

Picturing School Development and Support Services through a Kaleidoscope

Proposed Model in the Context of Digitalization and Insights into an Inventory of School Support in the German Federal State North-Rhine Westphalia

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Abstract

This article researches established support services for school development related to digitalization and their relationship to schools' requirements. We present a theoretical model combining the dimensions of school development and established services as an extension of the dimensions of school development by Eickelmann and Gerick (2017). We then introduce the project «Professional Development and Support Systems for School Development in the Context of Digitalization» (Original title in German: «Fortbildungs- und Unterstützungssysteme für Schulentwicklung im Kontext der Digitalisierung», abbreviated to ForUSE-digi) is introduced. The main aim is the provision of a Germany-wide inventory of strategies, structures and specific measures of school support and teacher professional development systems in all 16 federal states. The article presents initial results consisting of analyses of strategic papers, state-specific structures and concrete measures (including offers for teachers' professional development and consulting services) for the federal state of North Rhine-Westphalia (NRW). The results are discussed in relation to the extended model, with the aim of establishing what might constitute «optimal» services for schools in the context of digitalization. The results show that «optimization needs» still exist in both support services and school development processes. The article ends with a conclusion and a preview of the second part of ForUSE-digi, which will include expert interviews with key persons for the support systems of selected federal states.

Schulentwicklung und Unterstützungsleistungen wie durch ein Kaleidoskop betrachten. Modellvorschlag im Kontext der Digitalisierung und Einblicke in eine Bestandsaufnahme schulischer Unterstützungsleistungen in Nordrhein-Westfalen

Zusammenfassung

Im Mittelpunkt des vorliegenden Beitrags steht die Frage, inwiefern bestehende Unterstützungsangebote für die Schulentwicklung im Kontext der Digitalisierung und mögliche Unterstützungsbedarfe ineinandergreifen. Dazu wird zunächst ein Modell präsentiert, in dem Dimensionen der Schulentwicklung mit Unterstützungsleistungen kombiniert werden – als eine Erweiterung des Modells der Schulentwicklungsdimensionen nach Eickelmann und Gerick (2017). Anschliessend wird das Forschungsprojekt «Fortbildungs- und Unterstützungssysteme für Schulentwicklung im Kontext der Digitalisierung» (ForUSE-digi) vorgestellt. Ziel von ForUSE-digi ist eine deutschlandweite Bestandsaufnahme der Strategien, Strukturen und Massnahmen der Fortbildungs- und Unterstützungssysteme aller 16 Bundesländer. In diesem Beitrag werden ausgewählte Ergebnisse für das Bundesland Nordrhein-Westfalen (NRW) präsentiert. Dabei werden sowohl zentrale Strategiepapiere und bundeslandspezifische Strukturen als auch konkrete Massnahmen (u. a. in Form von Fortbildungen und Beratungsleistungen) analysiert. Die Ergebnisse werden vor dem Hintergrund der Modellerweiterung hinsichtlich der Frage nach «optimalen» Unterstützungsleistungen für Schulen im Kontext der Digitalisierung diskutiert. Dabei werden beidseitig bestehende «Optimierungsbedarfe» festgestellt. Der Beitrag schliesst mit einem Fazit sowie einem Ausblick auf den zweiten vertiefenden Teil des Forschungsprojekts ForUSE-digi, in dem Interviews mit Expertinnen und Experten bezüglich der Unterstützungssysteme ausgewählten den Bundesländern geplant sind.

1. Introduction¹

«Optimization» through professional development and support for schools?! This title, formulated as both a question and a statement, refers to a complex field of research, which this article will examine from various perspectives. Using the concept of school development, expanded to include specific elements related to digitalization, we explore what services are currently available to support school development and how well support services interconnect with school development in the context of digitalization. In a multilayered process which ultimately centres on students (see below), it seems necessary to identify this status quo before addressing questions or statements about «optimization». To do this, we present

1 This article is a direct translation from German under a new title. It was originally published in 2021 as part of the thematic issue «DGfE2020: Optimierung in der Medienpädagogik» (DGfE2020: Optimisation in Media Education; Endberg, Engec, and Van Ackeren 2021) and is available at <https://doi.org/10.21240/mpaed/42/2021.04.07.X>.

an expanded version of Eickelmann and Gerick's (2017) model of school development with the additional element of support services. Given that there has been no systematic survey of what digitalization-related support services and professional development courses are available for schools in Germany (Daschner and Hanisch 2019), we introduce the research project 'Fortbildungs- und Unterstützungssysteme für Schulentwicklung im Kontext der Digitalisierung' (Professional Development and Support Systems for School Development in the Context of Digitalization, abbreviated to *ForUSE-digi*), which takes this desideratum as its starting point. One aim of *ForUSE-digi* is to produce a national inventory of the strategies, structures and measures of professional development and support systems in all 16 of Germany's federal states. The present article gives insights into findings from *ForUSE-digi* relating to the professional development and support system in North Rhine-Westphalia (NRW), which served as the pilot state for the nationwide study.

1.1 Digitalization as part of school development

Digitalization and school development are key terms with a long-standing influence on the discourse on schools. At present there is an increasing tendency to link the two, partly as a result of the COVID-19 pandemic.² At the same time, different conceptions of the definition and meaning of digitalization in the school context have not yet been integrated into a single comprehensive understanding; rather, we find persistent differences between disciplines (see e.g. Brinda 2017; Deller 2018; Kammerl 2018). This article therefore deploys a broader interpretation of digitalization, which takes the different views into account and can best be characterized as *the integration of digital media into schools and teaching*.

