a teacher's cognitive, behavioural, and emotional involvement in teaching methods and their interest in learners and their learning process. Teaching commitment begins with the teacher's recognition that the learner is an authentic party in the learning process. This acknowledgment leads to a positive interest and active involvement in the learner's creation of knowledge and intellectual progress (Lazarides & Buchholz, 2019; Starr-Glass, 2019).

Although some scholars have linked leadership to teacher performance, the results are still contradictory and mixed. For instance, while some scholars (Imo & Ekpenyong, 2018; Ross & Gray, 2006) report that transformational leadership consistently predicts teachers' willingness to exert extra effort and to change their classroom practices, other scholars did not find consistent evidence to support this relationship (Day et al., 2016; Marks & Printy, 2003).

Learner-centred teaching practices

Learner-centred teaching is based on the idea of an active learner (Good & Lavigne, 2018). This approach focuses on learner variables and learning processes as critical to positive learner outcomes (Granger, Bevis, Saka, Southerland, Sampson & Tate, 2012). Under this approach, the teacher does not function as the primary source of knowledge in the classroom; on the contrary, teachers are seen as facilitators or coaches who assist learners to build their learning. Unlike teacher-centred teaching, learner-centred approaches allow learners to influence their own fate but are always guided by

teachers (Kunter, Klusmann, Baumert, Richter, Voss & Hachfeld, 2013).

By placing learners at the centre of the class, this approach shifts the focus from teaching to learning, and promotes an environment for learners to become independent and achieve more knowledge on their own (Bransford, Brown & Cocking, 2000). In fact, a large number of studies (Cordero & Gil-Izquierdo, 2018; Lazarides & Buchholz, 2019) have shown that the shift from traditional teaching to learner-centred teaching can lead to improved learner learning outcomes.

Theoretical Framework

Our study was framed by transformational leadership theory (Leithwood, 1994). It was adopted as a means to explore workplace conditions that contribute to the adoption of learner-centred teaching strategies by Mexican teachers in rural classrooms. According to Hallinger (2003), the practice of transformational leadership is ideal in schools as it attempts to change the conditions that impact school climate and the quality of curriculum and instruction delivered to learners in classrooms. Moreover, it provides intellectual direction and aims at innovation within the institution, while empowering and supporting teachers (Conley & Goldman, 1994; Leithwood, 1994), which are conditions that ultimately increase their commitment (Burns, 1978). Under this framework, practitioners focus on problem finding, problem solving, and collaboration to achieve shared goals (Hallinger & Heck, 1996). As other scholars (Allen, Grigsby & Peters, 2015; Baptiste, 2019; Rana, Malik & Hussain, 2016), we posit that the transformational leadership theory remains crucial to explore and understand the contextual conditions that lead school communities to certain behaviour that advance their development and improvement.

The present study

Despite the unequivocal interest in adopting learner-centred teaching practices in Mexico, insufficient attention has been given to the effects of principal leadership on teaching practices adopted in Mexican classrooms. Therefore, analysing the application of transformational leadership in rural Mexican communities becomes important for enhancing educational practices, which may hopefully be later turned into social development as well. In our study we explored the relationship among principals' degree of transformational leadership, school climate, teacher commitment to the learner, and the adoption of learner-centred teaching practices (see Figure 1). Based on the literature, a positive direct effect of principal transformational leadership was expected on school climate, teacher commitment, and learner-centred teaching practices. Also, it was expected that school climate and teacher commitment would favour the adoption of learner-centred teaching approaches. The indirect effects anticipated were that principals' transformational leadership would affect learner-centred teaching practices by its positive effect on school climate and teacher commitment.

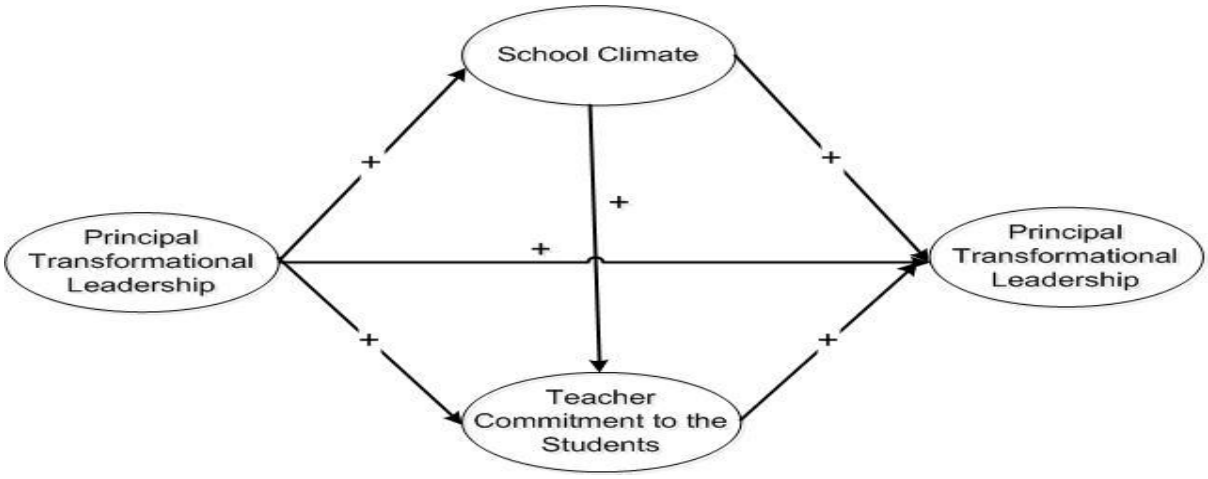

Figure 1 Theoretical model of the relationship among principals' transformational leadership, school climate, teacher commitment to the learners, and learner-centred teaching practices

