The Influence of School Context Factors on the Induction Support as Perceived by Newly Qualified Teachers

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This study explores the relationship between school demographic characteristics and the amount of provided induction activities, as perceived by beginning teachers (BTs), with special attention for Professional Development Schools and non-Professional Development Schools. The aim is to provide information that is useful to improve induction arrangements to particular school contexts. Data were collected in a Dutch national induction program in which qualified BTs are supported in their first 3 years of professional practice. The support monitor measures multiple induction activities with regard to the implementation of workload reduction, school enculturation, professional development plans and lessons support. 1,670 BTs working in 195 schools reported on these activities. Linear regression analyses revealed that less induction activities were associated with schools with multiple locations, more enrolled students and number of BTs employed, and with schools with older male teaching staff. No significant differences were found between the amount of support perceived by BTs in PDSs and non-PDSs. Yet school characteristics revealed stronger predictive values for the amount of support provided in non-PDS settings. These insights are relevant for mapping school differences in induction arrangements in order to enhance the equity of support across schools to assure the development of teaching skills of BTs.

Keywords: induction, support, beginning teachers, school context, Netherlands

INTRODUCTION

Within the teaching community teacher induction is a widespread professional development intervention aimed to attract, develop and commit beginning teachers (BTs) to teaching. The work of Ingersoll and Smith (2004) provides valuable guidelines that lead to higher teacher performance and higher retention rates. Teacher induction arrangements based on these guidelines have been implemented in the Netherlands. An experimental study applying a 3 year induction arrangement showed a longitudinal positive effect on teaching quality of BTs, as perceived by students (Maulana et al., 2015; Helms-Lorenz et al., 2016). In addition, this programme had a positive effect on teacher retention (Helms-Lorenz et al., 2016).

In the period 2013–2019 the Dutch Ministry of Education supported the implementation of a national project aimed to implement induction arrangements in at least 50% of secondary schools. This was done according to a pre-defined framework in which a set of coherent support activities in four key-induction elements were combined and carefully timed to the needs of BTs, guided by

regional teacher education institutes. The four elements concern 1) providing appropriate workload; 2) introducing the school culture and school policy; 3) implementation of professional development plans; and 4) providing classroom support in the form of feedback and coaching based on classroom observations and preparing and discussing lessons with a coach (Helms-Lorenz et al., 2015; Helms-Lorenz et al., 2018a). The 447 schools participating in this project were closely supported by teacher education institutes to help tailor the implementation of the framework to each school's specific social, political, cultural, individual, organizational and administrative context. This collaborative approach, however, does not guarantee that all participating schools were able to introduce and retain induction arrangements for BTs effectively. This study aims to get insight into the extent to which this large scale intervention has succeeded in schools offering BTs an adequate amount of support activities, regardless their contextual demographic characteristics. These demographic characteristics are school size, age and gender composition of the teaching staff, denomination, and the socioeconomic composition of the student population. As existing support- and learning infrastructures are assumed to be more organized in schools that have a formal collaboration relationship and structure with a teacher education institute, a distinction is made between Professional Development Schools (PDSs) and non-Professional Development Schools (non-PDSs). The findings may reveal that the national induction framework should be tailored more specifically to certain school context factors in order to reach all targeted BTs.

Significance of Induction Arrangements for Beginning Teachers

Induction arrangements aim to enhance teaching quality and to commit BTs to the teaching profession. The work of Ingersoll and Smith (2004) has had a great impact on the conceptualization and development of induction arrangements across the world. Their contribution to the field is especially important because they unravelled relative contributions to teacher retention of different features of induction arrangements. In their large scale survey study (N = 3,235), the strongest activities contributing to retention were having a mentor from the same field, having common planning time with other teachers in the same subject, having regular scheduled collaboration with other teachers, and being part of an external network of teachers. They also found that, as the number of components in the induction arrangement increased, the probability of teacher turnover decreased.

In addition to the association with teacher retention, a number of studies have shown positive effects of induction arrangements and high quality mentoring programs on job satisfaction and commitment (Richardson et al., 2007; Ingersoll and Strong, 2011), improved classroom instruction and student achievement (Ingersoll and Strong, 2011). In the Dutch context, a multicomponent induction arrangement on perceived teaching quality reported by students, revealed positive improvements of over time (Maulana et al., 2015; Helms-Lorenz et al., 2016). Researchers identified the separate

support elements responsible for this effect and found that a low degree of workload reduction and enculturation in the school contributed to teacher attrition and that classroom support had a positive impact on the development of teaching skills. The same research group also showed that specific induction arrangement elements appear to be meaningful to reduce the level of specific perceived stress causes and stress responses. Harmsen et al. (2018) found that workload reduction decreased the level of perceived high psychological task demands, negative social aspects, and stress responses. Classroom support decreased the level of perceived negative emotions and discontent, and school enculturation decreased perceived discontent over time. Similarly, in the Dutch context, Kessels (2010) found a positive effect of induction arrangements on BTs' well-being in general.

School Context and the Effective Implementation of Induction Arrangements

According to Firestone and Louis (1999), the formal structures that belong to an induction arrangement are effective when they are in line with, and reinforced by, the norms, values, and practices of the professional culture in which they are embedded. An effective professional culture is characterized by malleable conditions such as school leadership, school policies, and organizational conditions (Creemers and Kyriakides, 2010; Kraft and Papay, 2014; Kutsyuraba et al., 2016; Scheerens, 2016). Birkeland and Feiman-Nemser (2012) note that the success of a school-based induction arrangement relies on the commitment and investment of school leaders, and on the entire school taking responsibility to help new teachers succeed. Examples of factors that contribute to the variation in induction implementation and teacher experiences are leadership characteristics, clarity of tasks and responsibilities for beginning teacher support, types and formats of support, formal and informal rules, and organizational framework (Kutsyuraba et al., 2016). Ideally, induction arrangements are adapted to such school organizational conditions in the design and implementation phase. As these factors are complex, multi-layered, and hard to measure objectively, it is difficult to fully capture them within a research design. As these objective characteristics are associated indirectly with the organisational contexts of schools (Scheerens, 2016), this study aims to provide an indication of which school demographic characteristics facilitate or hinder the implementation of induction activities.

