AUDIT BRIEF 20 July 2021

Enabling digital learning

Report 1: 2021–22

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Speaker of the Legislative Assembly
Parliament House
BRISBANE QLD 4000

20 July 2021

This report is prepared under Part 3 Division 3 of the *Auditor-General Act 2009*.

The tabling protocols in the *Auditor-General Auditing Standards* specify that I generally do not send reports out for comment or table during a caretaker period or estimates. I planned to table this report in parliament on 20 July 2021, before the timing of the Queensland Parliament estimates hearings was changed. Day one of the estimates was brought forward from 27 July 2021 to 16 July 2021. Estimates then ceases for 11 days and the majority of hearings occur from 28 July 2021–5 August 2021.

On this occasion, I have chosen to proceed with my originally planned tabling date to ensure the information on public service delivery within this report remains timely.

Brendan Worrall
Auditor-General

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Summary

The COVID-19 pandemic accelerated progress towards a digital society. Within a few months of its arrival in Australia, schools, universities, government services, businesses and families adapted to new ways of working and staying connected. We saw a significant increase in remote working, online businesses and online education. These trends highlight the imperative of a workforce that is proficient in using digital technologies—one that can create new ways of working, learning and interacting. Innovation in using digital technologies is important for Queensland to be nationally and internationally competitive and for our continued economic wellbeing.

Using video conferencing and online learning as part of daily practice in classrooms gives students opportunities to improve their proficiency in digital technology. To offer these opportunities, the Department of Education (the department) and schools need to provide digital technologies and the supporting infrastructure in an efficient and consistent manner across the entire state. They can then embed digital literacy into daily learning practices.

The purpose of this audit brief is to share key facts about how the department is reliably connecting learners and staff of state schools to digital resources and online content. It focuses on:

- student access to the internet and devices (such as computers, laptops, and tablets)
- technology infrastructure that connects schools to the department, to the internet, and to learning and student administration systems
- required planning and investment to improve internet speeds and digital technologies.

Figure A shows the main facts about the department's technology intended to support digital learning.

Figure A
Key facts on technology to support digital learning

Student access to high-speed internet and devices

- The department's benchmark for internet speed is **25 kilobits per second (kbps)** per student. This is **well below other states** and is 200 times lower than the New South Wales benchmark.
- The department started a two-phase procurement process in July 2020 to increase internet speed in schools, and as part of the second phase it invited offers from suppliers in April 2021.
- Most students report they had access to the internet and a device during the 2020 COVID-19 lockdown (the lockdown).
- The percentage of students without access to a device and the internet during the lockdown was higher in lower socio-economic areas.
- 28 per cent of students reported receiving mainly paper-based learning materials during the lockdown.

Technology infrastructure

- The speed of the information technology network that connects the department to schools **will not be sufficient** in a few years as the demand for internet speed grows.
- The department is considering options for increasing network capacity and performance.
- Of the equipment linking schools to the department's network, 10 per cent is no longer supported by their suppliers. Over the last three years, schools have received $198 million in information technology funding, which they can use for maintaining their technology.

Planning and investment for digital learning

- The department understands its technology gaps for digital outcomes. It prepared its digital strategy and implementation plan, which had an estimated cost of $754 million over six years.
- Given the changes in technology in the market since the plan was developed (February 2020), and the current economic environment, funding was not made available to the department.
- The department has not yet revised the digital strategy to what is achievable using current technologies and within the current funding environment.

Source: Department of Education and Queensland Audit Office.

1. Recommendations

We recommend the Department of Education:

Student access to the internet and a device (computer, laptop, or tablet)
1. reviews its targets for internet speeds and actively explores new types of services to increase internet speeds in schools in order to support equitable access to digital learning
2. collaborates and shares information with the Queensland Government Chief Customer and Digital Officer to ensure the regions where schools need improved infrastructure for high-speed internet are considered in any relevant whole-of-government initiatives
3. collaborates with schools and continues to provide guidance materials and support for students' access to devices. It could review its funding model to ensure all students have access to a device
Technology infrastructure for digital learning
4. reviews its current policies for maintaining its technology infrastructure to better support digital learning outcomes in schools. New policies could include a. replacing hardware on a regular basis or with services that keep the technology up to date b. implementing processes for regular updates to software and operating systems
5. supports schools to manage their technology including a. setting clear guidelines on how schools use the funding they receive from the department for information technology b. monitoring that schools develop and fund plans for maintaining their technology
Planning for digital learning
6. reviews its: a. digital strategy, including targets for upgrading its technology infrastructure and internet speeds in schools b. portfolio of projects, with an investment plan and project delivery dates that align with the revised strategy c. monitoring processes, to enable effective delivery of the revised strategy and related projects
7. supports schools to have: a. a clear digital component in their strategic plans, which could include how they will embed digital literacy into daily learning practices and their preferred digital technologies in the contexts of their teaching and learning methods b. monitoring processes in place to enable effective delivery of their strategic plans, including the digital component.

Reference to comments

In accordance with s. 64 of the *Auditor-General Act 2009*, we provided a copy of this report to the Department of Education. In reaching our conclusions, we considered its views and represented them to the extent we deemed relevant and warranted. Any formal response from the entity is at Appendix A.

2. Introduction

Technology touches every aspect of our lives, including work, home, recreation, our environment and education. The Department of Education (the department) reports that 90 per cent of future jobs will involve digital literacy.

To prepare students for the workforce, schools introduce digital literacy from an early age, and learning is evolving to be online, self-directed, and on demand. Given the increasing use of wireless access, laptops, tablets, and mobile phones, learning no longer needs to occur within a school building or on a school day.

COVID-19 lockdowns have shown us that out-of-school access to the internet and digital learning has the potential to contribute significantly to the student learning experience. The department has identified a risk that insufficient investment in technology and workforce capability will mean that it will not be able to take full advantage of the increased use of technology that occurred during the lockdown.

Teachers also use digital technology to collaborate with colleagues and participate in professional development.

However, for this to work well, students and teachers need access to reliable, affordable internet services in the school and at home.

The objective of this audit brief is to share key facts about how the department is reliably connecting learners and staff of state schools to digital resources and online content. We have focused on three important factors that will contribute to enabling the department's digital strategy:

- student access to internet and devices (such as computers, laptops, and tablets)
- the department's technology infrastructure for connecting students and teachers to digital resources
- the department's plans and investments for continually improving internet speeds and technology so digital literacy can be embedded in schools' day-to-day learning practices.

