

The background of the image is a top-down view of a desk. On the left, a portion of a silver laptop is visible, showing its keyboard. In the center, a tablet is open, displaying a webpage with various images and text. To the right of the tablet is a white spiral-bound notebook with a pair of black-rimmed glasses resting on its surface. The entire scene is overlaid with a semi-transparent light blue filter. The text is contained within a white, rounded rectangular box in the upper left quadrant.

Appendix A:
Instruments to assess
availability and use of
technology for learning

A1: Student survey

Section A: Access to technology

1 **Are any of the following available at your home and/or school?** *[Select all that apply.]* Source: PISA 2018; Question(s): IC001Q01TA-IC001Q11TA and IC009Q01TA- IC009Q11TA [adapted]

	AT HOME	AT SCHOOL
a) Desktop computer	<input type="checkbox"/>	<input type="checkbox"/>
b) Laptop or notebook	<input type="checkbox"/>	<input type="checkbox"/>
c) Tablet (e.g., iPad)	<input type="checkbox"/>	<input type="checkbox"/>
d) Games console (e.g., PlayStation)	<input type="checkbox"/>	<input type="checkbox"/>
e) Printer	<input type="checkbox"/>	<input type="checkbox"/>
f) e-Reader (e.g., Kindle)	<input type="checkbox"/>	<input type="checkbox"/>
g) Internet	<input type="checkbox"/>	<input type="checkbox"/>

2 **Do you own a cell phone?** *[Select all that apply.]* Source: PISA 2018; Question(s): IC001Q01TA-IC001Q11TA and IC009Q01TA-IC009Q11TA [adapted]

- a) Yes, without Internet and data
- b) Yes, with Internet (but no data)
- c) Yes, with data (but no Internet)
- d) Yes, with Internet and data

Section B: Use of technology

- 3 **During the past week (from last Monday to last Friday), for how long did you use the following AT SCHOOL?** *[Select one option per row.]* Source: PISA 2018; Question(s): IC005Q01TA01-IC005Q01TA07

	NO TIME	1-30 MINUTES PER DAY	31-60 MINUTES PER DAY	1-2 HOURS PER DAY	2-4 HOURS PER DAY	4 HOURS OR MORE PER DAY
a) Desktop computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Laptop or notebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Tablet (e.g., iPad)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 4 **During the past week (from last Monday to last Friday), in which subject(s) did you use a desktop computer, laptop, or tablet AT SCHOOL?** *[Select all that apply.]* Source: PISA 2018; Question(s): IC151Q01HA-IC151Q09HA [adapted]

	I DO NOT STUDY THIS SUBJECT	NEITHER THE TEACHER NOR THE STUDENTS	ONLY THE TEACHER	ONLY THE STUDENTS	BOTH THE TEACHER AND THE STUDENTS
a) Language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Math	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Natural sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Social sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Foreign language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 5 **During the past week (from last Monday to last Friday), in which subject(s) did you use a desktop computer, laptop, or tablet OUTSIDE OF SCHOOL?** *[Select all that apply.]* Source: PISA 2018; Question(s): IC151Q01HA-IC151Q09HA [adapted]

	I DO NOT STUDY THIS SUBJECT	NEITHER THE TEACHER NOR THE STUDENTS	ONLY THE TEACHER	ONLY THE STUDENTS	BOTH THE TEACHER AND THE STUDENTS
a) Language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Math	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Natural sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Social sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Foreign language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 6 **During the past week (from last Monday to last Friday), for how long did you use the following OUTSIDE OF SCHOOL?** *[Select one option per row.]* Source: PISA 2018; Question(s): IC006Q01TA01-IC006Q01TA07

	NO TIME	1-30 MINUTES PER DAY	31-60 MINUTES PER DAY	1-2 HOURS PER DAY	2-4 HOURS PER DAY	4 HOURS OR MORE PER DAY
a) Desktop computer	<input type="checkbox"/>					
b) Laptop or notebook	<input type="checkbox"/>					
c) Tablet (e.g., iPad)	<input type="checkbox"/>					
d) Internet	<input type="checkbox"/>					

7 **During the past weekend (from last Saturday to last Sunday), for how long did you use the following OUTSIDE OF SCHOOL?** [Select one option per row.]