School Size and Proportion of Beginning Teachers

School size is an important factor influencing the number and type of programs schools offer to teachers and it also impacts the social interactions among the staff. In small schools, the social network is more compact, which enhances (informal) interpersonal relationships, teacher collaboration, and close relationships between teachers and students. In such contexts, staff are more likely to engage in common activities and teachers have greater autonomy (Fowler and Walberg, 1991; Lee et al.,

1993; Maslowski, 2001; Opdenakker and Van Damme, 2007). In larger school organisations, it is likely that more formal rules and procedures set the basis for activities; relationships may be more formal and staff members may have less autonomy (Lee et al., 1993; Maslowski, 2001). This implies that school size could influence the way support is provided to and experienced by BTs.

Efficiency in designing and implementing induction arrangements may be different in schools with a larger proportion of BTs in their staff than in schools that have relatively few BTs. For one, providing support activities to a larger group of BTs requires a larger number of supportive staff and demands a more detailed supportive structure for professionalization activities. We explore whether BTs working in schools with different student numbers and with different proportions of BTs employed, perceive different amounts of induction activities. The direction of the association between school size, proportion of BTs and induction effects is unclear, as both small and large scale situations can contain factors facilitating or hindering collaboration and supportive structures.

Age and Gender Composition of Teaching Staff

Although no studies were found focusing on the association between the age composition of schools' teaching staff and the provided support offered to BTs, researchers have studied the effect of age composition of teaching staff on learning cultures. According to Day and Gu (2007), schools may encounter difficulties in meeting support needs all staff members as they vary in professional, personal, and workplace conditions during different stages of the teaching career, which this affects teachers' commitment and resilience in different ways. For instance, BTs may prioritise support by head teachers and colleagues and a supportive school culture for their professional and identity development, while midcareer teachers face tension in managing professional and personal lives and are in need of support from trustable head teachers and colleagues, and veteran teachers are challenged by adjusting to (educational) change and health problems (Day and Gu, 2007). Kardos et al. (2001) studied the association between age composition of teaching staff and the type of learning cultures for BTs. They state that "a new teacher's encounter with professional culture will depend on the group of colleagues with whom she works, how they interact, and whether they welcome novices in their professional exchanges and pay attention to their needs and concerns". They describe different learning cultures in schools where the age composition of the teaching staff is predominantly young (novice-oriented professional cultures) or older (veteran-oriented cultures). Due to the lack of research on school employee composition, there is little insight in how this factor is associated with the type and amount of induction activities for BTs.

In addition to age, the gender composition of a school's staff can affect the social dynamics within schools. In general, women are more interested in informal communication and are more hesitant towards individualistic work settings (Bryk et al., 1999). As this is a rather complex and debated issue in the organizational literature, in this study we account for the gender composition of

a teaching staff in order to explore the possible association with the provision of induction activities to BTs.

Denomination of Schools

The cultural identity of a school is another characteristic that may influence the type and number of support activities organized for (beginning) teachers. Within a school system, historical norms and values differ by school denomination. Maslowski (2001) investigated the association between school culture and the performance of Dutch secondary schools and showed that Dutch secondary schools are rather similar with regard to values like collaboration, commitment and stability, but found substantive differences when comparing these orientations among denominations. Schools without a religious or philosophic denomination tend to value innovation, insight and adaptation and are therefore more inclined towards educational change than Catholic or Protestant schools. Protestant schools tend to value stability and continuity and are therefore more reluctant to change and to implement innovations and (Maslowski, 2001). Specific elements of the induction arrangement may be valued and implemented in a differently by a school's denomination, expecting to lead to differences in the amount of perceived support by BTs.

Socioeconomic Composition of Students

International research has shown that the socioeconomic background of students is associated with the policies, practices and resources of schools, and thereby the context in which (beginning) teachers are working (Lee et al., 1993; Loeb et al., 2005). Specific teaching skills are required to deal with the relatively high proportion of students with learning difficulties and behavioral problems and low socioeconomic backgrounds (Muijs et al., 2004; Sykes and Musterd, 2011; Sykes and Kuyper, 2013). In such challenging contexts, (beginning) teachers are less qualified (Bonesrønning et al., 2005; Boyd et al., 2005; Danhier, 2016; Lankford et al., 2002; Organisation for Economic Co-operation and Development Organisation for Economic Co-operation and Development, 2018, less experienced (Sass et al., 2012; Danhier, 2016), learn less (Lankford et al., 2002; Hanushek et al., 2004; Ronfeldt et al., 2016), have lower retention rates (Scafidi et al., 2007; Danhier, 2016), and cooperate less (Opdenakker and Van Damme, 2001; Sass et al., 2012). Schools with a more challenging student population are therefore in greater need for providing adequate teacher support. For the US context, Johnson et al. (2004) found a support gap between high- and low-income schools, where novice teachers working in low-income schools were supported less. The Dutch educational system has fairly homogeneous school conditions regarding teacher salaries and teacher qualification criteria, however some schools do have a high proportion of students with a lower socioeconomic backgrounds (Organisation for Economic Co-operation and Development, 2016). It is not clear to what extent the above mentioned features are associated with perceived support. This study accounts for the composition of the SES of a school's student population in order to get insight into the possible association with the provision of induction activities to BTs.

TABLE 1 | School characteristics and reported support activities, national and study sample, stratified by PDSs and non-PDSs.