Schools, like all educational institutions, are an important component of society and there is a «state interest in educational processes» (van Ackeren, Klemm and Kühn 2015, 193). Schools are therefore required to respond to social transformation processes. The ongoing development of the school system and of individual schools is an important task for all those involved in schools. According to the concept of school development (Berkemeyer and Hermstein 2018; Rolff 2016), processes of school development involve an interplay between various factors on the levels of organizational development, instructional development, and staff development. The core of any process of school development is the «learning progress of students as the ultimate point of reference» (Rolff 2016, 20). Stimuli for development can come from the school itself or from outside. In the case of digitalization it is necessary to establish and implement relevant goals and measures related to the organization,

2 The COVID-19 pandemic (often referred to as the coronavirus pandemic, see Fickermann and Edelstein 2020) refers to the worldwide spread of the lung disease COVID-19 (Coronavirus Disease 2019), caused by the novel virus Sars-CoV-2 from the coronavirus family (RKI 2020).

teaching practice and staff, which will ensure a well-founded education in and for a digital world. In addition to this, technical and infrastructural prerequisites are needed. These are included in expanded models of school development theory in the form of technology development (Eickelmann and Gerick 2017; Heinen and Kerres 2015; Schulz-Zander 2001).

When it comes to digital equipment in schools, Germany is below average in comparison to other countries, as shown by the results of the 2018 PISA study (Hofer et al. 2019) and the International Computer and Information Literacy Study (ICILS) (Eickelmann et al. 2019; Gerick et al. 2014). There are also marked differences between the federal states of Germany in this respect (Lorenz and Endberg 2017). The expansion of technological infrastructure in schools and the promotion of media literacy have been on the education policy agenda for many years (KMK 1995), with perspectives and approaches from media pedagogy playing a contributing role (Baacke 1997; Tulodziecki 1992). Yet it is only with the KMK³ strategy *Bildung in der digitalen Welt* (Education in the Digital World) (KMK 2017) that the promotion of students' media literacy has officially become a binding obligation, and this is only gradually having an impact on the structures of teacher training and on schools and teaching practice.

In Germany, the federal and state governments provide financial support for the development of digital infrastructure in schools through an agreement called DigitalPakt Schule (BMBF 2019). At the same time, the federal states have undertaken to produce concepts for teacher training and for work with digital media in schools. This is particularly important since «if support and professional development for teaching staff is not taken into consideration right from the start, [...] there is a danger that the best equipment will remain largely unused» (Brüggemann and Breiter 2016, 38). This underlines the need to understand digitalization as a collective task, which must be approached collaboratively both within schools and with external partners (businesses, universities, and *Schulträger* or maintaining bodies, i.e. the local authorities or other organizations responsible for establishing and maintaining schools).

Digitalization is therefore to be understood as part of school development. The model «Dimensions of school development with digital media» (see fig. 1), based on the work of Eickelmann and Gerick (2017), identifies the following dimensions: organizational development, the development of teaching practice, staff development, the development of collaboration, and technology development. These collectively contribute to the «promotion of so-called <digital> skills and the improvement

³ KMK = Kultusministerkonferenz, the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany. The KMK plays a significant role as an instrument for the coordination and development of education in the country. It is a consortium of ministers responsible for education and schooling, institutes of higher education and research and cultural affairs, and in this capacity formulates the joint interests and objectives of all 16 federal states.

of subject-specific and cross-curricular learning with digital media» (ibid., 74) and are regarded as elementary «for both work in schools and for the creation of support structures for schools» (Eickelmann and Gerick 2018, 111).

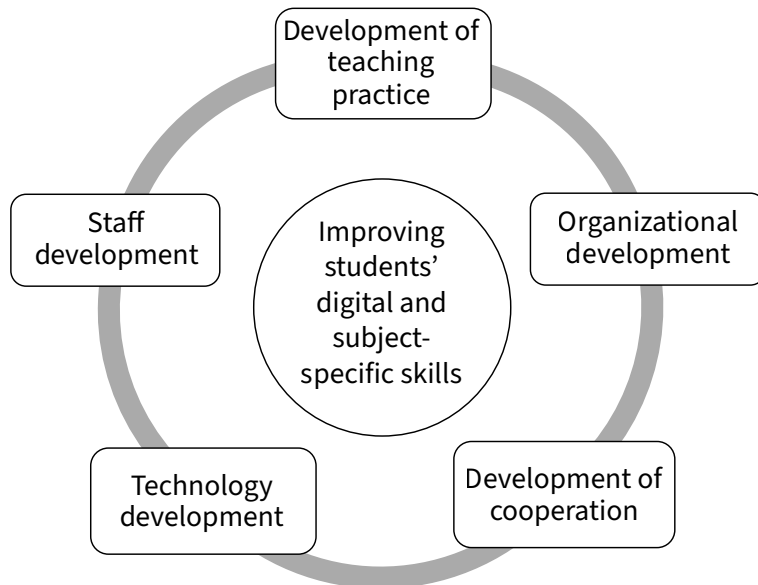


Fig. 1: Dimensions of school development with digital media, based on Eickelmann and Gerick (2017), own representation.

Key roles in initiating and implementing processes of school and teaching development are played not only by school management and institutionalized quality development structures (e.g. steering groups) but also by teachers (Rolff 2016). Professional development is therefore an important aspect of school development in the context of digitalization.

1.2 The necessary acquisition of skills

In many cases, teacher training fails to provide teachers with the skills needed for working with digital media in schools (Lorenz, Endberg, and Eickelmann 2019). Often these skills are poorly developed or weak in comparison to students of other disciplines even before future teachers begin their training (Senkbeil, Ihme, and Schöber 2019), so it cannot simply be assumed that teaching staff in schools will possess them. This is one of the reasons why ongoing learning and professionalization, within the framework of continuous professional development, is absolutely essential (Lipowsky 2010).

