Kennisnet
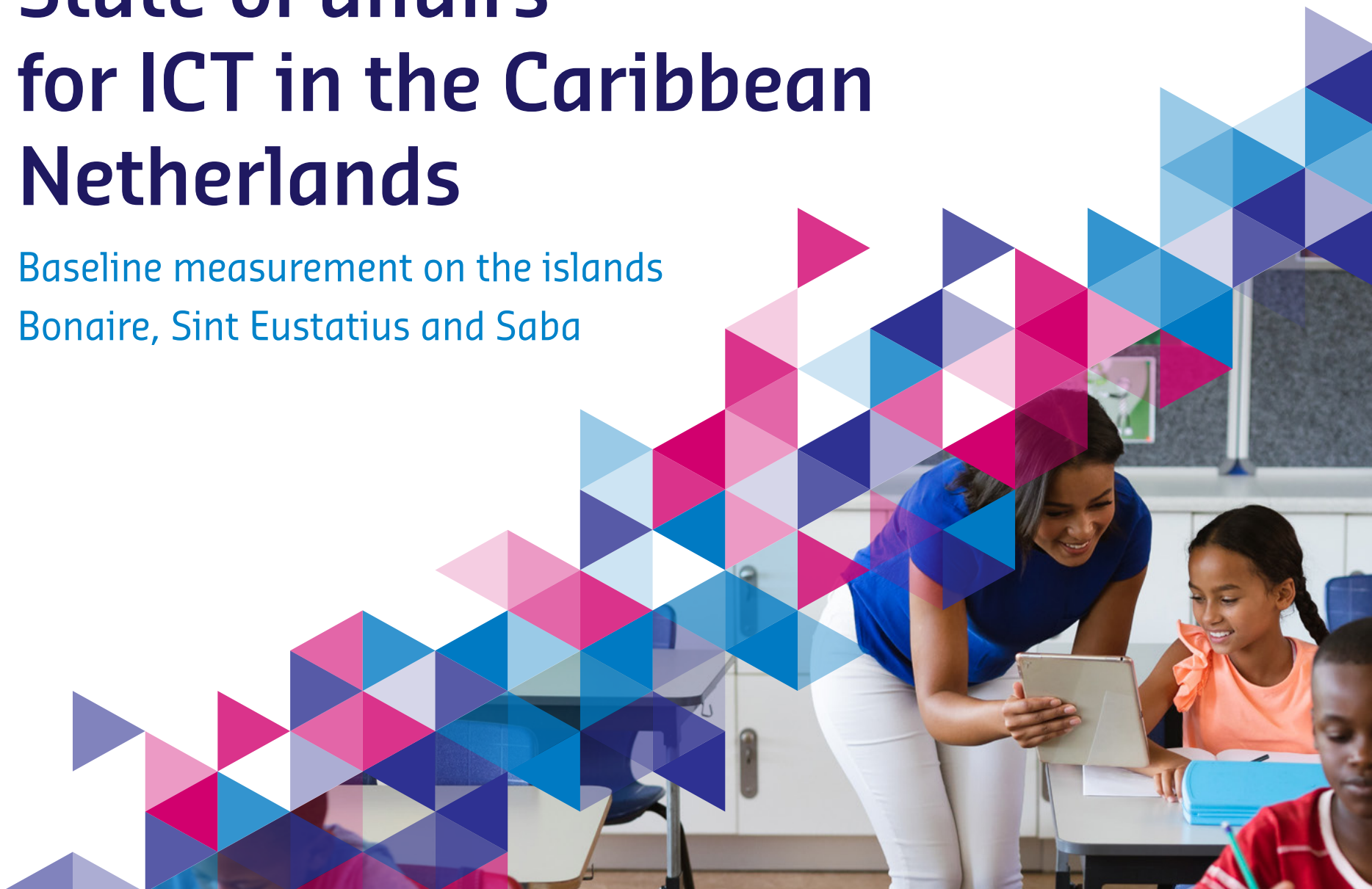
State of affairs for ICT in the Caribbean Netherlands

Baseline measurement on the islands
Bonaire, Sint Eustatius and Saba

Contents

Summary

Background and objective of the research

Digitisation in education has been accelerated by the coronavirus crisis. With the closing of schools in the Caribbean Netherlands islands of Bonaire, St. Eustatius and Saba, the application of technology for distance learning became a necessity there too in many cases. Because there was an insufficient understanding of the current application of ICT in education, the ICT prerequisites in place and the ambitions of the islands, the National Office for the Caribbean Netherlands' Department of Education, Culture and Science (RCN/OCW), the Ministry of Education, Culture and Science (OCW) and the Kennisnet Foundation jointly set up a survey. This research is a baseline measurement, a first measurement of several measurements that will take in the future to monitor the development of ict in education in Caribbean Netherlands. This baseline measurement was carried out by Kennisnet Foundation in conjunction with Oberon as an independent research and consultancy agency and Rianda Sacré as a local researcher.