	National sample (N = 651)			Study sample (N = 195)			PDSs (N = 89)			Non-PDSs (N = 106)		
	%	Mean	SD	%	Mean	SD	%	Mean	SD	%	Mean	SD
Schoolsize	—	—	—	—	—	—	—	—	—	—	—	—
One location	57.0	—	—	50.8	—	—	46.1	—	—	54.7	—	—
Multiple locations <2,500 students	25.4	—	—	23.1	—	—	20.2	—	—	25.5	—	—
Multiple locations>=2,500 students	17.7	—	—	26.2	—	—	33.7	—	—	19.8	—	—
Proportion beginning teachers (proxy)	—	—	—	—	—	—	—	—	—	—	—	—
≤5%	n.a	—	—	42.1	—	—	42.7	—	—	41.5	—	—
5–10%	n.a	—	—	34.4	—	—	32.6	—	—	35.8	—	—
>10%	n.a	—	—	23.6	—	—	24.7	—	—	22.6	—	—
Age and gender composition teaching staff	—	—	—	—	—	—	—	—	—	—	—	—
Average age male teachers		46.8	3.1		46.5	2.6	—	—	2.3		46.7	2.9
Average age female teachers		42.8	3.0		42.4	2.6	—	—	2.2		42.4	2.8
Proportion of female teachers		52.9	7.5		52.1	5.5	—	—	5.3		51.9	5.7
Professional Development School	—	—	—	—	—	—	—	—	—	—	—	—
Yes	28.6	—	—	45.6	—	—	—	—	—	—	—	—
No	71.4	—	—	54.4	—	—	—	—	—	—	—	—
School identity				—	—	—	—	—	—	—	—	—
No religious/philosophic background	28.7	—	—	34.9	—	—	32.6	—	—	36.8	—	—
Catholic	23.8	—	—	27.2	—	—	36.0	—	—	19.8	—	—
Protestant	30.0	—	—	24.6	—	—	23.6	—	—	25.5	—	—
Philosophic background	17.5	—	—	13.3	—	—	7.9	—	—	17.9	—	—
Proportion SES neighbourhood students	—	—	—	—	—	—	—	—	—	—	—	—
Highest SES	—	25.8	21.9	—	31.0	23.0	—	29.6	20.7	—	32.1	24.9
Lowest SES	—	30.6	24.5	—	25.9	21.6	—	24.8	19.8	—	26.8	23.0
Degree of urbanisation municipality	—	—	—	—	—	—	—	—	—	—	—	—
Very urban	23.8	—	—	25.6	—	—	22.5	—	—	28.3	—	—
Urban	33.6	—	—	32.3	—	—	31.5	—	—	33.0	—	—
Suburban	18.6	—	—	23.1	—	—	27.0	—	—	19.8	—	—
Rural	22.7	—	—	19.0	—	—	19.1	—	—	18.9	—	—
Reported support activities	—	—	—	—	9.9	2.4	—	9.9	2.2	—	10.0	2.6
Workload reduction (max 19)	—	—	—	—	4.1	1.0	—	3.9	1.0	—	4.2	1.0
School enculturation (max 6)	—	—	—	—	6.1	1.4	—	6.0	1.3	—	6.1	1.5
Professional development (max 10)	—	—	—	—	5.7	1.5	—	5.7	1.5	—	5.7	1.5
Effective teaching behavior (max 9)	—	—	—	—	9.9	2.4	—	9.9	2.2	—	10.0	2.6

Existing Collaboration With Teacher Education Institutes

Currently, an increasing number of schools and teacher education institutes form partnerships to collaborate in the design and implementation of teacher education programs and to provide a strong support system in which they both supervise and support the development of pre-service teachers. Schools that participate in such partnerships are called Professional Development Schools (PDSs). In this approach, field experience is spread throughout the teacher preparation program, aiming to closely connect theory with practice.

A recent small-scale longitudinal study in the Netherlands revealed that student teachers who were educated in PDSs had higher teaching skills and reported more opportunities to learn than a similar group of teachers working at non-PDSs (Helms-Lorenz et al., 2018b). It is expected that induction arrangements for BTs benefit from these existing learning infrastructures, providing more support activities to BTs working in PDSs schools than those working in non-PDSs schools. As in PDSs the infrastructure for learning is more integrated in the school organization, it is expected that the demographic school demographic characteristics have a weaker predictive value in explaining differences between schools in providing support activities to BTs than they have in non-PDSs. As in this study the participating schools could be defined by being a PDS or not, it will be possible to investigate these expectations.

The Dutch School Context and the National Three-Year Induction Arrangement

In 2015 there were 651 registered secondary schools, with an average size of about 1,500 students per school (**Table 1**). The school education system is subsidized by the government and parents are free to choose any school they prefer. Secondary schools can be categorized as public schools (29%) and schools that are based on a particular religious (54%) or educational philosophy (17%) (Dienst Uitvoering Onderwijs, 2016). It is important to note that in the Netherlands public schools do not have a religious profile, and that schools with a religious profile are not very different from public schools.

More than half of all Dutch schools are located in more urbanized areas and nearly one third is located in the

economic core. Due to declining birth rates, the student population for secondary education is predicted to decrease with more than five percent in the period 2015–2020 (Dienst Uitvoering Onderwijs, 2015b; Van den Berg et al., 2015). In 2014, 30 percent of all secondary school students in the Netherlands were from neighbourhouds with the lowest socioeconomic status, and a quarter of all students were from the highest SES neighbourhoods (Dienst Uitvoering Onderwijs, 2015a; Sociaalen Cultureel Planbureau, 2014. According to the latest OECD figures, the Dutch school system is one of the best in the OECD in the sense that a relatively high proportion of students with a disadvantaged background succeeding at school (Organisation for Economic Co-operation and Development, 2016). There are however remarkably large differences between schools concerning student achievement that may be explained by learning climate, teacher quality and learning materials (Inspectie van het Onderwijs, 2017).

Nearly one third of the teacher population in the Netherlands is 55 years and older (Centraal Bureau voor de Statistiek, 2018). Although the gender composition of the full teacher population is almost equal (46% male and 54% female teachers), a larger proportion of the older teachers is male (58%), whereas the younger teachers are more often female (60%) (Centraal Bureau voor de Statistiek, 2018). Female teachers in particular prefer to work part time.