Source: PISA 2018; Question(s): IC007Q01TA01-IC007Q01TA07

	NO TIME	1-30 MINUTES PER DAY	31-60 MINUTES PER DAY	1-2 HOURS PER DAY	2-4 HOURS PER DAY	4 HOURS OR MORE PER DAY
a) Desktop computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Laptop or notebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Tablet (e.g., iPad)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8 **How often do you use any of the following?** [Select one option per row.] Source:

PISA 2003; Question(s): IC05Q01-IC05Q12 [adapted]

	ALMOST EVERY DAY	A FEW TIMES A WEEK	BETWEEN ONCE A WEEK AND ONCE A MONTH	LESS THAN ONCE A MONTH	NEVER
a) The Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Word processing software (e.g., Microsoft Word)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Spreadsheets (e.g., Microsoft Excel)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Educational software (e.g., encyclopedia)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Games software, website, or platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Music player (e.g., Spotify, Apple Music)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) E-mail (e.g., Gmail, Microsoft Outlook)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9

- | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| h) Video streaming platforms (e.g., Netflix, YouTube) | <input type="checkbox"/> |
| i) Programming/coding software (e.g., Python) | <input type="checkbox"/> |

Do you use the Internet for any of the following SCHOOL RELATED purposes?

[Select all that apply.] Source: TIMSS; Question(s): Student survey, Q14 [adapted]

- a) Access the textbook or other course materials.
- b) Access assignments posted online by my teacher.
- c) Collaborate with classmates on assignments or projects.
- d) Communicate with the teacher.
- e) Find information, articles, or tutorials to aid in understanding of academic subjects (e.g., math, language, natural and social sciences).

Section C: Purposes for technology

10 **How often do you use the Internet for any of the following purposes?** *[Select all that apply.]* Source: PISA 2003; Question(s): IC05Q01-IC05Q12 [adapted]

	ALMOST EVERY DAY	A FEW TIMES A WEEK	BETWEEN ONCE A WEEK AND ONCE A MONTH	LESS THAN ONCE A MONTH	NEVER
a) Look up information about people, things, or ideas (e.g., Google)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Download software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Collaborate with others on a project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Play games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Play videos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Play music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Social media (e.g., Facebook, Instagram)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section D: Experience and ease of use

- 11 **How old were you when you first used the following?** *[Select one option per row.]* Source: PISA 2018; Question(s): IC002Q01HA06-IC002Q01NA05 [adapted]

	NEVER	3 YEARS OLD OR YOUNGER	4-6 YEARS OLD	7-9 YEARS OLD	10-12 YEARS OLD	13 YEARS OR OLDER
a) Desktop computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Laptop or notebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Tablet (e.g., iPad)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 12 **How well can you do each of the following tasks on a computer?** *[Select all that apply.]* Source: PISA 2003; Question(s): ICo6Q01-ICo6Q23 [adapted]

	I CAN DO THIS BY MYSELF	I CAN DO THIS WITH HELP FROM SOMEONE	I KNOW WHAT IT MEANS BUT CANNOT DO IT	I DON'T KNOW WHAT IT MEANS
a) Open a program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Open a file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Create a new file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Copy-paste a file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Copy-paste text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Print a file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Save a file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13

Have you done any of the following to find out about future study or types of work? *[Select all that apply.]* Source: PISA 2018; Question(s): EC150Q01WA-EC150Q10WA [adapted]

	YES	NO, NEVER
a) I researched the Internet for information about colleges	<input type="checkbox"/>	<input type="checkbox"/>
b) I researched the Internet for information about jobs	<input type="checkbox"/>	<input type="checkbox"/>

A2: Teacher survey

Section A: Access to technology

1 **Are any of the following available at your school, classroom, and/or home?**
[Select all that apply.] Source: PISA 2018; Question(s): IC001Q01TA-IC001Q11TA
 and IC009Q01TA- IC009Q11TA [adapted]

	IN MY SCHOOL	IN MY CLASSROOM	IN MY HOME
a) a. Desktop computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) b. Laptop or notebook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) c. Tablet (e.g., iPad)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) d. Printer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) e. e-Reader (e.g., Kindle)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) f. Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2 **Do you own a cell phone?** *[Select all that apply.]* Source: PISA 2018;
 Question(s): IC001Q01TA-IC001Q11TA and IC009Q01TA-IC009Q11TA [adapted]

- a) Yes, without Internet and data
- b) Yes, with Internet (but no data)
- c) Yes, with data (but no Internet)
- d) Yes, with Internet and data

3 **Do the students in your class have access to computers (desktop or laptop)?**
[Select one option per row.] Source: TIMSS 2015; Question(s): TC169Q01HA-
 TC169Q14HA [adapted]

	YES	NO
a) Each student has a computer	<input type="checkbox"/>	<input type="checkbox"/>
b) The class has computers that students can share	<input type="checkbox"/>	<input type="checkbox"/>
c) The school has computers that the class can use sometimes	<input type="checkbox"/>	<input type="checkbox"/>

