How are students using digital technologies for learning?

Practising subject-specific skills

92% of teachers say this happens often or sometimes

5% say it doesn't happen, but they'd like it to

Researching using the internet

80% of teachers say this happens often or sometimes

13% say it doesn't happen, but they'd like it to

Creating documents or slideshow presentations

70% of teachers say this happens often or sometimes

20% say it doesn't happen, but they'd like it to

Is digital technology being used in other ways?

Creating multimedia

56% of teachers say this happens often or sometimes

35% would like this to happen

Playing games or simulations

55% of teachers say this happens often or sometimes

15% would like this to happen

Collect or analyse data

41% of teachers say this happens often or sometimes

38% would like this to happen

Code and/or program

19% of teachers say this happens often or sometimes

43% would like this to happen

Students are also using technology to:

collaborate within school on shared learning projects

47% of teachers say this happens often or sometimes

41% would like this to happen

maintain a record of goals and learning achievements

36% of teachers say this happens often or sometimes

41% would like this to happen

collaborate with people beyond the school

14% of teachers say this happens often or sometimes

65% would like this to happen

communicate with people beyond the school

36% of teachers say this happens often or sometimes

53% would like this to happen

share evidence of learning progress and achievements in public online communities

29% of teachers say this happens often or sometimes

28% would like this to happen

share evidence of learning progress and achievements in private online communities

34% of teachers say this happens often or sometimes

45% would like this to happen

2

How are students using digital technologies for learning?

One way to understand the evolving role of digital technologies in New Zealand schools is to investigate how students currently use digital technologies in the classroom to learn, create, and share their work, and communicate, connect, and collaborate with people within and beyond their schools, and how this is changing over time. Variations of these questions have been asked in each iteration of the national survey since 2007, allowing for comparisons over time.

We also asked some new questions to find out about activities involving digital technology that are often touted as relevant for 21st century learning. These include coding, programming, gaming and simulations, and makerspaces.[8] We were interested in whether these kinds of activities, if they happened in schools, might be happening outside class time, and/or be optional activities for students, rather than part of everyday classroom learning and teaching. We asked about who plays a significant role in running these sorts of activities—for example, school leaders, teachers, library staff, students, parents or community members, or someone else.

This section reports findings in relation to these questions. We discuss what teachers said their students were currently doing with digital technologies, what teachers said they would *like* to happen in their classrooms, and to what extent additional opportunities such as coding, gaming, and makerspace activities are available to students within primary schools. It is important to note that this general picture of student use of digital technologies for learning is based on information provided by teachers, not from students themselves.

8 A TKI page about makerspaces describes them as "collaborative workshops where young people gain practical hands-on experience with new technologies and innovative processes to design and build projects". A makerspace does not need to be a specially-designed space. It "can be any space in a school where students and teachers come together to create, invent, prototype, design, tinker, explore, discover, code, build, craft, draft, draw and more". For more information, see http://elearning.tki.org.nz/Teaching/Innovative-learning-environments/Makerspaces

