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School leadership development and academic achievement: Effectiveness of the High Performing Schools programme

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ABSTRACT

Many education systems face declining levels of academic achievement. Consequently, educational policymakers and practitioners alike are seeking ways to improve academic performance. This study examines the effectiveness of a specific school leadership development programme in the Netherlands called the High Performing Schools (HPS) programme. The HPS programme is a continuing professional development (CPD) initiative focused on evidence-informed school and leadership improvement, targeting school personnel in two different versions: HPS for leadership teams (principals and middle-level leaders) and HPS for whole-school teams as professional learning communities (PLCs). Forty-seven primary schools participated in the HPS programmes between 2018 and 2021. A quasi-experimental design was implemented, and public academic attainment data were used to assess the effectiveness of the programme. The academic achievement at the school level in the academic year 2021 and 2022 was compared between the 47 participating schools and a comparison group of 6110 schools using ANCOVA with post-hoc tests. The analyses indicate that schools that participated in the HPS programme outperformed comparison schools. Moderate to large gains in achievement were found, equivalent to six to eight months of additional learning progress. Schools that participated in the PLC version of the programme performed best. The effects were statistically significant for math and writing, while no significant effects were found for reading. We conclude that the HPS programme shows promising results.

1. Introduction

Many industrialized countries face an alarming decline in pupils' academic performances as reported by cross-national studies, such as PISA, PIRLS, and TIMSS. For instance, in the Netherlands—where this study was conducted—the trends of the PISA study from 2003 through 2018 show that the average levels of reading and math performance decreased by at least the equivalent of half a year of schooling (OECD, 2019). Moreover, this decline is accompanied by concerns about increasing levels of inequality in the Dutch educational system, which became even more evident due to the COVID-19 pandemic, which severely harmed the academic performance of Dutch schools (Inspectorate of Education Inspectie van het Onderwijs 2021).

Educational policymakers and schools in many countries are looking for ways to reverse this declining trend and improve achievement levels for all pupils. While the literature on school effectiveness and school improvement provides an impressive account

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of the factors that may contribute to students' academic achievement (see Hopkins & Reynolds, 2001; Muijs & Reynolds, 2003, 2017), validated evidence of the impact of *specific* school improvement programmes generally yields very mixed results (Coe, 2009). School improvement studies that focus on specific leadership development programs are rather scarce (see Greany and Earley, 2021).

The context of this study is the Dutch educational system, which is characterized by high levels of autonomy for schools (Waslander, 2010). This means that school leaders and their teams make crucial choices and policies regarding the schooling of pupils. In this context, we examined the effectiveness of the High Performing Schools (HPS) program, which focuses on improving school leadership and setting up professional learning communities (PLCs) informed by the educational, psychological, and sociological scientific literature. The quasi-experimental design—in which we evaluated the effectiveness of the HPS intervention by comparison with other schools in the population—enabled us to examine the effects of the school improvement intervention. The emphasis on leadership in the programme will contribute to the large body of cross-sectional and longitudinal studies that have found a positive relationship between principal and teacher leadership and student learning outcomes (Seashore Louis, Dretzke, & Wahlstrom, 2010; Heck & Hallinger, 2009).

In this study, we aim to address the following research questions: (1) Does the HPS programme improve academic achievement in participating schools compared to non-participating schools? (2) Which version of the HPS programme (leadership teams or whole-school teams) is more effective in improving academic performance? (3) Are the effects of the HPS programme consistent across different subject areas, such as math, reading, and writing?

2. Literature review

School improvement has long been a central aim of research, policy, and practice, so it is unsurprising that there have been decades of efforts to develop effective school improvement programmes. Hopkins, Stringfield, Harris, Stoll, and Mackay (2014) describe the evolution of school improvement as exhibiting a number of distinct phases, ranging from an initial focus on school climate to school-level initiatives driven by action research, to an emphasis on comprehensive approaches to school reform (often encompassing a group of schools), to local level capacity-building, and finally, to the recent emphasis on system reform. While this progression to some extent describes developments, it also suggests that we already have sufficient knowledge of what improves schools to transition seamlessly to the system level. This perspective is rather optimistic, overestimating the extent to which we can definitively identify the effectiveness of improvement strategies aimed at individual schools or groups of schools. Consequently, the validity of this simplistic linear chronological narrative is unclear.