The acquisition of didactic and pedagogical skills is part of any undergraduate teacher training programme, along with subject-specific content and didactics. Technological knowledge – particularly in combination with pedagogical knowledge – as a fundamental component of teachers’ professional competencies (Gerhard et al. 2020) is currently not systematically acquired in the first two phases of teacher training (Eickelmann, Lorenz, and Endberg 2016; Endberg 2019). This was the conclusion reached by a study comparing teachers’ digital media skills in Germany’s different federal states (*Schule digital – der Länderindikator 2016*). In a representative survey of teachers at lower secondary level in Germany, respondents were asked whether their study programme/school placement/professional development courses had encouraged them to take an in-depth look at how digital media affected the teaching methods they used in their lessons (ibid.). Around a quarter (26.8 %) of the teachers agreed with this statement with respect to the second phase of teacher training, the school placement, while about a fifth (20.2 %) agreed with regard to their studies. Agreement was much higher in relation to professional development courses (around 56 %, ibid.). The statements are based on the «Technological Pedagogical and Content Knowledge» model (TPACK), which describes the interaction between the three areas of knowledge required for professional teaching with digital media (Koehler and Mishra 2009; Gerhard et al. 2020). Given the technological developments taking place and the expansion of didactic uses for technology, it is enormously important to provide on-the-job training to boost teachers’ professional skills in the area of digitalization. Professional development, the third and longest phase in teacher education, is mandatory in all the federal states of Germany (Daschner and Hanisch 2019), and there are confirmed findings on the characteristics of effective professional development, e.g. duration, format, depth of content, feedback, or the incorporation of research findings (Lipowsky and Rzejak 2017). Current research also shows, however, that teachers are frequently offered short «one-shot» courses, which are not interconnected (ibid.) and thus scarcely meet the criteria for effective professional development. In the context of digitalization, the existing findings focus mainly on participatory activities and not so much on the content and didactic design of the courses offered. For example, studies such as ICILS have found that teachers in Germany take part in courses relating to digitalization much less often than teachers in other countries (Gerick, Eickelmann, and Labusch 2019). This needs to be emphasized because of another finding related to digitalization, namely that «in countries with a higher average skill level among students, a higher proportion of teachers undertake professional development with a higher degree of continuity» (ibid., 199). Given that improving students’ skills should be at the heart of school development processes, this is an important correlation. We therefore need to look closely at the professional development landscape, bearing in mind

that this challenge «cannot be dealt with solely on the level of school processes, but is linked to professional development structures across multiple schools, across whole federal states, or even across multiple federal states» (ibid., 199).

1.3 Support systems for school development in the context of digitalization

Professional development for teaching personnel and the underlying professional development system is part of the support systems for schools (Fussangel, Rürup, and Gräsel 2016). Support systems are «institutionalized services [...], which are intended to help improve school quality, and which can be targeted at maintaining bodies (*Schulträger*), school administrators, teachers, and students» (Arbeitsgruppe Internationale Vergleichsstudie 2007, 148). The term often proves to be somewhat fuzzy, however, and allows at least the following three perspectives (ibid.):

Alongside support for students with special needs, and support in the form of networking between schools, the support system is also understood as

«organizations situated at school level [...], which are intended to improve the educational performance of schools through external consulting, particularly on school development, and through professional development of those employed in the school system» (ibid.).

Berkemeyer (2011) categorizes the different forms of activity that are explicitly understood as support, at least on one side of the support relationship. These are grouped according to the autonomy of the school system they are intended to support (ibid., 117f.):

- «paternalistic support», e.g. school inspections or assessments of learner progress,
- «subsidiary support», e.g. state-run professional development courses, initiatives for the implementation of new guidelines,
- «professional support», e.g. external support/advice on school development,
- «autonomous support», e.g. self-determined school development processes, networking activities across schools.

Furthermore, support can be *cooperative*, *controlling* or *competitive* (ibid.). Co-operation-based support systems include not only professional development but also consulting services and cooperative relationships based on collective action and collaboration (ibid.).

(External) consultation or support provides assistance aimed at «developing and evaluating practically oriented recommendations with regard to specific decision-making situations facing schools, communicating these recommendations to the school members and, if necessary, supporting their implementation» (Buhren and

Rolff 2018, 40). Here we can distinguish between different consulting roles (ibid.): school development consulting focuses on the process and helps the school to develop or manage change processes, while topic/subject-specific consulting offers advice relating to a specific topic or subject content.

In the context of digitalization it is worth mentioning a further component of the support system which is not included in existing descriptions (Berkemeyer 2011; Järvinen, Sendzik, Sartory, and Otto 2015). This is technical support, which is vital for the sustainable integration of digital media into everyday school life (Heldt et al. 2020). *Technical support* encompasses «those measures [...] that are necessary to ensure the technical functionality of digital media in schools. With respect to hardware, this primarily includes maintenance, repair, and the procurement or exchange of devices. With respect to software, technical support refers, for example, to aspects related to installation, updates, and basic user induction» (Bos, Lorenz, and Endberg 2018, 3). Support has already been discussed as a necessary aspect of school development processes (e.g. Breiter, Stolpmann, and Zeising 2015; Döbeli Honegger 2005).

At present there is no single model that brings together all the above-mentioned aspects of support for school development in the context of digitalization. Since it can be assumed that support is needed for all dimensions of school development, it seems helpful to consider support services and the dimensions of school development together.

2. Model of support services for school development in the context of digitalization

Based on the above remarks on school development and support systems in the context of digitalization, the following section presents a model that connects support services for school development with the dimensions of school development identified by Eickelmann and Gerick (2017). This model proposes to expand the perspective on processes of school development to include the support services needed for this development (see fig. 2).

