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The Relationship between Professional Environmental Factors and Teacher Professional Development in Israeli Schools

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Abstract: (1) Background: This paper examines the elements essential to effective teacher professional development (TPD) and the relationship between various professional environmental factors (professional learning community perceptions, self-efficacy, professional identity, principal's transformation leadership patterns), TDP in primary education schools, and TDP prediction. (2) Methods: Data were collected during the 2020 school year from 412 teachers in primary education schools in five Israeli districts. The professional learning community, self-efficacy, professional identity, transformation leadership patterns, and TPD scales were used to collect data. Descriptive statistics, Pearson moment-product correlation, and multiple regression analysis were used for data analysis. (3) Results: Overall, participants' TPD was high (4.12 $\pm$ 0.83). Statistically significant correlations were observed between TPD and four independent variables (0.41–0.64; $p < 0.0001$). No significant associations were seen between TPD and work-related characteristics. TPD differences were observed in participants with different educational levels (F = 4.63; $p = 0.003$). Higher TPD levels were predicted by perceptions of the principal's transformation leadership patterns, self-efficacy, the professional learning community, and education (F-ratio = 57.85; adjusted $R^2 = 0.50$; $p < 0.001$). Conclusions: The present study attests to the importance of the school principal's leadership patterns for TPD, alongside the contribution of self-efficacy, professional learning community, and professional identity.

Keywords: professional learning community; self-efficacy; professional identity; teacher professional development

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1. Introduction

In the last decade, the demands and expectations for better quality teaching and learning have been receiving more emphasis and attention from policymakers, education researchers, and school leaders. Teachers' professional development (TPD), which can be defined as "activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher" [1], is perceived to be a key factor in increasing the quality of teachers and advancing the education system. Thus, enabling teachers to learn within the school system and to receive training that is tailored to their needs is of great importance. The teacher, therefore, should be a significant focus when coming to meet these needs [1,2]. To understand this further, we need to establish what professional development means among teachers and how it contributes to the advancement of the education system. Therefore, the present study aims to investigate teachers' personal factors that promote professional development (TPD). More specifically, the present study examines teachers' perceptions of personal identity, self-efficacy, their professional learning community, and the school principals' leadership patterns and their impact on their professional development.

1.1. Teachers' Professional Development

TPD addresses developing and cultivating a teacher's knowledge, skills, role perception, and self-efficacy [2]. Optimal professional development helps the teacher to better understand and define the dilemmas and issues they face and gives them a wide-ranging

set of tools to exercise their judgment in the classroom and assist their students in the learning process [1].

There are a wide range of frameworks and mechanisms for the professional development of teaching staff, including advanced training, peer learning, discussion groups, and more. TPD often occurs in formal settings, such as professional development programs, teaching research groups, and mentoring programs, but also during informal interactions [1–3]. On the national level, administrations must ensure that their teachers develop professionally with the help of professional TPD teachers, while on the district and school levels, principals and teachers must strive to meet rigorous academic standards and state assessment goals [4,5]. In general, helping teachers feel that they have greater control over their professional lives through continual TPD increases their sense of efficacy and motivates them to exert greater effort, persistence, and resilience [6].

Indeed, teachers' participation in professional development is an indicator of teacher quality [7], which, in turn, significantly impacts students' learning [8]. Furthermore, practical professional development opportunities significantly impact teacher instruction [5]. Therefore, teacher training and TPD are essential mechanisms for enhancing teachers' content knowledge and developing their teaching practices [9].

TPD is built using a four-stage process [10]: (i) the most senior system-level comprises policymakers outlining the nature and trajectory of TDP. (ii) A second system for TPD includes a professional development framework focused on teaching staff and academic institutions. (iii) A third system includes the leadership of educational institutions that outlines the TPD process, supports it, and fosters a work environment that enables it. (iv) A fourth TPD system focuses on the teaching staff themselves. Unlike other human relations professionals, teachers tend to prefer group learning activities [11].