Section B: Use of technology

4 **How often are you involved in the following activities?** [Select one option per row.] Source: PISA 2018; Question(s): TC176Q01HA-TC176Q07HA [adapted]

	I DON'T KNOW WHAT IT IS	NEVER OR ALMOST NEVER	SEVERAL TIMES A MONTH	SEVERAL TIMES A WEEK	SEVERAL TIMES A DAY
a) Exchanging e-mails	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Exchanging messages (e.g., SMS, WhatsApp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Reading online news	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Searching information online to learn about a topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Taking part in online group discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Searching practical information online (e.g., schedules, events)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section C: Purposes for technology

- 5 **During the last month, did you ask your students to use digital devices (desktop computers, laptops or notebooks, tablets, or cell phones) for any of the following purposes?** *[Select one option per row.]* Source: PISA 2018; Question(s): TC168Q01HA- TC168Q12HA [adapted]

	YES	NO
a) Searching for subject-related information online	<input type="checkbox"/>	<input type="checkbox"/>
a) Working on extended projects (i.e., over several weeks)	<input type="checkbox"/>	<input type="checkbox"/>
b) Working on short assignments (i.e., within a week)	<input type="checkbox"/>	<input type="checkbox"/>
c) Working at their individual pace	<input type="checkbox"/>	<input type="checkbox"/>
d) Working on individualized material	<input type="checkbox"/>	<input type="checkbox"/>
e) Planning a sequence of learning activities for themselves	<input type="checkbox"/>	<input type="checkbox"/>
f) Submitting homework or classwork	<input type="checkbox"/>	<input type="checkbox"/>
g) Practicing or drilling	<input type="checkbox"/>	<input type="checkbox"/>
h) Coordinating schoolwork with other students	<input type="checkbox"/>	<input type="checkbox"/>
i) Following up on missed lessons or material	<input type="checkbox"/>	<input type="checkbox"/>
j) Reading texts electronically instead of paper versions	<input type="checkbox"/>	<input type="checkbox"/>
k) Writing a text such as a blog or wiki	<input type="checkbox"/>	<input type="checkbox"/>

- 6 **How often did you use the following tools in your teaching this school year?** *[Select one option per row.]* Source: PISA 2018; Question(s): TC169Q01HA- TC169Q14HA [adapted]

	NEVER	IN SOME LESSONS	IN MOST LESSONS	IN EVERY OR ALMOST EVERY LESSON
a) Tutorial software or practice program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Digital learning games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Word-processing software (e.g., Microsoft Word)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

d) Presentation software (e.g., Microsoft PowerPoint)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Spreadsheets (e.g., Microsoft Excel)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Multimedia production tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Social media (e.g., Facebook, Instagram)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Communications (e.g., e-mail, blogs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Computer-based information resources (e.g., websites, wikis, encyclopedia)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Graphing or drawing software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Software for assessing student learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7 **In your lessons, have you taught any of the following?** [Select one option per row.] Source: PISA 2018; Question(s): TC166Q01HA-TC166Q07HA [adapted]

	YES	NO
a) How to use keywords when using a search engine (e.g., Google)	<input type="checkbox"/>	<input type="checkbox"/>
b) How to decide whether to trust information from the Internet	<input type="checkbox"/>	<input type="checkbox"/>
c) How to compare different web pages and decide what information is more relevant for students' work	<input type="checkbox"/>	<input type="checkbox"/>
d) To understand the consequences of making information publicly available on social media (e.g., Facebook, Instagram)	<input type="checkbox"/>	<input type="checkbox"/>
e) How to use the short description below the links in the list of results of a search	<input type="checkbox"/>	<input type="checkbox"/>
f) How to detect whether the information is subjective or biased	<input type="checkbox"/>	<input type="checkbox"/>
g) How to detect phishing or spam e-mails	<input type="checkbox"/>	<input type="checkbox"/>

Section D: Experience and ease of use

- 8 **In the past year, have you participated in professional development in integrating information technology into instruction?** *[Select one option.]*
Source: TIMSS 2015; Question(s): Teacher survey, Q24-Q25 [adapted]
- a) No
 - b) Yes, for less than 6 hours
 - c) Yes, for 6-15 hours
 - d) Yes, for 16-35 hours
 - e) Yes, for more than 35 hours
- 9 **To what degree do you need further professional development in integrating information technology into instruction?** *[Select one option.]* Source: PISA 2018; Question(s): TC185Q05HA [adapted]
- a) No need at present
 - b) Low level of need
 - c) Moderate level of need
 - d) High level of need