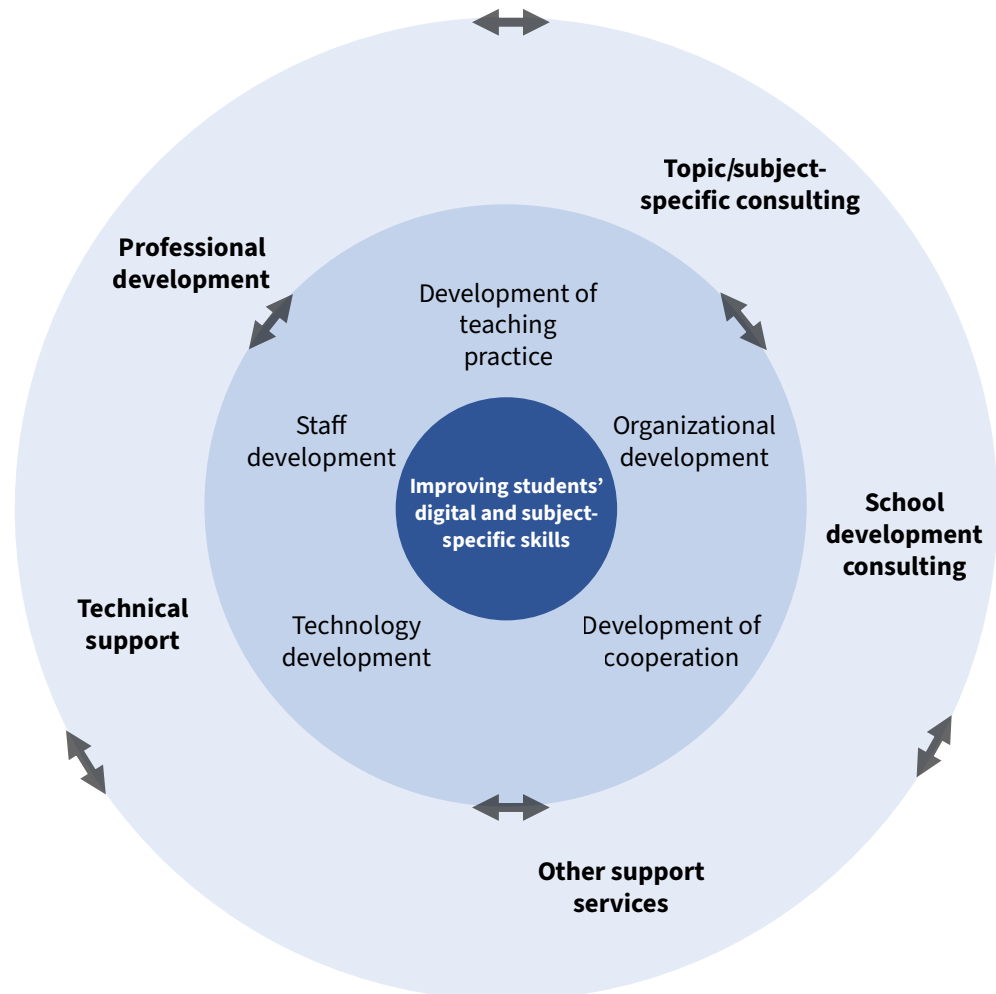


Fig. 2: Model of support services for school development in the context of digitalization (own representation).

At the centre is the overriding goal of boosting students' skills (inner circle). The dimensions of school development form the middle circle, and key support services (outer circle) are associated with these. The categories of support services encompass *school development consulting*, *topic/subject-specific consulting* and *professional development* (Berkemeyer 2011), as well as *technical support* and *other support services*. Technical support is included because it can be assumed that technology development as a dimension of school development will generate new support needs, and that the support system will respond to these with relevant services. The category *other support services* covers possible services that are not just targeted at individual schools, that depend on other actors outside the school (e.g. educational landscapes, school networks), or that cannot be directly derived from the existing

classifications and models. Research on school development has shown that the dimensions of school development cannot be considered separately, and that (successful) school development processes rely on an interplay between all the dimensions, which must collectively focus on students' learning outcomes (Rolff 2016). Much the same can be said about support services. Given the dynamics of digitalization, we contend that the model must take into account the emergence of new support needs and/or services. The model suggests that particular support services primarily target specific dimensions of school development (e.g. professional development services support staff development; technical support addresses technology development). However, professional development needs often arise from aspects of teaching development and from planning or participating in professional development courses, and are closely linked with decisions about organizational development. Technical support requires certain conditions at organizational level, knowledge and skills on the part of teachers (staff development), and points of contact in the area of teaching development. This makes it clear that successful school development processes and support for these processes are mutually dependent. At the same time, the model allows for the holistic nature of the school development process and the complexity of the support system: the arrows imply a dynamic interaction between the two levels of the circle, and the dimensions and support services are not to be understood in the 'rigid' order presented here.

In the following discussion, the model will be used to select and analyse the results of the *ForUSE-digi* study'. Particular attention is paid to the support services, which are placed in the outer circle. We will begin by presenting the research project *ForUSE-digi*, before looking at selected findings for NRW.

3. The ForUSE-digi project

The aim of the *ForUSE-digi* research project is to produce a comparative inventory of the strategies, structures and measures of state-run systems of professional development in Germany's different federal states, and to analyse the potential of these systems for school development processes. *ForUSE-digi* is being conducted by the Working Group for Educational Research at the University of Duisburg-Essen, as a subproject of the meta-project 'Digitalization in the Education Sector' ('Digitalisierung im Bildungsbereich'). It is funded by Germany's Federal Ministry of Education and Research (BMBF).

