Effects of Characteristics of School Quality on Student Performance in Secondary School: A Scoping Review

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Abstract: School quality has become a guiding concept that increasingly shapes educational planning and school development. For many decades, it has been a topic of significant interest, resulting in a wide-ranging and diverse research field. However, it is far from clear how school quality should be defined, what it should encompass, and how it influences student performance. The goal of this scoping review is to examine the existing evidence of the relationship between characteristics of school quality and student cognitive output/ student performance in secondary school. More precisely, it aims to (a) identify, (b) categorize, and (c) examine and evaluate the effects of characteristics of school quality affecting student performance and teaching characteristics in secondary school. In order to achieve these aims, we selected, clustered, and analyses 37 articles. The process was conducted by the research group through regular meetings, discussions, and consensus decisions. Our findings contribute to the comprehensive body of literature by identifying the following dimensions: *aims and strategies for quality development, leadership and management, professionalism, school culture*, and *resources*. Furthermore, the review revealed that although the field of school quality has been extensively researched, it lacks consistency, with many different operationalisations and definitions, making comparisons and syntheses challenging or even impossible. We believe that clear operationalisations and definitions are crucial to achieving comparability. Additionally, to achieve a standardized understanding of school quality and establish the categories internationally, uniform, theoretically sound, and content-related definitions of each category are necessary.

Keywords: *Leadership and management, professionalism, school culture, school quality, student outcomes.*

Introduction

Due to constant social, economic and environmental developments, the demands on learners and the entire education system are developing rapidly (Fadel et al., 2017; Mullis, 2014). The Education 2030 project writes: "Schools are facing increasing demands to prepare students for rapid economic, environmental and social changes, for jobs that have not yet been created, for technologies that have not yet been invented, and to solve social problems that have not yet been anticipated" (Organization for Economic Cooperation and Development [OECD], 2018, p. 22). Therefore, many stakeholders in the educational system (organisations like OECD or researchers) are concerned with increasing student outcome in school and determining variables that predict these outcomes. For instance, Holzberger et al. (2020) investigate the relationship between school characteristics and student outcomes using a meta-analysis. This effort is accompanied by the demand for quality in the education system. Especially in the last years, external circumstances like COVID-19 have caused significant disruptions to the global education system. In an early systematic review, Donnelly and Patrinos (2022) have shown that COVID-19-induced school closures result in a "learning loss" for students. This term commonly describes the decrease in knowledge and skills (Pier et al., 2021). Moreover, learning loss leads mostly to greater long-term challenges like lifetime earnings loss. Psacharopoulos et al. (2020) state that "[e]ducation is one of the most important drivers of human capital investment." (p. 2). Therefore, school is one of the most important elements to ensure children's and the youth's economic and social well-being.

Due to the importance of education, schools' further development is an important topic to be discussed. In the development of the school system, school quality has become a guiding concept that increasingly shapes educational

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planning and school development. This discussion is not limited to the German-speaking world (e.g., Steffens et al., 2016), but it is also being held internationally (e.g., OECD, 2005).

Theoretical Perspectives

School Quality

Before conceptualising school quality, it is important first to explain the two terms school and quality individually. Fend (1986) sees school as a "pedagogical unit of action" (in the German original "pädagogische Handlungseinheit") that can have an implicit or explicit effect, e.g., through teaching. Klieme (2016) continues the idea of Fend (1986) and understands the individual school for empirical research as a social instance and a pedagogical unit of action, which is not only an organisation-theoretical model or a school-pedagogical fiction but a social, empirically observable reality. The term quality goes back to the Latin "qualitas", and quality in the narrowest sense of the word means condition, goodness or intrinsic value. Quality is often defined with a technical-economic aspect, although this definition cannot simply be transferred to the school system (Ditton & Müller, 2011). Harvey and Green (2000) distinguish quality according to five groups of meaning, whereby the transformation approach relates to the school system. They declared that a "transformative view of quality is rooted in the notion of 'qualitative chance', a fundamental change of form. […] A quality education is one that affects changes in the participants and, thereby, presumably enhances them" (pp. 24-25). What has not been considered in the description of quality so far is where the groups involved should "transform" themselves. Especially due to the increasing spread of international and national school comparison studies, the quality discussion in education moves between two poles (Krautz, 2007): the humanistic approach (the general development of all human powers in terms of Wilhelm von Humboldt) and the functionalistic approach (economic usability of acquired competences and the efficiency of educational content).

The term school quality can now be better described with the idea of school as a pedagogical unit and quality in the sense of transformation with a focus on the functionalist approach. The origin of the school quality approach was a reaction to the sobering findings of the study of Coleman et al. (1966), which attributed little importance to schools in terms of educational success. This reaction led to the school effectiveness movement, which focused on the importance of the individual school (Steffens, 2012). This is evident in publications of this time, e.g., "Schools Make a Difference" (Teddlie & Stringfield, 1993). Both in the German-speaking (Ditton, 2016) and international research field (Scheerens, 2015), it has become apparent that looking at the individual school is insufficient. What is needed is an expansion of the concept of the "pedagogical unit of action" (Fend, 1986) of an individual school to schools which include the contextual conditions (e.g., learning requirements of the students or the structures in the school system). Thus, Ditton and Müller (2011) describe school quality as a multidimensional construct whose more precise definition must take into account the interrelation between contextual, instructional and target group factors. Similarly, Scheerens (2015) defines school quality or school/educational effectiveness as follows: "effectiveness is seen in a multilevel framework, which integrates system, school, and teaching effectiveness, the emphasis is on the school level and organizational theory" (p. 10).

Like Scheerens (2015), we also emphasise the school level. One widespread methodical approach to identifying effects in the multilevel framework school is multilevel analysis (e.g., Hox et al., 2017; Langer, 2009). Through this approach, it is possible to isolate the explained variance by each level. For instance, Hattie (2015) found that "about 50% of the variance in learning is a function of what student brings to the classroom" (p. 87). Lipowsky (2015) summarises the percentages of variance for the class level and school level: 10-30% for the class level and 5-14% for the school level on students' performance. Similarly, Steffens (2012) supports the importance of the individual school (school level), accounting for 6-8% of the variance explained.

Models of School Quality

So far, there are no established theories on school quality (Ditton, 2016) that can be used as a framework for a "complete" clarification of the variance explained. Some established approaches are useful as a structural grid for the analytical clarification of relationships between relevant influencing factors. However, they are not theories of school quality. Models of school quality/school effectiveness correspond in many aspects by systematising the significant factors according to input-process-output and outcome (OECD, 2005). A well-known and widely used model is the school effectiveness model by Scheerens and Bosker (1997). These models distinguish between the levels context, school, and classroom. The higher-level acts as a support system for the lower level in the structural hierarchy. Ditton (2000) provides a similar model, again distinguishing between a school and classroom level. Both models consider the multilevel character of schools and the multilevel framework of school quality.