The results of the baseline measurement provide insight into:
► The position of ICT use in education and the ICT prerequisites.
► The ambitions surrounding the use of ICT in education that exist in the schools and at the administrative level.
► Possible differences between and similarities among the vision for, and the implementation of, ICT use, ICT prerequisites and ambitions between the different islands, between the sectors and between the different groups of respondents.

Design of and participation in the research

The baseline measurement was taken at all schools in the islands of Bonaire, Sint Eustatius and Saba. There are 18 schools in total (primary education, secondary education and senior secondary vocational) and the Roman Catholic School Board on Bonaire. As part of the baseline measurement, an internet survey was conducted among the respondent group of teachers. In addition to the questionnaire among teachers, an interview was conducted with the respondent group of administrators (including staff members involved in ICT at the school) and school leaders. This report presents the results from the questionnaire that was completed by 146 teachers. This is 35 percent of the total number of teachers. The results of the interviews are also presented; a total of seventeen school leaders, administrators and ICT coordinators participated in the interviewing of the 18 schools.

The questionnaire conducted with teachers in the Caribbean Netherlands was constructed and based on previous questions arising from the Vier in balans-monitor (Kennisnet, 2017), the Monitor hybride onderwijs (Smeets, 2021a; Smeets, 2021b), the Monitor IBP (Welzen, Kilian & Kliest, 2019) and the Rapport Praktijkonderzoek Digitale Geletterdheid po-vo (Demaret, Van Kessel & Van Rooyen, 2021). The items and questions were adapted to the Caribbean culture in cooperation with the local researcher.

IT prerequisites

The interviews show that most schools have various digital teaching materials and application, registration and communication software in place. A few schools indicated that they have very little or no digital software available.

The schools that participated in this baseline measurement have an average of 0.89 devices (e.g. laptop or table) per pupil at the school. This means that not all pupils can have access to a device at the same time. An average of 62 percent of the number of devices available to schools are laptops or Chromebooks and 25 percent are tablets. In addition, about 20 percent of the pupils on the islands work on their own personal device while carrying out school tasks.

All schools have an ICT budget holder in place. The roles of these people vary somewhat. Sometimes the director or the administration is responsible for the budget, other times it is organised in consultation. Most schools want to invest in the purchase and maintenance of new and current equipment. Some schools want to invest in the professionalisation of teachers in the field of education and ICT, or the support of parents in the use of ICT by pupils. A majority of schools also have agreements about the implementation of compliance with the Personal Data Protection Act BES Islands (Wbp BES). But there are also schools where no agreements have yet been made.

All the schools that participated have wireless internet. There is considerable variation in the bandwidth at the schools. Most teachers, school leaders and ICT managers indicate that they find the internet connection acceptable or average. On Sint Eustatius, a larger proportion of the teaching staff indicates that the internet connection is not acceptable. In addition, some schools indicate that when several people are using the network simultaneously, there are occasional problems with the connection. This can also happen when using certain methods and software that are updated at night on European-Netherlands time. Due to the time difference between European-Netherlands time and Caribbean time, problems and disruptions occur in the afternoon (Caribbean time).

Application and use of ICT in education

The most used material or equipment by far are PCs, laptops and instructional videos. In the Caribbean Netherlands, there is comparatively little use of exercise software that allows pupils to practise subject matter and receive feedback, whereas this is more common in the European Netherlands. A possible explanation for the use of instructional videos is that there are few, if any, suitable (teaching) methods and materials that are sufficiently aligned to the islands' culture. Instructional videos may offer a larger range of information from which the teacher can choose, so that the teaching material is more in tune with the perception of pupils and students in the Caribbean Netherlands.

In the current educational situation on the islands, pupils are not commonly tested and assessed using ICT. Teachers do indicate though that they expect to do more of this in the future.

The interviews show that schools devote a lot of time to ICT development. Some schools have a diverse approach to pupils' digital literacy. For example, at some schools pupils take examinations in digital literacy and Electronic Document Preparation and Management (EDPM). Other schools assume that if pupils work with a device, that means they are digitally literate. But most schools are not yet devoting enough attention to the digital literacy of their pupils, so improvement is needed.