There is undoubtedly evidence that school improvement programmes can be effective. For example, in the US, an evaluation of large-scale school reform programmes revealed that some federally funded programmes led to enhanced pupil attainment (Slavin, 2007). In the UK, the High Reliability Schools programme yielded positive results (Stringfield, Reynolds, & Schaffer, 2008), while Success for All demonstrated positive impacts in several countries, including the US and the Netherlands (Hingstman, Doolaard, Warrens, & Bosker, 2021). Another effective programme is the Dynamic Approach to School Improvement (DASI), which has been tested in numerous European countries (Kyriakides et al., 2019). However, many other programmes have not shown an impact on outcomes or have not evaluated effects with sufficient rigour to substantiate any definitive statements regarding their impact (Allen, Evans, & White, 2021). The lack of proper comparators, for instance, has been criticized as a significant omission in most evaluations of school improvement programmes (Coe, 2009). This issue makes it challenging to determine the key factors that are likely to contribute to the success of a school improvement initiative due to the scarcity of studies directly comparing initiatives or thoroughly examining the presence or absence of different components (Coe, 2009; Allen, Evans, & White, 2021). In the absence of such studies, it is appropriate to examine the factors that we know are related to pupil achievement theoretically, with the aim of investigating whether a *combination of these factors* might lead to the development of successful school improvement initiatives.

In school effectiveness research, one factor that prominently influences pupil outcomes is the effectiveness of teachers and their performance in classrooms (Muijs et al., 2014). For instance, Muijs and Reynolds (2017) suggest that teachers account for up to 25 % of the variance in pupil attainment growth. However, effect sizes differ between studies and countries, and the persistence of such effects over time remains unclear (Hanushek & Rivkin, 2012; Akiba, LeTendre, & Scribner, 2007). Beyond this global evidence of teachers' importance, there is also evidence regarding effective teachers' practices. A robust evidence base supports the effectiveness of factors such as formative assessment, a positive classroom climate, explicit instruction in basic knowledge and skills, development of self-regulation and metacognition (Muijs et al., 2014), as well as culturally responsive and relevant teaching (Agirdag, 2020). Consequently, focusing on improving classroom practice appears to be essential for any effective school improvement program, and enhancing teacher quality is a common factor in successful school improvement initiatives (Askell-Williams & Koh, 2020).

This leads to the question of how to achieve these goals appropriately. Professional development is crucial (Desimone, 2011), but what form should teachers' professional development take? In recent decades, increasing research into CPD has identified key elements of effective approaches (Desimone, 2011). Specific forms of professional development have also been studied, with professional coaching, for example, showing particular promise (Sims & Fletcher-Wood, 2021). At the organizational level, however, the most promising approach appears to be the development of Professional Learning Communities (PLCs), which are communities where teachers and leaders continually collaborate and seek and share knowledge to enhance their professional competence and students' learning (DuFour, 2004; Burns et al., 2018); they are also referred to as professional learning networks (Poortman, Brown, & Schildkamp, 2022). Substantial evidence suggests that such communities or networks can be highly effective, thus enhancing organizational and teacher effectiveness and, ultimately, improving student learning at both the system and school level (Burns et al., 2018; Dogan, Pringle, & Mesa, 2016; Crippen, Biesinger, & Ebert, 2010; Poortman et al., 2022). Amongst the plethora of PLCs in education, however, not all are successful, indicating that, to make them work, several conditions must be met, including a focus on learning

processes, shared visions and values, collective responsibility, and openness to all school staff (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006).

The leadership of PLCs is another core element. Leadership has long been recognized as a key factor in school effectiveness, second only to teaching in its impact on pupil outcomes. Numerous studies have demonstrated leadership to have a significant (albeit modest and largely indirect) effect on attainment (Barker, 2001). School leadership typically accounts for approximately a fifth to a quarter of school-level variance in pupil attainment when intake and pupil background have been factored in. A lot of the impact of leadership is indirect through its effect on school climate, disciplinary climate, teaching quality and the curriculum. Moreover, the impact of school leadership is greatest in schools that serve the most disadvantaged communities (Leithwood, Harris, & Hopkins, 2008; Huber & Muijs, 2010; Robinson & Gray, 2019). Some studies—for example, the international PISA and TIMSS/PIRLS studies—have failed to find a strong relationship between leadership and achievement; however, the reasons for this may relate to the difficulty of defining effective practices across national contexts.

We may, therefore, tentatively hypothesize that successful school improvement programmes should simultaneously address the school and classroom levels, commit to building schools as learning organizations, and focus on classroom practices and teacher professional development through PLCs aligned with the development of effective school leadership. However, we know less about how these factors interact and what constitutes the essential or non-essential elements of an effective school improvement approach. The sustainability of school improvement is also unclear, as there are few truly longitudinal studies in this field. This leads us to propose the following model (see Fig. 1) for school improvement:

This model suggests that by fostering high-quality professional learning at the school level—using PLCs and Continuing Professional Development (CPD) for both teachers and leaders—we can improve teaching quality, which in turn will enhance learning outcomes. In this way, we combine insights from research on school improvement, teacher and school effectiveness, and CPD, as discussed in the literature. This model underpins the High-Performance Schools (HPS) program and makes it both distinctive and replicable. If a program based primarily on high-quality professional development for leaders and teachers can lead to significant improvement, we have a potentially powerful mechanism that can be applied across various countries and contexts.