Although the models presented here provide structured representations of possible school quality factors, research in this area remains fragmentary overall (Ditton & Müller, 2011). So far, the research has been rather unsystematic, with numerous individual variables (e.g., Huang et al., 2019; Schleicher, 2014).

Review Aims

The present scoping review is a compilation of existing evidence of characteristics of school quality with regard to student cognitive output/ student performance in secondary school. Existing systematic reviews focused on specific characteristics of school quality, such as schoolwide intervention programs on school climate (Charlton et al., 2021). We find the same situation for meta-analysis. Previous meta-analyses often examine single characteristics, such as school climate (e.g., Thapa et al., 2013), or focus on a specific set of studies, such as large-scale studies (e.g., Holzberger et al., 2020). Moreover, previous reviews mostly concentrate on the effect of characteristics on student performance (e.g., Scheerens et al., 2013). The present scoping review examines characteristics of school quality in secondary education without restrictions to selected characteristics or large-scale studies. This review has three aims, namely (a) identifying, (b) categorizing, and (c) examining and evaluating the effects of characteristics of school quality affecting student performance and teaching characteristics in secondary school. The Hessian framework of school quality [Hessischer Referenzrahmen Schulqualität] (Institut für Qualitätsentwicklung, 2011) provided the categories for the deductive part in the clustering process.[†]

Methodology

Since we conducted this research in parallel with a similar scoping review "Effects of generic and subject-didactic teaching characteristics on student performance in mathematics in secondary school: A scoping review" (Spreitzer et al., 2022), the methodology of both studies is very similar. Thus, the description here is shortened. For details, please refer to Spreitzer et al. (2022). Please note that while the methodology of the two reviews is similar, the studies are independent of each other.

Literature Review - Research Design

We conducted the systematic research on October 23, 2019, and the follow-up search on July 27, 2022, using the literature database Web of Science. A hand search also complemented the results. Initially, we limited the search to the 2005-2019 time span (e.g., Hartmann et al., 2012; Scheerens et al., 2013). In the follow-up search, we extended the period to 2022. We used "Basic Search" mode in the "Topic" field with the following search term: school AND quality AND ("school quality" OR "quality development" OR "school management" OR "professionalism" OR "school culture" OR "cooperation" OR "personnel development" OR "human resources development").

The initial query resulted in 6449 articles. After a pre-selection based on the Web of Science categories, excluding research fields irrelevant to the study (e.g., "computer science interdisciplinary applications"), we identified 2420 articles possibly relevant for the study. 6 articles were added by hand search. Following the PRISMA statement (Moher et al., 2009), Figure 1 provides an overview of the selection process.

[†] Although an adapted version of the Hessian framework of school quality has been released (Hessian Teachers' Academy, 2021), this research uses the 2011 version. Due to the integration of this scoping review into a larger project, the initial literature search and the process of developing categories were done in 2019. Therefore, it was not possible to switch to the current version during the follow-up search. In the discussion, however, the categories are discussed taking the latest framework into account.
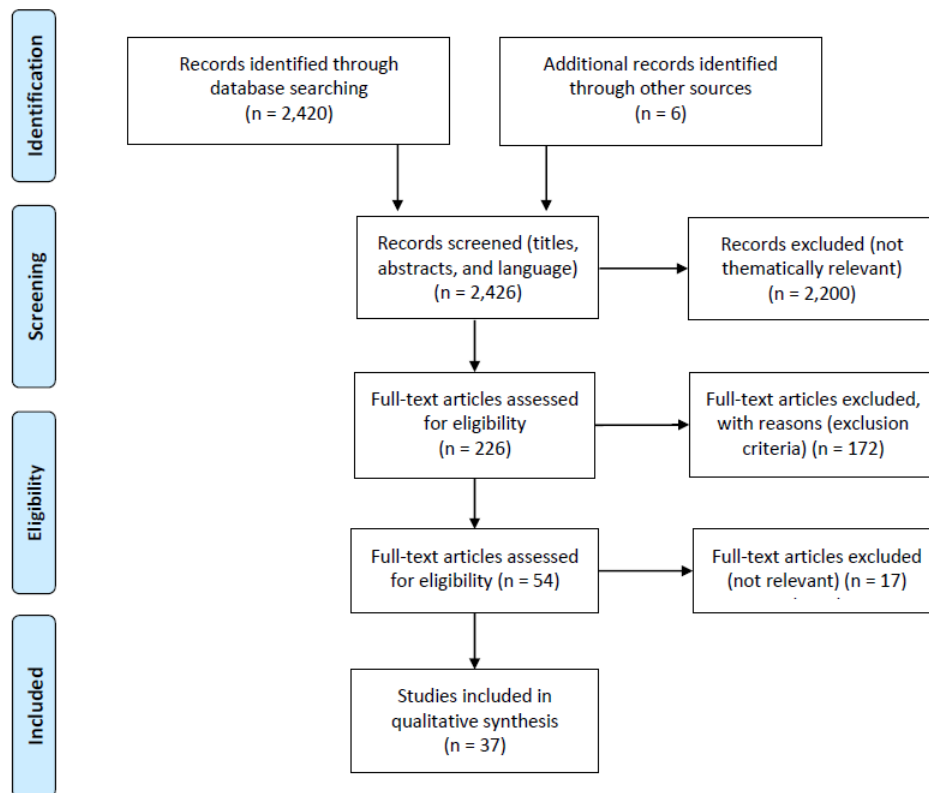
Figure 1. Flow Chart of the Study Selection Process According to PRISMA (Moher et al., 2009)

Article Selection

The authors of this study compiled the final selection of articles in three successive steps: 1) assessing the titles and abstracts (2426 articles to 226); 2) screening full texts using the inclusion criteria (226 articles to 54); 3) checking for relevance of content (54 articles to 37). The inclusion criteria are the following: (a) a focus on a sample of teachers, pupils, or other groups in secondary education; (b) clear inferences of the effects; and (c) a clear description of each characteristic in order to cluster the characteristics.

Analysis and Synthesis of the Results

We categorized the characteristics of school quality described in the articles based on deductive-inductive category information following Kuckartz (2014). For the deductive part, the Hessian framework for school quality (Institut für Qualitätsentwicklung, 2011) served as the basis for our categories. The categories of the Hessian framework are *aims and strategies for quality development*, *leadership and management*, *professionalism*, and *school culture*. Some characteristics could not be assigned to a category in this scheme, so we had to make modifications by trying to form new categories (inductive part).

For the assessment of the reported effects of characteristics of school quality, we used the following rating scheme:

- + (plus) denotes that the described trait improves cognitive output/ instructional quality,

- - (minus) denotes that the described trait has an adverse effect, and

- ~ (tilde) denotes that no effect was found, or the effect was negligible.