Teacher education programs lead to two types of degrees. A first level degree is obtained after graduation at the university (master) level, a second level degree is obtained at the bachelor level. Teachers with a first level degree are qualified to teach in the lower and upper tracks in secondary education. Teachers with a second level degree are qualified to teach in the lower tracks. Qualified BTs hold different positions at the labour market; in the first years the majority will have a temporary position, some a permanent position; being employed at one more schools; working full- or part-time. This work status is determined by a combination of possibilities and restrictions of the (regional) labour market and depends on individual preferences.

Since 2009, PDSs aim to bridge the gap between the job requirements and the theoretical curriculum requirements (Nederlands-Vlaamse Accreditatieorganisatie Nederlands-Vlaamse Accreditatieorganisatie, 2009). In these partnerships schools and teacher education institutes collaborate to educate student teachers and share the responsibility for the content and implementation of the curriculum. This implies an established professional learning infrastructure within the school.

Most schools in the Netherlands offer a 1 year induction arrangement for BTs. In this study, a 3 year induction program was implemented in 50% of all regions of the Netherlands, with the assistance of eight regional teacher education institutes to develop, implement, and evaluate the support activities. The implementation aimed to tailor the programme elements to the specific BT needs of each of the 447 participating schools. The framework combines a set of coherent support activities in four key-induction activities which are clearly described and carefully timed to the needs of BTs: 1) providing appropriate workload; 2) introducing the school culture and school policy; 3) implementation of professional development plans; and 4) providing classroom support in the form of feedback and coaching based on classroom observations and preparing and discussing lessons with a coach. A detailed description of the project can be found in Helms-Lorenz et al. (2015) and Helms-Lorenz et al. (2018a).

This study explores the relationship between school demographic characteristics and the amount of provided induction activities, as perceived by beginning teachers (BTs) and thereby aims to provide information that is useful to improve induction arrangements to particular school contexts.

Research Questions

1. What amount of support is provided by participating schools, as perceived by beginning teachers participating in this national induction arrangement?
2. To what extent do demographic characteristics of schools explain potential differences in the offered amount of support activities?
3. Are demographic characteristics of schools less associated with the amount of support activities offered by Professional Development Schools compared to non-Professional Development Schools?

METHOD

Participants, Sample and Procedure

The data were collected in three waves (cohorts) of the national longitudinal study in secondary education in the Netherlands (Helms-Lorenz et al., 2015; Helms-Lorenz et al., 2018a). During the academic years 2014 through 2019, 2,317 qualified BTs enrolled in the study. At the end of each academic year, a research questionnaire, the so called "support monitor" was used to measure BTs' perceptions of the induction activities provided by their schools. This monitor has been used previously (Helms-Lorenz et al., 2012; Harmsen et al., 2018a), details will be discussed in the next section. 2,040 teachers working at 286 schools filled in this questionnaire at least once. 149 cases were excluded as the teachers did not give consent to use the data for research purposes or due to incompleteness. For schools with multiple locations, at least five completed monitors were required to represent the offered induction activities at the school level. In order to capture the support activities provided to BTs working in smaller schools as well, all schools having one location were included in the study sample. This selection procedure resulted in a final sample of 195 schools among which 1,670 BTs completed the support monitor at least once.

This sample consisted of nearly 30% of the total number of secondary schools in the Netherlands (**Table 1**) and characterizes an overrepresentation of schools with multiple locations and a larger student population, and of schools located in suburban areas. The average age and gender composition of the teaching staff did not deviate from national averages. Compared with the national sample, the study sample contains a larger proportion of PDSs, more public and Catholic schools, and more schools with a greater proportion of students living in higher SES neighborhoods.

Comparing the samples of PDS and non-PDS, a similar proportion of BTs, average age, and gender composition of the teaching staff (**Table 1**) is evident. Compared with non-PDSs,

PDSs more often have multiple locations, more students, are more often located in highly urbanized areas and less often in rural areas, slightly more often have a religious profile, and have a lower proportion of students living in the highest and lowest socioeconomic status neighborhoods.

Measures

Dependent Variables: Support Activities Provided to Beginning Teachers

In order to gain insight in the type and amount of support activities that a school offers BTs, all BTs completed the "support monitor". This monitor focuses on four specific elements of the national induction arrangement; facilities concerning workload reduction (18 items), activities concerning school enculturation (6 items), stimulating professional development (9 items), and supporting effective teaching behavior (9 items). Examples of questioned activities are: My schools offered me the opportunity to ... "be exempted from teaching difficult classes", "meet with supervisors at set times", "work with a personal development plan", "to reflect with colleagues on professional development", "to evaluate classroom observations", and to "plan/prepare/execute my lessons with colleagues or my coach" (see **Supplementary Appendix S1A** for the questioned items for each of the four induction elements). All items were rated dichotomously (yes, was provided/no, was not provided) and for each individual teacher the nominal data was aggregated (counted) for each induction element. These aggregated teacher scores were used to calculate the mean perceived number of provided activities, per induction element, for each school.

Independent Variables: Demographic Characteristics of Schools

In the Netherlands, each registered school is represented by a unique administrative number (BRIN) that enabled us to retrieve contextual information which we connected to the data (Sociaalen Cultureel Planbureau, 2014; Dienst Uitvoering Onderwijs, 2015a; Dienst Uitvoering Onderwijs, 2016; Dienst Uitvoering Onderwijs, 2018).

The variable *school size* represents whether a school consists of a single or multiple locations and of the number of students being registered on October 1st, 2015. The three categories are 1) single location, 2) multiple locations with less than 2,500 students, 3) multiple locations with at least 2,500 students. Only three of the 99 single-location schools have at least 2,500 students.

Unfortunately, information about the exact number of BTs appointed per school was not available. The variable *proportion of beginning* teachers working at a school is therefore based on the number of BTs that the schools registered to participate in the national induction arrangement. As participating schools received financial support for each BT[1] enrolled in the project, creating an incentive to enrol all BTs, we assumed that the majority of BTs are captured with this proxy.

The continuous variables *average age male/female teaching staff* represents the average age of a schools' teaching staff, as administered on October 1st' 2015 (Dienst Uitvoering Onderwijs, 2018). The continuous variable *proportion of female teachers* refers to the proportion of female teachers employed at a school, administered at the same date (Dienst Uitvoering Onderwijs, 2018).