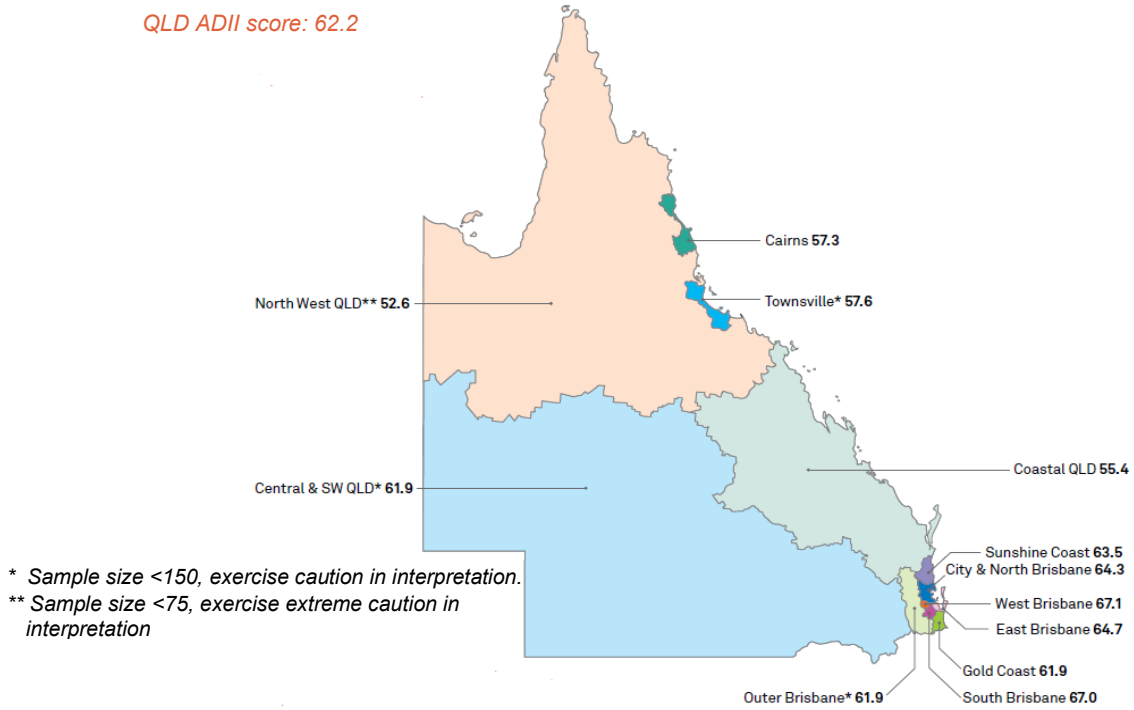
Along with the benefits, digital technologies bring risks that range from cyber-bullying to online security and privacy. These security aspects are not in the scope of this audit brief, but we have planned an audit of the effectiveness of cyber safety in schools in our forward work plan for the year 2022–23.

Australian Digital Inclusion Index for Queensland

The Australian Digital Inclusion Index (ADII) measures whether a person can access and afford online technologies and has the digital ability to connect to and use them effectively. According to the national research report: *Measuring Australia's digital divide: Australian Digital Inclusion Index 2020*, Queensland is lagging in its digital inclusion index, coming fifth out of the eight states and territories.

Figure 2A is taken from the report. The sample sizes for some areas were small, which means caution needs to be exercised in drawing across-the-board conclusions from the results. That said, this figure shows the digital inclusion score of 62.2 for Queensland, which is less than the national average of 63. The digital inclusion index of some parts of Queensland is significantly less than the national average. For example, North West Queensland has the third lowest score (52.6) in Australia.

Figure 2A
Queensland digital inclusion index by location



Note: QLD—Queensland.

Source: Measuring Australia's digital divide: Australian Digital Inclusion Index 2020.

The Queensland Government Chief Customer and Digital Officer is gathering information to assess the type and extent of investment that may be needed in the less digitally included regions of Queensland.

Queensland Government's digital readiness

Intermedium, a consultancy company that has published a digital government readiness indicator report annually since 2016, ranks Queensland as eighth out of 10 Australian and New Zealand governments.

Figure 2B shows Intermedium's rankings since 2016. The index has a maximum value of 10, and Intermedium assesses governments as being digitally ready when they gain a score of nine or higher. The Queensland Government's ranking has fallen over time. While its index has increased since 2016, each year it has been below the benchmark for being digitally ready.

Figure 2B
Digital government readiness progress: 2016–2021

Rank	July 2016	June 2017	January 2019	January 2020	January 2021
1	NSW 9.4	NSW 9.2	NSW 9.4	NSW 9.7	NSW 9.8
2	QLD 7.4	QLD 7.8	VIC 8.6	FED 9.2	FED 9.5
3	SA 7.4	FED 7.8	FED 8.6	NZ 9.2	NZ 9.4
4	VIC 7.3	VIC 7.7	QLD 8.5	VIC 8.6	ACT 8.9
5	FED 6.9	SA 7.5	SA 7.8	QLD 8.7	SA 8.6
6	WA 6.1	ACT 6.3	ACT 7.5	SA 8.5	VIC 8.5
7	ACT 5.1	WA 5.9	WA 6.8	NT 8.0	NT 8.2
8	TAS 4.8	TAS 4.8	NT 6.3	ACT 7.9	QLD 8.0
9	NT 4.1	NT 4.5	TAS 5.5	WA 7.4	TAS 7.1
10	-	-	-	TAS 7.0	WA 6.8

Note: NSW—New South Wales; QLD—Queensland; SA—South Australia; VIC—Victoria; FED—Australian Government; WA—Western Australia; ACT—Australian Capital Territory; NT—Northern Territory; NZ—New Zealand.

Source: Queensland Audit Office, using data from the 2021 Intermedium Digital Government Readiness Indicator Report.

Queensland Government's digital strategy

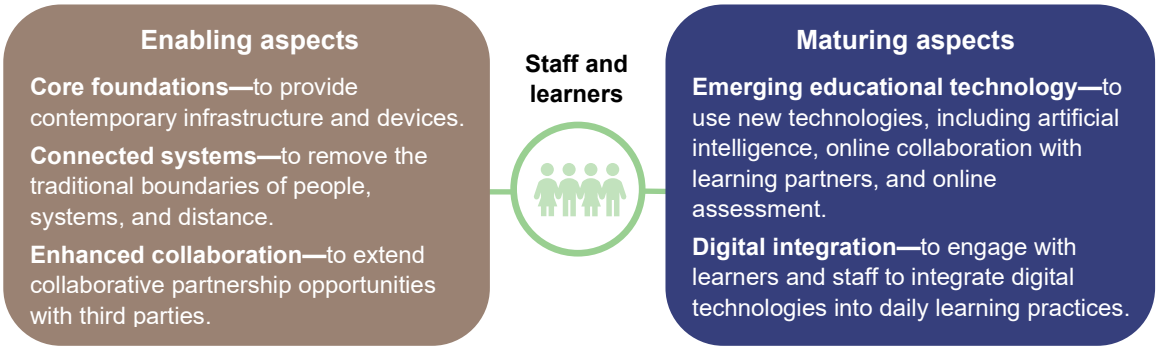
The Queensland Government's digital strategy was developed in 2017 and has never been updated. Some of the initiatives outlined within the strategy will continue to need investment to address the increasing demand on use of technology across the state.

This is consistent with the results of the Australian Digital Inclusion Index and the Intermedium readiness indicator report, which show that Queensland has not kept up the investment in technology compared with other states and territories.

Department of Education's digital strategy

The department has developed a digital strategy, with a vision of connected and engaged learners through digital technologies—now and in the future. Figure 2C is a summary of the strategy. It includes providing the technology infrastructure to support digital technologies. The department can then embed digital technologies into learning practices in schools.

Figure 2C
Department of Education—Digital strategy 2019–2023



Source: Queensland Audit Office, using information from the Department of Education.

The department developed and costed the implementation plan for this strategy. When the 2020 COVID-19 lockdown occurred, the department was in the process of seeking funding of $754 million over six years. This funding was not made available to the department due to the current economic conditions and the changes in technologies since the plan was developed.

3. Student access to the internet and a device

One of the keys to improving access to digital resources is ensuring that students can access affordable, high-speed internet and a device (such as a computer, laptop, or tablet) in school and at home. It is also a critical factor in determining which online content and applications students and teachers can use effectively.

Internet speed in schools

The target for the Department of Education (the department) for internet speed is 25 kilobits per second (kbps) per student. This is well below that of other states, as shown in Figure 3A. By comparison, the benchmark for New South Wales is 5,000 kbps per student.

- **25 kbps** per student
- New South Wales' benchmark is **200 times more**.

The department started a two-phase procurement process in July 2020 to increase internet speed in schools. As part of the second phase, it invited offers from suppliers in April 2021.