For distinguishing positive, negative, or negligible effects of standardized values (beta coefficients), we used ±0.05 as a threshold, following the recommendations of Pigott and Polanin (2020) and Toste et al. (2020). Non-standardized values were assessed subjectively (reflecting upon the article authors' perspective, the context, the size of the values, and the relationship to the other values of the study). All assessments were first made independently by the authors, and the final assessment was then made by consensus. Both in the reduction steps and in the assessment of the effects, there were regular discussion groups of the research team.

Results

Overview of the Selected Articles

Table 1 gives an overview of the articles analysed for the scoping review. For reasons of readability, we have assigned a numeric study ID to each article of the remaining 37 articles for the scoping review. In the following article (tables and text), references are not made via in-text-citations, but via the ID.

Table 1. Selected Studies

Study ID	Source	Country	Data set (study)	N	Category
1	Aburizaizah et al. (2019)	SAU	TIMSS 2003, 2011 and 2015 (modified)	2003: 85 S, 1799 St 2011: 98 S, 2446 St 2015: 96 S, 222 St	SC, LM, RE
2	Adnot et al. (2017)	USA	DC's Comprehensive Assessment System (DC CAS) achievement data, IMPACT evaluation data	56564 student-year obs., 1873 teacher-year obs.	LM
3	Anders et al. (2010)	DEU	COACTIV – PISA 2003/04	3483 St, 155 C	PR
4	Arribas Diaz and Martinez-Mediano (2018)	ESP	Own study	26 S, 809 T (Phase 3)	QD
5	Baumert et al. (2010)	DEU	COACTIV – PISA 2003/04	4353 St, 181 T, 194 C	PR
6	Belo et al. (2013)	PRT	Portugal's ninth-grade national exams (standardized)	628 St	RE
7	Bengo (2016)	CAN	Own study	2 coaches, 4 T	PR
8	Blömeke and Klein (2013)	DEU	TEDS-FU	221 T	LM
9	Blömeke et al. (2016)	intern.	TIMSS 2011	205515 St, 10059 C/T	PR
10	Boston and Smith (2009)	USA	Own study	18 T	PR
11	Corcoran (2017)	USA	Own study	Sample 1 (ES): 124 St, 22 S Sample 2 (EMS): 318 ST, 28 S	LM
12	Creemers and Kyriakidēs (2008)	CYP	Own study	2503 St, 108 C, 52 S	QD, PR, SC, LM
13	Drent et al. (2013)	intern.	Systematic review (of TIMSS data-based research)	N/A	PR, SC, LM, misc
14	Dubberke et al. (2008)	DEU	COACTIV – PISA 2003/04	155 C, 3483 St	PR
15	Fischer et al. (2018)	USA	External data source	133336 St, 7434 T	PR
16	Gärtner (2016)	DEU	Data from official school inspections in Brandenburg 2011-2015 (Düring et al., 2019)	587 S	QD, SC, LM
17	Gustafsson et al. (2018)	intern.	TIMSS 2011	282737 St	SC, misc
18	Hill et al. (2019)	USA	Data collected by the National Center for Teacher Effectiveness (Center for Education Policy Research- Harvard University, n.d.)	306 T, 10233 St	PR
19	Hill and Chin (2018)	USA	Data collected by the National Center for Teacher Effectiveness (Center for Education Policy Research- Harvard University, n.d.)	284 T, 9636 St	PR

Table 1. Continued

Study ID	Source	Country	Data set (study)	N	Category
20	Holzberger et al. (2020)	intern.	Meta-analysis	3960281 St, 260390 S	SC, RE
21	Huang et al. (2019)	SGP	TALIS 2013 and PISA 2012 (linked)	166 S	QD, SC, LM, RE, misc
22	Koellner and Jacobs (2015)	USA	Own study (iPSC project)	2007-2008: 4 S, 7 T 2008-2009: 3 S, 18 T 2009-2010: 6 S, 53 T 2010-2011: 11 S, 83 T	PR
23	Kunter et al. (2013)	DEU	COACTIV – PISA 2003/04	4353 St, 181 T, 194 C	PR
24	Kyriakides et al. (2015)	CYP	Own study	64 S, 2936 St	QD
25	Lazarevic and Orlic (2018)	SRB	PISA 2012	4684 St, 142 S	SC, RE, misc
26	Liu and Liao (2019)	intern.	TALIS 2013	6453 S, 100850 St	PR
27	Mohammadpour et al. (2015)	intern.	TIMSS 2007	134123 St, 4511 S	PR, SC, RE, misc
28	Mora-Ruano et al. (2019)	DEU	PISA 2012	869 T, 869 St	PR
29	Nilsen and Gustafsson (2016)	intern.	TIMMS 2007, 2011	2007: 170803 St, 2011: 217427 St	PR, SC
30	Özberk et al. (2018)	TUR	PISA 2012	317 St, 104 S	SC, RE
31	Pietsch et al. (2016)	DEU	Data from school inspections in Hamburg and the KERMIT project (Education and Training Authority, 2022)	37 S	LM
32	Rolfe et al. (2022)	SWE	TIMSS 2015	2888 St, 190 T	PR, SC
33	Ronfeldt et al. (2015)	USA	Data from a larger study of school leaders in MDCPS (Grissom et al., 2013; Grissom & Loeb, 2011)	336 S, 7881 T (6682 for math)	PR
34	Saminathen et al. (2018)	SWE	Stockholm School Survey (SSS), own survey (Stockholm Teacher Survey (STS))	9151 St, 147 S	PR, SC, LM
35	Scheerens et al. (2013)	intern.	Meta-analysis	N/A	PR, SC, LM, misc
36	Son et al. (2016)	KOR, USA	TIMSS 2011	KOR: 5170 St, 375 T USA: 10445 St, 537 T	PR, SC, RE, misc
37	Vanlaar et al. (2016)	BEL, CYP, DEU, GRC, IRL, SVN	Project "Establishing a knowledge base for quality in education: Testing a dynamic theory of educational effectiveness" (Creemers et al., 1999)	9321 St, 561 C, 329 S, 3010 T	QD, SC, PR

Note. Country codes refer to the ISO 3166 (alpha-3) standard.
N = sample size; St = students; T = teachers; S = schools; C = classes; QD = Aims and strategies for quality development; LM = Leadership and management; PR = Professionalism; SC = School culture; RE = Resources; misc = miscellany; N/A = Not available.

Description of the Clustered Categories

The clustering resulted in six categories: *aims and strategies for quality development, leadership and management, professionalism, school culture, resources*, and *miscellany* (Table 2). The first four categories are taken from the Hessian framework for school quality (Institut für Qualitätsentwicklung, 2011) for the school level. We did not include the fifth category of this framework, *teaching and learning*, since it belongs more to the domain of instructional quality and is thus not of interest to this scoping review.

Almost all articles (except for [6]) deal with categories and/ or subcategories of the Hessian framework. However, the interpretation of the categories and subcategories varies considerably, leaving a heterogenous picture of school quality. The numerous instruments for determining school quality or only parts of it also led to different operationalisations with varying focuses. Forming various subcategories should help to give a more detailed and meaningful overview.