Methodology

Participants

The study was carried out during the first semester (January-June) of 2019. The population came from rural tele-secondary schools (N = 373) situated in high social marginality localities in the state of Tabasco, Mexico (INEGI, 2015). The sites of study were 26 rural tele-secondary schools. In total, 174 teachers of these schools were randomly selected (N = 316 teachers, p = 95%, q = .50, e = 5%); 86 (49.4%) were male and 88 (50.6%) female. The teachers were aged between 28 and 60 years old (M

= 40.88, *SD* = 8.08 years). At the time of the study, they had an average of 15.5 (*SD* = 8.2 years) years of teaching experience. In terms of academic level, 63.8% reported holding bachelor, 32.8% master and 3.4% doctoral degrees.

Measures

Transformational leadership

An adapted Transformational Leadership Scale was used (Griffith, 2004). This scale used nine Likert-type items (0 = never, 4 = always) to measure teachers' perceptions of three components of principal leadership: (a) charisma or inspiration (3 items, α = .82; e.g., Principal encourages staff to talk about instruction); (b) individualised consideration (3 items, α = .80; e.g., Principal treats me with respect); and (c) intellectual stimulation (3 items, α = .84; e.g., Principal encourages me to come up with new ideas). The results of the Confirmatory Factorial Analysis (CFA) showed a good adjusted fit of the measurement model to the data (χ^2 = 8.81, *df* = 5, *p* = .11; Tucker-Lewis index [TLI] = .98; standardized root-mean-square residual [SRMR] = .01; adjusted goodness of fit index [AGFI] = .94; comparative fit index [CFI] = .99; root-mean-square of approximation [RMSEA] = .05, confidence interval [CI] 90% [.03, .07]).

School climate

The School Culture and Climate Scale was used (SCCS; Barkley, Lee & Eadens, 2014). The scale consists of nine items (e.g., "There is good communication among teachers," α = .80). The scale responses are in Likert-type format with five options: 1 (strongly disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree), 5 (strongly agree). The CFA showed a good fit of the model to the data (χ^2 = 6.85, *df* = 6, *p* = .23; TLI = .98, SRMR = .01; AGFI = .95; CFI = .99; RMSEA = .04, CI 90% [.01, .06]).

Teacher commitment to the learners

The teacher's commitment to learners was assessed using a 2-factor scale (Nir, 2002) with eight items using the same Likert format as above. One 4-item subset assessed teachers' commitment to children's academic achievement (e.g., "It is my responsibility to advance all my students for high academic achievements," α = .82). A second 4-item subset evaluated teachers' commitment to the social integration of children (e.g., "I have to be aware of the social relations among students in my class and assist whenever needed to improve them," α = .81). The CFA showed a good fit index of the model to the data (χ^2 = 6.94, *df* = 5, *p* = .14; TLI = .98; SRMR = .02, AGFI = .94; CFI = .99; RMSEA = .04, CI 90% [.02, .08]).

Learner-centred teaching

The scale of the Staffordshire Evaluation of Teaching Styles (Mohanna, Chambers & Wall, 2007) was adapted for the purpose of the study. The scale consists of six items that illustrate learner-centred teaching practices (α = .80; e.g., "I like to give students opportunity to explore how to learn"). It was answered with the same Likert scale as above. The CFA shows a good fit of the model to the data (χ^2 = 8.94, *df* = 5, *p* = .11; TLI = .96; SRMR = .01; AGFI = .94; CFI = .98; RMSEA = .07, IC 90 % [.03, .08]).

Procedure

Firstly, we gained ethical permission to conduct the study from the Ethical Research Committee of the Autonomous Juarez University of Tabasco. Then, several school administrators were visited in order to get approval to access schools. Finally, a letter of informed consent was signed by the teachers who participated in the study. The items were answered by teachers in approximately 15 minutes and were administered by the researchers.

Data Analysis

Lost data represented 1% of the sample. In all cases, the lost items were treated using the regression imputation method. Firstly, descriptive and correlational analyses were performed. Subsequently, the relationship model between the variables was tested using structural equations with the support of AMOS 20. The maximum likelihood estimation method (ML) was used with the AMOS bootstrap (2,000 repetitions, CI 95%). The model evaluation used adjustment indexes proposed by Byrne (2016): χ^2, *p* (chi-square and associated probability) > .001, TLI ≥ .90, SRMR ≤ .05, CFI ≥ .95, RMSEA CI 90% (error of the root-mean-square of approximation with its confidence interval) ≤ .05.

Results

Table 1 presents means, standard deviations, and correlations between the study variables. These results suggest that Mexican teachers perceive transformational leadership practices from their principals. However, it does not seem to be a frequent practice. Results also indicate that principal leadership positively correlates with school climate and learner-centred teaching practices. Finally, school climate shows a positive correlation to teacher commitment to the learners.

Table 1 Mean, standard deviations and correlations between principal transformational leadership, school climate, teacher commitment to the learners, and learner-centred teaching

Variables	*M*	*SD*	1	2	3	4
1) Transformational leadership	3.11	.87	-			
2) School climate	3.66	.44	.44***	-		
3) Teacher commitment to the learners	3.34	.59	.50***	.53***	-	
4) Teacher learner-centred teaching	3.49	.50	.32***	.42***	.44***	-

Note. ***p < .001.