This approach is, in many ways, more straightforward than other school improvement methods, which often require structural changes (such as High Reliability Schools or Success for All) or relatively complex models and assessments (like DASI). However, the program does demand a strong adherence to evidence-based elements in the professional development offered. Additionally, as we will discuss later in this paper, the HPS program was implemented in two different modalities: with or without the PLC element. This study allowed us to test the extent to which that more time- and effort-consuming element needs to be present for the approach to be successful.

3. The HPS programme

The HPS improvement programme was developed by scholars and educators at the Academica University of Applied Sciences in the Netherlands, drawing upon the principles of high-performing organization theory, as informed by the studies of De Waal (2006),

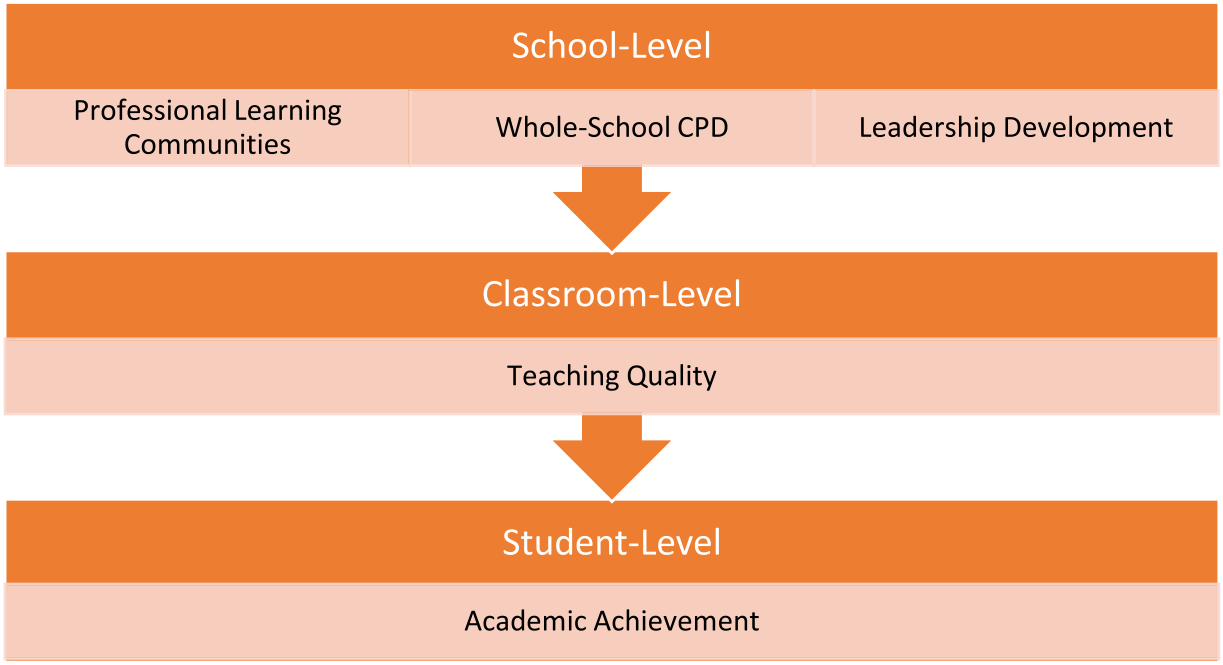

Fig. 1. conceptual school improvement model underlying HPS.

Senge (2006), and Hill, Mellon, Laker, and Goddard (2016). It is offered as a professional development programme to all schools in the Netherlands. A distinction is made between two types of HPS programmes targeting distinct groups of leaders and teachers in schools.

First, the HPS for Leadership programme is aimed at leadership teams in the participating schools, including principals and middle-level leaders. It consists of 20 full-day professional development sessions that provide the necessary knowledge, guidance, and strategies for successful implementation of the change programme. The programme take place over a relative long period of time (one year). This programme focuses not only on the knowledge advancement and individual development of leaders but also on how leadership teams can collectively translate the knowledge about the ten HPS characteristics (see below) to the context of their own school and practice. This means that during each meeting, the team must apply the theory to their own practice. Similarly, during each meeting, they are asked to provide feedback (in the form of reports, assignments, or presentations) to demonstrate how the implementation task from the previous meeting was completed.

Second, HPS for PLCs is another version of the programme, which combines HPS for Leadership teams with PLC development for the entire school staff. Participants engage in 10 development days, focusing on fostering collaboration and enhancing pedagogical practices within the learning teams. The implementation of HPS for leadership teams is closely supervised and supported by the HPS development team. This version places particular emphasis on the growth of learning teams, the refinement of their working methods, and the promotion of a supportive, collaborative culture that fosters ongoing professional development for all staff members. In this way, the HPS for PLCs programme aims to create a robust foundation for sustained school improvement by empowering both leadership teams and teachers to effectively address the challenges and opportunities presented in their unique school contexts.