However, not all aspects of school quality found in the articles fit into a subcategory. So, we tried to form new categories with them. We could create one new category, *resources*, with two subcategories: *material resources* and *human resources*. The newest version of the Hessian framework of school quality (Hessian Teachers' Academy, 2021) also includes these changes (see Discussion). All other aspects were put into the *miscellany* category (see Table 8).

Table 2. Categories and Subcategories of the Studies Surveyed

Categories and subcategories	Study ID (see Table 1)	Number of articles in (sub)category
Aims and strategies for quality development		6
Evaluation	12, 16, 37	3
School policy	4, 16, 21, 24	4
Leadership and management		11*
Human resource development	1, 8, 16	3
General leadership	8, 16, 31, 35	4
Educational leadership	8, 12, 13, 16, 21, 34, 35	7
Professionalism		23
Teacher knowledge	3, 5, 14, 18, 19, 23	6
Professional development	7, 9, 10, 15, 22, 26, 29, 36	8
Collaboration among staff	12, 13, 28, 33, 34, 35, 37	7
Teacher experience	18, 27, 32	3
School culture		16
Achievement orientation	1, 12, 13, 17, 20, 29, 32, 34, 35, 36	9
Partnership policy	12, 13, 16, 20, 21, 34, 35, 37	7
School climate	12, 13, 16, 17, 20, 25, 27, 30, 34, 35, 36	10
Resources		8
Material resources	1, 6, 20, 21, 27, 30, 36	7
Human resources	20, 21, 25, 30, 36	5

Note. *No subcategory for 2 and 11 available.

Aims and Strategies for Quality Development

Aims and strategies for quality development form the basis of school quality because schools are obliged to take responsibility for the design of school environment and teaching. This category is divided into two subcategories: *school policy* and *evaluation*.

School policy represents the planning component through taking responsibility for processes of school quality (Schratz & Hartmann, 2019). Taking responsibility for processes is reflected in the international trend towards more school autonomy (Moosbrugger et al., 2019). In the context of school autonomy, school policy is understood as the application of quality models [4, 16, 24]. It is about creating and implementing whole school development plans and programmes, such as the quality management systems (QMS) in Spain [4].

As school policy needs evaluation, the category *aims and strategies for quality development* needs an *evaluation* component. All components in the quality models of schools should be evaluated, e.g., evaluation of school policy for teaching or evaluation of school learning environment [12, 37]. Internal evaluation measures belong to this area, as internal evaluation serves to check whether school policy has achieved the goals of the actions introduced [16].

Leadership and Management

Principals need management knowledge and leadership skills for the professional management of a school and its development into a self-responsible learning organisation (Institut für Qualitätsentwicklung, 2011). Effective school leadership is paramount for school quality (e.g., Day et al., 2016). The range of tasks of principals is extensive, and we

divided these tasks into three subcategories: *human resource development, educational leadership*, and *general leadership*.

Principles are encouraged to "cultivate stronger teachers and deploy incentives to attract high-quality instructional staff" (Aburizaizah et al., 2019, p. 813) [1]. *Human resources development* includes actions such as external evaluation of teachers, use of peer review in teacher evaluation, feedback or the use of incentives to attract or retrain teachers [1, 8, 16]. Support for beginning teachers is also an important aspect of this subcategory. For instance, Blömeke and Klein (2013) [8] investigated the induction period of mathematics teachers and showed that their teaching quality is connected to the extent of support the teachers received.

Principals "are in charge of implementing educational activities [...] and ensuring that national goals for education are met" (Saminathen et al., 2018, p. 467) [34]. Through *educational leadership*, principals are encouraged to regularly visit teachers' classrooms and to give feedback on lesson development [16], which are only some aspects of *educational leadership* [12, 13, 35].

With increasing school autonomy, principals' responsibilities have been extended, meaning that in addition to *educational leadership*, more attention to *general leadership* is needed (OECD, 2015). *General leadership* is primarily task- and product-oriented and aims to optimise existing structures and processes and ideally leads to an improvement of already existing processes and mechanisms [31, 35]. It is also about providing information and coordinating school processes (Scheerens & Bosker, 1997).

Professionalism

School quality depends to a large extent on the competences of the pedagogical staff. The Hessian framework of school quality (Institut für Qualitätsentwicklung, 2011) proposes two subcategories, *professional development* and *collaboration among staff*, which are primarily concerned with securing and developing existing competences. In the process of the review, we recognized that two subcategories are insufficient. Therefore, we added these two: *teacher knowledge* and *teacher experience*.

The reviewed studies focused on different forms of *teacher knowledge*. The studies [5, 23] concentrated on mathematics content knowledge, whereas some studies also have taken teachers' pedagogical content knowledge into account [3, 5, 18, 23]. Kunter et al. (2009) found that teachers' pedagogical content knowledge is one of the most important predictors for cognitively challenging and constructively supportive lessons in mathematics. The Education Committee of the European Mathematical Society (2012) even considers PCK as the most import predictor. One prominent typology for mathematics teachers' knowledge goes back to Shulman (1987), which included content knowledge, pedagogical content knowledge, pedagogical knowledge and four further types (curriculum knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, knowledge of educational ends). Also the knowledge about students can be assigned to this typology, including knowledge about students' performance or students' misconceptions [3, 14, 19]. Knowledge must be constantly promoted, developed, and adapted to current challenges in the educational context, e.g., current teaching practices (Boston & Smith, 2009) [10].

Professional development is necessary to improve teachers' knowledge or practice. Different studies [9, 10, 15, 22, 26, 29, 36] have shown how to design, conduct and study *professional development*. Professional development activities include "school-based programs, and coaching, seminars, or other types of out- and in-service training with the aim of supporting the development of teacher competencies" (Blömeke et al., 2016, p. 25) [9]. Desimone (2009) summarized characteristics of effective professional development, like active learning, coherence, content focus or collective participation. Liu and Liao (2019) [26] identified four aspects of effective professional development programs: format, content, duration, and quality.

Linked to *professional development* is *collaboration among staff*. According to Darling-Hammond et al. (2017), teacher collaboration is one of seven factors that constitute effective professional development. They write that "by working collaboratively, teachers can create communities that positively change the culture and instruction of their entire grade level, department, school, and/or district" (p. v). Collaboration among staff can be about different issues: about content/instruction [12, 13, 28, 35, 37], about the importance of collaboration [12, 13, 34, 35], about projects/assessment [28, 33], about performance/problems concerning students [12, 28, 33, 34, 35] or between teachers [12, 34, 35, 37].

Teacher experience includes the number of years taught [18, 27], preparation routines [18, 32], and certification types [27].

School Culture

School culture, or in some studies called school climate, has been described and operationalized in different ways, as Creemers and Kyriakidēs (2008) [12] point out. They see *school culture* as one of the most important predictors of school effectiveness, dividing it into the following subcategories: *achievement orientation, partnership policy* and *school climate.* The Hessian framework of school quality (Institut für Qualitätsentwicklung, 2011) also defines these three

subcategories, although using different names (pedagogical attitude, school life, cooperation and external communication).