Figure 3A
Internet connection type and speed targets for state schools

State/territory	Current internet connection	Target internet speed
Queensland	83% fibre connection	25 kbps per student
New South Wales	99.99% fibre connection	5,000 kbps per student
Western Australia	97.5% fibre connection	2,000 kbps per student

Note: We have excluded Australian Capital Territory, Victoria, Northern Territory and South Australia as their targets for internet speed are on a per school basis, and are, therefore, not easy to compare with Queensland (which has targets for per student).

Source: Department of Education and Queensland Audit Office.

Most states are bringing all their schools onto a fibre connection, which enables consistent speed when sending messages online.

Internet speed for a sample of online activities

In 2012, the American State Educational Technology Directors Association (SETDA) published a report on download internet speeds for a sample of activities in schools, shown in Figure 3B.

Almost ten years on, the department's target speed of 25 kbps per student is well below the SETDA 2012 recommendations for basic online activities in schools. The lowest speed in Figure 3B is 250 kbps.

Figure 3B
SETDA recommended download speeds

Activity	Average download speed per user
Online learning	250 kbps
Email and web browsing	500 kbps
Download a 1 megabyte digital book in 5.3 seconds	1,500 kbps
High-definition quality video streaming	4,000 kbps
Skype group video session (7–10 people)	8,000 kbps

Source: The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs, a State Educational Technology Directors Association report.

Current internet speeds in schools across Queensland

While the department's benchmark for internet speed is 25 kbps per student, schools can request and pay for additional internet speed. The department considers the request based on the capacity of its technology infrastructure.

Figure 3C shows average internet speed per student (including additional speeds that schools have purchased) across the state.

98 per cent of students in Queensland state schools have access to internet speeds of **less than 250 kbps**.

As of March 2021, 98 per cent of students had internet speeds of less than 250 kbps. This is the lowest speed shown in Figure 3B for SETDA's sample of activities involving digital learning.

Figure 3C
Internet speeds in Queensland state schools as at March 2021

Internet speed	Number of school sites	Percentage of school sites	Number of Students	Percentage of students
19 to 24.9 kbps	24	1.9%	13,336	2.3%
25–49.9 kbps	392	31.2%	186,681	32.7%
50–99.9 kbps	446	35.5%	269,979	47.3%
100–249.9 kbps	198	15.8%	91,664	16.0%
250–999.9 kbps	130	10.3%	6,071	1.1%
1,000 kbps or more	67	5.3%	3,709	0.6%

Source: Queensland Audit Office using data from the Department of Education.

During the 2020 COVID-19 lockdown, the department upgraded internet speeds for 118 schools. Of these schools, 67 (57 per cent) have not retained the higher speeds, even though the service is available.

School internet speeds
↑ **118** schools upgraded during 2020 COVID-19 lockdown
↓ **67 (57 per cent)** of these schools have not retained the upgraded speeds

The fact that schools (as mentioned earlier) need to pay for the additional internet speed may be one of the reasons several have not maintained the higher internet speed.

We have included data on internet speed per student by region in Appendix C.

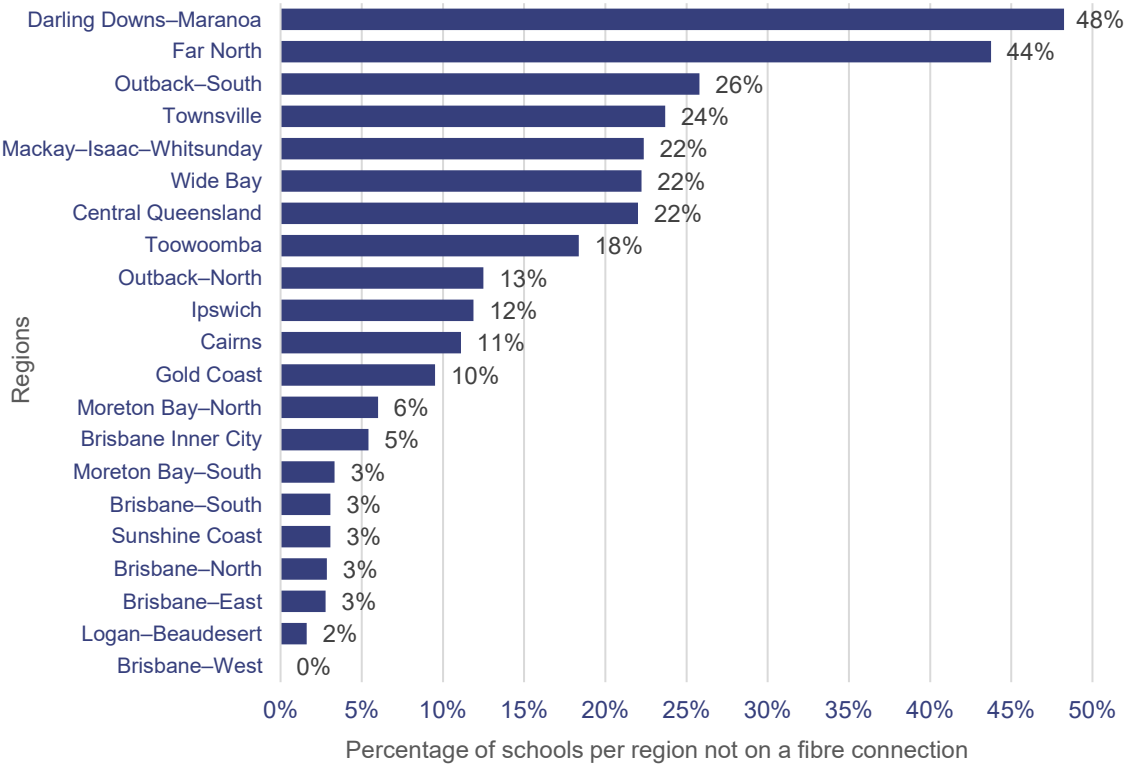
Recommendation 1

The department reviews its targets for internet speeds and actively explores new types of services to increase internet speeds in schools in order to support equitable access to digital learning.

From 2015 to 2017, the department ran a project to upgrade the internet speeds in schools from an average of eight to 25 kbps per student. The department's project closure report showed this included increasing the number of schools with fibre connections from 41 per cent to 80 per cent in 2017.

The work the department did at this time was not enough to keep up with the increasing demand on internet speed. Figure 3D shows the percentage of school sites that are currently not on fibre connections, by region.

Figure 3D
Percentage of school sites not on a fibre connection



Source: Queensland Audit Office using data from the Department of Education.

The department reports that currently, 227 out of the 1,347 state school sites are not on fibre connections. A total of 5,572 students (one per cent of all state school students) are enrolled in these schools, the majority of which are in more remote areas of the state. For example, 887 of these students (16 per cent) attend schools in the Far North region.

While the Darling Downs–Maranoa region has the highest percentage of school sites that are not on a fibre connection, its schools have a smaller number of students enrolled, with a total of 1,572 students across 55 school sites. Some have less than 10 students.

The total speed available through internet service providers is also different for some schools. As a result, their internet speed per student is variable, ranging from 32 to 12,500 kbps per student. When not on a fibre connection, they may experience a slowing down of the internet service during interactive sessions (such as video conferencing). A fibre connection is an important enabler for consistent speed when sending messages from one place to another online.

The department needs to work with the schools that are not on fibre connections to assess any impact on digital learning outcomes for students, and whether there is a need to improve infrastructure for high-speed internet.

It may be very expensive to provide some school sites with a fibre connection. A whole-of-government approach is needed to increase access to affordable high-speed internet for schools.

A **whole-of-government approach** is needed to deliver improved infrastructure and internet speed.

Recommendation 2

The department collaborates and shares information with the Queensland Government Chief Customer and Digital Officer to ensure the regions where schools need improved infrastructure for high-speed internet are considered in any relevant whole-of-government initiatives.