In both versions, the HPS professional development programme is operationalized through 10 fundamental characteristics of effective schools, which serve as the guiding principles of the programme. The first characteristic is a clear, shared vision or school culture; an HPS school commits itself to providing the highest quality education to all students. A solid foundation of knowledge regarding effective learning and teaching is necessary for schools to develop a shared vision of learning, organization, professionalism, and change. This shared school vision forms the basis of the school culture that the organization establishes, and it determines which changes will be selected and implemented (Hargreaves, 1995; Van Houtte, 2005; Didau & Rose, 2016).

The second characteristic entails maintaining high standards and expectations for all students. Research indicates that teachers who hold high expectations for all students, both individually and collectively, achieve better learning outcomes and foster a more positive classroom climate (Rubie-Davies, 2014; Fang, 1996; Agirdag, Van Avermaet, & Van Houtte, 2013; Agirdag, 2018). To facilitate this, HPS schools discourage ability grouping and actively address prejudices amongst the teaching team (Agirdag, 2020).

The third characteristic emphasizes effective school leadership, which is deemed essential to the success of HPS. Employing the Zenger & Folkman, 2014 methodology, leadership capacity is developed in areas such as setting long-term goals, fostering a professional and innovative culture, and facilitating the effectiveness and performance of teachers.

The fourth characteristic emphasizes fostering collaboration and communication. The school is encouraged to work collaboratively on educational development and improvement (DuFour & Eaker, 2009). The team shares responsibility for students' learning processes and engages in learning teams to enhance educational practices. Each learning team has a chair who regularly consults with other learning team chairs and the school leader.

The fifth characteristic is the alignment of curriculum, instruction, and assessments with core objectives. Good curriculum knowledge and an emphasis on explicit instruction are central to the pedagogical approach in HPS schools, ensuring that all students acquire the necessary knowledge to advance their learning (Rosenshine, 2012). The principles of formative assessment are also integral to the approach. Once students have acquired this knowledge, they can apply their learning in projects and assignments.

The sixth characteristic involves frequent monitoring of the quality of learning and teaching. At the team level, teachers utilize the principles of the PLC to continuously pursue educational improvement. The team then standardizes essential processes by incorporating them into a quality map as part of the quality approach. Data-based decision-making plays a significant role (Schildkamp, 2019; Brown, Schildkamp, & Hubers, 2017).

Seventh is professional development, as fostering the professionalism of the entire team is essential for achieving educational goals. To cultivate a culture of continuous improvement and collaboration, schools must invest in comprehensive and targeted professional development opportunities for their staff. This includes providing access to workshops, conferences, and training sessions, as well as supporting mentoring and peer coaching. By engaging in such activities, teachers and school leaders can enhance their skills, knowledge, and pedagogical approaches, ultimately contributing to the overall success of the school and the achievement of its students (Desimone, 2011; Ingersoll & Strong, 2011).

Eighth is an authoritative school climate for behaviour management at both the classroom and whole-school level (Bennett, 2017). HPS schools develop a supportive, warm climate while also maintaining a strict approach to discipline, encouraging students to learn. Teachers foster positive relationships with their students and maintain the conviction that all children can learn. A school-wide vision and approach to behaviour is implemented (Jia, Konold, & Cornell, 2016; Cornell, Shukla, & Konold, 2016), which promotes a safe, orderly, and inclusive environment, conducive to effective teaching and learning (Marzano, Marzano, & Pickering, 2003).

Ninth is a high level of parental and local community involvement, as extensive parental involvement is crucial for maximizing students' learning capacity and ensuring positive outcomes (Castro et al., 2015; Hornby & Blackwell, 2018). Parents are shown how they can contribute to their children's learning and why their contribution is essential, for instance, with literacy involvement (Hemmerechts, Agirdag, & Kavadias, 2017). In addition, HPS schools are expected to collaborate with the local authority and other agencies.

Tenth is an academic culture that inspires and motivates ongoing reflection. The team stays up to date with educational research, enabling them to critically consider their own practice on a continuous basis and make informed decisions about new and existing approaches. Working in learning teams facilitates the embedding of this knowledge academically in daily teaching practice. This

academic culture and working condition are regarded as important determinants of teacher job satisfaction (Toropova, Myrberg, & Johansson, 2021).

4. HPS and COVID

As is the case for all of education, the programme was affected by the COVID pandemic, which caused long periods of school closures in the Netherlands as elsewhere. This led to a lot of the professional development activities, including the PLC's, moving online during much of the pandemic. While not ideal, the nature of the programme meant that it was possible to deliver online during the pandemic. Once this was possible, the programme returned to face-to-face interaction. While some would hypothesise that online CPD would be less effective and this study therefore provides a lower boundary of the impact of the programme, there is little research to back up this view (Binmohsen & Abrahams, 2022; Sullivan, 2017).