Achievement orientation refers to internalized norms and views of the school community, including individual staff members, the principal and parents (Scheerens & Bosker, 1997). Gustafsson et al. (2018) [17] see *achievement orientation* as "the priority and ambition for learning and success" (p. 18).

The importance of parents is considered in the subcategory *partnership policy*. As with *achievement orientation*, it is not only about the expectations of the actors within the school but also about the parents' expectations. Thus, an essential component of *partnership policy* is the involvement of parents in decision-making processes and active participation in school life [12, 13, 16, 21, 35, 37]. Another aspect is the school's relationship with the community [12]. This includes cooperation with partners outside the school system [16] and with schools from where the students came or where they decide to go (Institut für Qualitätsentwicklung, 2011). School is a place where forms of social interaction coexist and where students experience and learn democratic participation.

Many studies analysing data from large-scale assessment studies like PISA or TIMSS [25, 27, 30] define *school climate* as a mix of aspects of social interactions, *achievement orientation* and *partnership policy*. Scheerens and Bosker (1997) see school climate as a synonym for *school culture* and, therefore, should only include indicators of behavioural characteristics, which ensure an orderly atmosphere and good behaviour of pupils, or absenteeism statistics or drop-out rates [13, 36].

Resources

Huang et al. (2019) [21] write that "schools generally have two types of resources: material resources and human resources" (p. 100). These two types also represent the two subcategories. *Material resources* include shortage or inadequacy of instructional materials [1, 21, 27, 30], computers and their software [21, 27, 30], library materials [21, 27] or insufficient Internet access [6, 21]. Özberk et al. (2018) [30] and Son et al. (2016) [36] see the quality of physical infrastructure (e.g., the school building) as part of *material resources*.

Four of the seven studies [21, 25, 30, 36] deal with *human resources* which includes the shortage of teachers and the availability of other support personnel (e.g., assistants and consultants).

Effects and their Relevance for the Categories Formed

Tables 3, 4, 5, 6, 7 and 8 depict the findings on the effect of school quality on student performance or instructional quality characteristics for each category. Since most studies report aggregated variables, it is not possible to report the effects for the subcategories. The narrative description addresses conspicuous findings for each category, separately for student performance and instructional quality characteristics.

Aims and Strategies for Quality Development

For the category *aims and strategies for quality development,* clear, positive effects on student performance were found. Four out of six articles [4, 12, 24, 37] examining components of this category found positive effects on student performance (Table 3).

Gärtner (2016) [16] found a positive effect on a characteristic of instructional quality, more precisely on support in learning processes. The dimension 'support in learning processes', which focuses on the teacher's actions in relation to the learning process (e.g., explaining tasks in a comprehensible way), showed a positive effect. In contrast, there was a lack of effects on 'motivation' and 'classroom management' that focus on components of the relationship level between teacher and students (e.g., praise for good answers and questions). To sum up, *aims and strategies for quality development* can positively influence the structuring actions of the teacher but not the characteristics of instructional quality that affect the relationship level between teacher and student. Another interesting finding is that the strategy "building consensus" about *aims and strategies for quality development* between the principals and the teachers had no effect on student performance [21]. This is in contrast to the expectations of the OECD (2005).

Table 3. The Effects of Individual Characteristics on Student Performance and Instructional Quality: Aims and Strategies for Quality Development

Variable names	Study ID (see Table 1)		
	[+]	[~]	[-]
ISO QMS models	[4]		
Evaluation of policy on teaching	[12]		
Evaluation of policy on the learning school environment		[12]	
Ziele und Programme [goals and programmes]	[16* - support in learning processes]	[16* - motivation; classroom management]	
Strategy: Building consensus		[21]	
School policy for improving teaching	[24**]		
School policy for improving the school learning environment	[24**]		
Evaluation teaching	[37]		
Evaluation school learning environment	[37]		

Note. (*) Effects on characteristics of instructional quality; (**) Indirect effects over teacher actions; Variable names were taken directly from the articles. Translations are provided in brackets.

Leadership and Management

Seven of the eleven studies [1, 2, 11, 12, 13, 21, 34] showed a positive effect of *leadership and management* on student performance (Table 4). Three studies [8, 16, 31] analysed the effects on characteristics of instructional quality. Blömeke and Klein (2013) [8] investigated the support of teachers through their principals, who "should provide high-quality management through administrative leadership, like clear communication" (p. 1032). Pietsch et al. (2016) [31] studied administrative leadership, focusing on optimising processes and procedures in the school. This aspect of *general leadership* had positive effects on student achievement [1, 12, 34] as well as on characteristics of instructional quality [16, 31].

Relating to *educational leadership*, when principals show a "high importance of interpersonal relationships" (Blömeke & Klein, 2013, p. 1043) [8], characteristics of instructional quality and student performance improve. Aburizaizah et al. (2019) [1] used the aggregated variable 'External evaluation' to describe the role of the principal as a quality controller of classroom teachers or classroom processes [14]. This variable and similar one, like 'quality of teaching' [12] or 'instructional improvement' [21] showed a positive effect. Corcoran (2017) [11] provided evidence of a positive effect on student performance for an aspect of *human resource development*. Interestingly, schools where principals do not take part in the professional development had better student performance. One possible reason might be that student performance is insufficient in measuring the improvement of aspects of school quality [11].

Two studies [1, 2] reported negative effects. Aburizaizah et al. (2019) [1] dealt with an aspect of the subcategory *educational leadership*, namely 'peer evaluation'. They assumed that "this may be a warning sign that emphasising the evaluation of teachers, if not done in a supportive way nor in a supportive school climate, may suppress teacher motivation and student achievement" (p. 810). Adnot et al. (2017) [2] researched the effects of teacher turnover, which is an aspect of *human resource development*. They outlined that the "exit of low-performing teachers is estimated to improve … student achievement" (p. 67), whereas the exit of high-performing teachers was assessed to have a negative effect on achievement.

Table 4. The Effects of Individual Characteristics on Student Performance and Instructional Quality: Leadership and Management

Variable names	Study ID (see Table 1)		
	[+]	[~]	[-]
Teacher incentives	[1 - 2011]		[1 - 2003]
External evaluation	[1 - 2003]; [1 - 2011]		
Peer evaluation			[1 - 2003]; [1 - 2011]
Teacher turnover (IMPACT)	[2 - low-performers]		[2 - high-performers]
Administrative leadership	[8* - teacher appraisal]		
Teacher appraisal	[8* - mathematics instruction; generic teacher task]		
Teacher autonomy	[8* - mathematics instruction; generic teacher task]		
Climate of trust	[8* - teacher autonomy]		

Table 4. Continued

Variable names	Study ID (see Table 1)		
	[+]	**[~]**	**[-]**
Executive Development Program (EDP)	[11 - no EDP; EDP]		
Quantity of teaching	[12]		
Opportunity to learn	[12]		
Quality of teaching	[12]		
Educational leadership	[13]		
Personal [staff]		[16* - support in learning processes; motivation; classroom management]	
Organisation [organisation]	[16* - support in learning processes; classroom management]		
Instructional improvement	[21]		
Führung im Allgemeinen [general leadership]	[31* - cooperation among staff; participation; job satisfaction]		
School leadership	[34]		
Educational leadership		[35]	

Note. (*) Effects on characteristics of instructional quality; Variable names were taken directly from the articles. Translations are provided in brackets.

