



# Enforced digitalisation in Germany's schools - Results of a survey of 2,750 teachers from all over Germany

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## Introduction

- The initial situation

## Method

- The " Digitalisation in the school system 2021" study

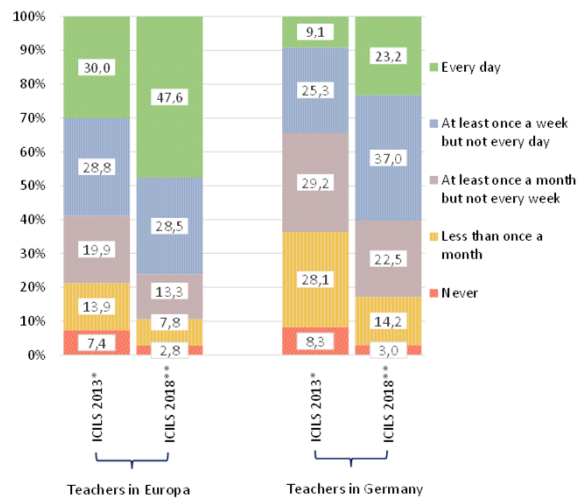
## Results

- Digitalisation surge during the pandemic
- Digital divide between Germany's schools
- Impact of the digital divide on teachers' working conditions and professional opportunities
- Conclusions



# The situation before the Corona pandemic - Germany lags behind in using digital media

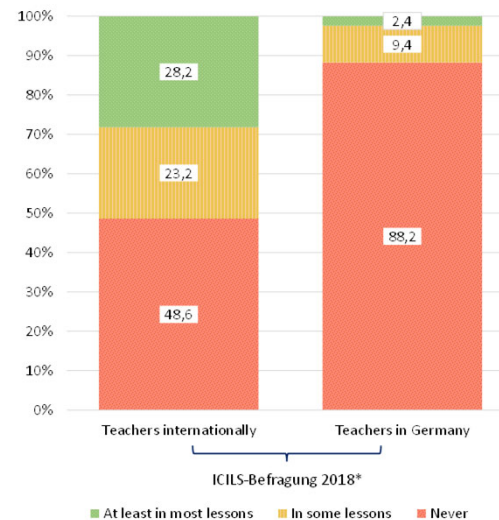
### Frequency of use of digital media in schools for teaching purposes



\* Eickelmann et al. 2014: 204  
\*\* Drossel et al. 2019: 215

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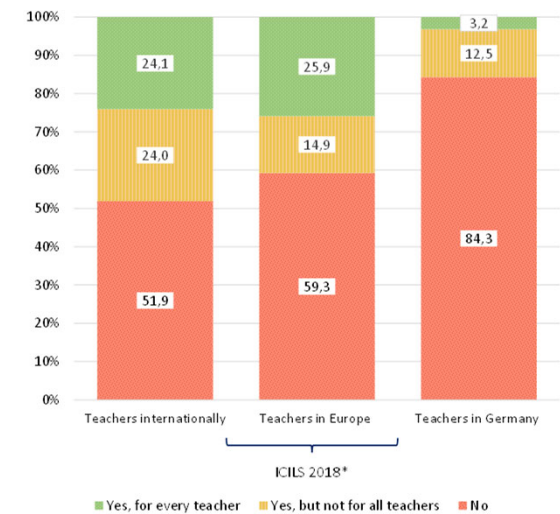
### Frequency of use of a learning management system



\* Drossel et al. 2019: 218

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### Provision of teachers with digital devices



\* Eickelmann et al. 2019: 158

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Before the pandemic, compared to other European countries, Germany lags far behind in the use of digital media in schools. The ICILS survey results for 2013 and 2018 show a significant gap. This was the initial situation when we prepared the study to investigate the state of digitalisation and its impact on teachers' working conditions. We were then - like everyone - surprised by the pandemic and had to adapt our study somewhat. But we came at the right time to survey the pandemic-related change.

Instrument: ICILS (IEA, BMBF)

# Research question of the study “Digitalisation in the [German] school system 2021”

- What is the state of digitalisation in the school system?
  - To what extent do schools pursue a strategy of digital teaching and learning?
  - What digital media and technologies are available and what are they used for?
  - What expectations do teachers have of digitalisation?
  - What are their experiences with digital media and technologies?
- What impact does digitalisation have on the working and professional conditions of teachers?
  - What opportunities and risks are associated with digitalisation?
  - How are working conditions changing (workload, working hours)?
  - How are teachers' digital competences being developed ( further education, teacher cooperation, non-formal learning)?
- What labour policy challenges does the increasing digitalisation of the school workplace pose for teachers' working hours, working conditions, workload and professional development?



## Information about the survey: Digitalisation in the school system 2021



<b>Survey phase:</b>	January 4 to February 21, 2021
<b>Participants:</b>	2,750 registered and confirmed teachers at 233 Schools nationwide from all German states
<b>Types of school:</b>	Secondary level (ISCED 24/34) (“Gymnasium”, “Gesamtschule”)
<b>Survey method:</b>	Online questionnaire (access-controlled, randomized)
<b>Funding:</b>	Max Traeger Foundation, BGAG Foundation Walter Hesselbach

### Quality of the sample:

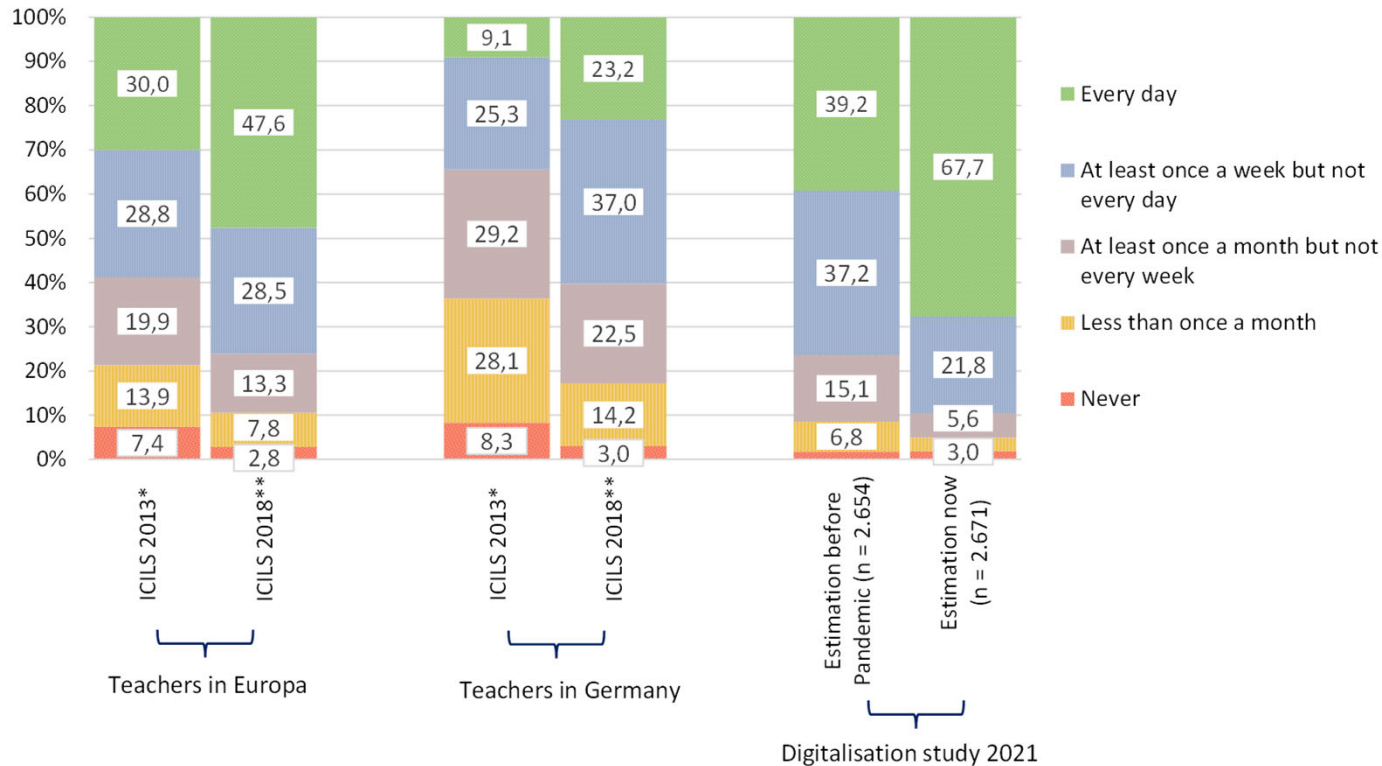
- Over one percent of the 269,727 teachers in Germany (basic population)
- 4,4 percent of the 5,271 schools
- Quality of field access, quantity and structural distribution of the sample allow for representative findings at the national level.