Student access to high-speed internet and a device at home

The department conducts annual school opinion surveys to collect the views of parents or caregivers, students, and school staff on learning and student achievement. The surveys focus on what the department and schools are doing well and where they could improve.

Last year's survey had the additional objective of reviewing the department's response to COVID-19. It included detailed questions about access to the internet, devices, and other technologies.

In this report, we have used the data on how students have responded to the survey questions to report on:

- student access to high-speed internet at home
- student access to a device.

Last year's survey was made available to students in Year 4 through to Year 12. The department's survey report states that 119,295 students responded, but that rural and remote students were under-represented in the respondents. The department reports that as of February 2020, 386,467 students were enrolled in Year 4 through to Year 12.

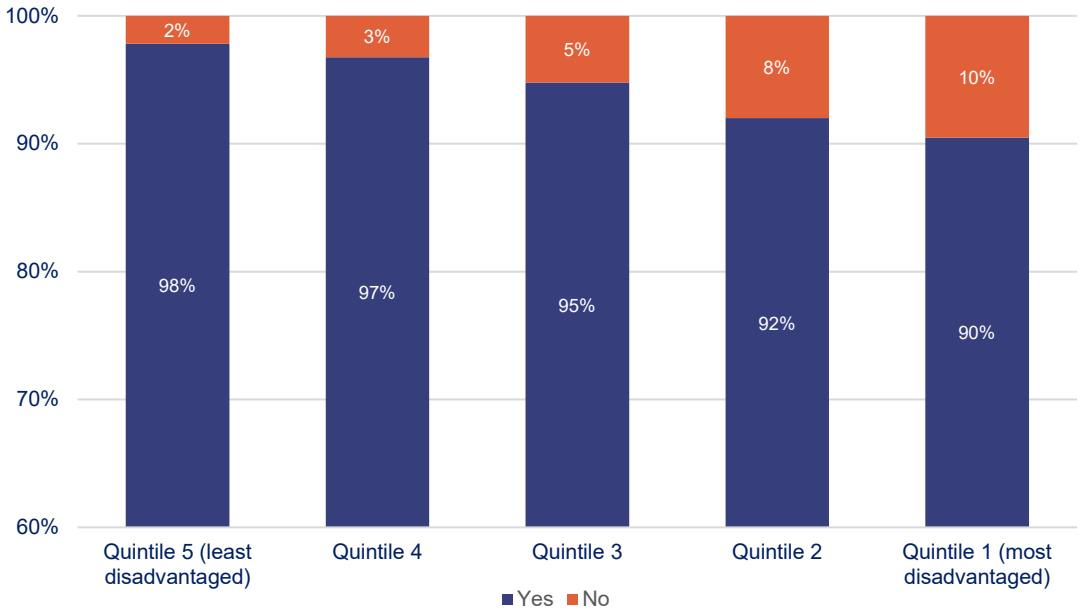
Student access to high-speed internet at home

Access to high-speed internet at home is critical for online learning and for doing homework or remote learning online. Through the department's survey, students and parents or caregivers reported that not all students have access to the internet at home. The percentage of students without internet access increases for low-income households.

Not all students have **internet access** at home.

Figure 3E shows how students responded in the department's survey on the question of whether they had access to data or the internet at home during the 2020 COVID-19 lockdown. We have presented the data according to the Australian Bureau of Statistics' categorisation of socio-economic groups (which divides them into 'quintiles'). Appendix C shows responses to this survey question by region.

Figure 3E
Student access to data or the internet—by socio-economic groups



Source: Queensland Audit Office using data from the Department of Education.

The department's survey report shows that rural and remote students were under-represented in the respondents. While we have used this data to show the trend, the actual percentage could be different if all schools were represented in the survey.

Student access to a device

Most students (92 per cent) reported that they had access to a device during the 2020 COVID-19 lockdown period.

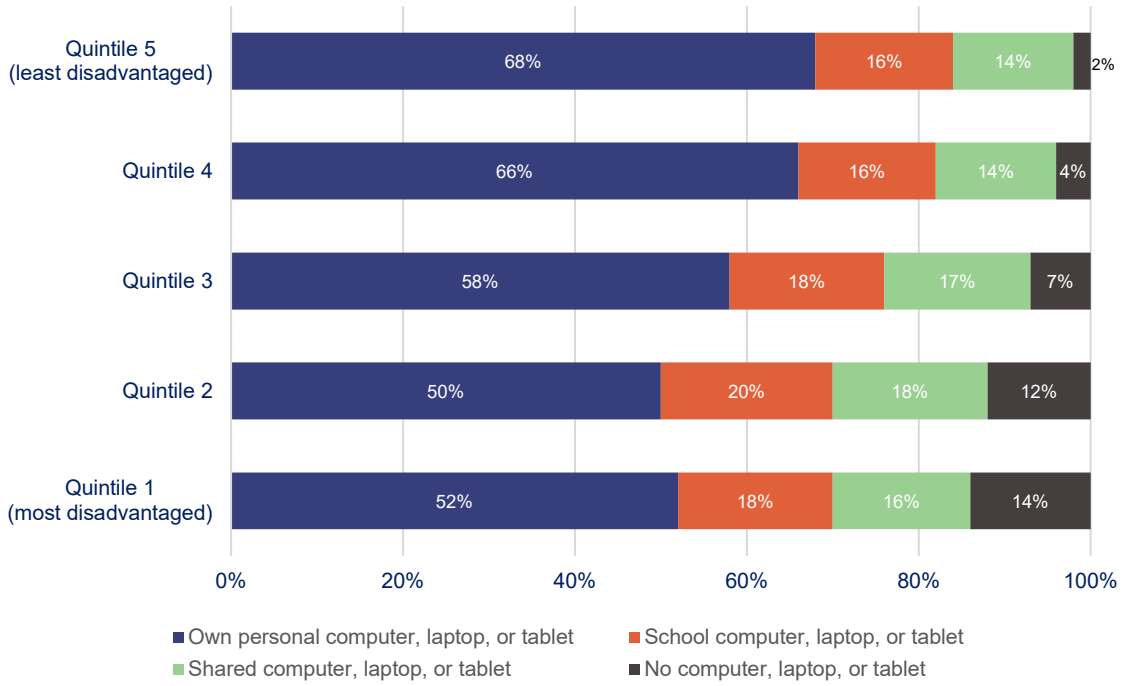
Schools achieve student access to a device in a variety of ways. These include a 'bring your own device' policy or where devices are part of a student resource scheme (a scheme run by schools that allows parents or caregivers to pay an annual amount to access learning resources). Both are influenced by a parent's or caregiver's ability to pay for the device(s).

During the 2020 COVID-19 lockdown, the department distributed around 5,200 devices to schools.

Figure 3F shows how the percentage of students who did not have access to a device changed depending on their socio-economic group.

The **percentage** of students without a device **increases in lower socio-economic groups.**

Figure 3F
Student access to a device—by socio-economic groups



Source: Queensland Audit Office using data from the Department of Education.

Fourteen per cent of students in the most disadvantaged socio-economic quintile reported that they did not have access to a device, compared to two per cent of students in the least disadvantaged socio-economic quintile.

Currently there is no funding allocated to schools specifically for providing students in low socio-economic groups with access to devices and the internet.

From the survey results, we noted that 28 per cent of students reported that they mainly received paper-based learning materials during the 2020 COVID-19 lockdown. The survey report stated this may be due to:

- reliability of access to information technology systems
- confidence of staff in the method of delivery
- inability to support all students equally without the students needing access to technology at home.