Digital technologies for learning in the classroom

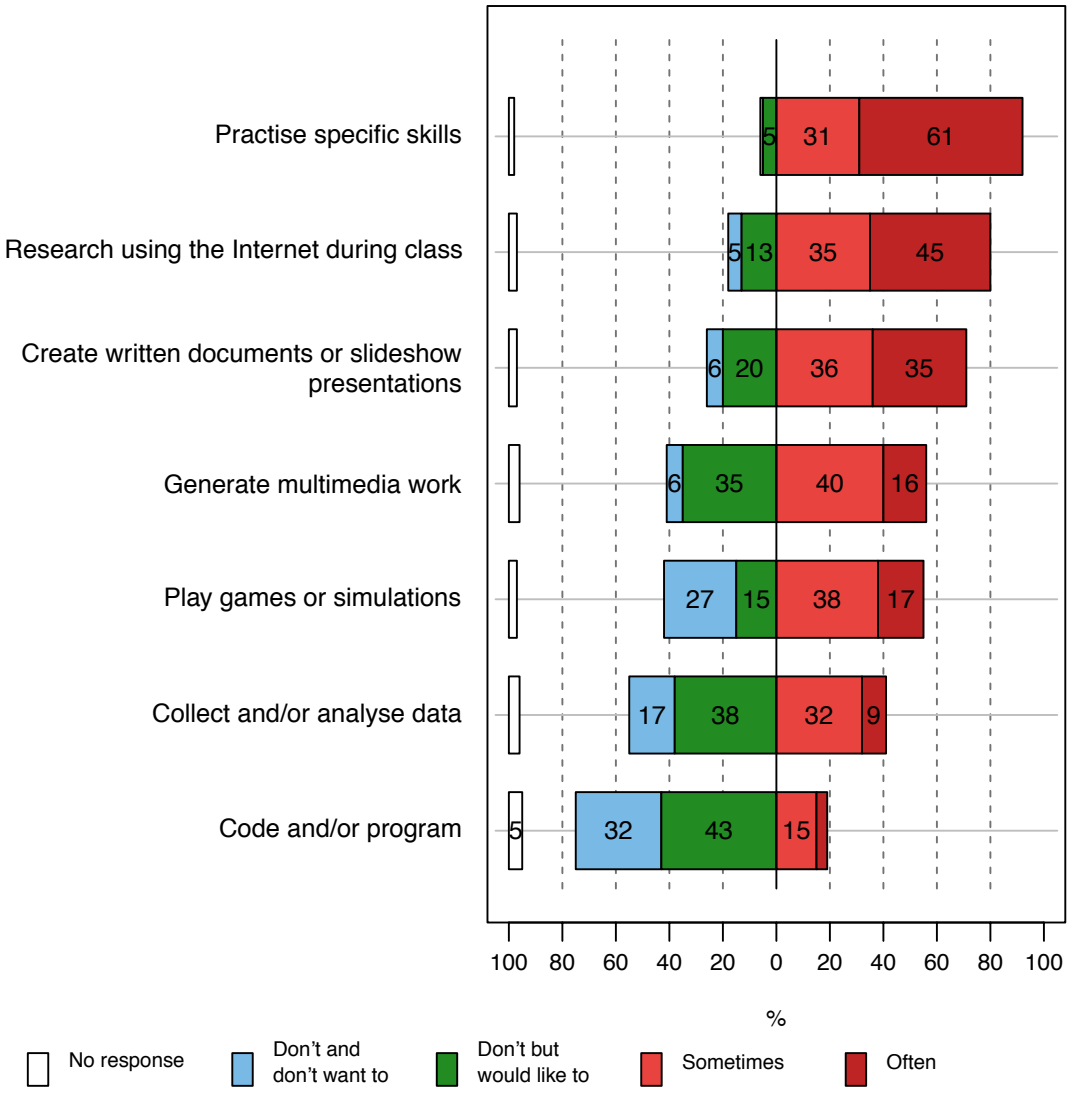
We asked teachers to respond to a set of statements to indicate different ways their students might currently use digital technologies in the classroom. Teachers could indicate whether these things happened often or sometimes, or if a particular practice wasn't currently happening, teachers could indicate whether or not they would *like* this to be happening.

Using digital technologies to learn, create, and produce work

As shown in Figure 1, the three most common ways students were using digital technologies for their school work were to practise subject-specific skills (reported as happening often or sometimes by 92% of teachers), research using the internet (80% often or sometimes), and creating written documents or slideshow presentations (71%).

Just over half said their students often or sometimes used digital technologies to generate multimedia work (including images, music, movies, animation), or to play games or simulations. Less than half of the teachers said students used digital technology to collect and/or analyse data, and less than a fifth of teachers said students use digital technology to code or program.

FIGURE 1 **Student use of digital technology to learn, create, and produce work, reported by teachers (n = 771)**