Structural Model

The values of the adjustment indices were acceptable, suggesting that the theoretical model was based on the data (χ^2 = 196.87, *df* = 162, p = .032; TLI = .97; SRMR = .04; CFI = .98; RMSEA = .04, CI 90 % [.01, .05]; BIC = 280.25; AIC = 411.35). The model explained 35% of the variance of the scores of the teacher's learner-centred teaching strategies.

Figure 2 shows that values of the standardised coefficients were significant and that they coincided with the proposed theoretical model. Teacher perceptions of transformational leadership were positively related to school climate (β = .49, p < .001) and to commitment to learners as well (β = .33, p < .001). On the other hand, school climate had a positive relationship to teachers' commitment (β = .36, p < .001) and the use of learner-centred methods (β = .32, p < .001). Likewise, higher commitment was related to higher use of learner-centred strategies (β = .32, p < .001). Nevertheless, an exception was the direct relationship between transformational leadership and teachers' use of learner-centred strategies (β = .05, p = .606).

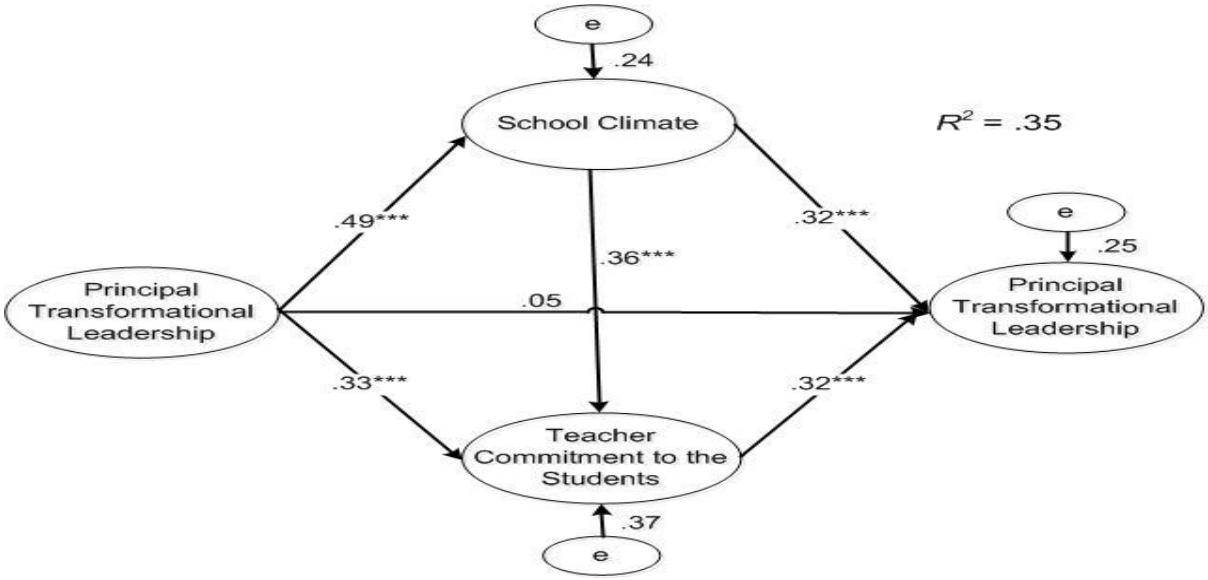

Figure 2 Results of the structural model of the relationship among principals' transformational leadership, school climate, teacher commitment to the learners, and the learner-centred teaching practices
Note. Standardised regression coefficient a residual error is reported. ***p < .001.

Indirect effects were calculated using the bootstrap method of AMOS with a 95% CI. In this way, transformational leadership was found to be positively related to teachers' use of learner-centred strategies (β = .22, p < .001, CI [.17, .29]) by higher positive school climate rates and commitment of teachers. A positive indirect relationship of the school climate (β = .10, p < .001, CI [.04, .14]) with learner-centred teaching strategies was also found.

Alternative Model

In order to strengthen the validity of the proposed theoretical model, an alternative model was evaluated that considered that teaching strategies with focus on learning were indirectly related to transformational leadership. The results show that the alternative model did not fit the data (χ^2 = 274.58, *df* = 164, p < .001; TLI = .92; SRMR = .09; CFI = .90; RMSEA = .09, CI 90% [.07, .10]; AIC = 366.58; BIC = 511.90). Therefore, the teachers' learner-centred teaching did not relate directly or indirectly with the transformational leadership exerted by the Mexican principals.

Discussion

While world requirements change rapidly, educational systems around the globe are in the

spotlight and responsible for equipping learners with a wide range of skills and knowledge. As a result, similar to other countries, Mexico is constantly searching for new ideas and practices to improve learner performance. The starting point for this study was acknowledging the relevance of transformational leadership to stimulate learner-centred teaching as a means to improve learner achievement. Specifically, we posited that schools relied on the principal's leadership of the organisation to shape and reshape positive features in the school climate that are capable to enhance teaching practices and learner outcomes as well. Although previous research (Baptiste, 2019; Sebastian, Allensworth & Huang, 2016) found that transformational leadership had an important effect on teacher and learner performance, no previous study had examined the mechanisms through which such influence occurs.