Teachers indicate that they think digital educational resources are more attractive to pupils than paper-based ones. Teachers also assert that pupils are better able to work independently with digital educational resources. Virtually all teachers in the Caribbean Netherlands see added value in the use of digital educational resources.

Professionalisation and ICT competence

On average, teachers on Bonaire, Sint Eustatius and Saba consider themselves highly competent in the areas of general and teaching skills with ICT. The interviews show that school leaders and ICT coordinators generally share this opinion. Two school leaders and ICT coordinators from the interview indicate that their teachers are not sufficiently competent. The majority of school leaders indicate that they consider themselves moderately competent or sufficiently competent.

The interviews show that most schools have the budget, time and space for professionalisation. The teachers also indicate that they want to continue developing in the field of education and ICT.

Vision and school's arrangements

A majority of the teachers (52 percent) indicate that there are no school-wide arrangements for how IT is used in the lessons, while a smaller group of teacher indicates that there are a few arrangements (35 percent). Compared to the other islands, the biggest group of teachers on Saba indicates that there are arrangements concerning the use of ICT for teaching (33 percent).

COVID-19

The interviews with the school leaders and IT coordinators show that generally speaking remote teaching went well during the lockdowns. However, a number of problems were experienced, such as the home situation of pupils. For example, a number of pupils had no home internet connection, no availability of devices and their digital skills were insufficiently developed for organising education at home. Parental involvement was often lacking.

Most schools mention that, should it become necessary again, working from home will be possible but that there are often not enough devices for every pupil and teacher. This corresponds to the calculated device/pupil ratio which was described earlier in this report.

1. Introduction

This report presents the results of the survey into the digitisation of education in the Caribbean Netherlands.

Digitisation in education has been accelerated by the coronavirus crisis. In many cases, the application of technology for distance learning became a necessity when the schools were closed. In order to turn this development into sustainable innovation, the school boards on Bonaire, Sint Eustatius and Saba (Caribbean Netherlands) have expressed their wish to develop a joint digitisation policy.

Because there was an insufficient understanding of the current application of ICT in education, the ICT prerequisites in place and the ambitions on Bonaire, Sint Eustatius and Saba, the National

Office for the Caribbean Netherlands' Department of Education, Culture and Science (RCN/OCW), the Ministry of Education, Culture and Science (OCW) and the Kennisnet Foundation jointly carried out this baseline measurement.

This research is a baseline measurement, a first measurement of several measurements that will take in the future to monitor the development of ict in education in Caribbean Netherlands.

The baseline measurement investigated the views of administrators, school leaders and teachers on the current use of ICT in education and the ICT prerequisites in place. The results of this report also analyse the schools' ambitions in this context.

In order to carry out this baseline measurement, Kennisnet Foundation worked in conjunction with Oberon as an independent research and consultancy agency and Rianda Sacré as a local researcher.

Objective of the research

The results of the baseline measurement provide insight into:
▶ The position of ICT use in education and the ICT prerequisites.
▶ The ambitions surrounding the use of ICT in education that exist in the schools and at the administrative level.
▶ Possible differences between and similarities among the vision for, and the implementation of, ICT use, ICT prerequisites and ambitions between the different islands, between the sectors and between the different groups of respondents.

Procedure

In collaboration with the local researcher, Kennisnet and Oberon developed a questionnaire and interview design for this baseline measurement. The questionnaire is based on the Vier in balans-monitor (Kennisnet, 2017), the Monitor hybride onderwijs (Smeets, 2021a; Smeets, 2021b), the Monitor IBP (Welzen, Kilian & Kliest, 2019) and the Rapport Praktijkonderzoek Digitale Geletterdheid po-vo (Demaret, Van Kessel & Van Rooyen, 2021) and was modified for the Caribbean culture. The questionnaire was distributed among teachers and the interviews were conducted among school leaders, administrators and ICT managers from Bonaire, Sint Eustatius and Saba. The local researcher conducted the interviews, face-to-face wherever possible.

In the following sections of this survey report, we will deal in turn with the survey's design and participation in the study (section 2), the results in the area of the implementation of education on Bonaire, Sint Eustatius and Saba (section 3), the application and use of ICT in education (section 4), professionalisation and ICT competence (section 5), the school's vision for education using ICT (section 6) and finally a retrospective on COVID-19 and the home working period (section 7). A number of in-depth analyses were also carried out (section 8) and the scaled scores of items were identified (section 9).