**Publications:** [www.Digitalisierung-Studie.de](http://www.Digitalisierung-Studie.de) (German language)



## During the pandemic: increasing the use of digital media in the classroom

Frequency of use of digital media in schools for teaching purposes (percentages)



Compared to the initial situation 2018, a greater use of digital media can already be documented before the pandemic 2020. However, in the year of the pandemic, there is a clear surge in the use of digital media in the classroom.

- 2021 68% of teachers in Germany used digital media every day for teaching - in 2018, only 23% in Germany did so, in 2020 39%

\* Eickelmann et al. 2014: 204

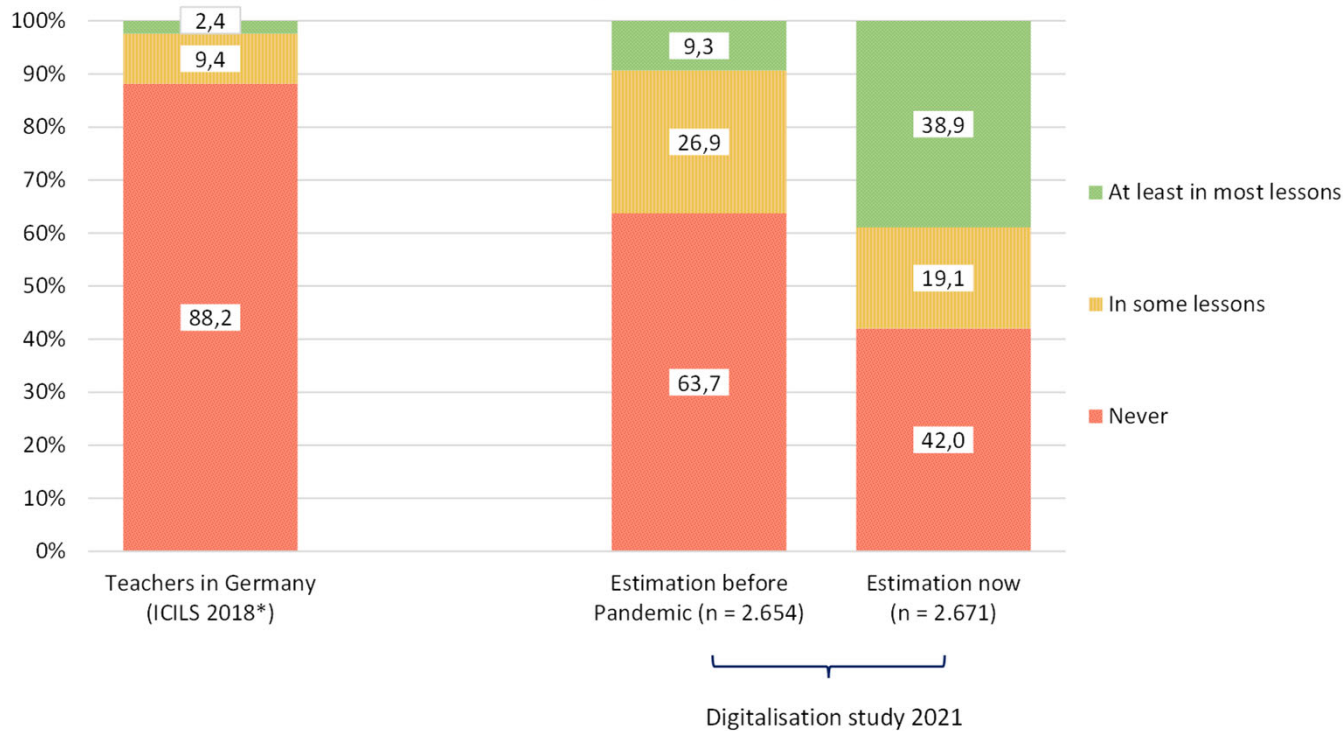
\*\* Drossel et al. 2019: 215

Instrument: ICILS (IEA, BMBF)

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## During the pandemic: significant increase in the use of learning management systems

Frequency of use of a learning management system (percentages)



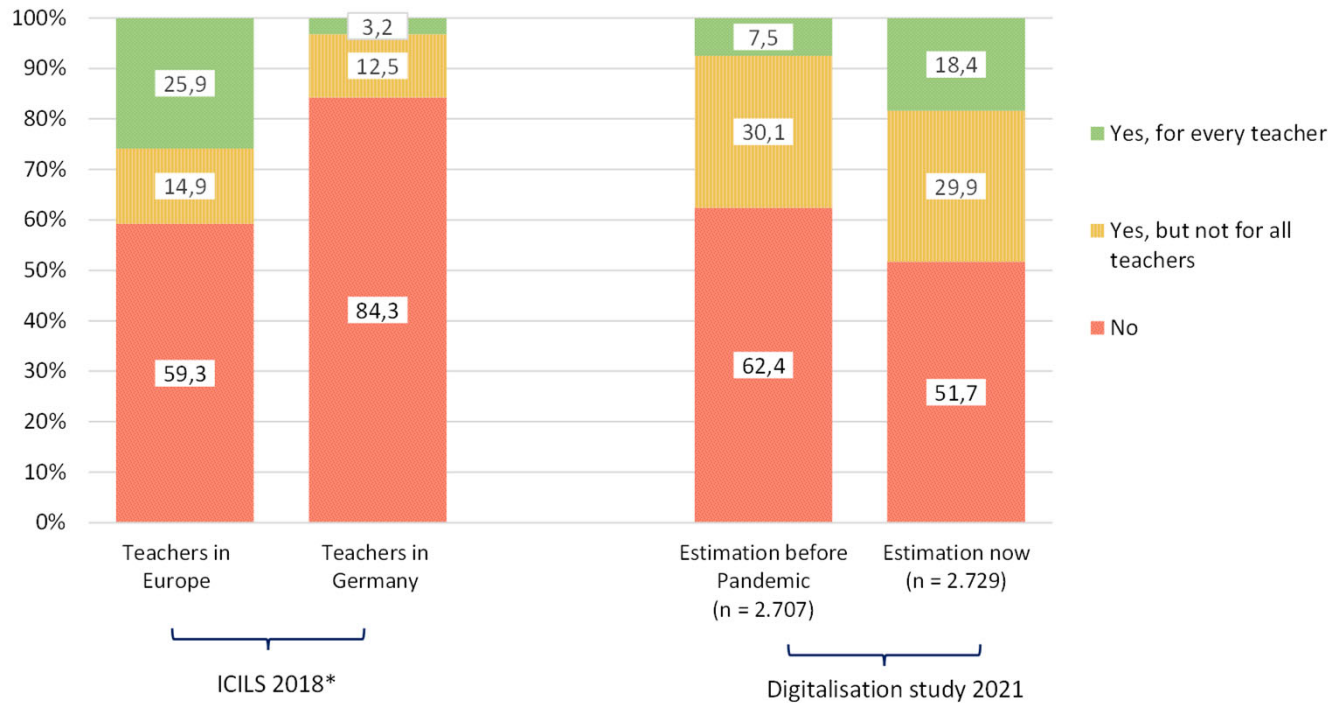
- While 2020 64% of teachers in Germany did not use a learning management system in their lessons – this share was reduced on 42 %. In 2018 it was still 88 %