1.2. Teachers' Professional Learning Community

One effective strategy for teacher competence development is a professional learning community comprising an association of educators working together to develop the quality of their teaching [12]. The members critically examine their practice in a reflective, inclusive, learning-oriented, growth-promoting way to enhance their collective effectiveness as professionals [13]. Such communities can be a place for teachers to share experiences, innovations, content, problem-solving measures, and build attachments with their peers as a means of developing their competencies and professionalism [14] and developing new learning methods [15].

1.3. Teacher's Professional Identity

Kramer and Hoffman defined teachers' professional identity as their sense of belonging and identification with the profession [16]. In contrast, Coldron and Smith asserted that teachers' professional identity is a fusion of their personal and social lives and is influenced by genetics and environment [17]. Similarly, Louden and Goodson contended that teachers' identities consist of personal and social biographies [18,19]. Another view stresses that experience, with increased knowledge and practice, reshapes teachers' professional identity over time [20].

According to Lopes and Pereira, a teacher's first professional identity derives from how student teachers see themselves in the future based on a set of personal and professional expectations [21]. These identity perceptions form key supports underpinning their future professional performances [22]. Furthermore, Beijaard suggested that teachers' professional identity shapes their self-efficacy and readiness to deal with educational changes and substantially impacts their professional decisions and judgments [23].

A great deal of the recent literature on teacher education underscores the importance of identity in teacher development [24]. For example, the professional identity of teachers correlates with teacher professional development in Serbia [25], and working with student teachers' identity can potentially promote their professional development [26].

1.4. Teachers' Self-Efficacy

Self-efficacy denotes an individual's belief that they can produce a successful outcome. For example, teachers' self-efficacy can be described as "a teacher's confidence to effectively organize and perform specific actions related to a particular teaching task" [27] Studies have shown that teachers' self-efficacy is related to different areas of their careers, including (1) beliefs about teacher–student relationships, (2) teachers' professional practice, and (3) emotional aspects [27]. Furthermore, self-efficacy determines which goals and challenges individuals set for themselves, how much effort they invest, and to what extent they persist in the face of difficulties and obstacles [28]. Self-efficacy beliefs can further influence the extent to which a teacher training program is effective in acquiring knowledge and skills since individuals with higher levels of self-efficacy perform better in training [29].

1.5. School Principals' Transformational Leadership

Transformational leadership centers on leaders establishing new norms, changing employee attitudes, creating a new vision of reality, and making fundamental changes to the organization's culture [30]. Transformational leadership transforms followers' attitudes, beliefs, and behaviors, increasing their motivation [31,32]. Transformational leadership plays a critical role in cultivating knowledge-sharing climates and behavior [33], while also influencing interpersonal trust and organizational learning [34] Likewise, transformational leadership enhances organizational learning by promoting learning through experimentation, communication, and knowledge creation [35], thereby increasing self-confidence, intrinsic motivation, inspirations and creative endeavors, and supporting innovation, personal development, and social relationships [36].

Research conducted over the past twenty years has supported the use and efficacy of transformational leadership in school settings. For example, effective leadership has been found as a central requirement in creating a school environment resulting in teacher professionalization [37], while effective and professional leadership leads to the professional development of teachers [38]. School principals' transformational leadership is also associated with improving teachers' self-efficacy [39], their motivation and commitment [40,41], and their cooperative professional development [42].

The purpose of the present study was to examine the impact of personal and school variables as perceived by the teacher on TPD. Specifically, we wished to address: (1) what are the teachers' perceptions of various professional environmental factors (professional learning community, self-efficacy, professional identity, principals' transformational leadership patterns, and teacher professional development)? (2) What relationships exists among the various professional environmental factors (professional learning community, self-efficacy, professional identity, principal's transformation leadership patterns, and teacher professional development)? (3) Which variables correctly predict TPD?

2. Materials and Methods

2.1. Research Design

This study, designed with a relational search model [43], was a quantitative study aiming to determine the relationship between teachers' perceptions of a professional learning community, self-efficacy, professional identity, and teacher professional development by using a cross-sectional study [44]. The research model consisted of four variables: a dependent variable (teacher professional development) and four independent professional environmental variables (professional learning community, self-efficacy, professional identity, and principal's transformation leadership patterns).