The results in this report are illustrated with tables and graphs with percentages. The first annex provides the details for an open question.

2. Survey design and participation in the research

2.1 Survey design

The baseline measurement was taken at all schools in the islands of Bonaire, Sint Eustatius and Saba. This involved a total of 18 schools (primary education, secondary education and senior secondary vocational) and the Roman Catholic School Board on Bonaire, including two private schools. Three respondent groups were selected for this survey. The first group was administrators, including staff members involved in the use of ICT in school. The second group was all school leaders and the last group was the teachers.

As part of this survey, an online questionnaire was conducted among the respondent group of teachers. The questionnaire covered the school's ICT prerequisites, ICT competence and ambitions in the field of education and ICT. The questionnaire was provided in English, Dutch and Papiamento.

The participants were able to choose in advance which language version of the questionnaire they wanted to use. The questionnaire was read and moderated by a person of island origin involved in education prior to its being distributed. As there is a very limited number of teachers on the islands, the moderator chosen was not a teacher. Final adjustments were made based on the moderator's feedback.

In addition to the questionnaire among teachers, an interview was conducted with the respondent group of administrators (including staff members involved in ICT at the school) and school leaders. This interview covered the school's ICT prerequisites, ICT competence and ambitions in the field of education and ICT. Respondents could choose the language in which they wanted the interview to be conducted: English, Dutch or Papiamento.

Respondents participating in the interview were also sent a number of quantitative questions in advance. These questions focused on the prerequisites of education and ICT. The answers to the quantitative questions were collected for processing in the report. The knowledge from the quantitative questions was not used to adjust the interview. The interview was piloted with a school director working in the Caribbean Netherlands. Final adjustments were made based on the moderator's feedback.

Schools were approached through a recruitment letter sent by RCN/OCW. They received this in November 2021. In December 2021/January 2022, they received a reminder to participate and the survey was publicised through local media on Bonaire. Also, during the interview with the administrator and school leader, they were asked to encourage teachers to complete the questionnaire. The survey was closed on 3 February 2022.

2.2 Participation in the research

Table 2.1 shows the usable responses. A total of 146 teachers completed the questionnaire. There was an extremely low response on the island of Saba. Consequently, a comparison between the three islands will not be representative.

Table 2.1 Response percentage per island

Island	Response	Population educational staff	Response %
Bonaire	113	282	40%
Saba	6	36	17%
Sint Eustatius	27	73	37%
Total	146	391	37%**

** Average response

The interview was conducted with 17 school leaders and ICT managers from 18 schools. In addition, a meeting was held with the RC school board on Bonaire. Thus, a total of eighteen interviews were conducted. Table 2.2 shows the distributions per island. In places, the report contains a comparison based on the information from the interviews.

Table 2.2 Interview respondents per island

Eiland	Number interviewed:	Number of schools
Bonaire	11	11
Saba	2	2
Sint Eustatius	5	5
Total	18	18

2.3 Background details of the respondents

In the tables below, we present the key breakdowns of the response by relevant background characteristics. The overwhelming majority of the teachers (65 per cent) teach in primary education (Table 2.3). As can be seen in Table 2.3, a comparison between the primary and secondary education sectors is possible because the response rate here is high enough. A comparison with the senior secondary vocational education (SSVE) is not possible because the response rate there is too low. For drawing the comparison and establishing correlations, Chi-square tests and ANOVAs (forms of statistical analysis) were performed. These results can be found in section 8. These comparisons concern the differences between the groups of teachers per sector regarding the teachers' ICT competence, the professionalisation requirement and the teacher-oriented application of ICT.

96 per cent of the participating schools are funded (Table 2.4). A reliable comparison between private schools and state-funded schools is not possible. The response rate from private schools is too low for that.

Table 2.4 Response percentage by funding

Funding	Response	Population of educational staff*	Response %
Private	6	15	40%
State	130	376	35%
Total	136	391	35%**

* For 10 respondents it is not known what kind of funding they have
** Average response

Table 2.3 Response percentage per sector

Sector	Response	Population of educational staff*	Response %
PE	89	222	40%
SE	46	161	29%
SSVE	1	8	13%
Total	136	391	35%**

* It is not known which sector 10 respondents are employed in
** Average response

3. Implementing teaching prerequisites

3.1 Availability of software and devices

The interviews show that most schools have various digital teaching materials and application software in place. Thus, most schools on Bonaire, Saba and Sint Eustatius mention the presence of software that aligns with the methods being used. Most schools also have communication software available that can be used to design distance lessons for example.