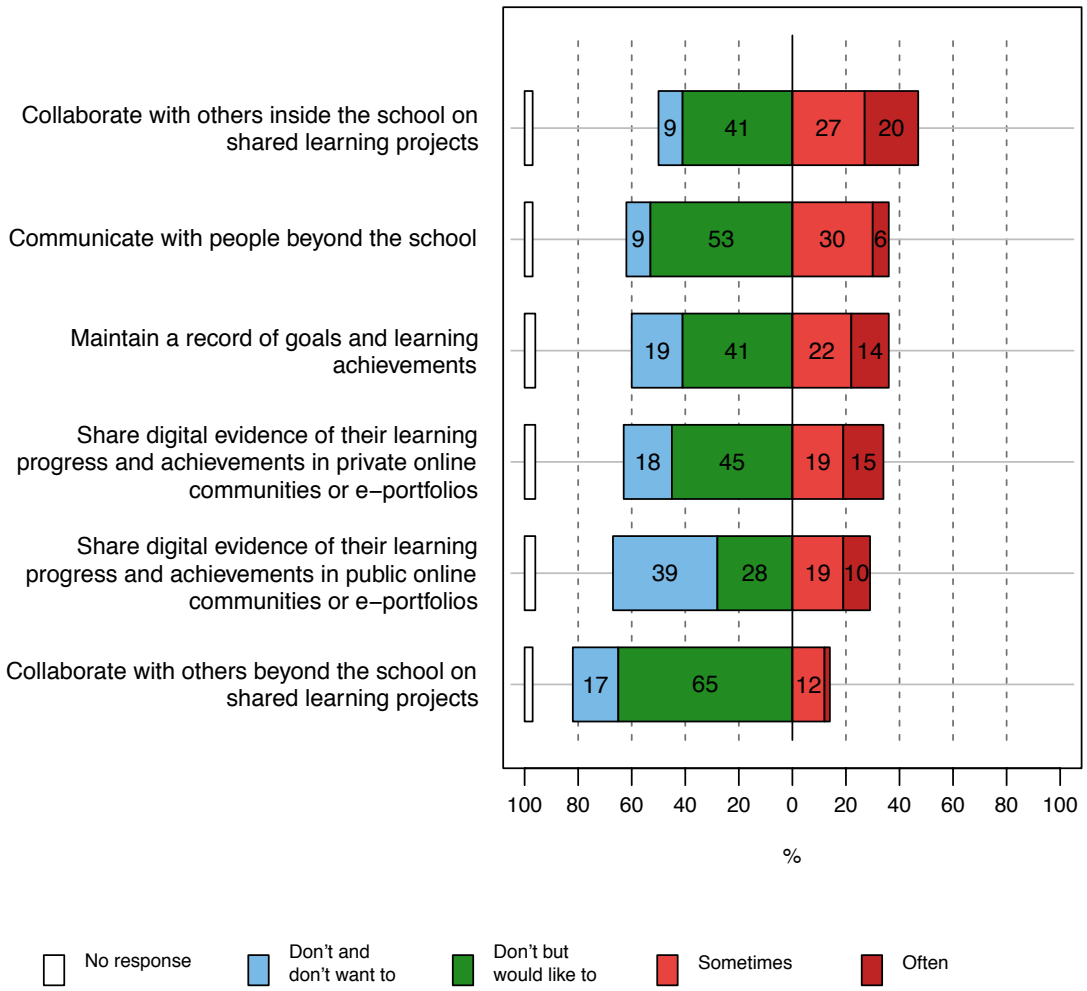
Using digital technology to communicate, connect, and share learning

Using digital technologies to communicate or collaborate is less common than using them to practise skills, do research, and create or produce work. Just under half the teachers (47%) said students often or sometimes use digital technologies to collaborate with others inside the school on shared learning projects (see Figure 2).

Around a third said students use it to communicate with people beyond the school (e.g. experts, other teachers or students, community groups), but only 14% said students use digital technology to collaborate with others beyond the school, including experts, other teachers or students, or community groups.

Thirty-six percent said students maintain a digital record of their learning progress and achievements, 34% said students share digital evidence of their learning progress and achievements in private online communities or e-portfolios, and 29% said students share evidence of their learning or achievements in public online communities or e-portfolios.

FIGURE 2 **Student use of digital technology to communicate, connect, and share learning, reported by teachers (n = 771)**



It is also interesting to look at which practices teachers said they would or would not like their students to be doing, if they weren't already doing so (shown in green and blue in Figures 2 and 3), and to consider what might be preventing these practices from happening more often in the classroom.

What teachers would *like* their students to be doing with digital technology

Of the five most common things teachers said they would *like* their students to be doing with digital technology—but which wasn't currently happening—four were about students using technology to communicate, collaborate, or share their learning:

- Collaborating with people beyond the school on shared learning projects (e.g. Google docs, wikis) (65% of teachers)
- Communicating with people beyond the school (e.g. experts, other teachers or students, community groups) (53%)
- Sharing evidence of their learning progress and achievements in private online communities and e-portfolios (45%)
- Collaborating with others inside the school on shared learning projects (41%)

In addition, 43% said they would like their students to use digital technology for coding and/or programming. This practice did seem to divide teachers though, with almost a third saying they didn't want to include this in their classroom programmes (see below). More than a third of teachers said they would like their students to be using technology to gather and analyse data (38%) and generate multimedia work (35%). Teachers from decile 1–2 schools were even more likely than teachers from decile 7–10 schools to indicate that they wanted their students to be using digital technology to generate multimedia work (50%).