2.2. Participants

Data from Israeli teachers during the 2020/2021 school year were used, focusing on five districts: Jerusalem District (85 out of 20,000 teachers in 8 schools), Tel Aviv District (70 out of 13,500 teachers in 6 schools), Central District (72 out of 13,000 teachers in 5 schools),

Haifa District (117 out of 10,500 teachers in 13 schools), and Northern District (68 out of 10,000 teachers in 4 schools).

The dataset included a total of 412 teachers in 36 Jewish and Arab elementary schools under the supervision of the Israeli Ministry of Education during the 2020 school year. Participants' mean age was 41.99 ± 9.13 (86.2% females). Mean teaching experience was 14.56 ± 10.13 years. For additional information, refer to Table 1.

Table 1. Study participant demographic and work-related characteristics (N = 412).

	Variable		Mean (SD) [Range] OR N (%)	Chi-Square Test (p Value)
Demographic variables	Age, years: mean (SD)		41.99 (9.13) [22.00–66.00]	- -
	Sex: N (%)	Females	355 (86.2)	431.39 (< 0.001)
		Males	57 (13.8)	
	Marital status: N (%)	Married	346 (84.0)	771.78 (<0.001)
		Single	41 (10.0)	
		Divorced	23 (5.6)	
		Widowed	2 (0.5)	
	Education: N (%)	Senior teacher	6 (1.5)	427.06 (<0.001)
		Bachelor of Education	132 (32.0)	
		Bachelor of Arts	92 (22.3)	
		Master of Arts	178 (43.2)	
		Doctor of Philosophy	2 (0.5)	
		Other	2 (0.5)	
Work-related characteristics	Experience in teaching, years: mean (SD)		14.56 (10.13) [0.0–45.0]	-
	Experience in teaching in the school, years: mean (SD)		9.79 (8.34) [0.0–38.0]	-

A letter was sent to the relevant schools explaining the learning objectives and their contribution to the teachers' professional development. Selected teachers filled out online questionnaires between May and June 2020, and responses were collected anonymously by the lead researcher.

This study was approved by the Ethics Committee of Israel's Chief Scientist Office and the Israeli Ministry of Education.

2.3. Data Collection

The Professional Learning Community scale [45], the Enabling School Structure scale, and Omnibus T-scale were utilized to collect data. The online questionnaire included four key independent variables, one dependent variable, and nine demographic variables. The independent variables included perceptions of leadership and change patterns of the principal (16 items), the professional learning community (15 items), professional identity (8 items), and professional self-efficacy (6 items). The dependent variable is related to the professional development of the teachers (6 items).

2.4. Dependent Variable

Teacher professional development, the dependent variable, was assessed by six items, for example: "My professional development experiences this year have been valuable to my practice as a teacher". Answers for each item ranged from 1 (strongly disagree) to 5 (strongly agree) and 6 (irrelevant). The average score of the 6 items was used to describe the level of TPD. The reliability of the instrument in this study was Cronbach's alpha = 0.89 [45].

2.5. Independent Variables

The professional learning community was assessed by 14 items, for example: "I build teaching materials with colleagues." Answers for each item range from 1 (rarely or never/do not agree at all) to 6 (more than once a week/totally agree). The average score of the 14 items was used to describe the teacher's professional learning community level. The reliability of the instrument in this study was Cronbach's alpha = 0.92 [45].

Self-efficacy was assessed by six items, for example: "How confident are you in using a variety of assessment methods?" Answers for each item ranged from 1 (not confident at all) to 5 (totally confident) or from 1 (do not agree at all) to 6 (totally agree). The average score of the 6 items was used to describe the teacher's self-efficacy level. The reliability of the instrument in this study was Cronbach's alpha = 0.87 [45].