3.1 Research questions

This article considers two research questions, with a focus on initial analyses for NRW as the pilot state:

- How are state-run systems of professional development and support for school development in the context of digitalization organized in Germany's federal states, in terms of strategies, structures and measures?
- What specific features, patterns or pointers can be deduced regarding possible potential for school development processes in the context of digitalization?

3.2 Research design and data used

ForUSE-digi is exploratory in character and addresses the above-mentioned desideratum: the absence of a broad overview of professional development and support systems for schools in the context of digitalization. The research design has two parts and comprises not just the inventory but also in-depth interviews, which have not yet been completed at the time of publication of this article.

For the inventory, we compiled thematically relevant documents from all the federal states, describing the *structures*, *strategies* or *measures* of support services related to digitalization. To find these, we conducted systematic searches of freely accessible documents from the state-run organizations, ministries of education and *Landesinstitute* (institutes responsible for teachers' professional development and other functions) or quality agencies in all the federal states. We combined these with systematic enquiries addressed to these organizations. The data collection took place after a pilot phase in NRW (summer 2019) from September 2019 to January 2020 and thus describes the state of development before the changes and restrictions resulting from the COVID-19 pandemic. Because of the pilot phase conducted in NRW to refine the nationwide strategy, we were able to carry out the analyses for this federal state earlier than for the others. The results will be presented in the following section. For initial results of the nationwide survey of professional development courses as support services for schools, readers are referred to Engec and Endberg (2020).

For the inventory, we were able to collect 143 documents, including digital strategies, federal state plans (*Landeskonzepte*), competence frameworks and on-line services, as a data corpus for the document analysis. We also used publicly accessible professional development portals provided by the federal states to view texts announcing professional development opportunities related to digitalization. For each federal state we took a random sample of these texts. We aimed to gather 30 such texts per federal state, but it was not possible to achieve this target in all

the federal states at the time of the survey. Out of a total number of 2357 relevant offerings in all federal states (range: 18 to 523), 450 announcements were randomly gathered as a sample.

For NRW we were able to identify 12 documents and register 523 offers of professional development, from which 30 were selected at random for the data analysis.

We analysed the documents and the texts advertising professional development opportunities by means of *qualitative content analysis* (Mayring 2015), using a deductive-inductive category system. Taking a structuring approach, we analysed the information from the federal states (which was already available in fixed form) with reference to the following deductively derived main categories: *strategies*, *structures* and *measures* of professional development and support systems.

For the first main category *strategies*, we considered strategy papers, concepts and plans developed by the federal states. The second main category *structures* covered institutions and (groups of) people as actors within the support system.

The third main category *measures* is derived deductively from the definitions proposed by the Working Group International Comparative Study (Arbeitsgruppe Internationale Vergleichsstudie, 2007) and Berkemeyer (2011), and contains five categories: *professional development*, school consulting in the form of *school development consulting* and *topic-specific consulting*, *technical support* as a new support service in the context of digitalization and *other support services*. In the category *professional development*, the subcategories were derived deductively on the basis of the characteristics of effective professional development (e.g. duration, format, depth of content), following Lipowsky and Rzejak (2017).

4. Findings

The following section presents selected findings for NRW, divided into the key areas of the study: first strategies and structures, then measures.

The documents for NRW found in the survey identify strategic considerations and structural conditions for digitalization in schools. Table 1 shows an overview of the documents, with information on the title, the institution publishing the document, the length (number of pages) and the year when the document was published or came into force.

#	Title	Publisher	Length (pages)	Date
01	<i>Strategie für das digitale Nordrhein-Westfalen</i> (Strategy for a Digital North Rhine-Westphalia)	Ministerium für Wirtschaft, Industrie, Klimaschutz und Energie des Landes Nordrhein-Westfalen (Ministry of Economic Affairs, Industry, Climate Action and Energy of the State of NRW)	57	2019
02	<i>Digitaloffensive Schule NRW</i> (Campaign for Digitalization in Schools NRW)	Medienberatung NRW (Media Consultancy NRW)	20	2018
03	Broschüre: <i>Medienentwicklungsplanung in NRW</i> (brochure on media development planning in NRW)		44	2019
04	Aufgabenprofil für Medienberaterinnen und Medienberater (task profile for media consultants)		1	2019
05	<i>Medienkompetenzrahmen NRW</i> (Media Literacy Framework NRW)		17	2019
06	<i>Lernförderliche IT-Ausstattung für Schulen</i> (Learning-Friendly IT Equipment for Schools)		36	2017
07	<i>Wartung und Pflege von IT-Ausstattungen in Schulen</i> (Care and Maintenance of IT Equipment in Schools.)		1	2008
08	<i>Datenschutz an Schulen in NRW</i> (Data Protection in Schools in NRW)		15	2019
09	<i>Gestaltung der schulischen Bildung in einer digitalen Gesellschaft</i> (Designing School-Based Education in a Digital Society)	Bezirksregierung Münster (Münster District Government)	32	2018
10	LOGINEO NRW. Schulen fit machen für die Digitalisierung (Preparing schools for digitalization)	Ministerium für Schule und Bildung des Landes Nordrhein-Westfalen (Ministry of School and Education NRW)	3	2019
11	<i>Lehrkräfte in der digitalisierten Welt</i> (Teachers in a Digitalized World)	Medienberatung NRW (Media Consultancy NRW)	15	2020
12	Leitlinie «Schule in der digitalen Welt» (Guidelines: School in the Digital World)	Bezirksregierung Detmold (Detmold District Government)	5	2019

Tab. 1: Documents NRW (N=12).