What teachers *don't* want their students to do with digital technology

Some teachers identified practices they *didn't* want to include in their programmes. The most common things were:

- Sharing digital evidence of their learning progress and achievements in public online communities or e-portfolios (e.g. class blog, Twitter, Facebook, YouTube) (39%)
- Coding and/or programming (32%)
- Playing games and simulations (27%)

Why might teachers not want their students doing these things? Regarding students sharing their learning online, twice as many teachers did not want students sharing their learning in public online spaces (39%) as private online spaces (18%). One possible explanation for this may be concerns relating to privacy or children's safety. Regarding games and simulations, perhaps some teachers don't see this as useful or appropriate for their own students, or are not aware of how to find and use resources that might be useful for learning. Regarding coding, this may be an unfamiliar area for some teachers, although it is worth noting that, overall, more teachers said they *would* like to include coding and programming (43%) than those who said they did not want to (32%). Although teachers were not specifically asked to discuss their perspectives on coding and programming, 15 teachers did mention it in written comments about the role of digital technology in their practice. Most of these comments alluded to the professional learning, time, or access to devices that teachers felt they would need to be able to support students learning to code.

> I would consider teaching coding in my classroom. However, I would need to see practical applications in the classroom in ways it could enhance my students' learning. I would need a lot of professional development.
>
> Not having enough devices is an ongoing frustration. I would love to use Minecraft and coding to engage students but simply can't find the time at the moment to learn about this myself.

> I think coding is the way forward, needs to start young but also requires a lot of one to one time to teach juniors.

One teacher said they didn't think coding knowledge was necessary.

> Coding is a bit like saying to drive a car you need to know all about the engine—I don't need to know everything—just how to use it.

Changes in digital technology classroom practices

Table 1 shows the percentage of teachers who reported particular uses of digital technology for students' learning as occurring "often" in the last four cycles of the national survey. As the survey items are revised periodically, some questions have been asked in some years and not in others.

TABLE 1 **Digital technology uses that teachers reported students doing "often" from 2007 to 2016**

Use of digital technology to ...	2007 (n = 912) %	2010 (n = 970) %	2013 (n = 713) %	2016 (n = 771) %
Practise specific skills (e.g. maths or reading)	22	38	58	61
Research using the internet	29	41	42	45
Create printed documents or slideshow presentations	42	29	24	35
Generate multimedia work (e.g. images, movies, music, animations)	5	12	14	16
Collaborate with others inside the school on shared learning projects	*	9	8	20
Collect and/or analyse data (e.g. from an internet site or spreadsheet)	5	3	10	9
Maintain a record of goals or learning achievements (e.g. e-portfolio)	*	*	10	14
Communicate with people outside the school (e.g. experts, other teachers or students, community groups)	7	*	7	6
Collaborate with others outside the school on shared learning projects (e.g. online book clubs, creating a wiki)	*	5	4	2

* Not asked

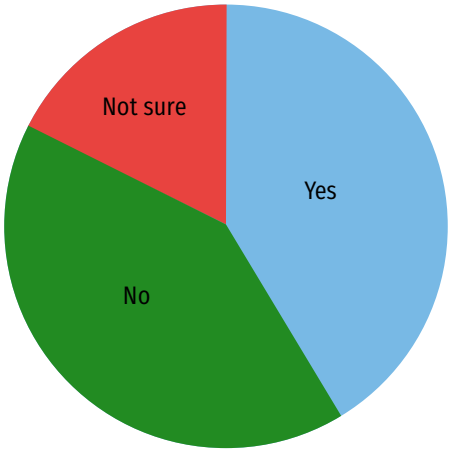
Overall, the data suggest that the use of digital technology for activities like skill practice and internet research has increased steadily since 2007. The use of digital technology to create printed documents or slideshow presentations has varied over the years, with no obvious explanation. There has been a general increase in the production of multimedia, and within-school collaboration, although these are more likely to be things that happen "sometimes" rather than often. Other kinds of digital technology uses—such as communication and collaboration beyond the school—still do not happen often in most primary and intermediate classrooms.