Professional identity was assessed by eight items, for example: "It is important for me to be a teacher." Answers for each item ranged from 1 (strongly disagree) to 5 (strongly agree). The average score of the eight items was used to describe the teacher's professional identity level. The reliability of the instrument in this study was Cronbach's alpha = 0.87 [46].

Perceptions of the principal's transformation leadership patterns were assessed by 16 items, for example: "The principal communicates a clear vision for teaching and learning at our school." Answers for each item ranged from 1 (strongly disagree) to 5 (strongly agree). The average score of the 16 items was used to describe the teacher's perceptions of the principal's transformation leadership patterns level. The reliability of the instrument in this study was Cronbach's alpha = 0.96 [45].

2.6. Data Analysis

2.6.1. Descriptive Statistics

Descriptive statistics (mean, standard deviation, range, and percentage) were used to describe participants' demographic and work-related characteristics. Chi-square tests examined differences in categorical variable prevalence. The dependent ("Teacher's professional development") and independent variables ("the professional learning community," "self-efficacy," "professional identity," and "perceptions of principal's transformation leadership pattern") are also presented graphically using box plots with the central box representing the values from the lower to upper quartile (25th to 75th percentile); the vertical line extends from the minimum to the maximum value, excluding outside values, displayed as separate points. An outside value was defined as a value that was less than the lower quartile minus 1.5 times the interquartile range or larger than the upper quartile plus 1.5 times the interquartile range. The middle line represents the median.

2.6.2. Factors Related to and Predicting the Dependent Variable

Associations between the dependent variable, independent variables, and continuous demographic and work-related characteristics were examined using Pearson's correlation. In addition, differences in the dependent variable based on categorical demographic characteristics were examined using an independent T-test for dichotomized variables (i.e., sex) and one way analysis of variance with the Tukey–Kramer post hoc test for multi-categorical variables (i.e., marital status and education). Finally, prediction of the dependent variable was conducted using multiple regression analysis. All independent variables were checked for multicollinearity using the variance of the inflation factor (VIF; VIF > 10) [47]. The criterion for inclusion was an alpha level of 0.05, and the exclusion criterion was an alpha level of 0.10. Only variables statistically significantly correlated with or differing in the dependent variable were included in the regression analyses.

The data were analyzed with IBM SPSS statistics 21. In all statistical analyses, p-values lower than 0.05 indicated statistical significance.

3. Results

3.1. Dependent and Independent Variables Descriptive Statistics

The study's dependent variable, "teacher professional development" mean score, was 4.12 ± 0.83, with a 25th-to-75th percentile range from 3.7 to 4.7. However, the score range was wide, with minimum and maximal scores of 1.6 and 5, respectively (Figure 1). Similarly, in three of the four independent variables, the mean score was >4, but the ranges were smaller to those observed in the dependent variable. Finally, the mean score of "professional learning community" was 3.84, and lower than 9 for the other independent variables (less than 4). For a graphical illustration of the independent variables' descriptive statistics, refer to Figure 2.