Recommendation 3
The department collaborates with schools and continues to provide guidance materials and support for students' access to devices. It could review its funding model to ensure all students have access to a device.

4. Department of Education technology infrastructure

The infrastructure with which the Department of Education (the department) provides its technology plays a crucial part in digital learning in schools.

Technology infrastructure forms the foundation for digital learning.

For digital technology to be part of normal practice in schools, the network hardware, the operating systems and the software all need to function reliably and well. Importantly, they also all need to be current versions—which means their suppliers still provide ongoing support for them.

To achieve this, the department needs to:

- plan to replace its network hardware and operating systems regularly, based on the dates on which the suppliers will end their support. Alternatively, it needs to use external suppliers that keep hardware on current versions
- update its software, at frequent intervals, keeping up with new features and updates in software security on a routine basis so they do not become outdated.

In this chapter, we provide facts on the department's infrastructure for its information technology network and software that it provides for schools.

The information technology network

The department's information technology (IT) network has around 1,347 sites and 634,000 users (students and staff) located throughout Queensland. The department and schools share responsibility for the network infrastructure, the main components of which are as follows:

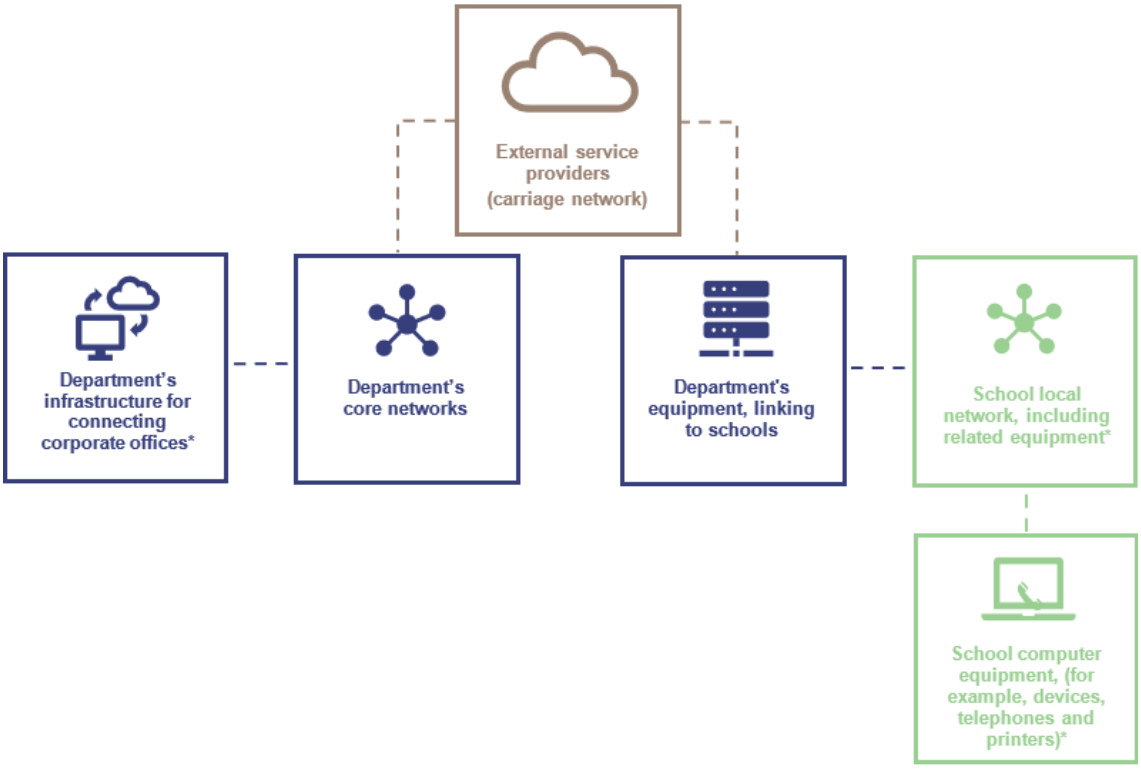
Department IT network has around:

- **1,347** sites
- **634,000** users.

- The core network is the central hub, through which regional offices and schools access the internet and business applications. The Queensland Government's information technology service provider (CITEC) hosts and supports this infrastructure for the department at an agreed fee.
- The department's core network connects to the networks for internet services (carriage network). The department has contracts with external service providers who operate and maintain the carriage networks. These also connect to local networks in schools.
- Schools are responsible for managing and supporting their own local networks. These are made up of information technology assets, for example, computers, equipment that assists in transmitting messages, cabling, and wireless access points (wi-fi). They connect the school's computer equipment, including student and staff devices, telephones, and printers.

Figure 4A provides a simple illustration of the organisation and responsibilities for these components of the information technology network.

Figure 4A
Responsibilities for state school network infrastructure



* Note: *Neither the department's infrastructure for connecting corporate offices nor the entire school local network and computer equipment are in the scope of this audit brief.*

Provided by the Department of Education
Provided by schools
External service providers

Source: Department of Education and Queensland Audit Office.

Components of the network that the department manages

The department has assessed that in its current state, its core network can support a maximum speed of 2,000 kilobits per second (kbps) per student. However, the target for internet speed for schools is 25 kbps because it is dependent on the contracts with the internet service providers and the state of technology throughout the entire network to the 'end point' (that is, staff and student devices).

The core network has several limitations. The department is considering options for addressing its capacity and performance, to improve the experience for online learning.

During the 2020 COVID-19 lockdown, the department increased its technology infrastructure, including storage, hardware, software, and licences.

COVID-19—infrastructure increased, including:
- storage
- hardware
- software
- licences.

Suppliers are currently providing regular updates for most of the department's equipment that joins the core network to the carriage network.

At present, suppliers' support has ended for only 0.4 per cent of the equipment. However, suppliers' support for 56 per cent of the equipment will end in the next two years.

The department does not have a documented operational and investment plan for replacing this network equipment. It currently replaces equipment when it fails or when the department needs to change the technology.

While this may be an acceptable policy for the technologies the department is currently using, the trend for digital technologies is to keep all aspects of the technology up to date. When parts of the technology infrastructure are not up to date, they have the potential to increase security risks and may not provide the network capacity and performance needed for digital learning.

Recommendation 4

The department reviews its current policies for maintaining its technology infrastructure to better support digital learning outcomes in schools. New policies could include:

a. replacing hardware on a regular basis or with services that keep the technology up to date

b. implementing processes for regular updates to software and operating systems.

Components of the network that third-party service providers manage

The department engages third-party service providers to deliver the internet to schools. Currently, it is assessing new technologies and considering how it can design third-party contracts to maximise internet speeds for schools.

During the 2020 COVID-19 lockdown, a third-party service provider donated around 4,300 SIM cards for the department to distribute to schools that needed them.

Components of the network that schools manage

The department's reports show that around 10 per cent of equipment linking schools to the department's network is no longer on current versions—which means that their suppliers no longer provide ongoing support. The reports also show that the quality and condition of equipment relating to school wi-fi, coverage, and service experience is variable.

There is no consistent model by which all schools plan for and maintain their technology infrastructure assets to ensure they are still supported by their suppliers. Some schools have developed plans (and budgets) to replace the equipment and saved these plans in the department's information system.

Schools that do not maintain their hardware appropriately, and do not provide access to consistently good wireless service, can have unreliable services that may not allow students and staff to connect from anywhere at any time.

$198 million in IT funding to state schools over the last three years.

State schools receive funding for implementing and maintaining information technology. Over the last three years, they have received a total of around $198 million. (Data on information technology funding by region is in Appendix C.) However, the department does not require the schools to report on how this funding is used.

Recommendation 5

The department supports schools to manage their technology including:

a. setting clear guidelines on how schools use the funding they receive from the department for information technology

b. monitoring that schools develop and fund plans for maintaining their technology.