5. Methods

5.1. Sample and participants

The primary sample for this study comprises 47 primary schools that participated in the HPS programme between 2018 and 2021, which we compared with the population of other primary schools in the Netherlands (N = 6110; i.e. all the rest schools of the Netherlands). For this purpose, we utilized publicly available data on the academic achievement of pupils in Dutch primary schools provided by the Department for the Implementation of Education at two time points. Specifically, we used national data on the results of the high-stakes final test (Eindtoets Basisonderwijs / Final Primary School Tests) that all pupils in the country must take at the end of primary school (grade 8), covering reading, writing and mathematics. We examined schools' academic achievement levels at T1 for the school year 2021 to 2022 while controlling for the achievement levels at T0 at school year 2017 to 2018. The Eindtoets Basisonderwijs assesses achievement levels in mathematics, reading, and writing. For these subject areas, the Dutch Inspectorate of Education identifies two standards or attainment levels: the basic level (1F) and the target levels (1S/2F). According to the Inspectorate, the basic level (1F) represents the minimum required to function in society (e.g., the ability to read), while the 1S/2F target levels are needed to facilitate pupils' transition to subsequent phases of education (Inspectorate of Education Inspectie van het Onderwijs 2021). Thus, we focused on the proportion of pupils that attained the 1S/2F target levels at the school level (see Instruments section).

5.2. Instruments and measurements

5.2.1. Independent variables

The central independent variable in this study indicates whether a school participated in the HPS programme. The data includes 47 HPS programme schools, of which 26 participated in the Leadership version of the program, and 21 participated in the PLC version of the program. A total of 6110 schools served as comparison schools.

5.2.2. Dependent variables

The dependent variable in this study is the proportion of pupils who attained the target levels in school at T1, based on the national achievement test (cf. supra.) The reliability and the validity of these test are controlled by the Dutch Committee on Tests and Testing (COTAN). For the first and second research questions, the overall level of achievement (i.e., the percentage of students who achieve the target level at school) is considered, calculated by pooling the achievement levels of the three outcome subjects (reading, math, and writing). For the second and third research questions, the outcomes for the three subject areas are examined separately.

5.2.3. Controls

The achievement levels at T0 are controlled for when calculating the effects. This variable is calculated analogously to the achievement levels at T1 (see dependant Variables).

Additionally, we examined whether HPS schools were comparable to the comparison schools regarding their ethnic and socio-economic composition. This is operationalized using the *'schoolweging'* index of schools, which is an official index calculated by considering the educational, financial, and ethnic backgrounds of pupils' parents in a given school. The index ranges from 19.0 to 41.5; the higher the index, the larger the proportion of pupils from socioeconomically deprived and ethnic minority backgrounds in a given school.

5.3. Analysis design

Since participation in the HPS programme is voluntary, there is no random assignment between the intervention and control conditions. As such, it is crucial to ensure that there are no apparent selection effects that can bias the analyses. Therefore, before exploring the effects of the HPS programme, we examine whether there are differences at baseline between schools that participated in the HPS programme and the comparison group. More specifically, we investigate whether there are differences concerning (1) baseline achievement in 2018 and school composition. Afterward, we will discuss the descriptive results by exploring univariate differences (means and standard deviations) regarding overall achievement across HPS-Leadership schools, HPS-PLC schools, and the comparison group schools at both time points, for the overall/pooled and subject-specific outcomes. This exploration provides us with an initial

understanding of the variations in academic performance amongst these groups and how the different versions of the HPS programme may impact the outcomes.

To address the first research question (i.e., to examine the impact of the HPS programme), we perform Analysis of Covariance (ANCOVA) on the overall academic achievement in 2022. That is, we compare the academic achievement of schools that participated in the HPS programme with other schools in the population while controlling for the achievement levels of 2018 as a covariate. For the second research question, we conduct post-hoc analyses, comparing schools in the HPS-Leadership version of the programme and the HPS-PLC version of the programme. Both are compared with control schools and also amongst each other. To address the third research question, similar ANCOVA analyses are conducted but now separately for the three subject areas.

The magnitude of effect is expressed in terms of Cohen's d effect sizes, defined as the difference between two means divided by the pooled standard deviation (Cohen, 1988). For the interpretation of these effect sizes, we utilize the Sutton Trust–Education Endowment Foundation Teaching and Learning Toolkit (EEF-Toolkit), which can be employed to translate effect sizes into months of educational progress (Education Endowment Foundation 2018).