The categorical variable *school identity* distinguishes the main four school types in the Netherlands by 1) public school, 2) Catholic denomination, 3) Protestant denomination, and 4) specific educational philosophy. These categories are in line with the work of Maslowski (2001).

Socioeconomic status of students' residential neighborhoods was used as a proxy for socioeconomic composition of schools' student populations. Information of the residential zip codes of schools' registered students (Dienst Uitvoering Onderwijs, 2015a) were merged to status scores of these neighborhoods (Sociaalen Cultureel Planbureau, 2014). These status scores are composed of average income, share of residents with a low income, share of residents with a low educational level, and share of unemployed residents (Sociaalen Cultureel Planbureau, 2014). The two continuous variables *proportion of highest/lowest SES students* represent the proportion of students living in neighborhoods with the highest and lowest socioeconomic status.

The variable *professional development school* indicates whether teachers were working at schools qualified as a Professional Development School by the Nederlands-Vlaamse Accreditatieorganisatie (NVAO) in the period 2009–2015 (see Nederlands-Vlaamse Accreditatieorganisatie, 2009 for qualification criteria).

Analytic Strategy

As none of the variables have missing values, no missing value analysis was required. Descriptive analyses provide insight in the amount of provided activities at school level (RQ1). Bivariate linear regression models were conducted to provide insight in the extent to which the described sociodemographic school characteristics predicted the amount of perceived activities (RQ2). General linear regression models including all independent variables were run separately for each of the four induction elements (RQ2). A multivariate model was not used, as the four elements can be implemented independently from each other. Interactions between the four dependent variables are therefore not useful for the interpretation of the results. The full models were stratified by PDSs and non-PDSs in order to gain insight into the extent to which the independent variables predict the offered amount of induction activities in each of these contexts (RQ3). All data preparation and analyses were conducted with SPSS Version 24.

RESULTS

Type and Amount of Perceived Support Activities

On average, the 195 schools offered about half of the measured activities concerning workload reduction and enculturation (**Table 1**). On average, schools offered about 60 percent of the activities concerning professional development and effective

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[1]In this project a beginning teacher is defined as a person certified to teach in secondary education, having less than 2 years of teaching experience after certification

TABLE 2 | Binary models: relation reported support activities by BTs and school characteristics, four induction elements, full sample (N = 195).

	Workload reduction			Enculturation			Professionalization			Effective teaching		
	Estimate	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*
Schoolsize[a]	—	—	—	—	—	—	—	—	—	—	—	—
Multiple locations <2,500 students	−0.858*	0.423	0.043	−0.254	0.178	0.152	−0.299	0.257	0.244	−0.118	0.270	0.663
Multiple locations >=2,500 students	−1.330**	0.406	0.001	−0.595***	0.170	0.000	−0.444	0.246	0.071	−0.113	0.258	0.662
Proportion of beginning teachers (proxy)[b]	—	—	—	—	—	—	—	—	—	—	—	—
5–10%	−1.318**	0.428	0.002	−0.147	0.186	0.431	−0.644*	0.257	0.012	−0.523	0.273	0.055
>10%	−1.829***	0.445	0.000	−0.333	0.194	0.085	−0.929***	0.267	0.001	−0.567*	0.284	0.046
Age and gender composition teaching staff	—	—	—	—	—	—	—	—	—	—	—	—
Average age male teachers	−0.042	0.066	0.519	−0.079**	0.027	0.003	−0.104**	0.038	0.007	−0.052	0.041	0.196
Average age female teachers	0.034	0.068	0.622	0.013	0.029	0.646	0.005	0.040	0.899	0.035	0.042	0.406
Proportion of female teachers	0.023	0.032	0.467	0.030*	0.013	0.025	0.025	0.019	0.175	0.030	0.020	0.124
Professional Development School[c]	—	—	—	—	—	—	—	—	—	—	—	—
Yes	−0.089	0.347	0.799	−0.283	0.145	0.051	−0.013	0.207	0.952	0.021	0.216	0.923
School identity[d]	—	—	—	—	—	—	—	—	—	—	—	—
Catholic	-0.586	0.441	0.184	-0.150	0.186	0.418	-0.475	0.259	0.067	-0.151	0.273	0.580
Protestant	0.090	0.454	0.842	0.156	0.191	0.413	-0.102	0.267	0.703	0.183	0.281	0.516
Philosophic background	−0.374	0.555	0.501	0.075	0.234	0.747	−0.742*	0.326	0.023	−0.308	0.344	0.371
Proportion SES neighbourhood students	—	—	—	—	—	—	—	—	—	—	—	—
Highest SES	0.007	0.008	0.372	0.007*	0.003	0.024	0.000	0.005	0.960	0.007	0.005	0.121
Lowest SES	−0.003	0.008	0.755	−0.005	0.003	0.155	−0.003	0.005	0.598	-0.008	0.005	0.116

Notes: *p < 0.05. **p < 0.01. ***p < 0.001. [a]ref one location, [b]ref 0–5%, [c]ref non-PDS, [d]ref no religious/philosophic background.

teaching behavior. For each type of induction element, the average amount of perceived activities did not differ significantly between PDSs and non-PDSs, although for enculturation activities the differences were marginally significant, with PDSs offering somewhat less enculturation activities (b = −0.283, p = 0.052).

The bivariate regression models showed significant associations between some of the school characteristics and the number of perceived support activities (**Table 2**). First, schools with multiple locations offered less activities concerning workload reduction and enculturation than schools with a single location. Second, a larger proportion of BTs in the staff showed a negative association with the amount of perceived activities, in particular workload reduction and professional development plans. The binary models indicated a contrasting association of increasing average age of the male (negative) and female (positive) teaching staff with perceived activities provided to BTs, and also indicated a positive association between a greater proportion of female teachers and number of activities provided to BTs.