\* Drossel et al. 2019: 218

Instrument: ICILS (IEA, BMBF)

## During the pandemic: Provision of digital devices for teachers

Provision of teachers with their own portable digital device (percentages)



- 2018 63% of German teachers had not been provided with a digital device, one year later this share was reduced on 52% - 2018 it was 84%.

\* Eickelmann et al. 2019: 158

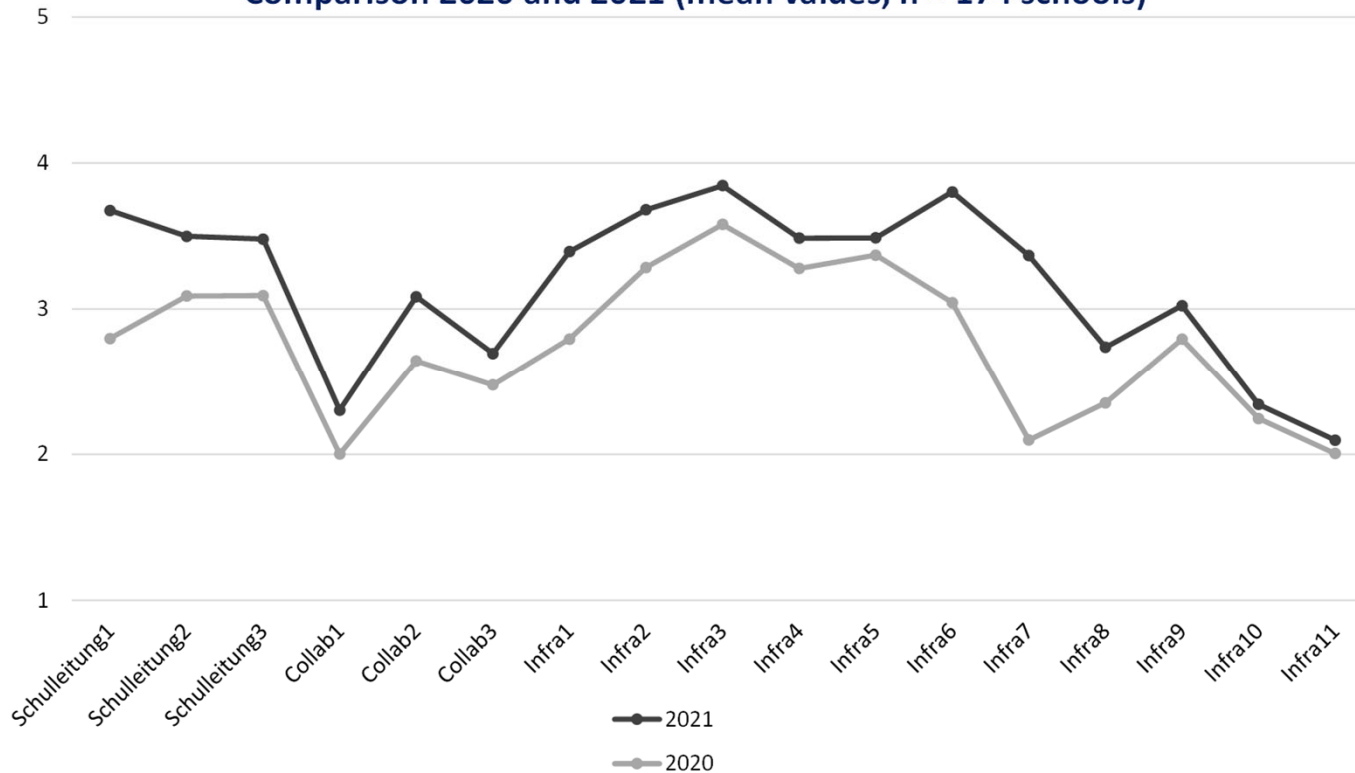
Instrument: ICILS (IEA, BMBF)

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## During the pandemic: a digitalisation surge in schools

Strategy and infrastructure items from SELFIE at school levels  
Comparison 2020 and 2021 (mean values, n = 174 schools)\*



\* = only schools with at least five participants

Instrument: SELFIE (EU-Commission)

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We have mapped the digitalisation surge across 17 items that document the digital maturity of a school. We use the European Commission's SELFIE tool for this purpose. All schools have been able to develop their digital maturity (increase in all items).

### SELFIE-Items (Examples)

Schulleitung1

- We have a digital strategy at our school.

Collab2

- At our school, we discuss the advantages and disadvantages of teaching and learning with digital technologies.