Pupil information is also processed and kept up to date by most schools in registration software in the form of a pupil monitoring system. A few schools indicated that very little or no digital software available is available at the school.

The schools were also requested to fill in pupil numbers and how many devices they have. This data was used as the basis for calculating the available number of devices per pupil in the schools. The average is 0.89 device per pupil. This means that on average there is less than one device per pupil.

Table 3.1 Number of devices per pupil at the school

Average	Std. deviation	Minimum	25%	50%	75%	Maximum	n
0.89	0.366	0.19	0.675	0.89	1.025	1.52	18

Table 3.2 Average percentage of the numbers of laptops, tablets and personal devices in the schools

Percentage	Average percentage of the number of devices	Minimum percentage	Maximum
School's laptops/ Chromebooks	62%	15%	100%
School's tablets	25%	0%	90%
Pupils who work on a personal device for school	20%	0%	85%

Also calculated was the percentage of the number of devices in the school's possession that are laptops (including Chromebooks) or tablets. Table 3.2 shows the average percentage. It also shows the number of pupils who have a personal device that they use for school and educational purposes. On average, 62 percent of the devices available in the schools are laptops or Chromebooks. Laptops or Chromebooks are available at all schools. There are schools that only have laptops or Chromebooks, i.e. no tablets. An average of 25 percent of the devices owned by the schools are tablets. In addition, about 20 percent of the pupils on the islands use a personal device during schoolwork.

3.2 ICT budget and investment

The school leaders and ICT coordinators were asked whether there is an ICT budget holder, and who holds this position within the organisation. The interviews show that all schools have an ICT budget holder (table 3.3). There are schools with internal managers for the ICT budget but here the director or school leader is the person ultimately responsible. There are also schools where the financing is managed by administrators. Finally, there are schools where the ICT budget is managed by the director and an administrator jointly.

The interviews show that most schools want to invest in the purchase and maintenance of new and current equipment and devices. Consideration is also being given to investing in content-related purchases, such as subscriptions to (professional) journals, digital textbooks or applications that are aligned with the content of the lessons. A few schools also mention an investment in the materials required for the effective use of blended learning and an investment in the professionalisation of teachers or the support of parents. In the latter case they might offer parents a course on the use of ICT in their child's education.

Table 3.3 Data from interviews: who is the ICT budget holder and manager within the organisation? Interviewees could give more than one answer

| Type of investment	Bonaire (N = 11)	Saba (N = 2)	Sint Eustatius (N = 5)
Director/school leader	5	2	1
Administration/financial manager	6	2	5

3.3 Infrastructure/internet connection

All participating schools in this survey have wireless internet that is accessible both by personal and school devices. There is considerable variation in the bandwidth at the schools. E.g. the lowest download speed was 10 Mbit/s and the highest 300 Mbit/s. The upload speed also varies enormously between the schools. The lowest upload speed was 10 Mbit/s and the highest 100 Mbit/s.

Figure 3.1 shows how teachers experience the network connection when giving lessons in the classroom. 42 percent of teachers say they experience it as good, roughly half (49 percent) consider the network connection to be moderate and 9 percent experience it as poor.

Figure 3.1 What is your general experience of the network connection when giving lessons in the classroom?

9%	I experience the network connection as poor
49%	I experience the network connection as moderate
42%	I experience the network connection as good
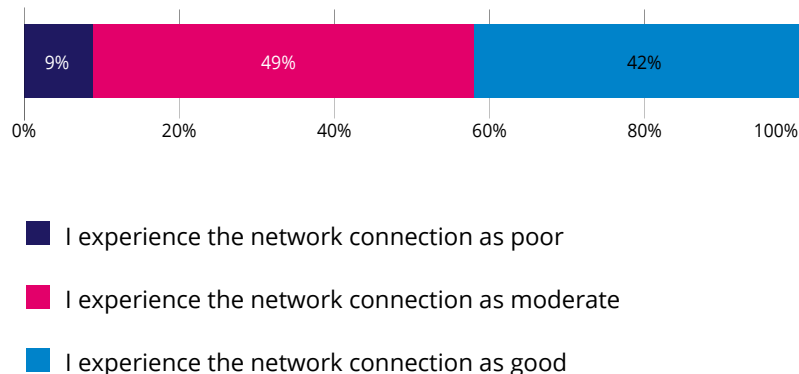
It appears from the interviews that the school leaders and ICT managers on Bonaire and Saba generally consider the internet connection to be acceptable or average (table 3.4). On Sint Eustatius, a number of schools indicate that the internet connection is not acceptable.