The ways that transformational leaders might lead Mexican tele-secondary teachers to adopt a learner-centred approach in classrooms were explored using quantitative methods. The adoption of transformational leadership theory resulted to be a suitable framework to test the proposed model.

Transformational Leadership's Direct Effect on School Climate, Teacher Commitment, and Learner-centred Teaching Practices

From the analysis above, results show that transformational leadership did not directly correlate to the adoption of learner-centred teaching in Mexican tele-secondary classrooms. A similar pattern of results was obtained in other studies (AlSaeedi & Male, 2013; Day et al., 2016; Marks & Printy, 2003) where scholars found that a school's ability to improve was not directly the result of the principals' leadership style. However, findings suggest that principals' transformational leadership did have an indirect influence on learner-centred teaching practices by their effects on school climate and teachers' commitment to learners.

Principals' transformational leadership was positively associated to school climate. These results are in line with those of other studies (Allen et al., 2015; Bass & Riggio, 2006; Hallinger & Heck, 1996) which reported transformational leaders having a positive impact on school climate, from the school teachers' perspective. A possible explanation is that when school communities believe that their principal exhibits a high level of idealised attributes, they feel more comfortable with their leader, and as a result, more positive about the overall school climate.

The analysis also showed evidence for the positive association between transformational leadership and teacher commitment. This result ties well with previous studies (Imo & Ekpenyong, 2018; Rana et al., 2016; Ross & Gray, 2006; Stewart-Banks, Koufie, Hakim & Branch, 2015), where transformational leadership was found to improve the commitment of stakeholders from school communities. In this regard, like Kuhnert (1994), we believe that individuals who exhibit transformational leadership often have an important set of internal values, ideals, and behaviour that motivate staff members to get involved and committed to institutional goals.

School Climate Relationship with Teachers' Commitment

The analysis of school climate demonstrates two things. Firstly, results add to the literature providing supporting evidence of the association between school climate in Mexican rural schools and teachers' commitments of teachers to the learner. Others (Collie, Shapka & Perry, 2011; Ross & Gray, 2006) have shown similar results in the past. In this regard, like Rhodes et al. (2009), we believe a positive climate encourages cooperation, trust, and openness among staff members. Teachers who perceive a positive school climate are more likely to get involved and committed, not only to the learner but also to achieve institutional goals. Secondly, our analysis showed a positive association between school climate and the adoption of learner-centred teaching. It is important to note that we are unaware of a similar analysis in previous studies. However, we believe that the existence of a positive school climate must be a pre-requisite to foster any school strategy, including the adoption of a teaching approach.

School Climate and Teacher Commitment Relationships with Learner-centred Teaching Approaches

Our findings also add supporting evidence that school climate favours the use of learner-centred teaching. In the past, other scholars (Collie et al., 2011; Ross & Gray, 2006) have shown the role of school climate on teacher practices. In this regard, like Rhodes et al. (2009), we believe that a positive climate encourages cooperation, trust, and openness among staff members and learners.

We also found evidence of the positive relationship between teacher's commitment and the adoption of learner-centred teaching in Mexican rural schools. This finding is consistent with other studies (De Rijdt, Stes, Van der Vleuten & Dochy, 2013; Kim & Hwang, 2017) where teachers' traits – including professional insights – had significant results on their practice and conceptions of teaching and learning. We believe that this finding was quite predictable as teachers who are committed to learners tend to be willing to try any promising academic strategy in order to improve learner outcomes.

Principal's Transformational Leadership has Indirect Effect on Learner-centred Teaching Practices

Overall, Mexican rural teachers perceived a certain level of transformational leadership in their principals. However, these findings demonstrate that this type of leadership is incapable by itself to ensure the adoption of learner-centred teaching practices. However, together, the findings confirm that school climate and teachers' commitment to learners are significant pathways through which transformational leadership influences the adoption of learner-centred teaching in Mexican rural classrooms.

From the findings above, we believe that this has important theoretical implications because it helps to understand how principals' transformational leadership influences teaching practices. The effect of transformational leadership on using learner-centred approaches is fully mediated by their influence on school climate and teacher commitment to learners' learning. In a practical way, we suggest that principal leadership should encourage positive school climates to facilitate teachers to adopt learner-centred approaches. Positive school climate must be considered a pre-requisite for the use of learner-centred teaching. Therefore, principals, as school leaders, must prioritise and support any strategy aimed to improve it. Furthermore, Mexican rural principals should always prioritise the welfare of teachers as a means to raise their commitment to the school and the learners as well. The findings call for the need to provide institutional support to promote teachers' commitment to learners as a bridge for disseminating the practice of learner-centred teaching.

Despite the relevance of these findings, the results have limitations and should be interpreted with caution. Specifically, the cross-sectional design does not allow causal relations to be established between the explored variables. In this regard, longitudinal or experimental designs will help to gain a better understanding of these relations. Moreover, this sample came from a particular area of Mexico, which may or may not be similar to other populations. All these conditions limit the generalisation of the findings. Further studies must include teachers of diverse regions of the country.

Conclusion

Results of the study clearly indicate that transformational leadership is important for nurturing and stimulating a climate where teachers are more likely to engage in actions that positively impact learner academic performance. Even though these findings suggest that transformational leadership is incapable to influence the adoption of learner-centred teaching practices alone, this leadership style is an important influence on school climate and teacher commitment as well. Therefore, there is a need for this leadership as a means to foster such conditions. Nonetheless, further research is needed to understand whether Mexican teachers are able to identify the differences between traditional and transformational leadership.