Infra1

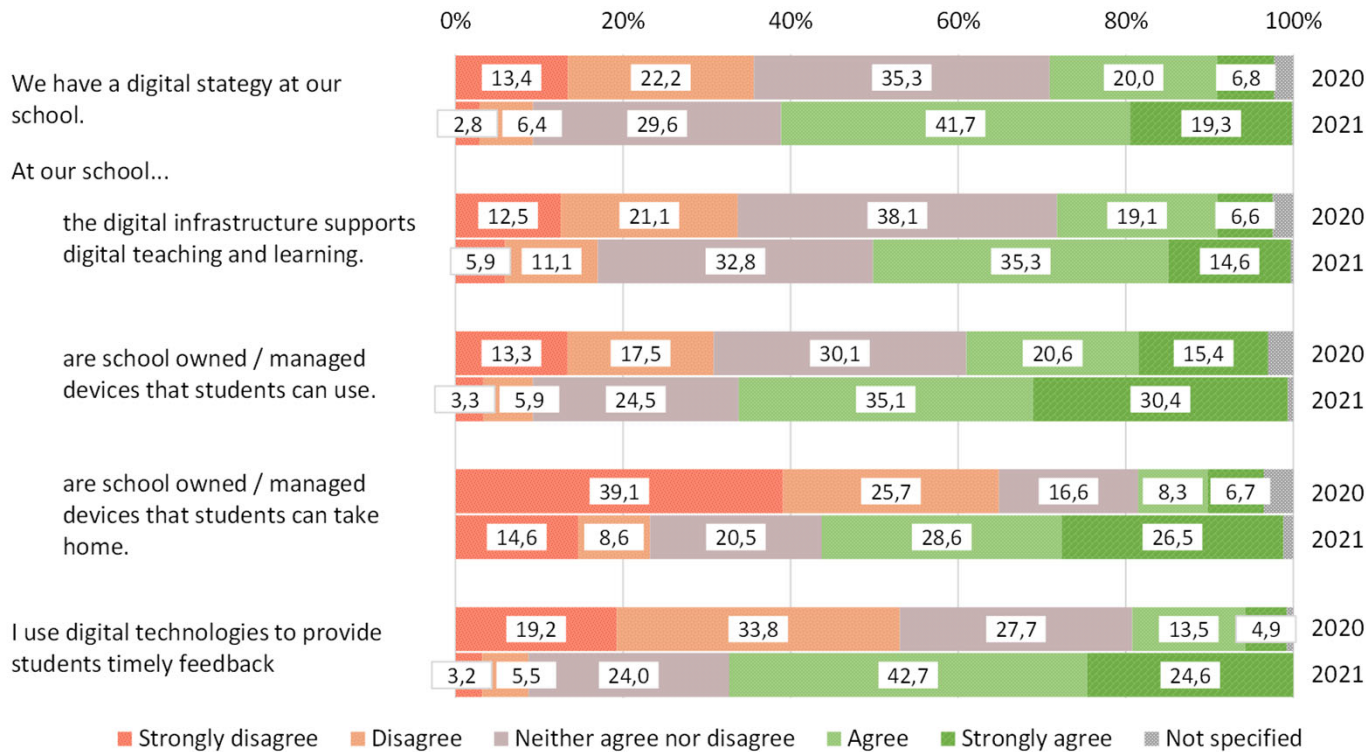
- At our school, the digital infrastructure supports teaching and learning with digital technologies

Infra 11

- At our school there are online libraries with teaching and learning materials

# Focus on safeguarding teaching during the pandemic's restrictions

**Digitalisation boost for teaching and learning at German schools  
(2020 before Pandemic and the beginning of 2021, percentages, all states, n = 2.750)**



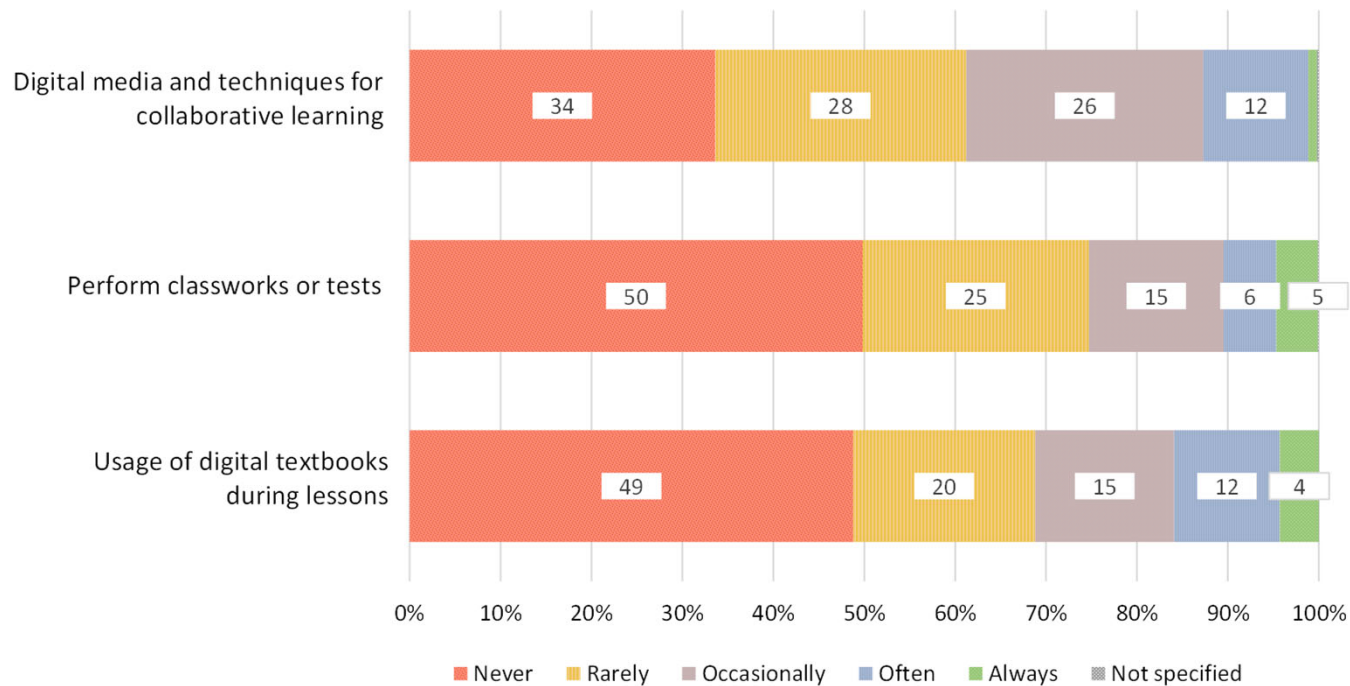
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The biggest changes concern aspects related to safeguarding teaching during the pandemic's restrictions on school operations.

- Doubling the number of teachers who have a digital school strategy from **27%** to **61%** (green bars) and who have a supporting digital infrastructure from **26%** to **50%**.
- Increase also for school-owned devices: For devices that are to be used by students from **36%** to **65%**, which can also be taken home for learning, even from **15%** to **55%**
- Nearly quadrupling the proportion of teachers providing timely digital feedback from **18%** to **68%**

# Advanced concepts of digital teaching and learning weakly developed

**Frequency of use of digital media for collaborative learning by students  
(percentages, n = 2.750)**



The crisis did not have any particular impact on the pedagogical use of digital opportunities.