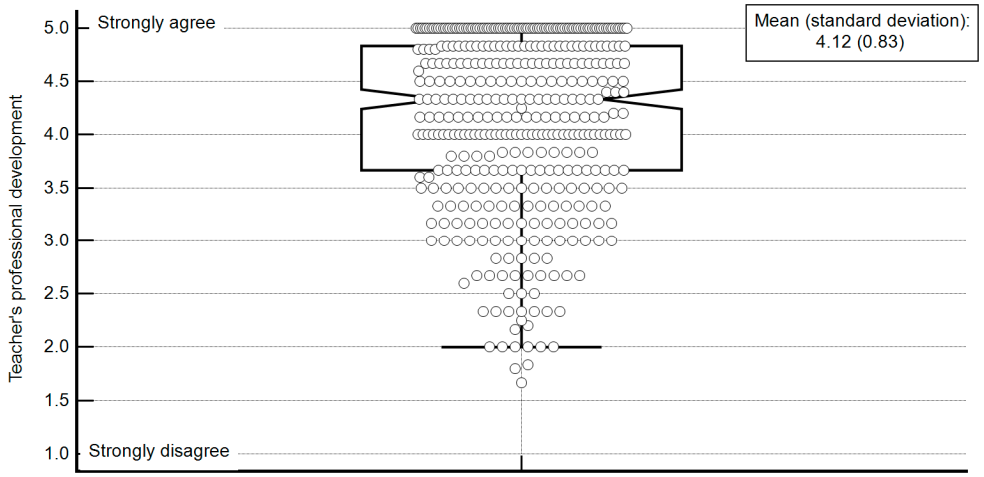

Figure 1. Dependent variable—teacher's professional development: box-and-whisker graph (N = 412). Notes: A higher score represents a higher perception of teachers' professional development; the central box represents the values from the lower to the upper quartile (25th to 75th percentile); the vertical line extends from the minimum to the maximum value; the middle line represents the median.

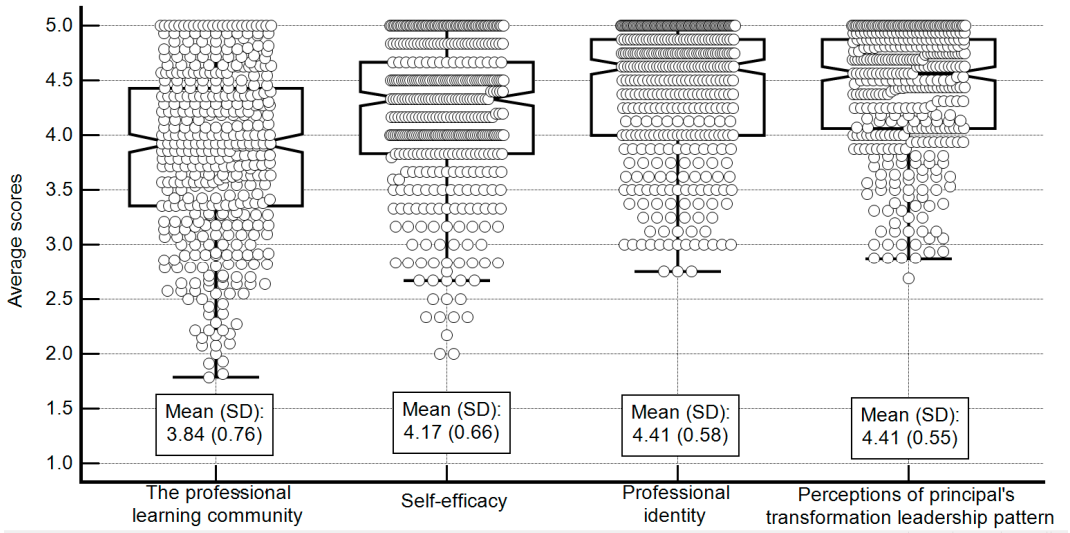

Figure 2. Independent variables: box-and-whisker graph (N = 412). Notes: SD, standard deviation; a higher score represents higher levels of the independent variables; the central box represents the values from the lower to upper quartile (25th to 75th percentile); the vertical line extends from the minimum to the maximum value; the middle line represents the median.

3.2. Factors Related to and Predicting the Dependent Variable

Statistically significant correlations were observed between the dependent variable and the four independent variables (correlational range: 0.41–0.64; $p < 0.0001$). However, no statistically significant associations were observed between the dependent variable and the demographic and work-related characteristics (r range = −0.08 to −0.04; $p > 0.05$). Statistically significant correlations were also observed between the independent variables (r range: 0.39 to 0.62; $p < 0.0001$). Perceptions of the principal's transformation leadership patterns statistically significantly negatively correlated with years of teaching experience and years of experience in the school. For additional information, refer to Table 2.

Table 2. Associations between the dependent, independent, and continuous demographic variables (N = 412).