Table 3.4 Data from interviews: What is your experience of the network connection at the school?

	Bonaire (N = 11)	Saba (N = 2)	Sint Eustatius (N = 5)
Acceptable	4	1	1
Moderate/Average	6	1	2
Not acceptable	1	-	3

In the interviews, respondents mainly indicated that they experience problems with the internet connection at the schools at specific times. This mainly happens when several people, and thus several devices as well, use the internet simultaneously. This makes the internet slower. On Bonaire, Saba and St. Eustatius much use is also made of European-Dutch software that is located and updated on European-Dutch servers. This is often done at night per European-Netherlands time. This is an issue for the islands, as they are often using the software in the afternoon. Due to the time difference between European-Netherlands time and Caribbean time, issues and disruptions occur in the afternoon (Caribbean time).

3.4 Accessibility, management, technical support

Table 3.5 shows who is responsible for technical and functional support in the schools where the interviews took place. The technical and functional support resolves ICT problems and faults, for example. On Bonaire, schools manage this in various ways. There are schools where this is organised internally by the director or ICT manager, in the administration, or externally by hiring in a party to deal with issues, for example. At the schools on Saba and Sint Eustatius, the ICT manager mainly organises this internally or externally.

Table 3.5 Data from interviews: who is responsible for the technical and functional support? Interviewees could give more than one answer

Responsibilities	Bonaire (N = 11)	Saba (N = 2)	Sint Eustatius (N = 5)
Director/school leader (internal)	3	-	-
ICT manager/coordinator in the school (internal)	2	1	1
Administration (helpdesk, IT administrator)	3	-	-
Hired in externally	3	2	4

3.5 Application of Wbp BES

The Personal Data Protection Act BES Islands (Wbp BES) lays down the guidelines for ensuring that citizens' personal data are legally protected. The Wbp BES came into force on the Caribbean Netherlands on 10 October 2010. Table 3.6 shows who has agreements on the implementation of the BES Wbp.

Table 3.6 Data from interviews: Are there agreements on the implementation of compliance with the Personal Data Protection Act BES Islands?

Responsibilities	Bonaire (N = 11)	Saba (N = 2)	Sint Eustatius (N = 5)
No agreements or agreements still under development	5	-	1
There are agreements	6	2	4

The responsibilities for the Wbp BES on the islands are assigned to various persons. Thus, 7 schools indicate that their ICT specialist or coordinator looks after this and is accountable for it. There are also schools where no specific expert is responsible for compliance with the Wbp BES. In most schools, the management or the administration is accountable.

Conclusions

A range of digital teaching materials are available at the schools and this is also the case for application software. On average there is less than one device per pupil. The majority of the devices are laptops or Chromebooks. Twenty percent of the pupils on the islands use a personal device for schoolwork. All schools have an ICT budget holder. And most schools indicate that they want to invest in the purchase and maintenance of new and current equipment and devices.

Both pupil' own devices and school devices are able to use the wireless internet at all schools. Almost half of the teachers consider the network connection to be moderate. The interviews show that schools experience issues with a poor internet connection at certain times. This happens for example when several devices are using the internet simultaneously. Furthermore, schools use European-Dutch software that is often updated in the evening or at night at European-Netherlands times. When these schools use the software in the afternoon, they may experience disruption due to the time difference.

The responsibility for the technical and functional support lies with the schools on Bonaire internally with the director or ICT manager, with the administration or externally. On Saba and Sint Eustatius the responsibility lies mainly internally with the ICT manager or externally. There are also agreements about the implementation of compliance with the Personal Data Protection Act BES Islands (Wbp BES) at the majority of schools. But there are also schools where no agreements have yet been made.

4. Application and use of ICT in education

4.1 Presence and use of digital educational resources and teaching materials

The teachers were asked which digital educational resources and which digital teaching materials they use.
▶ Digital educational resource is understood as a resource made available digitally and used in a formal teaching situation to teach the pupil knowledge and skills.
▶ Digital teaching materials are understood as materials made available digitally, the content of which is focused on the transfer of information in educational situations and the use of which is prescribed by the competent authority within the educational provision specifically for the relevant pupil grade.