Professionalism

Table 5 lists the effects for *professionalism*. Hill et al. (2008) wrote that "there is evidence for the proposition that stronger teacher knowledge yields benefits for classroom instruction and student achievement" (p. 431). Baumert et al. (2010) summarized that empirical studies used various components of teachers' knowledge to predict instructional quality and student performance. Six articles [3, 5, 14, 18, 19, 23] dealt with the subcategory *teacher knowledge*, although there were no clear effects on student performance or instructional quality. All studies except [23] reported mixed effects, meaning that a combination of positive, negative, and no effects were found in the same study. In the COACTIV study, Baumert et al. (2010) [5] found a substantial positive effect of pedagogical content knowledge on student performance as well as instructional quality characteristics. This is in line with two other articles [3, 23]. In contrast, for content knowledge almost no effects on characteristics of instructional quality (except "curricular level of tasks") have been found [5, 18]. Dubberke et al. (2008) [14] found that transmission beliefs are counterproductive to student learning.

One aspect of knowledge is the knowledge about the difficulty level of, e.g., mathematics tasks. In order to adapt the difficulty of a task to the individual student needs, it is necessary to correctly assess learning and performance-relevant characteristics of individual students as well as of the entire class (Anders et al., 2010) [3]. The ability to correctly assess the difficulty of tasks in mathematics did not affect student performance [3].

All eight studies [7, 9, 10, 15, 22, 29, 36, 37] reported a positive effect of the subcategory *professional development* on student performance and on characteristics of instructional quality. Bengo (2016) [7] researched mathematics coaching as a form of professional development and concluded that "[t]he results show that job-embedded learning was needed to demonstrate how the teaching strategies worked" (Bengo, 2016, 94 f.) [7]. Nilsen et al. (2016) [29] summarized: "In agreement with much previous research, we found quite substantial relations between student achievement and the amount of professional development activities that the teachers had participated in" (p. 92).

Two of the three studies [18, 27] in the subcategory *teacher experience* found no effect on student performance. These results contradict previous findings, as Hill et al. (2019) [18] point out. Only Rolfe et al. (2022) [32] found a positive effect on student performance for the variable 'teacher preparedness'.

Different studies on school effectiveness highlight the importance of teacher cooperation and consensus among staff (e.g., Roland & Galloway, 2004). Five of the seven studies [12, 13, 34, 35, 37] dealing with the subcategory *collaboration among staff* indicated clear positive effects of collaboration on student performance. However, these studies did not differ between different forms of collaboration. Mora-Ruano et al. (2019) [28] reported that instruction-related (IRC) and project-related collaboration (PRC) did not affect student performance. The study authors assumed that "[t]hese results are an indicator that these two forms (IRC and PRC) may have effects on other aspects such as increased job satisfaction" (p. 8).

Table 5. The Effects of Individual Characteristics on Student Performance and Instructional Quality: Professionalism

Variable names	Study ID (see Table 1)		
	[+]	[~]	[-]
Aufgabenbezogene Urteilstendenz [task-related judgment tendency]		[3]	
Diagnostische Sensitivität [diagnostic sensitivity]	[3]		
Pedagogical content knowledge	[5] [5** - cognitive level of tasks; curricular level of tasks; individual learning support] [23* - classroom management; learning support; cognitive activation]	[5** - effective classroom management]	
Content knowledge	[5] [5** - curricular level of tasks]	[5** - cognitive level of tasks; individual learning support; effective classroom management]	
Mathematics coaching (job-embedded learning)	[7* - teaching practices]		
Professional development	[9* - instructional quality] [10* - cognitive demanding tasks] [15* - instructional practices] [22]; [29]; [36]; [37]	[9]	
Collaboration	[12]; [33]; [37]		
Staff-cooperation	[13]; [34]; [35]		
Extend of teachers' use of professionalization activities	[13]		
Extend of teachers meet regularly to discuss instructional goals/issues			[13]
Transmissionsüberzeugungen [transmission beliefs]			[16] [16** - student support; cognitive activation]
Teacher preparation and experience		[18]	
Mathematical knowledge for teaching		[18]	
Teacher judgment accuracy	[20* - remediation; use of student productions; monitoring, evaluation and feedback]	[20]	
Knowledge of student misconceptions	[20* - remediation]	[20] [20* - use of student productions; monitoring, evaluation and feedback]	
Professional development format	[26]		
Professional development content	[26]		
Teacher quality		[27]	
Instruction-related collaboration		[28]; [33]	
Project-related collaboration		[28]	
Organization, performance and problems related collaboration	[28]		
Teacher preparedness	[32]		
Students collaboration	[33]		
Assessment collaboration	[33]		

Note. (*) Effects on characteristics of instructional quality; (**) Mediation models; Variable names were taken directly from the articles. Translations are provided in brackets.

School Culture

School culture refers to the school's design as a "living space", the relationships between teachers and learners and between these two groups, and the cooperation with parents and extracurricular partners. The general assumption is that *school culture* (or parts thereof) positively affects student performance (e.g., Scheerens & Bosker, 1997). 15 of the 16 articles addressing *school culture* [1, 12, 13, 16, 20, 25, 27, 29, 30, 32, 34, 35, 36, 37] showed a positive effect on student performance or characteristics of instructional quality (Table 6). Three aspects often used to operationalise *school culture* and for which clear positive results were found are academic press/ climate, school climate, and parental involvement [13, 16, 20, 35].

Besides the clearly positive effects, there were some noticeable deviations in the results. Gustafsson et al. (2018) [17] found negative effects for the aspects 'school emphasis on the academic success' and 'safety and orderly climate'. The authors stated: "All these educational systems had a high level of HDI [Human Development Index], which suggests that the compensatory effect of school climate varies as a function of level of human development" (p. 27).

Özberk et al. (2018) [30] showed the difference between teacher-related factors and student-related factors affecting school climate. The student-related factors showed a positive effect, whereas the teacher-related factors had no effect. The authors concluded that "[e]ducation and school climate, each of which is a powerful force, need to touch students' life to make a difference" (p. 125). The same was observed in [29].