Software the department provides for state schools

The department provides software for school and student administration, and tools for online collaboration and digital learning. The schools have a choice as to whether they use the software the department provides, except for OneSchool—which they must use.

Figure 4B shows the main department-provided software that state schools are currently using. At the time of our audit, apart from Microsoft Office 365, the software in Figure 4B was either no longer supported by their original suppliers or would have run out of support in the near future. To address this, the department has current projects to:

- enhance the student management system (OneSchool)
- replace the eLearning and content management systems (The Learning Place and Equella)
- update the operating systems (the managed operating environment)
- replace the online portal that presents information for parents (QParents).

Figure 4B
Main software the department provides for schools

Application	Functions
OneSchool	This is a student management system. Its main functions include learning and resource management, finance, and performance reporting.
The Learning Place	This is an eLearning environment that provides access to digital resources and online spaces for teaching and learning, collaboration, and networking.
Equella	This is a learning content management system for eLearning.
Microsoft Office 365	This is an office automation and collaboration platform for schools.
Managed operating environment	This provides access to the department's network and corporate systems.
QParents	This is an online portal that presents information, including student timetables, attendance records, and report cards.

Source: Department of Education and Queensland Audit Office.

During the lockdown in 2020, the department rolled out Microsoft Teams software for online meetings and for connecting with staff and students. Schools also used functions in the online learning tool (The Learning Place) for video conferencing.

Schools use other online learning applications. They decide which applications they wish to make available to students and have a process for obtaining consent from parents or caregivers.

5. Department of Education plans for technology infrastructure

The Department of Education (the department) has undertaken significant work since 2018 to assess the current information technology (IT) environment. In 2019, it developed its digital strategy, and in February 2020, it developed detailed implementation plans to bridge the gap between its existing and planned technology environments.

Implementation plans for the digital strategy

The department produced comprehensive reports in 2019 on the then current state of the technology infrastructure for the network it uses to connect schools (the core network).

These reports show that the department lacked the technology capabilities needed to meet its levels of service at that time and to fulfil future digital learning needs. Based on these reports, the department developed plans, but did not start work on them, to increase its targets for internet speed per student as shown in Figure 5A.

Figure 5A
Targets set in 2018 for internet speeds per student

Year	Per student speed target
2018	25 kbps
2019	250 kbps
2020	500 kbps
2023	1,000 kbps
2025	5,000 kbps

Source: Queensland Audit Office using the Department of Education's documents.

Instead of starting work to increase its targets for internet speed, the department developed a plan to upgrade its core network and other related technologies to support digital learning. It was also going to negotiate higher internet speeds with its major internet service provider in June 2020, when its five-year contract ended. The department is currently in the market to enter into contracts for higher internet speeds for schools.

Estimated cost of the implementation plans

The department had estimated its February 2020 implementation plan would cost around $754 million and intended to deliver the plan over six years. Around this time, the COVID-19 pandemic started. Due to economic constraints, and changes in technologies since the plan was developed, the budget was not progressed and funding was not made available.

Currently, the department is continuing with existing projects relating to digital transformation in schools, with total estimated costs of around $23 million. These are shown in Figure 5B. These projects will not be enough for the department to achieve its vision of embedding digital literacy into daily learning practices.

Figure 5B
Current projects relating to digital transformation in schools

Project	Description	Estimated costs
Internet service contracts	Procure new contracts for internet services to schools.	Currently in procurement
Digital learning project	Replace the outdated learning management system.	$8,116,662
Dynamic service broker (data exchange between applications)	Develop integration capability to enable data exchange between the OneSchool and third-party applications for use in schools.	$1,490,000
OneSchool (functional improvement)	Improve functions of the student management system (OneSchool).	$1,698,126
Managing user identities and access	Progress the department's strategies for managing computer users' identities and access to departmental systems.	$650,000
EQGlobal (international student management system)	Replace the current international student management system.	$4,968,000
School online reporting dashboard	Develop an online reporting tool for corporate reports relating to school performance.	$6,200,000

Source: Queensland Audit Office using the Department of Education's documents.

The department is progressing the projects in Figure 5B, but it has not developed:

- a revised digital strategy and expected digital learning outcomes in line with the changing technologies in the market and the current economic environment
- a revised portfolio of projects with new timelines for improving the technology (including internet speeds) to support digital learning in schools
- guidance materials and processes for supporting schools in developing and implementing their digital strategies aimed at embedding digital literacy into daily learning practices.

The department's digital strategy needs to be revised to reflect what is achievable with the new technologies, and funding that can be made available, for educating for the digital future.

Recommendation 6

The department reviews its:

a. digital strategy, including targets for upgrading its technology infrastructure and internet speeds in schools

b. portfolio of projects, with an investment plan and project delivery dates that align with the revised strategy

c. monitoring processes, to enable effective delivery of the revised strategy and related projects.

Recommendation 7

The department supports schools to have:

a. a clear digital component in their strategic plans, which could include how they will embed digital literacy into daily learning practices and their preferred digital technologies in the contexts of their teaching and learning methods

b. monitoring processes in place to enable effective delivery of their strategic plans, including the digital component.

Appendices

A. Entity responses

We gave a copy of this report with a request for comments to the Department of Education.

The head of the entity is responsible for the accuracy, fairness, and balance of its comments.

This appendix contains its detailed response.

Comments received from Director-General, Department of Education

Queensland Government

Office of the
Director-General

Department of
Education

9 JUL 2021

Mr Brendan Worrall
Auditor-General
Queensland Audit Office
Email: qao@qao.qld.gov.au

Dear Mr Worrall

Thank you for your email dated 22 June 2021 regarding the Queensland Audit Office's proposed report *Enabling digital learning*.

I welcome the opportunity to provide feedback on the findings and recommendations, prior to the report being tabled in Parliament.

The Department of Education accepts the seven recommendations in the report. Please find enclosed with this letter, the management responses to the audit recommendations.

It is pleasing to note the report acknowledges the significant work the department has undertaken since 2018 in assessing the Information Technology environment along with the development of a detailed implementation plan, which aims to address the gap between current technology infrastructure and the preferred digital learning environment.

It is important to note that Queensland has some unique challenges when providing education services to our significantly distributed population. This includes isolated school locations that are often not within the proximity of a township and its associated services.

As the report has identified, the department is currently undertaking market engagement activities with telecommunications' providers for upgraded carriage services, and continues to work with the Queensland Government Chief Customer and Digital Officer to provide high-speed internet at schools as part of the Digitally Connected Regions Project.

The department has also recently commenced the consultation phase for development of a revised Digital Strategy. The department acknowledges the need to provide clear guidance for schools on the appropriate use of targeted technology funds, and the development of strategic plans that include the role of digital pedagogies for learning and wellbeing.

Should you wish to discuss this matter further, I invite you to contact

The department looks forward to continuing to work collaboratively with the Queensland Audit Office.

Yours sincerely

TONY COOK
Director-General

Ref: 21/399857

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Responses to recommendations

Queensland Audit Office
Better public services

Department of Education

Enabling digital learning

Response to recommendations provided by Department of Education on 2 July 2021.