Catholic schools and schools with a specific educational philosophy provided less professional development plans and instruments compared with school without such background. The binary models indicated that the proportion of students living in the highest SES (positive) and lowest SES (negative) neighborhoods was inversely associated with the frequency of all induction elements. This means that the higher the SES of a school's student population, the more activities BTs perceive. However, nearly all associations were not significant in these binary models.

Predictive Value of School Characteristics for the Amount of Induction Activities

Estimates of the full regression models show that schools with multiple locations offer significantly less activities concerning workload reduction, enculturation and professional development plans and instruments. The larger the schools, the fewer of such activities are offered to BTs (**Table 3**). A larger proportion of BTs working at a school was associated with fewer perceived activities, with the strongest negative association with workload reduction and professional development plans. Increased average age of the male teaching staff was associated with fewer enculturation and professional development plans, whereas increased average age of female teachers was associated with more activities concerning support of effective teaching. A greater proportion of female teachers at a school was associated with more enculturation activities provided to BTs. Marginally significant positive associations between average age of female teachers and activities concerning enculturation (b = 0.052, p = 0.080), and professional development plans (b = 0.081, p = 0.054) were found.

Schools with a Catholic background or a specific educational philosophy offered less professional development plans and instruments than public schools. Finally, when accounting for the other school characteristics, no associations are found between the socioeconomic composition of schools' student population and the number of provided induction activities.

Determinants of provided induction activities for BTs working in a PDS and non-PDS context.

In order to understand whether the selected school characteristics had similar or different predictive values in different learning and support infrastructures, the full models were stratified for PDSs and non-PDSs. For PDSs, the full models showed that schools having multiple locations and at least 2,500 students offered significantly less activities concerning workload reduction and enculturation than those with a single location (**Table 4**). For non-PDSs having multiple locations but less than 2,500 students, this is the case for professional development plans as well (**Table 5**).

TABLE 3 | Linear regression models: reported support activities by BTs and school characteristics, four induction elements, full sample (N = 195).

	Workload reduction			Enculturation			Professionalization			Effective teaching		
	Estimate	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*
Intercept	10.543*	4.242	0.013	5.636**	1.763	0.001	9.176***	2.493	0.000	3.437	2.763	0.213
School size[a]	—	—	—	—	—	—	—	—	—	—	—	—
Multiple locations <2,500 students	−0.769	0.430	0.074	−0.187	0.179	0.295	-0.388	0.253	0.125	0.028	0.280	0.921
Multiple locations >=2,500 students	−1.490***	0.404	0.000	−0.584***	0.168	0.001	−0.575*	0.237	0.015	−0.023	0.263	0.929
Proportion of beginning teachers (proxy)[b]	—	—	—	—	—	—	—	—	—	—	—	—
5–10%	−1.288***	0.416	0.002	−0.150	0.173	0.387	−0.687***	0.245	0.005	−0.619*	0.271	0.022
>10%	−2.012***	0.433	0.000	−0.479**	0.180	0.008	−1.057***	0.254	0.000	−0.649*	0.282	0.021
Age and gender composition teaching staff	—	—	—	—	—	—	—	—	—	—	—	—
Average age male teachers	−0.066	0.071	0.357	−0.099***	0.030	0.001	−0.140***	0.042	0.001	−0.059	0.047	0.205
Average age female teachers	0.058	0.072	0.415	0.052	0.030	0.080	0.081	0.042	0.054	0.095*	0.047	0.043
Proportion of female teachers (N)	0.037	0.032	0.241	0.028*	0.013	0.034	0.030	0.019	0.109	0.032	0.021	0.122
Professional development school[c]	—	—	—	—	—	—	—	—	—	—	—	—
Yes	0.054	0.330	0.870	−0.245	0.137	0.074	−0.055	0.194	0.777	−0.016	0.215	0.940
School identity[d]	—	—	—	—	—	—	—	—	—	—	—	—
Catholic	−0.684	0.417	0.101	−0.113	0.173	0.516	−0.533*	0.245	0.030	−0.222	0.272	0.415
Protestant	0.045	0.429	0.916	0.163	0.178	0.362	−0.098	0.252	0.698	0.195	0.279	0.485
Philosophic background	−0.562	0.535	0.293	0.076	0.222	0.734	−0.692*	0.314	0.028	−0.347	0.348	0.319
Proportion SES neighbourhood students	—	—	—	—	—	—	—	—	—	—	—	—
Highest SES	−0.001	0.009	0.921	−0.001	0.004	0.850	−0.010	0.005	0.068	0.001	0.006	0.916
Lowest SES	0.003	0.009	0.768	−0.002	0.004	0.572	−0.005	0.005	0.400	−0.006	0.006	0.277
Model summaries	—	—	—	—	—	—	—	—	—	—	—	—
LL (*df = 181*)	−430,82			−259,65			−327,17			−347,21		

Notes: *p < 0.05. **p < 0.01. ***p < 0.001. [a]ref one location, [b]ref 0–5%, [c]ref non-PDS, [d]ref no religious/philosophic background.

TABLE 4 | Linear regression models: reported support activities by BTs and school characteristics, four induction elements, PDSs (N = 89).