Table 6. The Effects of Individual Characteristics on Student Performance and Instructional Quality: School Culture

Variable names	Study ID (see Table 1)		
	[+]	[~]	[-]
Academic press and climate	[1 - 2003]; [1 - 2011]; [20]; [35]		
Partnership policy	[12]		
Number of periods scheduled for teacher to counsel students			[13]
Academic climate	[13]		
Safety at school (teachers' perception)	[13]		
Average perceived safety in school by students	[13]		
Extent of cheating of students	[13]		
Teachers dedication towards lessons preparation	[13]		
Teachers beliefs about math			[13]
Extent of absence of students			[13]
Extent of violations of dress code			[13]
Extent of students causing injury to other students			[13]
Frequency school has to deal with class disturbance			[13]
Extent of problems with late arrival on school			[13]
Extend of parental involvement	[13]; [35]		
Organisation	[16* - support in learning processes; motivation; classroom management]		
School emphasis on academic success	[32]		[17]
Safety and orderly climate	[35]		[17]
School climate	[20]; [27]		
Out-of-school activities	[20]		
Distributed leadership		[21]	
Student-related factors affecting school climate	[25]; [30]		
Good attendance at school	[27]		
School emphasis on academic success	[36 - USA]	[29] ; [36 - KOR]	
Parental support	[29]		
Students' desire to learn	[29]		
Teacher-related factors affecting school climate		[30]	
Teacher morale		[30]	
Teacher focus		[30]	
School ethos	[34]		
Perceived safe and order in school	[36 - KOR]	[36 - USA]	
Community	[37]		

Note. (*) Effects on characteristics of instructional quality; Variable names were taken directly from the articles. The country codes refer to the ISO 3166 (alpha-3) standard.

Resources

The findings regarding the effectiveness of resources on student performance varied (Table 7). Some aspects, particularly the subcategory *human resources*, showed positive relationships [1, 21, 25, 30]. Please note that some aspects are negatively worded and that negative relationships of, e.g., teacher shortage should be interpreted accordingly [e.g., 25].

Material resources, however, had mixed results. While Holzberger et al. (2020) [20] observed a positive effect of material resources, other studies reported the opposite [1, 6, 21, 27, 30]. Mohammadpour et al. (2015) [27] concluded: "This indicates that school resources themselves are not an effective variable on achievement; rather, it depends on other variables, such as the level of usage of the resources, teacher's attitude, and teaching style" (p. 452).

Table 7. The Effects of Individual Characteristics on Student Performance and Instructional Quality: Resources

Variable names	Study ID (see Table 1)		
	[+]	[~]	[-]
Instructional hours			[1 - 2003]; [1 - 2011]
General shortage		[1 - 2011]	[1 - 2003]
Technology shortage	[1 - 2003]; [1 - 2011]		
Computer availability	[1 - 2003]; [1 - 2011]		
Difficulty in filling vacancy			[1 - 2003]; [1 - 2011]
Usage of broadband per student			[6]
Material resources	[20]		[21]
Human resources	[21]	[20]	
Proportion of mathematics teachers	[25]		
Student-teacher ratio		[25]	
Teacher shortage		[30]	[25]
School resources			[27]
Quality of school educational resources	[30]		
Quality of physical infrastructure			[30]
Perceived working condition			[36 - KOR]

Note. Variable names were taken directly from the articles. The country codes refer to the ISO 3166 (alpha-3) standard.

Miscellany

It was not possible to form a new category with the variables listed in Table 8, however, we could combine characteristics addressing aspects of school organisation, such as the variable 'written statement of curriculum' in Drent et al. (2013) [13]. The two studies [13, 35] investigating such aspects found positive effects on student performance.

Noteworthy is the negative effect of the variable 'grouping by ability' on student performance [27]. The authors stated that "past studies explored the relationship between students grouping by ability and academic achievement. The findings indicate that there is no significant link between the two variables" (p. 451).

Extracurricular activities did not have unambiguous effects. Results ranged from positive [21, 27] to negative effects [25].

Table 8. The Effects of Individual Characteristics on Student Performance and Instructional Quality: Miscellaneous

Variable names	Study ID (see Table 1)		
	[+]	[~]	[-]
Number of topics taught	[13]		
Written statement of curriculum	[13]		
Amount of students tracked in top stream	[13]		
Amount of students tracked in bottom stream			[13]
Extend of teachers' emphasis on homework	[13]		
Instructional quantity			[17]
School responsibility	[21]		
Teacher participation in leadership	[21]	[25]	
Extra-curricular activities	[21]		

Table 8. Continued

Variable names	Study ID (see Table 1)		
	[+]	**[~]**	**[-]**
Mathematics extension courses		[25 - both remedial and enrichment]	[25 - without differentiation based on prior achievement or either remedial or enrichment]
Grouping by ability			[27]
Enrichment course		[27]	
Remedial course	[27]		
Monitoring	[35]		
Curriculum quality	[35]		
Effective learning time	[35]		
Perceived career satisfaction	[36]		

Note. Variable names were taken directly from the articles.

Discussion

This structure of the discussion is guided by our three main objectives: (a) identification of characteristics of school quality affecting student performance and teaching characteristics in secondary school; (b) clustering into categories; (c) analysing and rating the effects of these characteristics.

Characteristics of School Quality and their Operationalisation

A possible explanation for the large number of articles (2,426) we found in the first step of our literature search is that there are no established theories on school quality (Ditton, 2016). There are a few established approaches but no concrete theory. For example, the models in Ditton (2000) or Scheerens and Bosker (1997) place school quality in a multilevel framework, which integrates context, school, and classroom. According to these frameworks, characteristics like school composition (e.g., socioeconomic status, the proportion of students with a migration background (Wenger et al., 2020)) or the three basic dimensions of instructional quality (classroom management, student support, and cognitive activation (Klieme et al., 2006)) can be assigned to school quality. Due to this broad definition of school quality, many articles are published under the keyword school quality, although variables are not allocated at the school level.

Furthermore, the operationalisations and definitions of the characteristics of the included studies vary considerably between different studies. Sometimes, characteristics had the same name but completely different operationalisations or definitions. An example is 'professional development' from the category *professionalism*. Seven articles [9, 10, 15, 22, 29, 36, 37] deal with this variable, although the descriptions of 'professional development' differ in content (e.g., 10 - participation in professional development as intervention; 29 - professional development as an aspect of teacher qualification). Similarly, different variables referred to the same construct (e.g., 35 - 'safety and orderly climate'; 36 - 'perceived safety and order in school').

In the early days of research on school quality, the focus was on the level of the individual school. In the further development of this research area, an expansion to the school system level and, thus, to all levels of action in the education system took place (e.g., van Buer & Wagner, 2009). This expansion was accompanied by constant adaptions and additions to the field, pushing a uniform theory farther and farther away. Nevertheless, identification and compilation of central characteristics for school quality embedded in a theory are needed to avoid heterogeneous findings, as reported in the review. The discussion in the following paragraph supports this.