		Dependent Variable	**Independent Variables**				**Demographic and Work-Related Characteristics**		
		Teacher's Professional Development	**The Professional Learning Community**	**Self-Efficacy**	**Professional Identity**	**Perceptions of the Principal's Transformation Leadership Patterns**		**Experience in Teaching**	**Experience in Teaching in the School**
Dependent variable	Teacher's Professional Development	-	0.61 **	0.61 **	0.41 **	0.64 **	−0.04	−0.05	−0.08
Independent variables	The Professional Learning Community	-	-	0.61 **	0.40 **	0.62 **	−0.04	−0.03	−0.01
	Self-Efficacy	-	-	-	0.49 **	0.59 **	−0.02	0.03	−0.07
	Professional Identity	-	-	-	-	0.39 **	0.05	0.02	0.00
	Perceptions of the Principal's Transformation Leadership Patterns	-	-	-	-	-	−0.05	−0.14 *	−0.15 *

* $p < 0.05$, ** $p < 0.01$.

Further data analysis showed no statistically significant differences in the dependent variable between males and females (t-test statistic= −0.52; $p = 0.59$) or as a function of marital status (ANOVA; f = 1.35; $p = 0.25$). However, statistically significant differences in teachers' professional development were observed in participants with different educational levels, with participants with Bachelor of Education, Master of Arts, and Doctor of Philosophy degrees having higher teacher's professional development levels than teachers with Bachelor of Arts degrees (F = 4.63; $p = 0.003$; Table 3).

Multiple regression analysis showed that higher levels of teachers' professional development were predicted by the professional learning community, self-efficacy, professional identity, perceptions of the principal's transformation leadership patterns, and a Bachelor of Arts degree. Overall, the model explained 50% of the variability of teacher professional development (F-ratio = 57.85; adjusted $R^2 = 0.50$; $p < 0.001$). Although there were several relatively high correlations between the dependent and the independent variables (r > 0.60), no multicollinearity was detected in the multiple regression analysis (VIF > 10). For additional information, refer to Table 4.

Table 3. Differences in teachers' professional development based on categorical demographic characteristics (N = 412).

Variables		Teacher's Professional Development: Mean (SD)	*t*-Statistic or f-Value (*p* Value)
Sex	Females (N = 355)	4.13 (0.20)	−0.52 (0.59)
	Males (N = 57)	4.06 (0.95)	
Marital status	Married (N = 346)	4.10 (0.83)	1.35 (0.25)
	Single (N = 41)	4.30 (0.70)	
	Divorced and widowed (N = 25)	3.87 (1.0)	
Education	Bachelor of Education (N = 132)	4.25 (0.73) [b]	4.63 (0.003)
	Bachelor of Arts (N = 92)	3.85 (0.85) [a,c]	
	Master of Arts and Doctor of Philosophy (N = 180)	4.16 (0.83) [b]	
	Senior teacher and other (N = 8)	4.13 (1.04)	

Notes: *t*-statistic is reported for categorical variables (i.e., sex); f-value is reported for multi-categorical variables (i.e., "marital status" and "education"; [a], statistically significantly different from "Bachelor of Education ($p < 0.05$; 2-tailed); [b], statistically significantly different from "Bachelor of Arts" ($p < 0.05$; 2-tailed); [c], statistically significantly different from "Master of Arts and Doctor of Philosophy" ($p < 0.05$; 2-tailed); SD, standard deviation.

Table 4. Results of multiple regression analysis for prediction of teacher professional development (N = 412).

Independent Variables	Coefficient	Standard Error	*t*	*p*	Variance Inflation Factor
(Constant)	−0.517				
The professional learning community	0.200	0.05	3.78	<0.001	1.85
Self-efficacy	0.273	0.06	4.43	<0.001	1.90
Professional identity	0.115	0.05	2.06	0.03	1.32
Perceptions of the principal's Transformation leadership patterns	0.514	0.06	7.43	<0.001	1.89
Bachelor of Arts (relative to other education types)	−0.174	0.07	−2.26	0.02	1.30
Model summary	F-ratio = 57.85 ($p < 0.001$); adjusted R2 = 0.50.				

Notes: Only variables that statistically significantly correlated with teacher professional development were included in the regression model; no multicollinearity was detected in the multiple regression analysis (VIF > 10).