6. Results

6.1. Selection effects

To minimize the potential for selection effects, we examined whether schools that participated in the HPS programme differed at the baseline (T0) from the schools in the control group. Regarding overall achievement, the mean level of the share of students attaining the target levels was 60.1 % in the control schools, 58.5 % in schools that enrolled in the HPS-Leadership programme, and 60.1 % in the HPS-PLC programme. An Analysis of Variance (ANOVA) reveals that the observed difference is not statistically significant ($F = 0.195$; $p = .822$). In other words, schools that participated in the HPS programme did not achieve better or worse at T0.

Concerning school ethnic and socioeconomic composition, the mean level of the *'schoolweging'* index was 29.97 in the control schools, 29.06 in schools that enroled in the HPS-Leadership programme, and 29.30 in the HPS-PLC programme. An ANOVA indicates that the observed difference is not statistically significant ($F = 1.074$; $p = .342$).

Hence, we continue our analysis with the assumption that no apparent selection effects are present, and the schools that participated in the HPS programme were similar to the other schools in the population of schools in the Netherlands in terms of initial achievement and school socioeconomic and ethnic composition. This similarity at the baseline provides a reasonable basis for comparing the outcomes of the HPS programme with those of the comparison group.

6.2. Descriptive results

Table 1 again demonstrates that at the baseline (T0), only very small differences are visible regarding the overall achievement level. However, at T1, the differences become apparent, as schools that participate in the HPS programme outperform the comparison schools. While at average 57 % students attain the target levels in the comparison schools, this number increases to 61 % in schools that participated to the HPS-Leadership programme and to 67 % in HPS-PLC schools. An ANOVA reveals that these differences at T1 are statistically significant ($F = 4.642$; $p = .010$). Furthermore, Fig. 2 clearly shows that the overall achievement of the comparison group schools decreased during the years of the pandemic and the lockdowns, while the overall achievement level of schools that participated in the HPS programme did not decrease and actually increase. This suggests that the HPS programme may have played a role in supporting academic achievement during this challenging period.

Upon examining the descriptive statistics for the three subjects separately, we observe a pattern similar to the overall results: comparable outcomes at T0 evolve into differences favouring HPS programme schools at T1 (see Table 2). However, it is evident that, in general, a smaller proportion of students achieve the target levels for math (< 50 %), while a larger group of students attains the target levels for reading (> 70 %), both at T0 and T1.

6.3. Main results

To provide a definitive answer for the first research question – whether the HPS programme improves academic achievement in participating schools compared to non-participating schools – we conducted an ANCOVA with overall achievement at T1 as the dependent variable and overall achievement at T0 as a covariate. The results presented in Table 3 reveal statistically significant differences between schools that participated in the HPS programme and comparison schools ($F = 5.292$; $p = .005$). As demonstrated in the descriptive results, HPS programme schools outperform non-participating schools.

With respect to the second research question – that is, which version of the HPS programme is more effective in improving academic

Table 1
Descriptive statistics of overall achievement at T0 and T1 - share of students at school level attaining target levels.

	T0 Overall Mean (SD)	T1 Overall Mean (SD)
Comparison group	.601 (0.136)	.579 (0.140)
HPS-Leadership	.585 (0.147)	.610 (0.138)
HPS-PLC	.601 (0.079)	.665 (0.113)

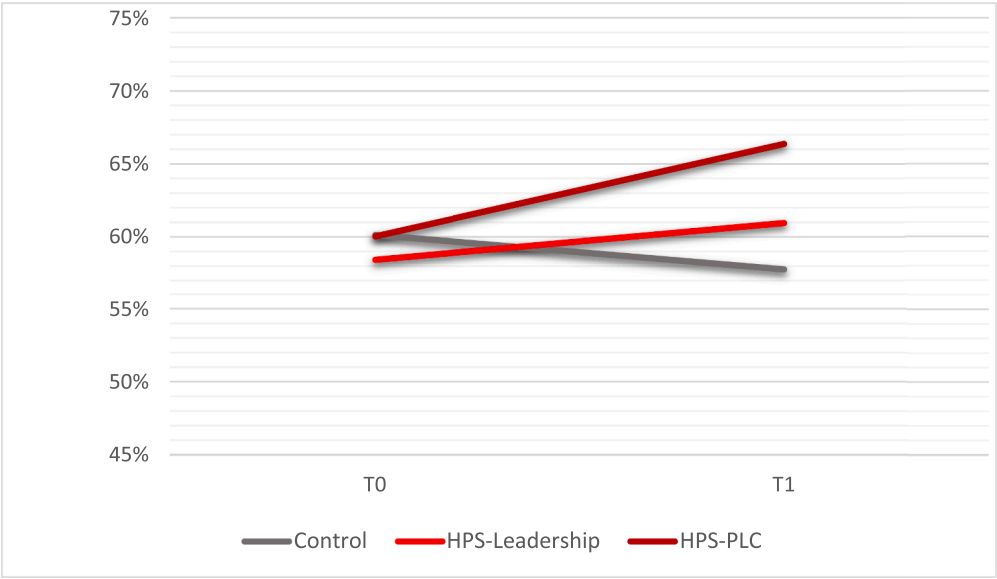

Fig. 2. Descriptive differences in overall achievement level at T0 and T1.