Coding, gaming, and makerspaces

Students' opportunities to participate

Across all teachers surveyed, 41% indicated their students have opportunities to participate in coding, gaming, or makerspaces at their school (Figure 3). Another 41% said students did not have these opportunities, and 17% were not sure. Overall, teachers from decile 9–10 schools were slightly more likely to say yes (49%) than teachers from decile 1–2 schools (26%).

FIGURE 3 **Do students have opportunities to participate in coding, gaming, or makerspace activities at your school? Teachers' responses (n = 771)**



Who runs these activities?

Of those who said coding, gaming, or makerspace activities did happen in their school (*n* = 314), most (71%) said that just one or a few teachers had a significant role in running these activities (see Table 2). Some said that a principal or senior leader had a significant role (22%) or that students themselves did (19%). It was not common for this responsibility to be shared by most teachers in the school (7%). A few teachers (4%–8%) said parents or community helpers or library staff played a role.

TABLE 2 **Who plays a significant role in running coding, gaming, or makerspace activities in your school?**

	Teachers (*n* = 314) %
One or a few teachers	71
Principal or senior leader	22
Students	19
Parent or community helper	8
Most teachers	7
Library staff	4

We asked teachers to estimate how many students in their class had taken part in these activities over the past 12 months at school. Their responses in Table 3 suggest that, in most schools, student participation in these kinds of activities is limited to some or just a few students. Overall, it appears that student gaming or coding activities are somewhat more common than makerspace activities, with 41% of teachers saying at least "a small number" of students in their class have participated in these in the past 12 months, compared with only 7% of teachers who said this about makerspace(s). There were no significant decile-related differences.

TABLE 3 **How many students in your class have taken part in these activities over the past 12 months, at school? (n = 771)**

	Gaming or coding	Makerspace(s)
	%	%
All or most students	12	2
Some students	15	2
A small number of students	14	3
No students	29	39
Not sure/no response	29	55

Although teachers were not specifically asked to comment on coding, gaming, or makerspaces, a few mentioned these in written comments about teaching with digital technology. These comments largely suggest these are still relatively marginal practices in schools, and may be quite dependent on having appropriate resources and/or knowledge available within the school.

> I have introduced 'Scratch' into classroom with great success. We did have a 'coding club' 2 years ago for some students at lunchtime.
>
> Funding specifically for makerspaces and STEM activities would be great.
>
> With parent-helper facilitator, I run a Raspberry Pi lunchtime club using Python. With ASB support several after school coding clubs operate. Several interested teachers incorporate other coding opportunities within their class programme.
>
> We have had a couple of small groups use coding but reliant on a teacher with that knowledge being available.

Summary

Teachers' reports suggest that students' use of digital technologies often centres on a few key kinds of activities, such as practising skills, searching for information, and producing work such as documents or slideshows. These are of course quite broad categories of activity, and we don't know the details of the contexts in which they occur (e.g. the curriculum intentions and pedagogical approaches that underpin these ways of using technology). Other digitally-based learning opportunities are still relatively uncommon in primary classrooms, such as students learning to code or program, or are quite variable between classrooms (e.g. use of games and simulations, or creation of multimedia).

One interesting finding was that many teachers say they would *like* their students to be using digital technologies to collaborate and communicate with people beyond the school on shared learning projects. The reasons why this doesn't already happen are unclear, but may include time pressures, a lack of

opportunity to connect with people in other schools or the wider community around authentic learning projects, or teachers and students not knowing how or where to start in order to make this a reality.

Teachers had more mixed views about whether or not they would like their students to be doing things such as coding or programming, or sharing evidence of learning and progress in public online forums. Some did want these kinds of things to happen in their classrooms, others did not.

Responses to the new questions we asked about coding, gaming, and makerspaces suggest that these sorts of activities are still relatively marginal in primary schools, and if these opportunities are present, they are generally run by one or a few teachers, and not something that all students have opportunities to be involved in. Teacher comments suggest activities of this nature might be limited by the resources and knowledge available within the school to run them. It may also be that activities such as student gaming and coding clubs or makerspaces are not viewed as being especially relevant or important in many schools, or that schools simply have other priorities when it comes to curricular and co-curricular activities that might be offered within the school.

Some of the practical and conceptual challenges teachers and school leaders experience with respect to the integration of learning with digital technologies are discussed in Chapters 4 and 5.