Recommendation	Agree/ Disagree	Timeframe for implementation (Quarter and financial year)	Additional comments
We recommend that the Department of Education: 1. reviews its targets for internet speeds and actively explores new types of services to increase internet speeds in schools in order to support equitable access to digital learning.	Agree	Q2, 21/22	The Department of Education's (DoE) proposed Network Upgrade Program is in the final stages of evaluation. DoE expects the new contractual arrangement will be in place by September 2021. DoE expects to have a basis for setting a new benchmark at the completion of this process. It is expected that any rollout of upgrades would be completed by mid-2023.
2. collaborates and shares information with the Queensland Government Chief Customer and Digital Officer to ensure the regions where schools need improved infrastructure for high-speed internet are considered in any relevant whole-of-government initiatives	Agree	Q1,21/22	DoE is currently represented on the Whole-of-Government Digitally Connected Regions Project. The DoE approach to market will result in a Standing Offer Arrangement that will be available across government to leverage economies of scale based on an aggregated government spend basis.
3. collaborates with schools and continues to provide guidance materials and support for students' access to devices. It could review its funding model to ensure all students have access to a device	Agree	Q2, 21/22	Schools currently provide access to devices in a range of ways - Bring Your Own Device (BYOD), school supplied devices and fee for service. DoE will continue to provide guidance and support materials for schools to use when making decisions about implementation models that suit their school communities.

1

Queensland Audit Office
Better public services

Recommendation	Agree/ Disagree	Timeframe for implementation (Quarter and financial year)	Additional comments
4. reviews its current policies for maintaining its technology infrastructure to better support digital learning outcomes in schools. New policies could include: a. replacing hardware on a regular basis or with services that keep the technology up to date b. implementing processes for regular updates to software and operating systems	Agree	Q3, 21/22	DoE's Information and Communication Technology (ICT) assets are risk managed and subject to proactive investment planning to ensure they are performing optimally in the delivery of frontline and corporate services, in accordance with published policies and procedures. DoE will review their policies and support on maintaining and refreshing technology infrastructure. DoE is currently upgrading the windows operating system across its environment. It is expected that DoE will be able to leverage Windows evergreen capability in early 2022. Applications listed by QAO in Figure 4B are all under current support agreements.
5. support schools to manage their technology including: a. setting clear guidelines on how schools use the funding they receive from the department for information technology b. monitoring that schools develop and fund plans for maintaining their technology.	Agree	Q1, 22/23	DoE will review the current process for IT planning and reporting in schools and guidelines for funding use. DoE will provide clear guidance for schools on the appropriate use of targeted technology funds. DoE will need to engage stakeholders in any activities that may be perceived as workload increases for schools.
6. reviews its: a. digital strategy, including targets for upgrading its technology infrastructure and internet speeds in schools b. portfolio of projects, with an investment plan and project delivery dates that align with the revised strategy c. monitoring processes, to enable effective delivery of the revised strategy and related projects	Agree	Q2, 21/22	DoE is in the process of developing a new Digital Strategy 2022–2025 and will prioritise success measures tied to modern learning, business modernisation and core foundation outcomes. Consultation on the strategy has commenced with key stakeholders.

2

Queensland Audit Office
Better public services

Recommendation	Agree/ Disagree	Timeframe for implementation (Quarter and financial year)	Additional comments
			The ICT Portfolio Prioritisation process is aligned to the current Digital Strategy and Savings and Debt Plan. This will be realigned once the new strategy has been developed.
7. supports schools to have: a. a clear digital component in their strategic plans, which could include how they will embed digital literacy into daily learning practices and their preferred digital technologies in the contexts of their teaching and learning methods b. monitoring processes in place to enable effective delivery of their strategic plans, including the digital component.	Agree	Q3 21/22	DoE is currently working on a number of recommendations from our COVID-19 review. This review highlights the need for school strategic plans to include the role of technology in the support of digital pedagogies for learning and wellbeing. Strategic Plans are operationalised by the use of Annual Implementation Plans and by the annual reporting process.

3

B. How we prepared this audit brief

Objective and scope

The objective of this audit brief is to present key facts about how the department is reliably connecting learners and staff of state schools to digital resources and online content.

We have focused on three important factors that will contribute to enabling the department's digital strategy, including:

- student access to internet and devices (such as computers, laptops, and tablets)
- the department's technology infrastructure for connecting students and teachers to digital resources
- the department's plans and investments for continually improving internet speeds and technology so that digital literacy can be embedded in schools' day-to-day learning practices.

Entity subject to the audit

Department of Education.

Our approach

We conducted the audit in accordance with the *Auditor-General of Queensland Auditing Standards*—December 2019, which incorporate the requirements of standards issued by the Australian Auditing and Assurance Standards Board.

The audit included:

- review of documents and data provided by the Department of Education
- interviews with staff from the Department of Education
- review of other jurisdictional and international benchmarks for internet speeds
- consultation with relevant Queensland Government stakeholders, for example, the Queensland Government Chief Customer and Digital Officer.

C. Data used in this report

This appendix details the following data collected for this audit brief:

- Internet speed per student (weighted median)
- Student access to the internet and a device
- Information technology funding for schools.

This data is also presented on an interactive map of Queensland regions, on the Queensland Audit Office website.

Internet speed per student by regions

In Figure C1, we have used the weighted median to represent the median internet speed a student would experience within each Queensland region. For example, the average internet speed for 50 per cent of the students in the Brisbane–East region is 83 kilobits per second (kbps) per student or less.

The weighted median was calculated by:

1. ordering each school within a region by internet speed per student from slowest to fastest
2. cumulatively adding the number of students at the schools in that order until the 50th percentile was reached (that is, the school that represented the crossing of 50 per cent of total number of students for the region). The speed per student at that school became the weighted median for the region.

Figure C1
Internet speeds by Queensland regions

Region	Internet speed kbps per student (weighted median)	Maximum kbps/student	Minimum kbps/student
Overall	**61**	**12,500**	**20**
Brisbane–East	83	159	26
Brisbane–North	56	232	22
Brisbane–South	67	3,448	21
Brisbane–West	67	162	24
Brisbane Inner City	58	397	25
Cairns	54	3,125	25
Central Queensland	55	4,167	24
Darling Downs–Maranoa	64	12,500	32
Far North	52	2,632	20
Gold Coast	60	683	23
Ipswich	60	9,372	23
Logan–Beaudesert	54	273	23
Mackay–Isaac–Whitsunday	53	2,778	22
Moreton Bay–North	62	273	23

Region	Internet speed kbps per student (weighted median)	Maximum kbps/student	Minimum kbps/student
Moreton Bay–South	66	227	27
Outback–North	38	2,907	20
Outback–South	85	2,778	46
Sunshine Coast	68	3,226	24
Toowoomba	72	12,500	24
Townsville	62	5,000	24
Wide Bay	59	4,167	21

Source: Queensland Audit Office using data from the Department of Education.

Access to the internet and a device for students

The department conducted a survey in 2020 that reviewed (among other things) its response to the 2020 COVID-19 lockdown. Through this survey, students, parents or caregivers, school principals, and teachers answered several questions about the availability and accessibility of the internet and technology.

Figure C2 shows the percentage of students who answered yes to the following questions in the survey:

- Did you/your child have data or internet access? (We have only used responses from students.)
- Did you/your child have access to a computer, laptop, or tablet? (We have only used responses from students.)

We have used these results to show student access to the internet and a device at regional levels.