	Workload reduction			Enculturation			Professionalization			Effective teaching		
	Estimate	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*
Intercept	6.731	6.165	0.275	3.511	2.678	0.190	3.518	3.806	0.355	0.640	4.302	0.882
School size[a]	—	—	—	—	—	—	—	—	—	—	—	—
Multiple locations <2,500 students	−0.076	0.610	0900	0.438	0.265	0.098	0.530	0.377	0.160	0.565	0.426	0.185
Multiple locations >=2,500 students	−1.540**	0.496	0.002	−0.497*	0.215	0.021	−0.333	0.306	0.276	−0.105	0.346	0.760
Proportion of beginning teachers (proxy)[b]	—	—	—	—	—	—	—	—	—	—	—	—
5–10%	−0.901	0.551	0.102	−0.234	0.240	0.328	-0.666	0.340	0.050	−0.530	0.385	0.168
>10%	−1.421*	0.576	0.014	−0.283	0.250	0.258	-0.754*	0.356	0.034	−0.273	0.402	0.497
Age and gender composition teaching staff	—	—	—	—	—	—	—	—	—	—	—	—
Average age male teachers	0.190	0.113	0.092	−0.029	0.049	0.551	0.012	0.070	0.858	0.020	0.079	0.800
Average age female teachers	−0.127	0.114	0.267	0.000	0.050	0.999	0.036	0.070	0.608	0.087	0.080	0.274
Proportion of female teachers (N)	0.030	0.045	0.507	0.042*	0.020	0.032	0.032	0.028	0.254	0.027	0.031	0.385
School identity[c]	—	—	—	—	—	—	—	—	—	—	—	—
Catholic	−0.609	0.524	0.245	−0.190	0.228	0.403	−0.364	0.324	0.260	−0.177	0.366	0.629
Protestant	0.060	0.582	0.918	0.497	0.253	0.050	0.294	0.359	0.414	0.523	0.406	0.198
Philosophic background	−0.461	0.893	0.606	0.411	0.388	0.289	−0.495	0.551	0.369	−0.836	0.623	0.180
Proportion SES neighbourhood students	—	—	—	—	—	—	—	—	—	—	—	—
Highest SES	−0.007	0.015	0.643	0.003	0.006	0.637	−0.005	0.009	0.595	−0.008	0.010	0.436
Lowest SES	−0.001	0.014	0.949	−0.013*	0.006	0.029	−0.019*	0.008	0.027	−0.021*	0.009	0.029
Model summaries	—	—	—	—	—	—	—	—	—	—	—	—
LL (*df = 93*)	−184,668			−110,465			−141,753			−152,655		

Notes: *p < 0.05. **p < 0.01. ***p < 0.001. [a]ref one location, [b]ref 0–5%, [c]ref no religious/philosophic background.

In schools where more than ten percent of the teaching staff were BTs, PDSs offered less activities concerning workload reduction and professional development plans (**Table 4**). This school characteristic had a stronger negative association with all provided activities in non-PDSs (**Table 5**). The average age of male and female teaching staff was not predictive in the amount of activities provided to BTs working in PDSs (**Table 4**), but did matter in a non-PDS context (**Table 5**). In non-PDSs, the amount of activities for enculturation, professional development plans and effective teaching was less with increasing age of male teachers, and more with increasing age of female teachers. In contrast, the positive association between a greater share of female teachers and enculturation activities appeared to be significant in PDS only (**Table 4**).

TABLE 5 | Linear regression models: reported support activities by BTs and school characteristics, four induction elements, non-PDSs (N = 106).

	Workload reduction			Enculturation			Professionalization			Effective teaching		
	Estimate	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*	*Estimate*	*SE*	*p*
Intercept	11.067	5.672	0.051	6.059[**]	2.137	0.005	11.051[***]	3.067	0.000	4.320	3.528	0.221
School size[a]	—	—	—	—	—	—	—	—	—	—	—	—
Multiple locations <2,500 students	−1.233[*]	0.580	0.034	−0.682[*]	0.218	0.002	−0.992[**]	0.314	0.002	−0.345	0.361	0.339
Multiple locations>=2,500 students	−1.311[*]	0.642	0.041	−0.564[*]	0.242	0.020	−0.714[*]	0.347	0.040	0.165	0.399	0.680
Proportion of beginning teachers (proxy)[b]	—	—	—	—	—	—	—	—	—	—	—	—
5–10%	−1.944[***]	0.598	0.001	−0.157	0.225	0.487	−0.920[**]	0.324	0.004	−0.921[*]	0.372	0.013
>10%	−2.349[***]	0.643	0.000	−0.647[**]	0.242	0.008	−1.401[***]	0.348	0.000	−0.847[*]	0.400	0.034
Age and gender composition teaching staff	—	—	—	—	—	—	—	—	—	—	—	—
Average age male teachers	−0.201[*]	0.091	0.027	−0.127[***]	0.034	0.000	−0.216[***]	0.049	0.000	−0.116[*]	0.056	0.040
Average age female teachers	0.179	0.091	0.050	0.082[*]	0.034	0.018	0.115[*]	0.049	0.020	0.126[*]	0.057	0.026
Proportion of female teachers (N)	0.052	0.045	0.248	0.025	0.017	0.137	0.041	0.024	0.093	0.039	0.028	0.159
Schoolculture[c]	—	—	—	—	—	—	—	—	—	—	—	—
Catholic	−0.730	0.624	0.242	−0.021	0.235	0.928	−0.663	0.338	0.050	−0.349	0.388	0.369
Protestant	−0.007	0.600	0.990	−0.148	0.226	0.511	−0.464	0.325	0.153	−0.161	0.373	0.665
Philosophic background	−0.708	0.682	0.299	−0.088	0.257	0.733	−0.825[*]	0.369	0.025	−0.372	0.424	0.380
Proportion SES neighbourhood students	—	—	—	—	—	—	—	—	—	—	—	—
Highest SES	0.007	0.012	0.545	-0.005	0.005	0.314	−0.013[*]	0.006	0.048	0.005	0.007	0.482
Lowest SES	0.010	0.012	0.411	0.004	0.005	0.360	0.006	0.007	0.330	0.004	0.008	0.601
Model summaries	—	—	—	—	—	—	—	—	—	—	—	—
LL (*df* = 76)	−237,05			−133,57			−171,89			−186,71		

Notes: *p < 0.05. **p < 0.01. ***p < 0.001. [a]ref one location, [b]ref 0–5%, [c]ref no religious/philosophic background.

PDSs with a Protestant denomination provided significantly more activities for enculturation than PDSs with a Catholic or no religious/philosophic background (**Table 4**). Among non-PDSs, schools without a specific denomination or philosophy provided significant more activities for professional development plans compared with the remaining non-PDSs (**Table 5**).

Finally, the results showed that a higher proportion of students living in the lowest SES neighborhoods had a small negative association with the amount of activities concerning enculturation, professional development plans and instruments and classroom support provided to BTs working in PDSs (**Table 4**). Socioeconomic composition of students was not associated with perceived activities of BTs working in non-PDSs (**Table 5**).