4.1 Strategies and structures

The *Strategie für das digitale Nordrhein-Westfalen* (Strategy for a Digital North Rhine-Westphalia) (#01) identifies strategic concepts and milestones, two of which are relevant for the school context:

4.1.1 Digital strategy for schools

«We have held conferences in all administrative districts to mark the start of a digitalization campaign in schools. The results will feed into a digital strategy for schools, which we will be presenting soon.» (#01, 25)

The 2018 question-and-answer brochure *Digitaloffensive Schule NRW. Schule und Unterricht in der digitalen Welt* (Campaign for Digitalization in Schools, NRW: School and Teaching in the Digital World) (#02) marks the launch of activities in the individual administrative districts (*Regierungsbezirke*). At the time of the survey, two of the five administrative districts had published strategy papers about digitalization in schools, (#09; #12), which hint at individual paths within the administrative districts.

The state-wide digital strategy for schools promised in the above strategy paper has been published in February 2022; as the deadline for data collection was in February 2021, it could not be considered for the inventory.⁴

4.1.2 Orientation for teacher training and professional development

«A binding framework giving orientation for teacher training and professional development with regard to learning in the digitalized world will soon be incorporated into the creation and adaptation of up-to-date professional development formats.» (#01, 25)

This framework was published at the beginning of 2020 with the title: *Lehrkräfte in der digitalisierten Welt. Orientierungsrahmen für die Lehrerbildung und Lehrerfortbildung in NRW* (Teachers in the Digitalized World: Orientation Framework for Teacher Training and Professional Development in NRW). The framework is based on the document «Kompetenzen in der digitalen Welt» (Competencies in the Digital World) (KMK 2017) and gives state-run programmes of teacher professional development a «high-quality tool to fulfil their mandate of training and professional development for the relevant target groups» (#11, 05).

4 Please note: In the course of translating this article, we have decided to adjust this statement slightly compared to the original publication. At the time, it was not foreseeable when the strategy paper would be published and we had noted that no reference to the publication date could be found in other official statements.

In addition to this, the *Medienkompetenzrahmen NRW* (Media Literacy Framework NRW) constitutes a state-wide initiative to boost media literacy in schools. The framework is aimed at the NRW-specific implementation of the KMK strategy of 2017. The main tool for this is the NRW «media passport», which documents students' media literacy in six areas of competence:

«In conjunction with the curriculum compass [*Lehrplankompass*] and the media literacy framework, the NRW media passport offers support in teaching media literacy from primary level to the end of lower secondary school» (#06, 35).

The curriculum compass offers teachers guidance on how media can be used for different subjects and year levels, based on the curriculum; it includes specific ideas for implementation and teaching materials.

According to the digital strategy, the plan is to scale and adapt the media literacy framework for all areas of education (#01), giving it a wider remit as an orientation framework for media-related skills.

Both the orientation framework for teacher training and professional development and the NRW media literacy framework (with the NRW media passport to document students' media literacy) are explicitly based on the areas of competence in the KMK strategy *Education in the Digital World* (*Bildung in der digitalen Welt*) (KMK 2017). These frameworks are core strategic elements of the digitalization-related support services provided by the federal state of NRW, and are also referred to in subsequent documents (e.g. #02, #05, #06). By concentrating on (future) teachers and school pupils, these documents are focusing on key groups within the institution of school, who play a decisive role in school development processes – or benefit from these processes (Rolff 2016).

4.2 Measures

The following findings from the NRW survey are divided into the categories *professional development*, *topic-specific consulting*, *school development consulting*, *technical support* and *other support services*.

4.2.1 Professional development

The support measures recorded by *ForUSE-digi* include texts advertising professional development opportunities in the context of digitalization. The following section presents initial analyses of the random sample of 30 such texts, with regard to the categories (1) format, (2) asynchrony, (3) thematic focus, and (4) duration, based on the characteristics of effective professional development (Lipowsky and Rzejak 2017).

Format

The analysis of the randomly selected texts advertising professional development opportunities via publicly accessible state-run professional development portals shows that 29 of the 30 offerings in NRW are advertised as being face-to-face. Only one offering from the random sample is planned as «blended learning»; here synchronous online phases are combined with face-to-face phases on site.

Asynchrony

When it comes to the design of professional development courses, digitalization creates opportunities for online or hybrid formats and potentially also asynchronous learning. There was, however, no mention of any asynchronous professional development offerings for teachers in the sample of texts from NRW at the time of the survey.

Thematic focus

The analysis of the topics on offer shows that the professional development courses advertised often cover more than one thematic area. As far as the thematic focus of the offerings is concerned (see fig. 3), there is a strong emphasis on *general applications*. This category comprises basic or introductory explanations and applications for the use of digital media in schools and teaching, so a general understanding of technical and operational aspects of media and/or specific software.