Figure 4.1 shows the number of teachers who indicate that they use educational resources and teaching materials. The most commonly used digital educational resources and/or teaching materials by far are PCs and laptops. In addition to the internet, many teachers use videos together with explanations as a source of information.

The materials least used for lessons are e-books and simulation software. It is noteworthy that method-related materials are used about as often as non-method-related materials. If we break down the figure below for a comparison of the islands, we find that a majority of teachers on Sint Eustatius (63 percent) indicate that they (almost) never use a digital whiteboard, compared to 17 percent of teachers on Saba and 23 percent on Bonaire.

Figure 4.1 Number of teachers who indicate they use educational resources and teaching materials. The numbers are broken down by percentile of the total number of educational resources and teaching materials used. There are twelve teachers who indicate that they do not use any given educational resource or teaching material.

Legend: ■ <25% ■ 25-75% ■ >75%
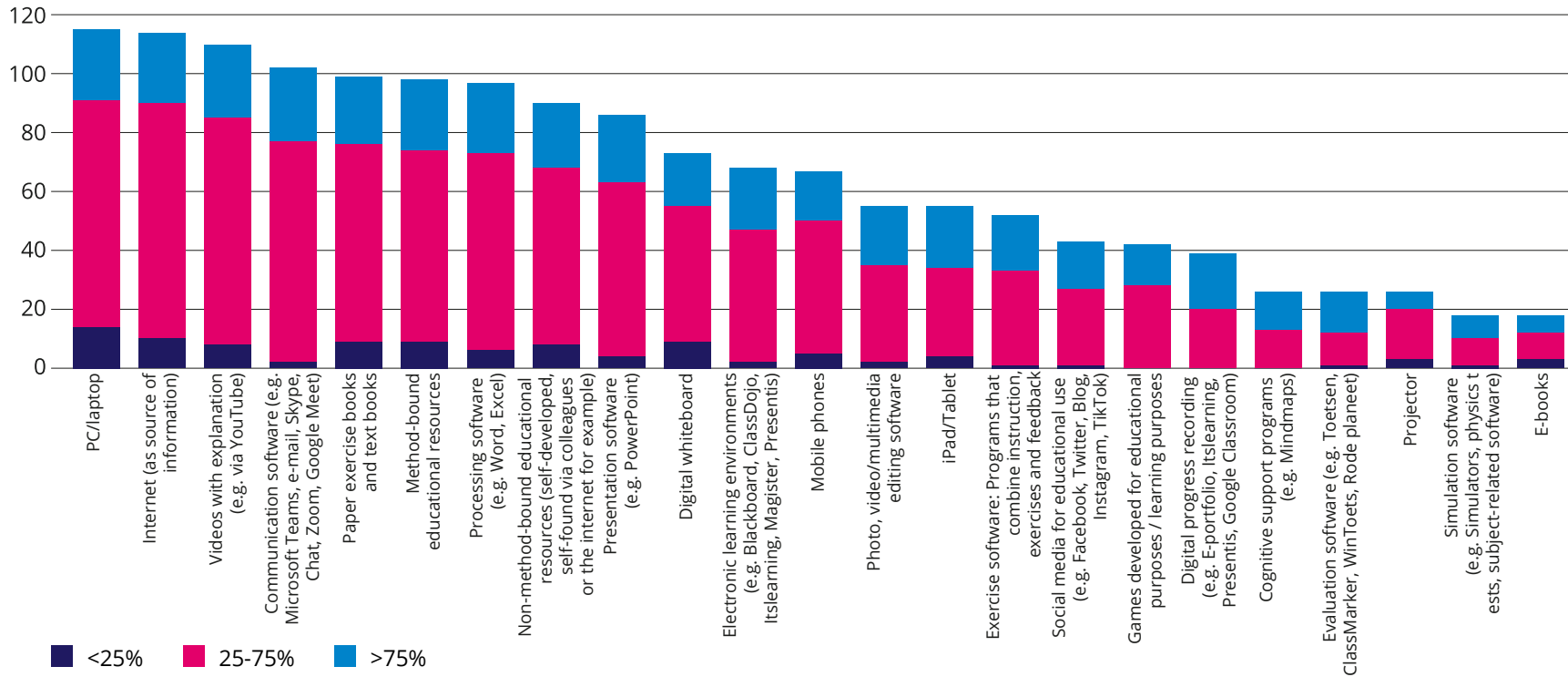
The school leaders and ICT coordinators were asked what they think is needed to ensure that teachers use digital educational resources in the required manner.