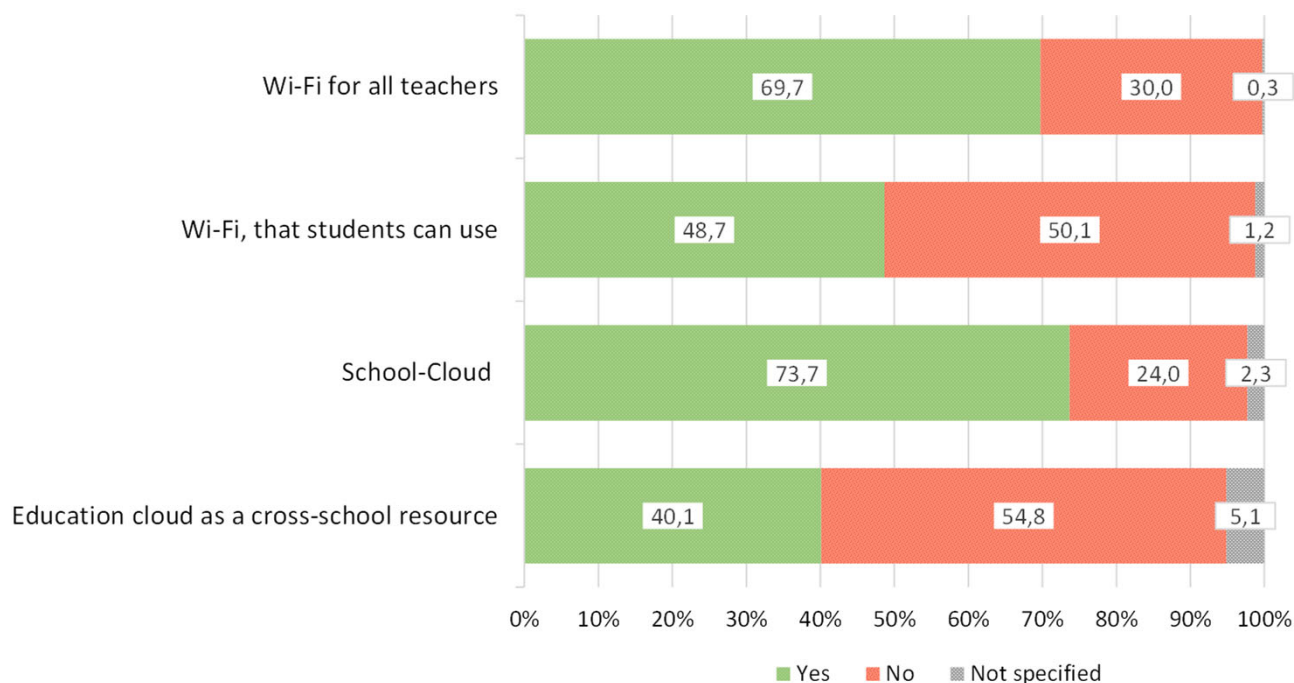
- Only a minority of **13%** of the teachers use collaborative learning forms more frequently (often/always).
- Digital classwork and tests are also rather rarely part of everyday school life: rarely/occasionally: **39%** - often/always: **10%**.
- Digital textbooks are also rarely used: rarely/occasionally: **35%** - often/always: **16%**

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Instrument: Techniques and functions (Cooperation Office )

# Despite the surge in digitalization, there are still deficiencies in the infrastructure of schools

**Digital infrastructure available at German schools  
(percentages, Begin of 2021, all states, n = 2.750)**



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Despite the surge in digitalization, there are still deficiencies in the infrastructure of schools.

- Only in 70 % of the schools do all teachers have WLAN
- Only in 49% of schools can pupils use the WLAN
- Only in 74% of schools can a school cloud be used

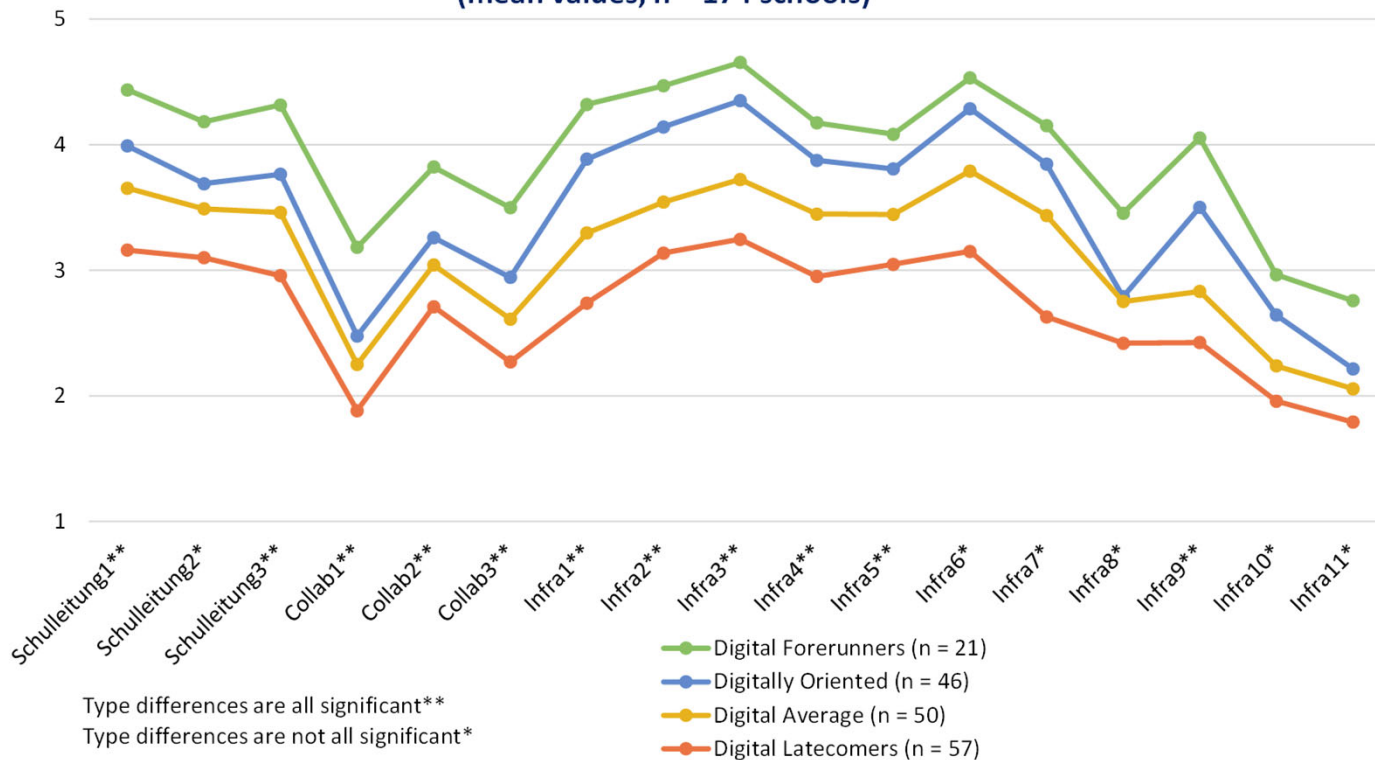
This documents that the foundations are not in place in many German schools to implement modern forms of digitally supported teaching and learning.

Instrument: Techniques and functions (Cooperation Office )

# Digital divide between Germany's schools

## Digital divide – four types of schools

Digital maturity levels of strategy and infrastructure at school levels in 2021  
(mean values, n = 174 schools)\*



\* = only schools with at least five participants

Instrument: SELFIE (EU-Kommission)

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If we use an elaborate statistical procedure (class analysis) to work out the hidden patterns in the data, we get **four different types of schools**.

- They differ in the intensity with which they were able to build a digital school strategy and a digital infrastructure for teaching and learning.
- The figure shows that the four school types differ significantly from each other in all 17 dimensions.