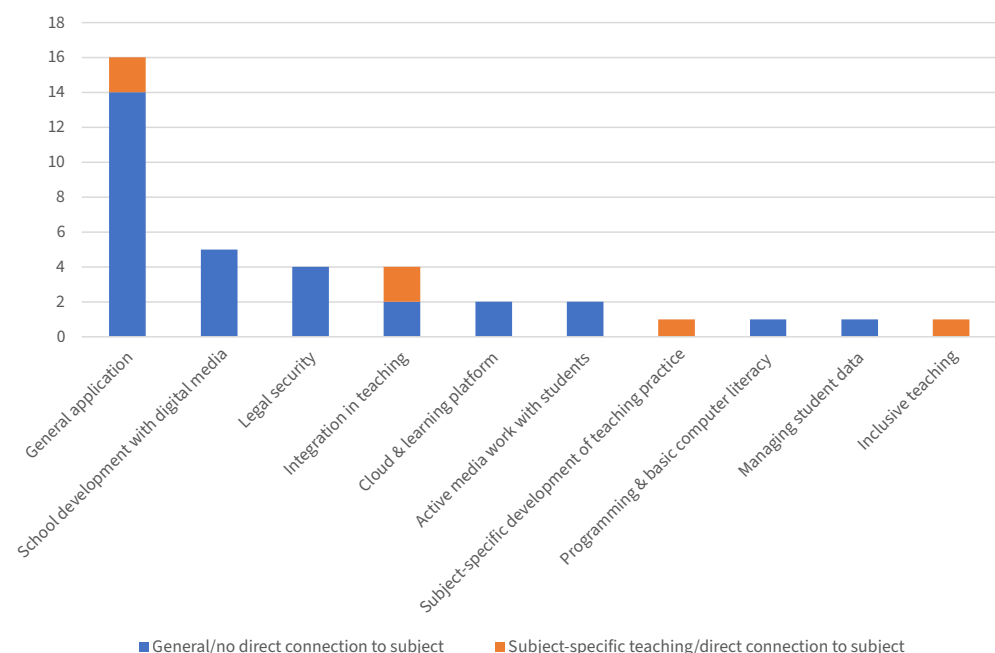


Fig. 3: Topics of professional development courses in NRW (absolute figures; own representation).

The topics *school development with digital media*, *legal security* and *integration of digital media in teaching* are all mentioned 4 to 5 times. *Subject-specific teaching development*, *programming/basic IT education*, *managing student data* and *inclusive teaching* are each mentioned only once.

It becomes clear here that topics without a direct connection to a school subject are much more strongly represented. Six of the courses advertised have a direct connection to a subject or are focused on subject-specific teaching. Here the STEM subjects are most strongly represented, with three mentions, while the social sciences are mentioned twice and the art subjects once.

Duration

With regard to the duration of the professional development offerings (see fig. 4), it is striking that 26 of the 30 texts analysed give no information about course duration.

Two offerings are advertised as half-day courses (≤ 4 h) and one as a one-day course ($> 4 \leq 8$ h); another is advertised as a multi-day course.

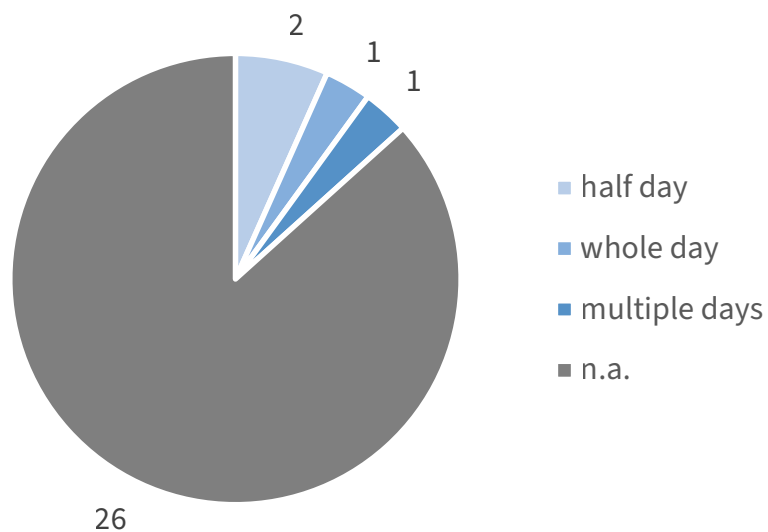


Fig. 4: Duration of the professional development courses in NRW (N=30; own representation).

4.2.2 Topic-specific consulting

With regard to consulting/advice offered to schools in NRW, the document analysis found the following key thematic areas:

- General consulting relating to «digital education» (#04, 4)
- Developing a media concept: key topics included
- A media concept as part of the school programme and a component of the school development process (#05)

- Planning a professional development programme when digital devices are introduced (#12, 2)
- Assessing professional development needs among teaching staff (#05)
- Selecting suitable/learning-friendly equipment (see e.g. #03; #04)
- Legal security and data protection (see e.g. #02; #06)
- Implementing state-wide projects, e.g. LOGINEO NRW, *Medienkompetenzrahmen NRW* (Media Literacy Framework NRW) (#04)

4.2.3 School development consulting

The documents from NRW analysed here contained no explicit mentions of the terms «Schulentwicklungsberatung» (school development consulting) or «Schulentwicklungsbegleitung» (school development support) in the context of digitalization. Implicit mentions via the description of support services were also subjected to a contextual examination in the documents. Additional search terms were: «Prozess*/-begleitung/-beratung» (process*/support/consulting); inflections of the verbs «beraten» (advise, consult), «begleiten» (accompany, support).

4.2.4 Technical support

«For technical support, the NRW state government and local authorities have agreed on a division of labour between schools (first level) and maintaining bodies (second level).» (#02, 17)

First-level support is covered by the federal state, that is, by the school and its employees. It involves tasks such as network maintenance, the integration of mobile devices into everyday school life, providing a first point of contact for support queries, and «basic» troubleshooting, or referring faults/problems to second-level support with an «appropriate description of the fault» (#07, 5). «The threshold to second-level support is definitely reached if a teacher is doing the job of a technician» (#02, 17).

Second-level support mainly involves tasks such as supporting/assisting those providing first-level support in schools, e.g. training them in the use of the technology provided, setting up broadband connections, installing cables in school buildings, troubleshooting and service enquiries.

Medienberatung NRW (the NRW state media consultancy) is also involved in matters of technical support and

«organizes the ongoing development of technical and organizational assistance for first- and second-level support, so that recent developments and findings from communication technology are incorporated into the design of effective and cost-effective support.» (#07, 9)

One specific example of the role the NRW media consultancy can play is the state-wide rollout of LOGINEO NRW, a basic IT infrastructure provided to schools by the federal state. After a test phase this will be made available to all schools, in a phased rollout organized by Medienberatung NRW (#10).