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Authors' Contributions

DEMM: conceptualisation, research design, statistical analyses, and preparation of the original draft; SPAZ: conceptualisation, research design, and editing original manuscript; AAVC: statistical analyses, and writing; LGPP: conceptualisation and writing. All authors reviewed the final manuscript.

Notes

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References

Allen N, Grigsby B & Peters ML 2015. Does leadership matter? Examining the relationship among transformational leadership, school climate, and student achievement. *NCPEA International Journal of Educational Leadership Preparation*, 10(2):1–22. Available at https://files.eric.ed.gov/fulltext/EJ1083099.pdf. Accessed 3 May 2019.

Al-Mahdy YFH, Emam MM & Hallinger P 2018. Assessing the contribution of principal instructional leadership and collective teacher efficacy to teacher commitment in Oman. *Teaching and Teacher Education*, 69:191–201. https://doi.org/10.1016/j.tate.2017.10.007

Alsaeedi F & Male T 2013. Transformational leadership and globalization: Attitudes of school principals in Kuwait. *Educational Management Administration & Leadership*, 41(5):640–657. https://doi.org/10.1177/1741143213488588

Baptiste M 2019. No teacher left behind: The impact of principal leadership styles on teacher job satisfaction and student success. *Journal of International Education and Leadership*, 9(1):1–11. Available at https://files.eric.ed.gov/fulltext/EJ1212519.pdf. Accessed 2 July 2019.

Barkley B, Lee D & Eadens D 2014. Perceptions of school climate and culture. *eJournal of Educational Policy*:1–12. Available at https://files.eric.ed.gov/fulltext/EJ1158085.pdf. Accessed 20 January 2018.

Bass BM 1985. *Leadership and performance beyond expectations*. New York, NY: Free Press.

Bass BM 1997. Does the transactional–transformational leadership paradigm transcend organizational and

national boundaries? *American Psychologist*, 52(2):130–139. https://doi.org/10.1037/0003-066X.52.2.130

Bass BM, Avolio BJ, Jung DI & Berson Y 2003. Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, 88(2):207–218. https://doi.org/10.1037/0021-9010.88.2.207

Bass BM & Riggio RE 2006. *Transformational leadership* (2nd ed). Mahwah, NJ: Lawrence Erlbaum Associates.

Beckley GM 2012. Catholic school leadership: School climate and culture and the influence on principal satisfaction. PhD dissertation. Nashville, TN: Trevecca Nazarene University. Available at https://www.proquest.com/docview/1034452730?pq-origsite=gscholar&fromopenview=true. Accessed 31 December 2021.

Bird JJ, Wang C, Watson JR & Murray L 2009. Relationships among principal authentic leadership and teacher trust and engagement levels. *Journal of School Leadership*, 19(2):153–171. https://doi.org/10.1177/105268460901900202

Boberg JE & Bourgeois SJ 2016. The effects of integrated transformational leadership on achievement. *Journal of Educational Administration*, 54(3):357–374. https://doi.org/10.1108/JEA-07-2014-0086

Bonilla-Ruiz E 2020. Education truly matters: Key lessons from Mexico's educational reform for educating the whole child. In FM Reimers (ed). *Audacious education purposes: How governments transform the goals of education systems*. Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-030-41882-3

Bransford JD, Brown AL & Cocking RR (eds.) 2000. *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Brault MC, Janosz M & Archambault I 2014. Effects of school composition and school climate on teacher expectations of students: A multilevel analysis. *Teaching and Teacher Education*, 44:148–159. https://doi.org/10.1016/j.tate.2014.08.008

Burns JM 1978. *Leadership*. New York, NY: Harper & Row.

Byrne BM 2016. *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed). New York, NY: Routledge.

Cheema JR & Kitsantas A 2014. Influences of disciplinary classroom climate on high school student self-efficacy and mathematics achievement: A look at gender and racial–ethnic differences. *International Journal of Science and Mathematics Education*, 12(5):1261–1279. https://doi.org/10.1007/s10763-013-9454-4

Cohen J, McCabe EM, Michelli NM & Pickeral T 2009. School climate: Research, policy, practice, and teacher education. *Teachers College Record*, 111(1):180–213. https://doi.org/10.1177/016146810911100108

Collie RJ, Shapka JD & Perry NE 2011. Predicting teacher commitment: The impact of school climate and social–emotional learning. *Psychology in the Schools*, 48(10):1034–1048. https://doi.org/10.1002/pits.20611

Conley DT & Goldman P 1994. Ten propositions for facilitate leadership. In J Murphy & KS Louis (eds). *Reshaping the principalship: Insight from transformational reform efforts*. Thousand Oaks, CA: Corwin Press.

Cordero JM & Gil-Izquierdo M 2018. The effect of teaching strategies on student achievement: An analysis using TALIS-PISA-link. *Journal of Policy Modeling*, 40(6):1313–1331. https://doi.org/10.1016/j.jpolmod.2018.04.003

Day C, Gu Q & Sammons P 2016. The impact of leadership on student outcome: How successful school leaders use transformational and instructional strategies to make a difference. *Education Administration Quarterly*, 52(2):221–258. https://doi.org/10.1177/0013161X15616863

Day C, Sammons P, Hopkins D, Harris A, Leithwood K, Gu Q, Brown E, Ahtaridou E & Kington A 2009. *The impact of school leadership on pupil outcomes* (Final Report). London, England: Department for Children, Schools and Families. Available at https://dera.ioe.ac.uk/11329/1/DCSF-RR108.pdf. Accessed 31 December 2021.