**12%** Digital Forerunners

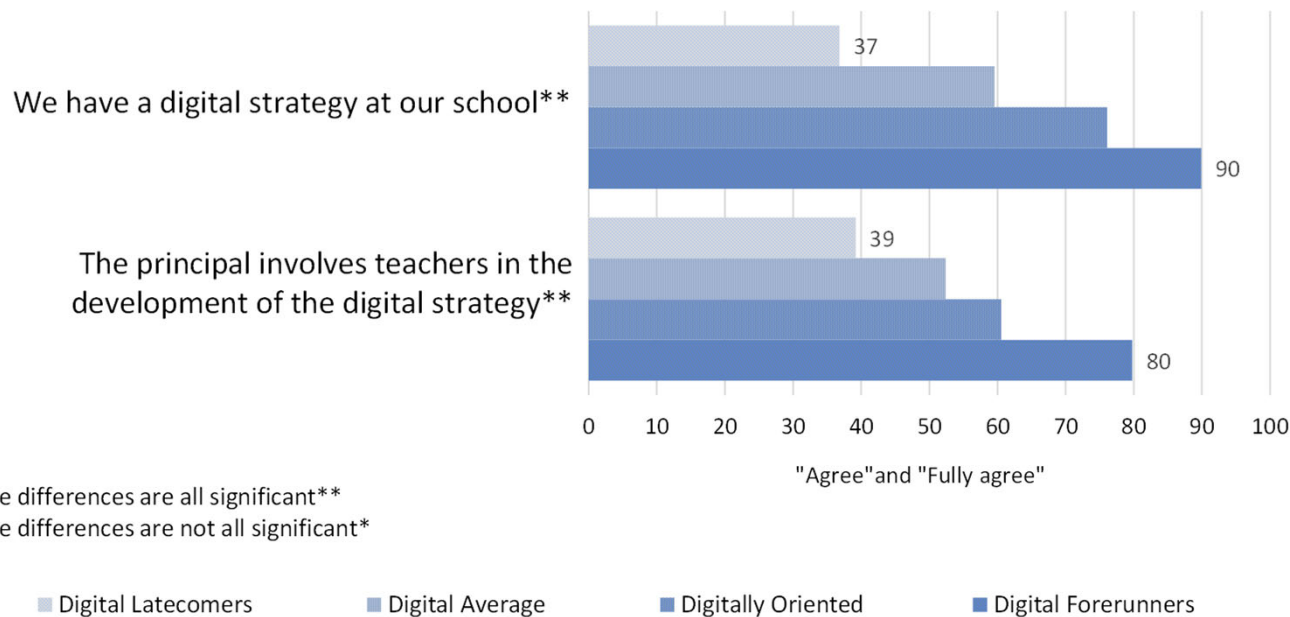
**26%** Digitally Oriented

**29%** Digital Average

**33%** Digital Latecomers

# Digital divide between schools: Digital school strategy

**Digital school strategy by school types  
with different strenghts of digital strategy and infrastructure  
(percentages, n = 2.505 to 2.620)**



Type differences are all significant\*\*  
Type differences are not all significant\*

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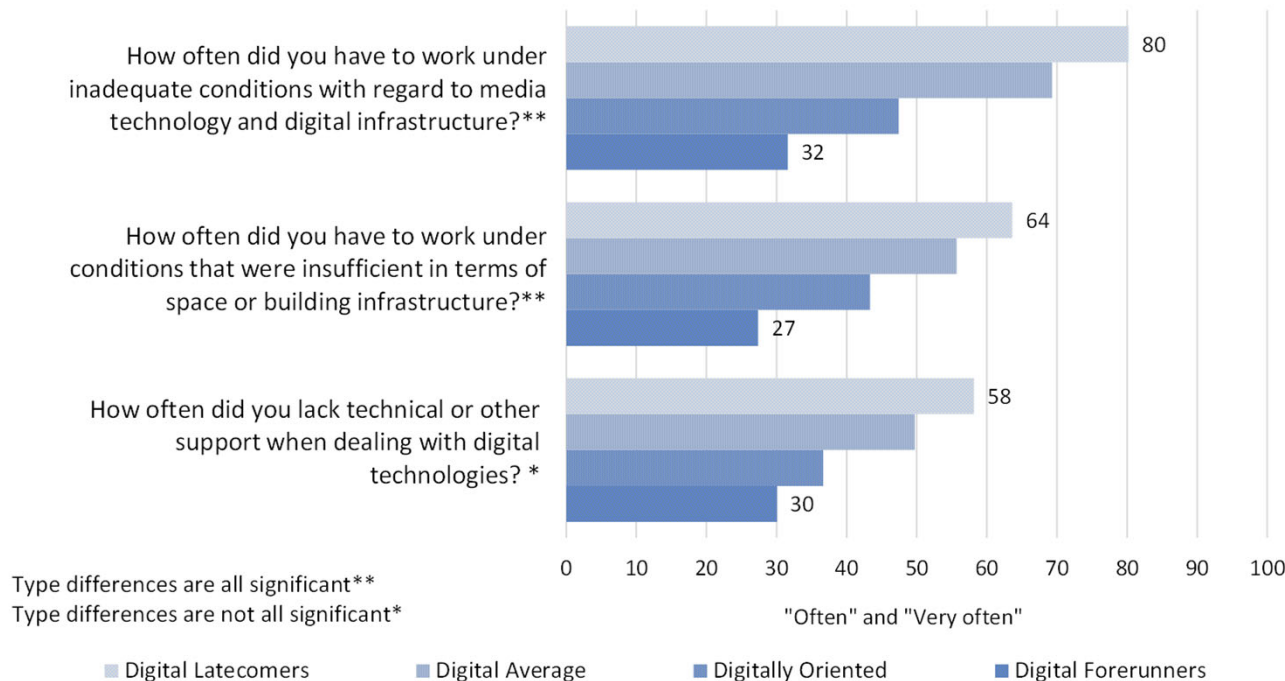
The differences between the school types are shown here as representative of the 17 dimensions. The differences are huge and they are always significant in the post hoc test of the analysis of variance.

Teachers are often not given orientation on how digital teaching and learning should be realised at their school.

- **90%** of teachers at digital forerunner schools can be guided by a digital school strategy - **37%** at Digital Latecomer schools
- **80%** are involved in the development of a digital strategy at Forerunner Schools.
- **39%** at Digital Latecomer Schools

# Digital divide between schools: There are significant limitations in technology use and support

**Obstacles to the use of digital technologies in schools with different strengths of digital strategy and infrastructure (percentages, n = 2.609 to 2.619)**



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We can show the importance of a consistent implementation of digital teaching and learning by looking at the differences in the situation of teachers in the different types of schools.