Figure C2
Access to internet and a device by Queensland regions

Region	Access to internet	Access to a device				
	Did children have internet access? (% Yes)	Did children have access to a device? (% Yes) (A + B + C)	Own personal computer, laptop, or tablet (A)	School computer, laptop, or tablet (B)	Shared computer, laptop, or tablet (C)	No computer, laptop, or tablet
Overall	**94.3%**	**91.9%**	**58.7%**	**17.6%**	**15.6%**	**8.1%**
Brisbane–East	**96.0%**	**94.2%**	67.6%	14.7%	11.9%	5.8%
Brisbane–North	**96.5%**	**94.3%**	60.2%	16.8%	17.3%	5.7%
Brisbane–South	**97.9%**	**97.4%**	63.6%	23.9%	9.9%	2.6%
Brisbane–West	**98.4%**	**99.1%**	73.2%	16.2%	9.7%	1.0%
Brisbane Inner City	**98.3%**	**98.8%**	73.2%	9.5%	16.1%	1.2%
Cairns	**89.9%**	**85.1%**	52.7%	13.6%	18.8%	14.9%
Central Queensland	**91.2%**	**88.0%**	47.7%	19.8%	20.5%	12.0%
Darling Downs–Maranoa	**88.5%**	**84.2%**	40.9%	23.5%	19.8%	15.8%

Region	Access to internet	Access to a device				
	Did children have internet access? (% Yes)	Did children have access to a device? (% Yes) (A + B + C)	Own personal computer, laptop, or tablet (A)	School computer, laptop, or tablet (B)	Shared computer, laptop, or tablet (C)	No computer, laptop, or tablet
Far North	**75.3%**	**77.0%**	36.2%	29.6%	11.2%	23.0%
Gold Coast	**97.0%**	**96.7%**	65.0%	18.1%	13.6%	3.2%
Ipswich	**91.6%**	**86.9%**	45.1%	19.8%	22.0%	13.1%
Logan–Beaudesert	**93.7%**	**89.7%**	53.0%	18.3%	18.4%	10.3%
Mackay–Isaac–Whitsunday	**94.1%**	**90.3%**	57.2%	18.0%	15.1%	9.6%
Moreton Bay–North	**92.7%**	**90.2%**	54.0%	19.3%	16.9%	9.8%
Moreton Bay–South	**96.8%**	**95.6%**	72.5%	10.4%	12.7%	4.4%
Outback–North	**89.4%**	**85.1%**	39.2%	33.0%	12.9%	14.9%
Outback–South	**88.9%**	**84.8%**	26.6%	45.7%	12.5%	15.3%
Sunshine Coast	**95.5%**	**94.5%**	70.2%	10.0%	14.3%	5.5%
Toowoomba	**93.9%**	**89.0%**	53.0%	13.2%	22.8%	11.0%
Townsville	**90.8%**	**84.8%**	45.1%	21.4%	18.3%	15.2%
Wide Bay	**91.1%**	**87.7%**	53.2%	20.1%	14.4%	12.3%

Source: Queensland Audit Office using data from the Department of Education.

Information technology funding for schools

Figure C3 shows the total funding the department has provided to schools for information technology over the last three years (2018 to 2020). This funding is based on the number of students, so the higher the number of students, the higher the funding.

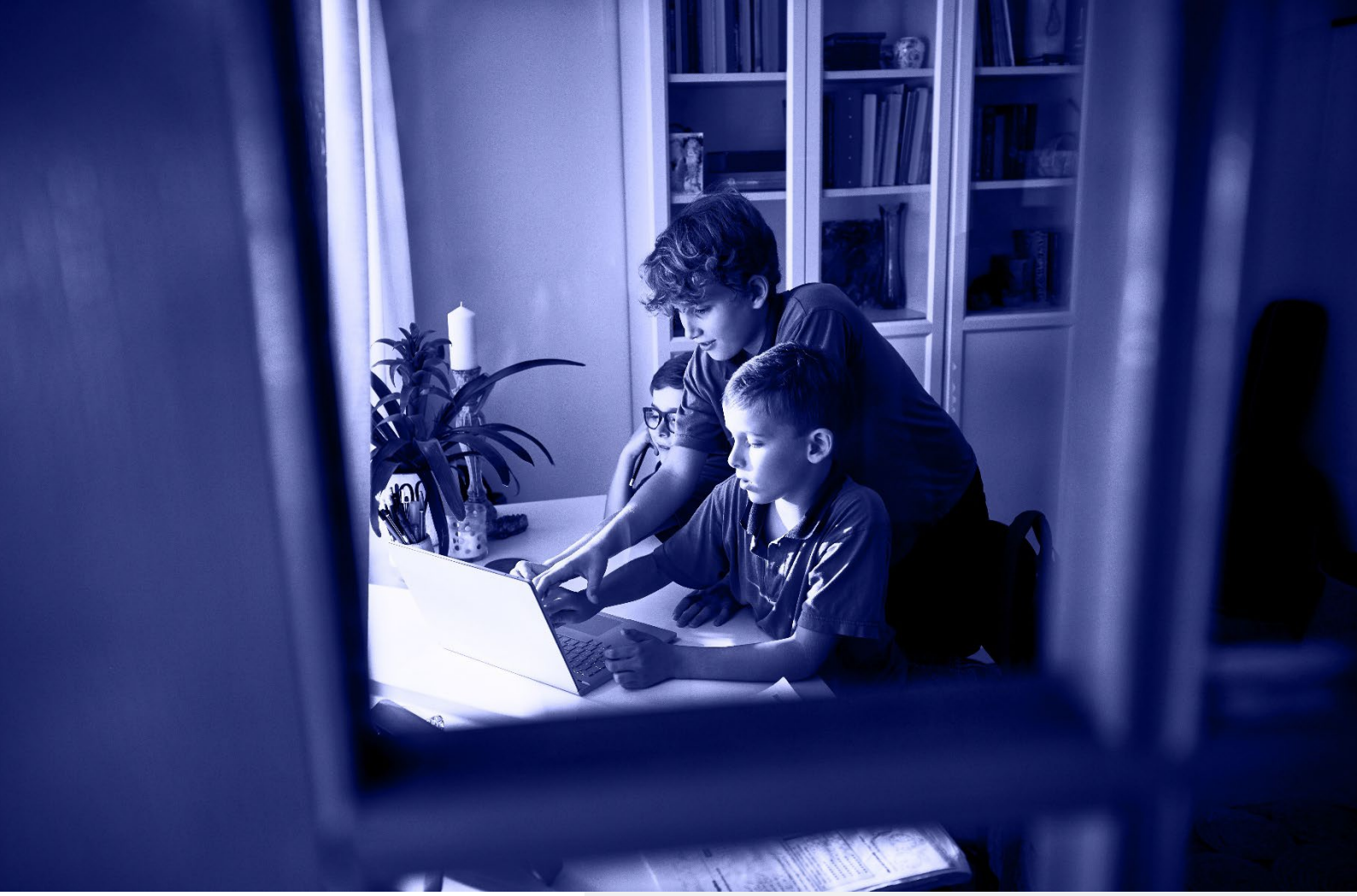
The student enrolment data is as of February 2021.

Figure C3
School information technology funding by Queensland regions

Region	Student full-time equivalent (FTE) enrolments	School information technology funding
Overall	**570,455**	**$197,679,567**
Brisbane–East	22,488	$7,720,872
Brisbane–North	19,057	$6,418,418
Brisbane–South	42,689	$14,654,921
Brisbane–West	27,091	$9,012,114
Brisbane Inner City	24,982	$8,227,188
Cairns	29,604	$10,689,745
Central Queensland	27,594	$9,951,808
Darling Downs–Maranoa	14,550	$5,960,806
Far North	4,862	$1,753,406

Region	Student full-time equivalent (FTE) enrolments	School information technology funding
Gold Coast	66,557	$22,551,960
Ipswich	46,174	$15,660,837
Logan–Beaudesert	43,456	$14,563,081
Mackay–Isaac–Whitsunday	22,691	$7,744,916
Moreton Bay–North	30,513	$10,623,156
Moreton Bay–South	25,071	$8,457,487
Outback–North	4,063	$1,455,875
Outback–South	1,809	$848,886
Sunshine Coast	42,542	$14,480,278
Toowoomba	17,780	$6,219,264
Townsville	23,427	$8,646,438
Wide Bay	33,456	$12,038,111

Source: Queensland Audit Office using data from the Department of Education.



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