Discussion of Categories and their Descriptions

Due to the lack of an internationally accepted theory, the studies followed the principle of the input-process-output model (OECD, 2005). Consequently, it is not possible to distil categories in which the descriptions of the characteristics are homogeneous. As a basis for our categories we used the Hessian framework of school quality (Institut für Qualitätsentwicklung, 2011) since it is an established and widely used framework, especially in German-speaking countries. However, the results of the scoping review show that one category, namely *resources*, was not considered in this conceptional structure. Both *material resources* [1, 6, 20, 21, 27, 30, 36] and *human resources* [20, 21, 25, 30, 36] play an important role in the international literature on school quality. The Hessian framework of school quality has since been updated to include this category (Hessian Teachers' Academy, 2021). However, since this project was launched in 2018, the updated version was not considered in the categorisation process. *Resources*, especially *material resources*, have been widely researched in the past, but their findings are ambiguous (Hanushek, 1997), which might

have been a reason for the delayed inclusion as a category of school quality. The effects are discussed in the next section.

The category *professionalism* includes characteristics on the school level as well as on the teacher level (class level), which can also be a part of school quality due to the expansion to all levels in the educational system. For Drent et al. (2013) [13] the variable 'consensus and cohesion among staff' is a process factor at the school level. Compared with this, the category *professionalism* includes many aspects of teacher quality, which variables are at the class level (e.g., Baumert et al., 2010; Nilsen et al., 2016). For example, Nilsen et al. (2016) include 'teacher education', 'preparedness', 'confidence', 'job experience' and 'professional development' in their framework for teacher quality. In the understanding that school is a multidimensional system and is thus modelled in multilevel models from a methodological point of view (e.g., Hox et al., 2017), mixing school variables and teacher variables into one category leads to inconsistency in terms of both content and methodology. Thus, it is necessary to clearly delineate the category *professionalism* (class level) from the subcategory *human resources development* of the category *leadership and management* (school level). Principals are encouraged to take action to cultivate stronger teachers (Aburizaizah et al., 2019) [1]. Here the principal is the actively acting person, whereas in the category *professionalism*, the teachers are the focus of action.

This section of the discussion again underlines the need for a unified theory/understanding. It is not a matter of finding a single correct theory with fixed variables, as one can hardly assume that there is only one "quality of school". Instead, different quality profiles can be found for schools, and different paths to quality can be taken (Steffens & Bargel, 2016).

In contrast to school quality, there are efforts in research around instructional quality to create an overall picture of the theory of instructional quality. Praetorius et al. (2020) published a first framework to organize the heterogenous field of instructional quality and show the limits of the three basic dimensions model. Spreitzer et al. (2022) follow a similar approach. It is also necessary for school quality to establish such a framework.

However, the concept of school quality has to be continuously adapted to reflect the social developments in the education system to meet the challenges described in the introduction. Schools cannot be mere teaching institutions; they have to perform more educational work, more social work has to be done in schools, and more emphasis has to be put on school life and school culture. Therefore, it is also crucial to distinguish clearly between the different levels of the school (school level, context level, teaching level, and teacher level).

Discussion of Effects

The following sections will focus on observations that can be made across several categories since the effects of the different variables as well as conspicuous findings have already been discussed in the results section.

The effects on student performance and some characteristics of instructional quality (depicted in Tables 3, 4, 5, 6, 7 and 8) provide an incomplete picture. Several characteristics from different studies but with similar operationalisations were reported to have positive, negative, or negligible effects. For example, in the category *aims and strategies for quality development* we found that the principal can positively influence the structuring actions of the teachers but not characteristics of instructional quality that affect the relationship level between teacher and student (Gärtner, 2016) [16]. A possible explanation lies in the indirect effect of school leadership actions (Heck & Hallinger, 2014). While school leadership can indirectly influence organisational factors of teaching, this may not be possible for factors of the relationship level. We observed the same in other categories or subcategories. In the subcategory *collaboration among staff*, we see that the school leadership can influence, for example, collaborations around assessment but less on instruction-related collaborations (Ronfeldt et al., 2015) [33]. Corcoran (2017) [11] provides a possible reason for the incomplete picture. He claims that student performance might be insufficient in measuring the improvement of aspects of school quality.

Conclusion

In this scoping review, we aimed to (a) identify, (b) categorize, and (c) examine and evaluate the effects of characteristics of school quality affecting student performance and teaching characteristics in secondary school. To accomplish this, we selected, analysed, and clustered 37 articles. Our findings add to the already extensive and well-researched field of school quality.

While the field of school quality is well-researched, the review revealed that it is untidy, with many different operationalisations and definitions, which makes comparisons and syntheses complicated or simply impossible. To fully understand the impact of school quality on student performance or instructional quality characteristics, there are two key requirements. First, to achieve comparability we need clear operationalisations and definitions. To establish a standardized understanding of school quality and establish the categories internationally, a uniform, theoretically sound, and content-related definition of each category is needed. This has to go hand in hand with standardized operationalisations. Second, since school quality is a multidimensional framework, more research should be conducted using models that capture multidimensional effects (e.g., multilevel mediation models).

Recommendations

To achieve the goal of establishing categories internationally and building well-founded definitions, it is necessary to deal with a broad range of characteristics and their different operationalisations. Due to an untidy nature of the body of literature an in-depth analysis of each category is necessary. With this in-depth analysis a theoretical foundation for each category and consequently a standardized understanding of school quality should be formed. This scoping review provides a starting point for further in-depth analyses of school quality. A promising tasks could be analysing the categories and their effects on cognitive and non-cognitive outcome. Non-cognitive outcome can be, for example, student motivation. Also important is to consider the contextual variables of students (e.g., socio-demographic variables) and of the school itself (e.g., proportion of rural population or proportion of migration). Without these variables, it would not be possible to form a well-founded theory of school quality, as school is embedded in a multidimensional framework.

Limitations

The present review focused on characteristics affecting student performance and characteristics of instructional quality, not focusing on one subject. In the present scoping review, we aimed to synthesise a broad international research field. Although we made an extensive effort to include relevant literature, including hand searching, studies that investigated a specific variable not labelled with the keyword school quality, may not have been included in the analysis.

This review did not consider context variables of school, which are also interrelated with school quality, characteristics of instructional quality and student performance (e.g., Hogrebe & Tate, 2010; Wenger et al., 2020). Future research could investigate the effect of contextual variables in the multidimensional framework of school.

Effective teaching influences the cognitive output (student performance) (Weinert, 1996) as well as affective characteristics (motivation or interest) of the students (Krapp, 1999). Due to the fact, that school quality has direct as well as indirect effects on students, school quality can also have effects on the affective learning outcomes of students. This scoping review only considered the cognitive output. Therefore, it is necessary to investigate the effects of characteristics of school quality on affective learning outcomes.

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Declaration of Interest

We have no known conflict of interest to disclose.

Authorship Contribution Statement

Spreitzer: Conceptualization, design, data analysis/ interpretation, writing, editing. Hafner: Data analysis/ interpretation, critical revision of manuscript, reviewing.

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