Section E: Challenges to technology adoption

- 10 **In your current school, how severe is each of the following problems?** *[Select one option per row.]* Source: TIMSS 2015; Question(s): Teacher survey, Q8 [adapted]

	NOT A PROBLEM	MINOR PROBLEM	MODERATE PROBLEM	SERIOUS PROBLEM
a) Computers need significant repair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Teachers do not have a space to use computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Students do not have a space to use computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Software installed is outdated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Internet access is unreliable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A3: Principal survey

Section A: Access to technology

- 1 **Are any of the following available at your home and/or school?** *[Select all that apply.]* Source: PISA 2018; Question(s): IC001Q01TA-IC001Q11TA and IC009Q01TA- IC009Q11TA [adapted]

	IN MY HOME	IN MY CHOOOL
a) Desktop computer	<input type="checkbox"/>	<input type="checkbox"/>
b) Laptop or notebook	<input type="checkbox"/>	<input type="checkbox"/>
c) Tablet (e.g., iPad)	<input type="checkbox"/>	<input type="checkbox"/>
d) Printer	<input type="checkbox"/>	<input type="checkbox"/>
e) e-Reader (e.g., Kindle)	<input type="checkbox"/>	<input type="checkbox"/>
f) Internet	<input type="checkbox"/>	<input type="checkbox"/>

- 2 **Do you own a cell phone?** *[Select all that apply.]* Source: PISA 2018; Question(s): IC001Q01TA-IC001Q11TA and IC009Q01TA-IC009Q11TA [adapted]

- a) Yes, without Internet and data
- b) Yes, with Internet (but no data)
- c) Yes, with data (but no Internet)
- d) Yes, with Internet and data

3

The goal of the following set of questions is to gather information about the student-computer ratio for students in grade 10 at your school. [Enter a number for each response. Enter “0” (zero) if there are none.] Source: PISA 2018; Question(s): SC004Q01TA- SC004Q07TA [adapted]

	NUMBER
a) At your school, what is the total number of students in grade 10?	<input type="text"/>
b) Approximately, how many desktop computers are available for these students for educational purposes?	<input type="text"/>
c) Approximately, how many of these computers are connected to the Internet?	<input type="text"/>
d) Approximately, how many laptop computers or notebooks are available for these students for educational purposes?	<input type="text"/>
e) Approximately, how many tablets are available for these students for educational purposes?	<input type="text"/>
f) Approximately, how many interactive whiteboards are available in this school altogether?	<input type="text"/>
g) Approximately, how many data projectors are available in the school altogether?	<input type="text"/>
h) Approximately, how many computers with internet connection are available for teachers in your school?	<input type="text"/>

Section B: Challenges to technology adoption

- 4 **To what extent do you agree with the following statements about your school's capacity to enhance learning and teaching using digital devices?**
[Select one option per row.] Source: PISA 2018; Question(s): SC155Q01HA-SC155Q11HA [adapted]

	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE
a) The number of digital devices connected to the Internet is insufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) The school's Internet bandwidth or speed is insufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) The number of digital devices for instruction is sufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Digital devices at the school have sufficient computing capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) The availability of adequate software is sufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Teachers have sufficient time to prepare lessons integrating digital devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Effective professional resources for teachers to learn how to use digital devices are available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Teachers are provided with incentives to integrate digital devices in their teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) The school has sufficient qualified technical assistant staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5

Does your school have any of the following? *[Select one option per row.]*

Source: PISA 2018; Question(s): SC156Q01HA-SC156Q08HA [adapted]

	YES	NO
a) Its own written statement about the use of digital devices	<input type="checkbox"/>	<input type="checkbox"/>
b) Its own written statement specifically about the use of digital devices for pedagogical purposes	<input type="checkbox"/>	<input type="checkbox"/>
c) A program to use digital devices for teaching and learning in specific subjects	<input type="checkbox"/>	<input type="checkbox"/>
d) Regular discussions with teaching staff about the use of digital devices for pedagogical purposes	<input type="checkbox"/>	<input type="checkbox"/>
e) A specific program to prepare students for responsible Internet behavior	<input type="checkbox"/>	<input type="checkbox"/>
f) A specific policy about using social networks (e.g., Facebook) in teaching and learning	<input type="checkbox"/>	<input type="checkbox"/>
g) A specific program to promote collaboration on the use of digital devices among teachers	<input type="checkbox"/>	<input type="checkbox"/>
h) h. Scheduled time for teachers to meet to share, evaluate or develop instructional materials and approaches that employ digital devices	<input type="checkbox"/>	<input type="checkbox"/>