De Rijdt C, Stes A, Van der Vleuten C & Dochy F 2013. Influencing variables and moderators of transfer of learning to the workplace within the area of staff development in higher education: Research review. *Educational Research*, 8:48–74. https://doi.org/10.1016/j.edurev.2012.05.007

Dulay S & Karadağ E 2017. The effect of school climate on student achievement. In E Karadağ (ed). *The factors effecting student achievement: Meta-analysis of empirical studies*. Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-319-56083-0

Franken M, Branson C & Penney D 2018. A theory-to-practice leadership learning arrangement in a university context. *International Journal of Leadership in Education*, 21(4):491–505. https://doi.org/10.1080/13603124.2016.1247196

Gilar-Corbi R, Miñano P, Veas A & Castejón JL 2019. Testing for invariance in a structural model of academic achievement across underachieving and non-underachieving students. *Contemporary Educational Psychology*, 59:101780. https://doi.org/10.1016/j.cedpsych.2019.101780

Gobierno de México 2019. *Plan Nacional de Desarrollo 2019 - 2024* [National Development Plan 2019 - 2024]. Mexico: Author. Available at https://siteal.iiep.unesco.org/sites/default/files/sit_accion_files/10042_0.pdf. Accessed 31 December 2021.

Good TL & Lavigne AL 2018. *Looking in classrooms* (11th ed). New York, NY: Routledge.

Granger EM, Bevis TH, Saka Y, Southerland SA, Sampson V & Tate RL 2012. The efficacy of student-centered instruction in supporting science learning. *Science*, 338(6103):105–108. https://doi.org/10.1126/science.1223709

Griffith J 2004. Relation of principal transformational leadership to school staff job satisfaction, staff turnover, and school performance. *Journal of Educational Administration*, 42(3):333–356. https://doi.org/10.1108/09578230410534667

Gu Q & Johansson O 2013. Sustaining school performance: School contexts matter. *International Journal of Leadership in Education*, 16(3):301–326. https://doi.org/10.1080/13603124.2012.732242

Hallinger P 2003. Leading educational change: Reflections on the practice of instructional and transformational leadership. *Cambridge Journal of Education*, 33(3):329–352. https://doi.org/10.1080/0305764032000122005

Hallinger P & Heck RH 1996. Reassessing the principal's role in school effectiveness: A review of empirical research, 1980-1995. *Educational Administration Quarterly*, 32(1):5–44. https://doi.org/10.1177/0013161X96032001002

Hallinger P & Heck RH 2010. Collaborative leadership and school improvement: Understanding the impact on school capacity and student learning. *School Leadership & Management*, 30(2):95–110. https://doi.org/10.1080/13632431003663214

Huang FL & Cornell DG 2016. Multilevel factor structure, concurrent validity, and test–retest reliability of the high school teacher version of the Authoritative School Climate Survey. *Journal of Psychoeducational Assessment*, 34(6):536–549. https://doi.org/10.1177/0734282915621439

Imo EU & Ekpenyong AM 2018. Principals' transformational leadership practices as determinants of organizational commitment and value re-orientation among secondary school teachers. *International Journal of Education, Learning and Development*, 6(2):26–40. Available at https://www.researchgate.net/profile/Uduak-Ekpoh-2/publication/332802256_PRINCIPALS'_TRANSFORMATIONAL_LEADERSHIP_PRACTICES_AS_DETERMINANTS_OF_ORGANIZATIONAL_COMMITMENT_AND_VALUE_RE-_ORIENTATION_AMONG_SECONDARY_SCHOOL_TEACHERS/links/5ccad328299bf120978fb40e/PRINCIPALS-TRANSFORMATIONAL-LEADERSHIP-PRACTICES-AS-DETERMINANTS-OF-ORGANIZATIONAL-COMMITMENT-AND-VALUE-RE-ORIENTATION-AMONG-SECONDARY-SCHOOL-TEACHERS.pdf. Accessed 31 December 2021.

Kangas M, Siklander P, Randolph J & Ruokamo H 2017. Teachers' engagement and students' satisfaction with a playful learning environment. *Teaching and Teacher Education*, 63:274–284. https://doi.org/10.1016/j.tate.2016.12.018

Khanin D 2007. Contrasting burns and bass: Does the transactional-transformational paradigm live up to Burns' philosophy of transforming leadership? *Journal of Leadership Studies*, 1(3):7–25. https://doi.org/10.1002/jls.20022

Kim KJ & Hwang JY 2017. Characteristics of medical teachers using student-centered teaching methods. *Korean Journal of Medical Education*, 29(3):187–191. https://doi.org/10.3946/kjme.2017.64

Kuhnert KW 1994. Transforming leadership: Developing people through delegation. In BM Bass & BJ Avolio (eds). *Improving organizational effectiveness through transformational leadership*. Thousand Oaks, CA: Sage.