Table 2
Descriptive statistics of math, reading and writing achievement - share of students at school level attaining target levels, at T0 and T1.

	T0 Math Mean (SD)	T1 Math Mean (SD)	T0 Reading Mean (SD)	T1 Reading Mean (SD)	T0 Writing Mean (SD)	T1 Writing Mean (SD)
Comparison group	.482 (0.178)	.408 (0.169)	.738 (0.150)	.718 (0.153)	.584 (0.170)	.609 (0.170)
HPS-Leadership	.498 (0.161)	.451 (0.181)	.728 (0.156)	.739 (0.121)	.532 (0.190)	.642 (0.156)
HPS-PLC	.456 (0.111)	.496 (0.119)	.739 (0.115)	.769 (0.115)	.607 (0.099)	.726 (0.167)

performance – we conducted ANCOVA post-hoc comparisons (see Table 4). It becomes evident that the PLC version is the most effective HPS programme. The effect size (Cohen's d) for the HPS-PLC programme is 0.645 and statistically significant ($p = .009$). According to the EEF-Toolkit, this effect size corresponds to an increase of eight months of learning gains and is regarded as "high impact." While schools that participated in the HPS-Leadership programme occupy an intermediate position, neither the difference with the comparison group ($d = 0.272$; $p = .349$) nor the difference between HPS-Leadership and HPS-PLC schools reaches statistical significance ($d = 0.372$; $p = .412$).

The third and final research question addresses whether the effects of the HPS programme are consistent across different subject areas. Analogous to the analyses of the second research question, we conduct separate ANCOVAs for the three subject areas. Significant effects were found for math ($F = 3.697$; $p = .019$) and for writing ($F = 5.698$; $p = .003$). However, no statistically significant effects were observed for reading ($F = 1.650$; $p = .192$). The pattern of the significant effects is similar to the post-hoc comparison of overall achievement. That is, the largest effect is found for the HPS-PLC version of the programme, while the HPS-Leadership occupies a non-significant intermediate position. The effect sizes (d) of HPS-PLC programme is for math 0.557 ($p = .029$) and for writing 0.677 ($p = .006$). According to the EEF-Toolkit, these effects correspond to an additional six and eight months of learning, respectively.

7. Discussion

Numerous education systems and institutions grapple with the issue of diminishing academic performance levels, as highlighted in various global evaluations. This challenge has become increasingly pronounced in light of the COVID-19 pandemic. Consequently, educational policymakers and practitioners alike are seeking ways to improve their schools' academic performance. While the school

Table 3
ANCOVA - Impact of HPS programme on overall achievement at T1.

	Sum of Squares	df	Mean Square	F	p
HPS Programme	.190	2	.095	5.292	.005
T0 Achievement	9.537	1	9.537	531.797	< .001
Residuals	104.645	5835	0.018		

Table 4
ANCOVA – Post-Hoc comparisons impact of HPS programme on overall achievement.

		Difference	SE	t	Cohen's d	p_{tukey}
Comparison group	**HPS-Leadership**	0.036	0.026	1.385	.272	0.349
Comparison group	**HPS-PLC**	0.086	0.029	2.949	.645	0.009
HPS-Leadership	**HPS-PLC**	0.050	0.039	1.270	.372	0.412

improvement literature provides a well-informed account of the generic factors that may contribute to pupils' academic achievement, validated evidence is scarce on the impact of specific school improvement or professional development programmes in particular contexts (for a Dutch exception, see Mullender-Wijnsma et al., 2016). Hence, this study examined the effectiveness of a specific school improvement program (the HPS program) in the context of Dutch primary schools. We applied a quasi-experimental design and used publicly available academic attainment data to examine the program's impact. More specifically, we tested the (1) impact of the HPS programme on overall achievement; (2) the effect of the different versions of the programme; and (3) the impact on different subject areas.

Overall, the analysis of public data on school achievement suggests that the HPS programme has had a positive impact on overall achievement in the 47 participating schools. Schools that participated in the HPS programme demonstrated greater progress on average than the comparison schools. Furthermore, while a decrease in achievement is evident in the comparison group of schools during the COVID-19 pandemic period, the achievement of schools that participated in the HPS programme did not decline; instead, it improved during the COVID-19 pandemic period. This is an interesting finding, which may be explained by the fact that the programme continued during COVID.