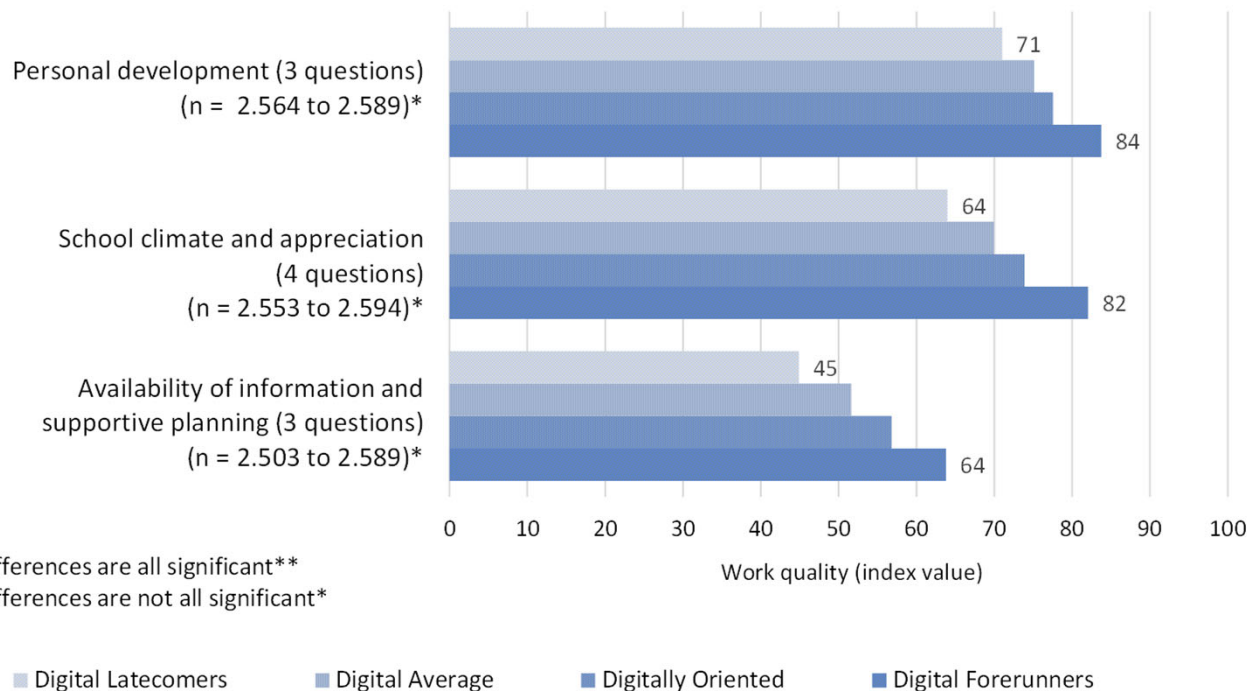
What are the consequences of these differences?

Digital divide between schools: There are significant limitations in technology use and support

- **32%** of teachers at Forerunner Schools complain about inadequacies in the digital infrastructure vs. **80%** at Digital Latecomer Schools
- **30%** lack of technical or other support in using technology v. **58%** at Digital Latecomer Schools

# Digital divide between schools: Differences in the quality of working conditions

**Quality of the working conditions of teachers in schools with different strengths of digital strategy and infrastructure (mean values)**



Type differences are all significant\*\*  
Type differences are not all significant\*

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The digital divide has consequences for the quality of teachers' working conditions (DGB Good Work Index). They rate their work situation better if their school is actively engaged in digitalisation.

The results indicate that teachers understand digitalisation

- as a contribution to personal development **+13 points**
- as an expression of appreciation and part of an open school climate **+18 points**
- as improving information and planning in their school. **+19 points**

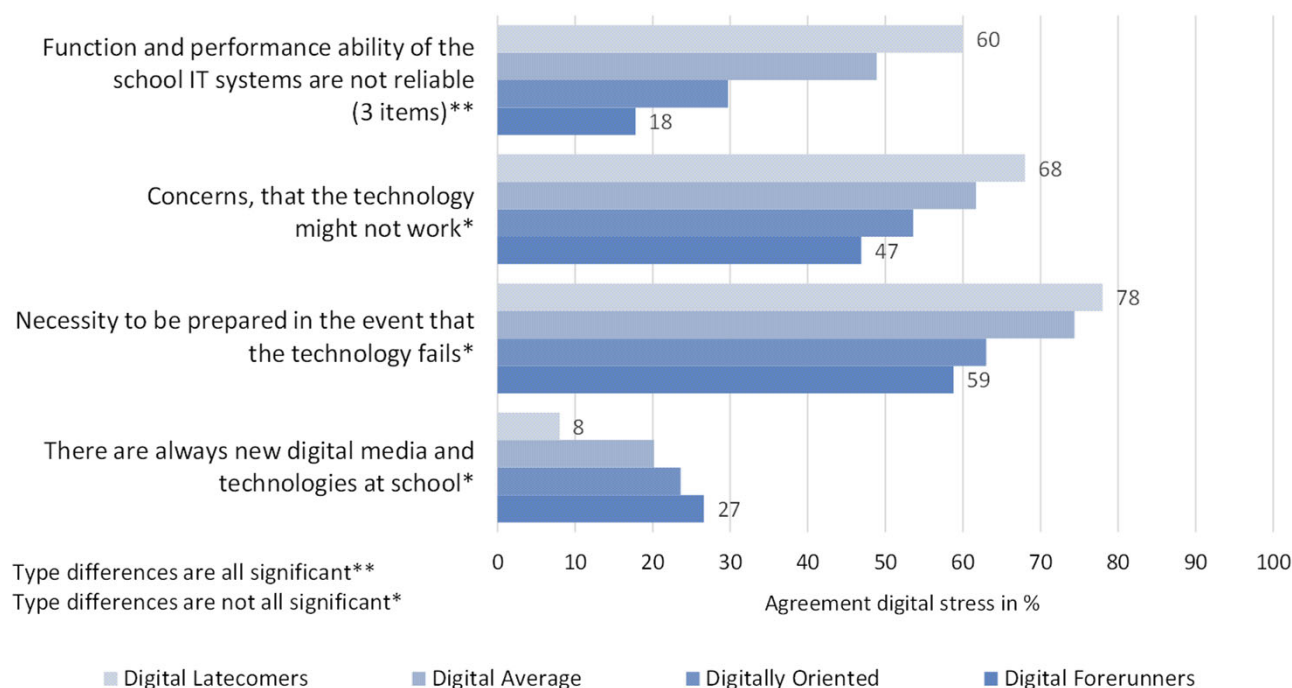
The more the schools realise digitalisation, the better the work is evaluated.



## Digital divide between schools:

The more schools realise digitalisation, the less technostress teachers have

**Aspects of digital stress in schools  
with different strenghts of digital strategy and infrastructure  
(percentages, n = 2.386 to 2.491)**



Contrary to popular belief, this also applies to technostress: the more the school realises digitalisation, the less technostress teachers experience