Kunter M, Klusmann U, Baumert J, Richter D, Voss T & Hachfeld A 2013. Professional competence of teacher: Effects on instructional quality and student development. *Journal of Educational Psychology*, 105(3):805–820. https://doi.org/10.1037/a0032583

Kurland H, Peretz H & Hertz-Lazarowitz R 2010. Leadership style and organizational learning: The mediate effect of school vision. *Journal of Educational Administration*, 48(1):7–30. https://doi.org/10.1108/09578231011015395

Lazarides R & Buchholz J 2019. Student-perceived teaching quality: How is it related to different achievement emotions in mathematics classrooms? *Learning and Instruction*, 61:45–59. https://doi.org/10.1016/j.learninstruc.2019.01.001

Leithwood K 1994. Leadership for school restructuring. *Educational Administration Quarterly*, 30(4):498–518. https://doi.org/10.1177/0013161x94030004006

Leithwood K, Day C, Sammons P, Harris A & Hopkins A 2006. *Seven strong claims about successful leadership*. Nottingham, England: National College for School Leadership. Available at https://dera.ioe.ac.uk/6967/1/download%3Fid=17387&filename=seven-claims-about-successful-school-leadership.pdf. Accessed 31 December 2021.

Leithwood K & Jantzi D 2006. Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices. *School Effectiveness and School Improvement*, 17(2):201–227. https://doi.org/10.1080/09243450600565829

Leone S, Warnimont C & Zimmerman J 2009. New roles for the principal of the future. *American Secondary Education*, 37(2):86–96. Available at https://www.jstor.org/stable/41406144. Accessed 12 May 2018.

Lewis E, Boston D & Peterson S 2017. A global perspective of transformational leadership and organizational development. *Journal of Research Initiatives*, 2(3):1–6. Available at https://digitalcommons.uncfsu.edu/jri/vol2/iss3/5/. Accessed 26 April 2018.

Liu Y & Werblow J 2019. The operation of distributed leadership and the relationship with organizational commitment and job satisfaction of principals and teachers: A multi-level model and meta-analysis using the 2013 TALIS data. *International Journal of Educational Research*, 96:41–55. https://doi.org/10.1016/j.ijer.2019.05.005

Marks HM & Nance JP 2007. Contexts of accountability under systemic reform: Implications for principal influence on instruction and supervision. *Educational Administration Quarterly*, 43(1):3–37. https://doi.org/10.1177/0013161X06291414

Marks HM & Printy SM 2003. Principal leadership and school performance: An integration of transformational and instructional leadership. *Educational Administration Quarterly*, 39(3):370–397. https://doi.org/10.1177/0013161X03253412

Mohanna K, Chambers R & Wall D 2007. Developing your teaching style: Increasing effectiveness in healthcare teaching. *Postgraduate Medical Journal*, 83(977):145–147. https://doi.org/10.1136/pgmj.2006.054106

Murillo Torrecilla FJ & Román Carrasco M 2011. ¿La escuela o la cuna? Evidencias sobre su aportación al rendimiento de los estudiantes de América Latina. Estudio multinivel sobre la estimación de los efectos escolares [The school or the cradle? Evidence about their contribution to the performance of Latin American. Multilevel study about the estimate of school effects]. *Profesorado.*

Revista de Currículum y Formación del Profesorado, 15(3):27–50. Available at http://www.ugr.es/recfpro/rev153ART3.pdf. Accessed 15 April 2018.

National Institute for the Evaluation of Education 2005. *La calidad de la educación básica en México* [Quality of basic education in Mexico]. Mexico City, Mexico: Author. Available at https://historico.mejoredu.gob.mx/wp-content/uploads/2018/12/P1B203.pdf. Accessed 31 December 2021.

National Institute for the Evaluation of Education 2018a. *La educación obligatoria en México. Informe 2018* [Compulsory education in Mexico. 2018 Report]. Mexico City, Mexico: Author. Available at https://www.inee.edu.mx/wp-content/uploads/2018/12/P1I243.pdf. Accessed 31 December 2021.

National Institute for the Evaluation of Education 2018b. *Panorama educativo de México. Indicadores del Sistema Educativo Nacional 2017 educación básica y media superior* [Educational overview of Mexico. Indicators of the National Education System 2017 elementary and upper secondary education]. Mexico City, Mexico: Author. Available at https://www.inee.edu.mx/wp-content/uploads/2018/12/P1B116.pdf. Accessed 31 December 2021.

National Institute for the Evaluation of Education 2019a. *Informe de resultados. El aprendizaje de los alumnos de tercero de secundaria en México* [Results report. The learning of third-year secondary school students in Mexico]. Mexico City, Mexico: Author.

National Institute for the Evaluation of Education 2019b. *Panorama educativo de México* [Educacional overview of Mexico]. Mexico City, Mexico: Author.

National Institute of Statistic and Geography 2015. *Catálogo único de claves de áreas geoestadísticas estatales, municipales y localidades* [Unique catalogue of keys of state, municipal and local geostatistical areas]. Available at https://www.inegi.org.mx/app/ageeml/. Accessed 20 July 2019.

National Institute of Statistic and Geography 2019. *El INEGI da a conocer los resultados de la Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018* [INEGI announces the results of the National Survey of Household Income and Expenses (ENIGH) 2018] [Press release no. 384/19]. Available at https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2019/EstSociodemo/enigh2019_07.pdf. Accessed 20 January 2019.

National Population Council 2014. *40 años del Consejo Nacional de Población* [40 years of the National Population Council]. Mexico City, Mexico: Author.

Navarro-Sola L 2019. *Secondary school expansion through televised lessons: The labor market returns of the Mexican telesecundaria* (Job Market Paper). Available at https://www.carloalberto.org/wp-content/uploads/2020/01/Navarro-Sola_JMP.pdf. Accessed 20 September 2019.