4. Discussion

The present study's objectives were three-fold: to examine teachers' general perceptions of various professional environmental factors (professional learning community, self-efficacy, professional identity, principals' transformational leadership patterns) and TPD; to understand the relationships among these variables; and to explore which of these variables better predicts TPD. With regard to the first and second objectives, we found that teachers reported high professional development in their schools and high professional identity, and their perception of the school principal's transformational leadership patterns was also high (means of 4.12, 4.41 and 4.41 out of possible range of 1–5, respectively). In addition, we found that the teachers' perceptions of professional identity, self-efficacy, learning community, and principals' transformational leadership patterns were all positively and significantly correlated with TPD. These findings are in line with other studies in the TPD field, which have shown the importance of teachers' professional identity in promoting their professional development [25,26]. Similarly, studies have demonstrated that

TPD is enhanced by teachers' self-efficacy beliefs [27,29] and by professional community learning [12].

Several studies have emphasized the critical role of transformational leadership in cultivating knowledge-sharing climates and behavior [33,48] and have established the contribution of the principal's transformational leadership to the professional development of teachers [38,42]. Furthermore, principals' transformational leadership patterns positively influence teachers' self-efficacy beliefs [39], their commitment and motivation [40,41], and job satisfaction [49]. Addressing our third objective, the present study found that perceptions of principals' transformational leadership patterns explain 40% of the TPD variance, underpinning the importance of the principal's leadership to teachers' professional development. A future study may examine the direct and indirect effects of the principal's leadership patterns on TPD through mediating variables such as self-efficacy, professional community, and teacher motivation. As noted above, the present study has shown that teachers reported an overall high level of TPD. Worthy of note, however, is the finding that teachers with Bachelor of Arts degrees reported significantly lower TPD levels than teachers who have Bachelor of Education or higher academic degrees. This finding relates to a conclusion from TALIS 2018, according to which, in half of the OECD countries, there are indications that "teachers who lack full experience in pre-service training receive TPD opportunities of a lower quality, compared to qualified colleagues" [8,50]. One explanation is that these teachers may primarily work as substitute temporary teachers who do not fully participate in professional training programs. A future study can further explore the observed differences in TPD regarding teachers' education and work status.

Strengths, Limitations and Directions for Future Study

This study had many strengths. We included a relatively large sample size from five different districts throughout the country, making our sample representative of the total population. Additionally, to our knowledge, this is the first paper to explore various professional environmental factors and their impact on. TPD.

This research has several limitations that are important to observe. First, all measures of this study were self-report. Though self-report is appropriate for capturing the measured variables in this study, they are subject to common method biases (Podsakoff et al., 2003). To enhance the reliability of the study, we suggest including data from other sources such as third party evaluation of teacher performance.

In addition, the cross-sectional design of the present study does not allow us to infer the direction of relationships found. Hence, it could be that TPD predicts teachers' self-efficacy, and their perceptions of the principal's leadership patterns, or that the associations between these variables are reciprocal in nature. This suggests that a longitudinal study design that captures the various measures at several points over a longer period of time could better reflect the direction of the relationships between the study variables and their effect on teachers' professional development. It is also suggested to replicate the present study using a bigger sample of teachers from a different culture to allow for the generalization of the results.

5. Conclusions

The findings of the present study reveal a high level of TPD among teachers in Israeli primary schools. The teachers' perceptions of professional identity, self-efficacy, learning community, principals' transformational leadership patters and TPD were all positively and significantly correlated with each other. The variable that was found to be the most significant predictor of TPD was the teachers' perceptions of the principal's transformational leadership patters.

Above all, the present study's findings attest to the importance of the school principal's leadership patterns for the professional development of teachers, alongside the contribution of the teachers' professional identity, self-efficacy, and professional learning community opportunities. Thus, the study findings emphasize the importance of improving school

principals' leadership skills to effectively increase the professional quality of their teaching staff and the entire school.

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Conflicts of Interest: The authors declare no conflict of interest.

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