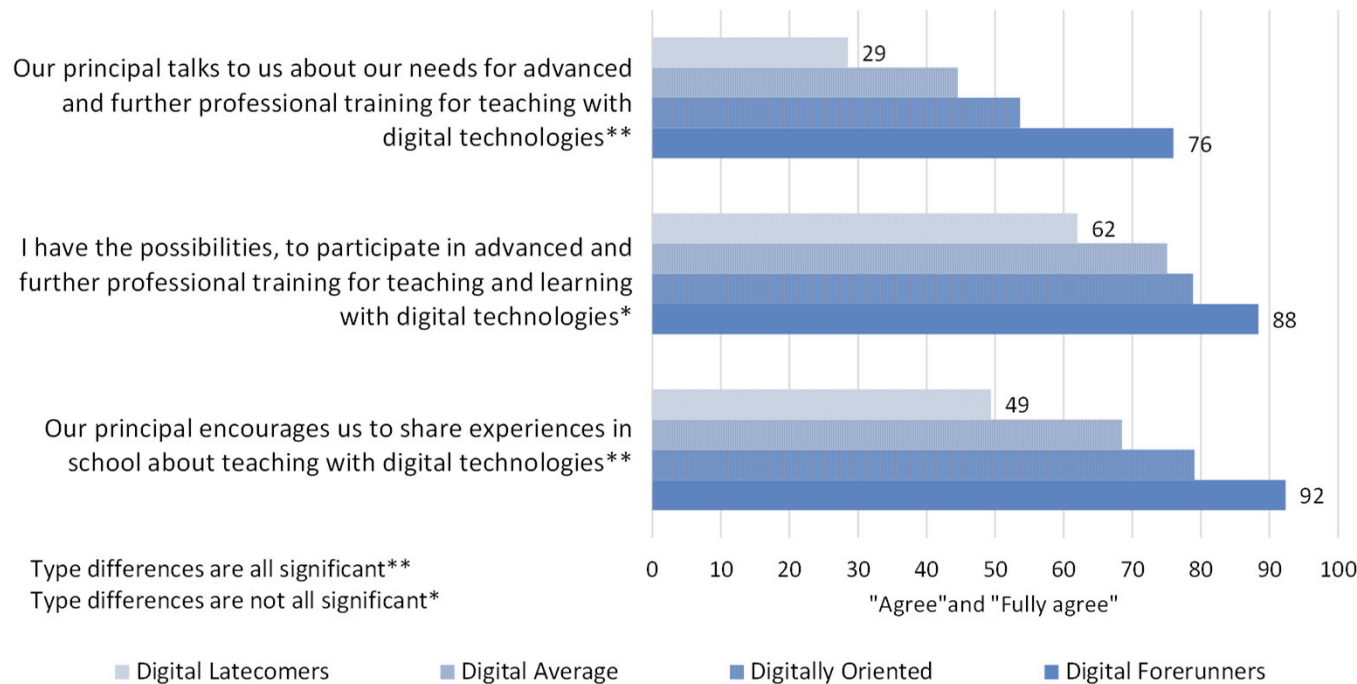
- in the case of unreliable IT systems, it is **42% less**
- on the concern of failing technology **21% less**
- the need to protect against technical failure **19% less**
- *Exception:* the insecurity caused by constantly new media and techniques rarely occurs with latecomers, but with forerunners the stress is about **19% bigger**

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Instrumente: Technostress / Digitaler Stress  
(Ragu-Nathan et al. / Ayyagari et al. / Gimpel u.a.)

# Digital divide between schools: Development of digital competences of teachers

## Further professional training for teaching with digital technologies in schools with different strengths of digital strategy and infrastructure (percentages, n = 2.604 to 2.611)



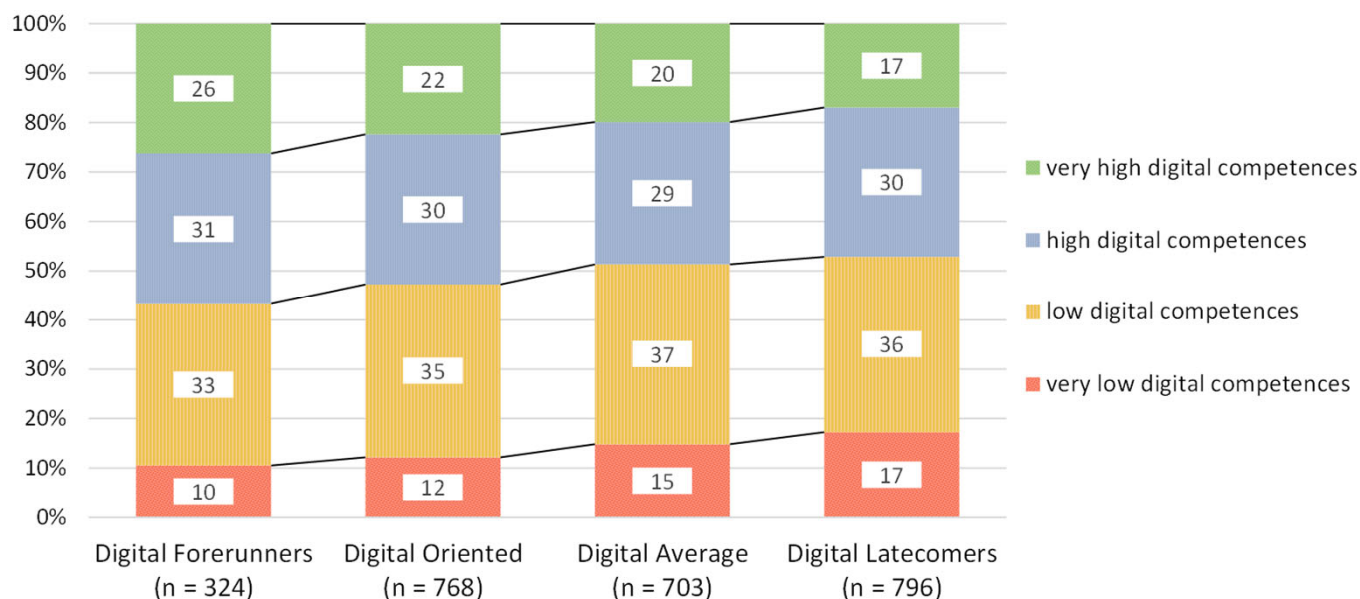
Despite increased demands on digital teaching and learning, there is often a lack of opportunities for further training and exchange of experiences within the teaching staff.

- **88%** of teachers at Forerunner Schools have the opportunity for professional development on digital teaching and learning, **62%** at Digital Latecomer Schools
- **92%** Of teachers on Forerunners Schools feel supported by their school management in exchanging experiences on digital teaching and learning.
- **49%** at Digital Latecomer Schools

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# Digital divide between schools: Better development conditions for teachers' digital competences at digital forerunner schools

**Digital competence of teachers  
in schools with different strengths of digital strategy and infrastructure  
(percentages, n = 2.591)**



Schools with a digital orientation and functioning infrastructure also seem to offer better conditions for the development of competences for digital teaching and learning.

Not only do they promote digitally affine teachers, but they can probably also better motivate teacher with weaker digital competence

- 10% of teachers at Digital Forerunner Schools rate their digital competence as low
- 17% at Digital Latecomer Schools

The mean differences between the school types are significant (with the exception of directly adjoining school types)

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Instrumente: Technostress / Digital stress  
(Ragu-Nathan et al. / Ayyagari et al. / Gimpel u.a.)

We do not know whether Germany's schools have caught up in an international comparison. Comparative data is currently lacking. But we can say on an empirical basis:

1. The pandemic-related digitization surge has led to a **significant increase on digitally supported teaching and learning** in German schools. The usage scenarios served primarily to safeguard teaching under pandemic conditions.
2. **A digital divide** has developed among secondary schools in Germany. Only 12% of schools are Digital Forerunners.
3. Teachers **at digital forerunner schools have significantly better working conditions and better professional development opportunities** than teachers at Latecomer Schools.
  - Professional advantages due to a digital school strategy and a functioning infrastructure
  - Better working conditions (personal development, school climate, information and planning)
  - Less Technostress
  - Better Opportunities to further training, learning and acquiring digital skills.
4. Also for labour policy reasons, **schools should therefore pursue a clear strategy** of digital teaching and learning
5. Research should increasingly address the question of under what conditions **organizational development can succeed in schools** that successfully implement pedagogically informed concepts of digital teaching and learning.

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- All SELFIE questions.  
[https://ec.europa.eu/education/resources-and-tools/document-library/selfie-questions\\_de](https://ec.europa.eu/education/resources-and-tools/document-library/selfie-questions_de)

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# Digitalisation in the school system 2021

## Working hours, working conditions, framework conditions and perspectives of teachers in Germany

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