However, the size of the effects varied amongst the subject areas (math, reading, and writing) and amongst the two types of HPS programme. Regarding the different subject, we found significant effects for math and writing, while no significant effect for reading. There are two explanations for these differences. First, this supports a recurrent finding in the literature that schools and teachers have more impact on math than on reading outcomes, because mathematics is learned mostly in schools, while reading is more likely to be learned outside school as well (Nye, Konstantopoulos, & Hedges, 2004). Second, the share of students that attained the target levels for reading in our data was relatively high. For instance, while 74 % of pupils attained the target level for reading at T0, only 48 % did so for math. This could indicate that the bar of attainment in reading – the official 1S/2F level – is set too low. Consequently, the absence of any statistically significant improvement may be related to the so-called ceiling effect; there may simply be less room for documented improvement due to how reading attainment is captured in the public data.

We also found that different types of HPS programmes yielded different results. It is notable that the HPS-PLC programme tends to have the strongest impact, while the HPS-Leadership programme takes an intermediate position. This has implications for theory and the design of school improvement programmes, suggesting that focusing purely on the leadership level might be a starting point, but may be insufficient to produce significant change; effectiveness simply does not trickle down. On the contrary, an approach that integrates leadership development with a distributed, whole-school emphasis on classroom practice is more likely to be effective. This provides further evidence of the value of professional learning communities as a significant means by which we can develop teachers and leaders, which in turn can lead to enhanced pupil learning outcomes (see Poortman et al., 2022).

Overall, the findings of this study largely confirm those of school improvement research. Firstly, we find that a well-developed programme can have a significant positive impact, but also that this impact tends to be moderate in size and somewhat varied across schools participating in the school improvement initiative (Hopkins et al., 2014; Harris, 2000; Kyriakides et al., 2019). The study also confirms the value of key elements of effective school improvement, such as an emphasis on leadership development (Harris et al., 2013; Bush, 2009; Heck & Reid, 2020), classroom pedagogy (Muijs et al., 2014; Kyriakides, Panayiotis, & Dimosthenous, 2021), professional development (Harris et al., 2013; Muijs et al., 2014), and teacher collaboration in PLCs (Poortman et al., 2022).

From this perspective, the study is therefore largely a confirmation within a Dutch context that these internationally recognized factors can contribute to effective school improvement programmes here as well, although as mentioned above the primary focus on CPD in HPS makes it relatively straightforward to implement compared to some other approaches which require greater structural change. However, what is noteworthy from the international evidence base is that while the core elements of effective school improvement are known, it is nonetheless common for school improvement initiatives to fail (Coe, 2009; Benoliel and Berkovich, 2021; Bryk, 2010). This study can help shed some light on this important question. Our findings suggest that, firstly, there is a need to fully integrate all elements of effective school improvement, including teacher collaboration, and, secondly, support the importance of teacher participation and collaboration to make school improvement work. This suggestion, which joins a growing body of research on implementation of school improvement, implies that school improvement requires sustained and intensive focus to succeed (Kyriakides et al., 2021; Supovitz, D'Auria, & Spillane, 2019).

Questions, of course, remain in relation to the findings from this study. We do not yet know the extent to which these improvements will be sustainable or last over time. The HPS programme aims to build sustainable capacity for growth and change, but follow-up research will be needed to ascertain the extent to which this is the case. We will also need to explore in more depth the extent to which impact still differs across schools, and which implementation and cultural factors may be in play there.

Although this study is likely to interest policymakers, school boards and future researchers, it should be considered within its limitations, of which two deserve mention. First, we have no structured data on the processes of implementation across the schools that participated in HPS programmes. This makes it difficult the capture the specific factors in the programmes that are particularly effective. At this stage, therefore, it is not possible to distinguish between the must-have and nice-to-have elements of the different

programmes. Further research with more implementation data could inform us about these processes. A second limitation is that the schools in this study were not randomly assigned to different HPS programmes; they (or their school boards) voluntarily opted for the HPS programme. While we made use of (longitudinal) achievement growth rather than (cross-sectional) achievement-level data as a dependent variable, and carefully examined selection effects, a full experiment using a clustered randomised controlled trial (RCT) assignment could obviate potential self-selection effects.

In conclusion, while further follow-up is needed to study the long-term impact of HPS, and research is needed to better identify the impact of various components, this study lends support to the concept of an integrated approach that pulls levers at the school and teacher level, drawing on theoretical and practical insights from leadership, effective teaching and professional development through learning communities. This has clear implications for both practice and policy. Firstly, from a policy perspective, it confirms the centrality of professional development and communities of practice to effective education. While many policymakers focus on structural aspects of the education system, such as school choice or governance reforms, it may be also fruitful to invest resources in high-quality professional development for teachers and leaders. From a practice perspective, this study offers a message of hope to school leaders and educators. Using an evidence-informed approach, it is possible to improve the quality of education and, consequently, learning outcomes in your school. Again, a focus on Continuing Professional Development (CPD) should be at the heart of such endeavours.

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