4.2.5 Other support services

Besides the support services listed so far, the documents from NRW also refer to the following offerings, intended to support schools as they integrate digital media into school and teaching:

- The provision of digital textbooks (*mBook GL NRW*, *BioBook NRW*) and learning resources via the platform learn:line NRW (#01; #06)
- Publications/materials, e.g. on IT equipment, questions of legal security, creating a media concept, media development planning (#02; #11)
- An online portal on the *Medienkompetenzrahmen* (Media literacy framework) (#05)
- Ideas for lesson planning, examples of best practice (see e.g. #02; #05; #08)

5. Discussion

Here the findings from NRW will be discussed in the light of the theoretical framework and the current research.

The school support system in NRW and the state's portfolio of support for school development in the context of digitalization shows the following overall picture: the Ministry of School and Education of the federal state of NRW, as the highest education authority, functions as the central strategic actor in the support system. The state's strategy is unmistakably based on that of the KMK (Kultusministerkonferenz – the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder); this shows that NRW is doing its best to uphold the consensus developed by the KMK for the sustainable promotion of digitalization-related skills.

Further strategic and structural plans and guidelines are formulated and implemented by the district governments (*Bezirksregierungen*) and by Medienberatung NRW (the NRW state media consultancy). Medienberatung NRW in particular has a variety of functions, mainly encompassing advice and support services. The support strategies, structures and measures cover a wide spectrum of the categories derived from the literature, though it is striking that school development consulting is not explicitly mentioned in the documents analysed. Whether that means that this level of consulting has a lower status in the context of digitalization remains unclear. School development consulting may, however, be implicitly included in the other support services, in the form of help with planning a media concept (for schools) or media development (for maintaining bodies).

With regard to measures, we find a broad portfolio of support, including technical support in the form of a two-tier support concept and some other support services. The texts advertising professional development opportunities suggest that these are often not systematically based on the characteristics of effective professional development, since they are mainly synchronous face-to-face courses. Furthermore, few of the texts announcing these offerings give any indication of their duration, and of those that do state their duration the majority are very short. A recent evaluation of the professional development system in NRW reached a similar conclusion, rating it as «suboptimal» (Altrichter et al. 2019); the report recommended that universities should play a larger and more systematic role in the professional development of teachers. At the same time, questions of how to structure teachers' professional development, e.g. how to integrate the higher education sector (van Ackeren et al. 2019), are relevant throughout Germany (Priebe et al. 2019).

The findings presented here highlight the need for a (better) fit between school development processes (needs) and support services (supply). The model presented in this article is intended as a theoretical framework suggesting how the complex interplay between these levels can be better organized. The model should not, however, be understood as a rigid structure with fixed points of reference and configurations. Instead it can be understood as a «kaleidoscope», in which new connections are created when the middle or outer circles are moved. At the same time, the services provided by the support system and the school development processes within schools must be internally consistent to ensure «optimal» interaction between the two levels. If we remind ourselves that students and their learning outcomes and competence gains are at the centre of all efforts at school development, and therefore all related support services, then it is always possible to discern further «optimization needs» on both levels. School development and support services are therefore engaged in a continuous process of mutual coordination and adaptation, which is shaped by external influences. The COVID-19 pandemic can be cited as the most recent example.

6. Conclusion

This article presents selected findings of a survey of strategies, structures and measures for professional development and support systems in NRW, and questions the fit between school development processes and support services. The results show clear «optimization needs»: for example, those designing professional development programmes need to take into account research findings about the efficacy of such offerings.

If we want to assess other possible «opportunities for optimization», we not only need to know about the support portfolio available and the different measures offered to schools and their employees. It is also useful to consider the underlying structures and actors, and the coordination of their activities with regard to the implementation and orientation of support tools.

The «educational governance» perspective, which defines governance as the coordination of activities in the coordination of activities in the multi-level system of school (Altrichter and Maag Merki 2016; Feldhoff, Huber, and Durrer 2011) is helpful here. This research perspective thus explores «the emergence, preservation and transformation of social order and performance in the education system, from the perspective of the coordination of activities between different actors in the complex multi-level system» (ibid., 396).

In the multi-level system, systems of professional development and support are classed as occupying an intermediate level, between the central and meso levels. This highlights the need to consider interdependencies and possible «interface problems» (Altrichter 2015, 37) when planning support services. Current professional development offerings and support services reflect an underlying coordination of activities, which should be scrutinized for possible ways in which support might be used to influence outcomes. The implementation and orientation of the support portfolio play a crucial role, insofar as the services target different points in schools and can thus contribute to a development process, as well as having a significant impact on the introduction of new topics and tasks.

The findings presented here represent only a small extract of the data from the *ForUSE-digi* project. They focus on the analyses in NRW, which, as the pilot state, was used to fine-tune the strategy for the Germany-wide survey. Since these were the first findings for any federal state, it was not possible to compare these across all results. Further analyses comparing the different federal states have yet to be carried out – these will make it possible to identify both state-specific features and overarching patterns. Interviews will also be conducted with key individuals in the support systems, serving to give deeper insight into the support systems of selected federal states and also to revisit and reflect on the developments caused by the pandemic. Here it is important to remember that «opportunities for optimization» within the support system can only be identified with an in-depth look at the implementation and orientation of support services in the context of the system as a whole. Ascertaining the current status quo must be seen as a necessary prerequisite for identifying «opportunities for optimization» (in the form of evaluations and guidelines) – insofar as «optimization» can actually be seen as a worthy aim for school development?!

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Further information on the meta-project «Digitalisierung im Bildungsbereich» can be found at <https://digi-ebf.de>; for more information on the *ForUSE-digi* project see <https://digi-ebf.de/foruse-digi>.