Nir AE 2002. School-based management and its effect on teacher commitment. *International Journal of Leadership in Education*, 5(4):323–341. https://doi.org/10.1080/13603120210134616

Owens RG 2004. *Organizational behavior in education: Adaptive leadership and school reform* (8th ed). New York, NY: Pearson Education.

Park I 2005. Teacher commitment and its effects on student achievement in American high schools. *Educational Research and Evaluation*, 11(5):461–485. https://doi.org/10.1080/13803610500146269

Park JH & Lee JY 2015. School-level determinants of teacher collegial interaction: Evidence from lower secondary schools in England, Finland, South Korea, and the USA. *Teaching and Teacher Education*, 50:24–35. https://doi.org/10.1016/j.tate.2015.04.002

Rana SS, Malik NI & Hussain RY 2016. Leadership styles as predictors of job involvement in teachers. *Pakistan Journal of Psychological Research*, 31(1):161–182.

Rhodes JE, Camic PM, Milburn M & Lowe SR 2009. Improving middle school climate through teacher-centered change. *Journal of Community Psychology*, 37(6):711–724. https://doi.org/10.1002/jcop.20326

Robinson V & Gray E 2019. What difference does school leadership make to student outcomes? *Journal of the Royal Society of New Zealand*, 49(2):171–187. https://doi.org/10.1080/03036758.2019.1582075

Robinson VMJ, Lloyd CA & Rowe KJ 2008. The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly*, 44(5):635–674. https://doi.org/10.1177/0013161X08321509

Ross JA & Gray P 2006. Transformational leadership and teacher commitment to organizational values: The mediating effects of collective teacher efficacy. *School Effectiveness and School Improvement*, 17(2):179–199. https://doi.org/10.1080/09243450600565795

Sebastian J, Allensworth E & Huang H 2016. The role of teacher leadership in how principals influence classroom instruction and student learning. *American Journal of Education*, 123(1):69–108. https://doi.org/10.1086/688169

Secretary of Public Education 2010. *La telesecundaria en México: Un breve recorrido por sus datos y relatos* [The tele-secondary in Mexico: A short historical tour of its data and stories]. Mexico City, Mexico: Author. Available at https://docplayer.es/49005310-La-telesecundaria-en-mexico-un-breve-recorrido-historico-por-sus-datos-y-relatos.html. Accessed 31 December 2021.

Shapiro J & Trevino JM 2004. *Compensatory education for disadvantaged Mexican students: An impact evaluation using propensity score matching* (World Bank Policy Research Working Paper 3334). Washington, DC: World Bank. Available at https://openknowledge.worldbank.org/bitstream/handle/10986/14176/WPS3334.pdf?sequence=1&isAllowed=y. Accessed 20 September 2021.

Smith BS 2016. The role of leadership style in creating a great school. *SELU Research Review Journal*, 1(1):65–78. Available at

https://selu.usask.ca/documents/research-and-publications/srrj/SRRJ-1-1-Smith.pdf. Accessed 23 September 2018.

Starr-Glass D 2019. Seeing international students as students: Changing institutional classification, identity, and stereotype. In K Bista (ed). *Global perspective on international student experiences in higher education: Tensions and issues*. New York, NY: Routledge.

Stewart-Banks B, Koufie M, Hakim A & Branch R 2015. Education leadership styles impact on work performance and moral of staff. *Journal of Marketing & Management*, 6(2):87–105. Available at https://www.proquest.com/docview/1735589055?pq-origsite=gscholar&fromopenview=true. Accessed 23 October 2019.

Valentine JW & Prater M 2011. Instructional, transformational, and managerial leadership and student achievement: High school principal make a difference. *NASSP Bulletin*, 95(1):5–30. https://doi.org/10.1177/0192636511404062

Vos D, Van der Westhuizen PC, Mentz PJ & Ellis SM 2012. Educators and the quality of their work environment: An analysis of the organisational climate in primary schools. *South African Journal of Education*, 32(1):56–68. https://doi.org/10.15700/saje.v32n1a520

Walker J & Slear S 2011. The impact of principal leadership behaviors on the efficacy of new and experienced middle school teachers. *NASSP Bulletin*, 95(1):46–64. https://doi.org/10.1177/0192636511406530

Wang MT & Degol JL 2016. School climate: A review of the construct, measurement, and impact on student outcomes. *Educational Psychology Review*, 28(2):315–352. https://doi.org/10.1007/s10648-015-9319-1

Witziers B, Bosker RJ & Krüger ML 2003. Educational leadership and student achievement: The elusive search for an association. *Educational Administration Quarterly*, 39(3):398–425. https://doi.org/10.1177/0013161X03253411

Wolff L, De Moura Castro C, Navarro JC & García N 2002. Television for secondary education: Experience of Mexico and Brazil. In WD Haddad & A Draxler (eds). *Technologies for education: Potentials, parameters, and prospects*. Paris, France: United Nations Educational, Scientific and Cultural Organization. Available at https://www.researchgate.net/profile/Gudmund-Hernes/publication/44828882_Emerging_trends_in_ICT_and_challenges_to_educational_planning/links/54415fee0cf2a76a3cc7e389/Emerging-trends-in-ICT-and-challenges-to-educational-planning.pdf#page=150. Accessed 31 December 2021.