DISCUSSION

With intensive support of regional teacher education institutes, 3-year induction programs were implemented in a large number of secondary schools (N = 447) in the Netherlands in order to improve teaching quality and increase retention of BTs. The elements of the arrangement were intended to be tailored to specific BT needs and the implementation were aimed to be adapted to each school's specific context in the design and implementation phase. As organisational contexts of schools are (to some extent) associated with particular demographic school characteristics that might facilitate or hinder the implementation of induction activities, the aim of this study was to approach the association of school factors with the implementation of induction arrangements as objectively as possible, by investigating the association between demographic characteristics of schools and provided support activities, as perceived by BTs themselves.

On average, participating schools offered at least half of the activities as prescribed in the four elements of the study's induction framework (RQ1). Findings indicate that increased school size decreases the provision of activities, which is in line with studies showing that teacher collaboration and engagement in common activities is less likely to occur in schools with more students (Fowler and Walberg, 1991; Lee et al., 1993; Maslowski, 2001; Opdenakker and Van Damme, 2007). Schools with more locations may have different local policies and different educational instructional design preferences which may cause less alignment in the induction arrangements across locations, leading to different perceptions of BTs concerning the available induction activities within one school (RQ2). As recommended by Kutsyuruba et al. (2016), strong school leadership can improve the implementation of induction arrangements, especially in larger schools having more locations. In addition, this study indicates that schools with a larger proportion of BTs provide less activities than schools with relatively few BTs. Providing support activities to a larger group of BTs requires a larger number of supportive colleagues and demands more detailed supportive infrastructures (RQ2). This may be relative easy to design on paper, but might be more difficult to put into practice, where more individual restrictions have to be accounted for, such as individual contract hours and teaching schedules. Guidelines adapted to this situation could assist school leaders in allocating sufficient induction activities for BTs.

The results also indicate that the teaching staff age composition matters. Older male teacher staff composition is negatively associated, and older female teacher staff composition is positively associated with BTs perceived activities (RQ2). This pattern could reflect that older female teachers more often take up supportive activities compared to older male teachers. As the teacher population is ageing in the Netherlands, with an increasing share of older male teachers in the near future, this finding implies that induction programmes may be less efficient in schools that have greater share of older male teachers. More in-depth investigations could provide more insight in and understanding of such mechanisms. The question whether schools encounter difficulties in meeting the specific support needs of both BTs and older male teachers as described by Day and Gu (2007), or whether interactions between older male teachers and BTs inhibit support activities as stated by Kardos et al. (2001), or whether other mechanisms hinder the implementation of induction arrangements in these contexts needs to be clarified in the future.

In this study, SES composition of students does not have a clear association with the type and amount of support activities provided to BTs (RQ2). Future studies should reveal the needs of BTs in more challenging school contexts, as it could be expected that BTs are in need for more support activities than currently provided.

In this study, differences in activities provided in PDSs and non-PDSs were specifically investigated, as the existing support and learning infrastructures were assumed to be different. It was argued that the existing infrastructure within PDSs to support student teachers would facilitate support activities for BTs, thereby making them less sensitive to school contextual factors compared to non-PDSs. This proved to be the case: for all four induction elements, the amount of activities provided was similar in both school contexts (RQ3). Within these two contexts, the amount of support provided was more strongly associated to school characteristics in non-PDS (RQ3). In non-PDSs, a higher share of BTs and a higher average age of the male teaching staff were negatively associated with perceived provided support activities (RQ3). For the PDSs the association of school characteristics with perceived provided support was smaller or non-existing, indicating that induction arrangements for BTs benefited from existing learning infrastructures aimed for student teachers. In the absence of such existing structures, policy makers and school leaders should be aware that particular school characteristics could hinder or enhance the implementation of support activities, which requires awareness and more intensive support. In PDSs, the socioeconomic composition of students appears to be associated with the support provision of BTs. For the benefit of education quality, it is relevant to gain more insight in the mechanism behind this finding, as schools with a more challenging student population are generally in greater need to provide adequate teacher support. Finally this study showed that PDSs are able to carry an additional responsibility (supporting BTs) besides the tasks and duties they already have in their collaboration with teacher education institutes to educating student teachers.

A major strength of this study is the large number of participating schools, enabling us to statistically adjust for various school characteristics in order to generate insights into differences between schools in providing induction arrangements to BTs. Another strength is that provided support is measured from the perspective of the BTs themselves, rather than from school leaders or formal documents. Having insight in how BTs perceive the provision of induction activities is relevant, as it generates information about the implementation process and effectiveness of such interventions.

A limitation of this study is that it can be questioned whether the reported support activities represent the induction arrangement of schools in an adequate manner, as not all BT's participating in the induction arrangement completed the support monitor. Potential unintended selective participation of BTs in this study could therefore lead to an over- or underreporting of actual provided induction activities, for instance when it were particularly those BT's that are positive about the induction arrangement who responded, or those who have a good relationship with the school environment. A second limitation of this study is that it did not capture BTs' perceptions of the quality and usefulness of the provided activities. Even though the support monitor contains questions about whether or not each offered induction activity was evaluated to be useful, this information could not be used in the analyses, as the vast majority of BTs reported the provided activities as being useful, resulting in too little variety in response patterns, for an aggregated school-level approach. Future research should apply an individual-level approach too, to provide insight in individual determinants of differences in support provision, where the perceived quality of provided induction activities is incorporated.

The insights gained from this study are relevant for mapping school differences in induction arrangements and can therefore be informative for tailoring induction arrangements to particular school contexts in order to assure optimal development of teaching skills of all BTs.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the respondent's were not asked for permission to share data. Requests to access the data should be directed to m.helms-lorenz@ rug.nl.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics commission Teacher Education department.

The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MV was in the lead in the writing process and the analyses. MH-L shares the intellectual ownership and helped shape the manuscript, and is the project leader responsible for the research proposal, the data collection and its national execution.

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