A majority of those interviewed indicate that more work is needed, in particular on thinking about and practising the skills associated with the use of digital educational resources. Some of those interviewed also think that more should be invested in professionalisation, such as attending workshops or using in-service training. The availability of digital resources, the appreciation of the usefulness of ICT, better internet and ICT policy are mentioned a few times.

4.2 Testing and assessment using the support of ICT

The teachers were asked what they are already doing as regards testing with ICT and digital educational resources, and what they anticipate doing in the future. Figure 4.2 shows that 58 percent of the teachers (almost) never, or only in a minority of the lessons, make use of digital analyses of test results, compared to 41 percent of the teachers who actually do this regularly. Slightly less than half of the teachers (47 percent) also say they regularly use digital educational resources to assess pupils. Finally, 65 per cent indicate that they (almost) never, or less often, use digital tests for pupil assessment while 35 percent actually do this regularly.

In the future, an overwhelming majority of teachers would like to make more use of digital analyses of test results (87 percent), use results from digital educational resources for pupil assessment (88 percent) and use digital tests for pupil assessment (85 percent).

Figure 4.2 Please fill in how often you pay attention to the following aspects during lessons. Please also fill in the number of lessons in which you are planning to do this in the future

Legend:
- (Almost) never
- In a minority of the lessons
- In approximately half of the lessons
- In more than half of the lessons
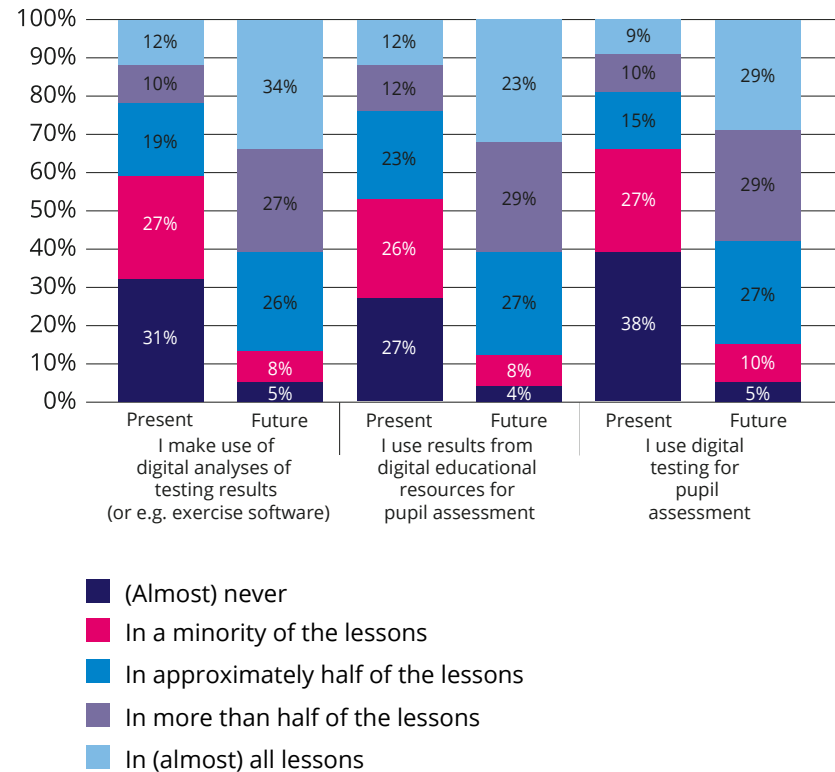- In (almost) all lessons

Figure 4.3 shows that 59 percent of the teachers (almost) never, or only in a minority of the lessons, adapt their teaching based on digital testing, while 40 percent do this regularly. 62 percent of teachers use digital testing to assess pupils' levels in the interim less frequently, compared to 37 percent who do this regularly. Finally, three quarters of the teachers (almost) never, or less often, give digital feedback, a quarter of them do so in about half of the lessons or more often.

The analyses show that teachers want to use the various aspects more in their future teaching practice. Thus, a majority of teachers (81 percent) would like to adapt their teaching on the basis of digital testing in about half of the lessons or more. Also, 78 percent of teachers plan to use (formative) digital testing more often and 77 percent want to give digital feedback to pupils more often. Furthermore, 81 percent of teachers are planning to check pupils' understanding of material more regularly using digital applications.

Figure 4.3 Please fill in how often you pay attention to the following aspects during lessons. Please also fill in the number of lessons in which you are planning to do this in the future
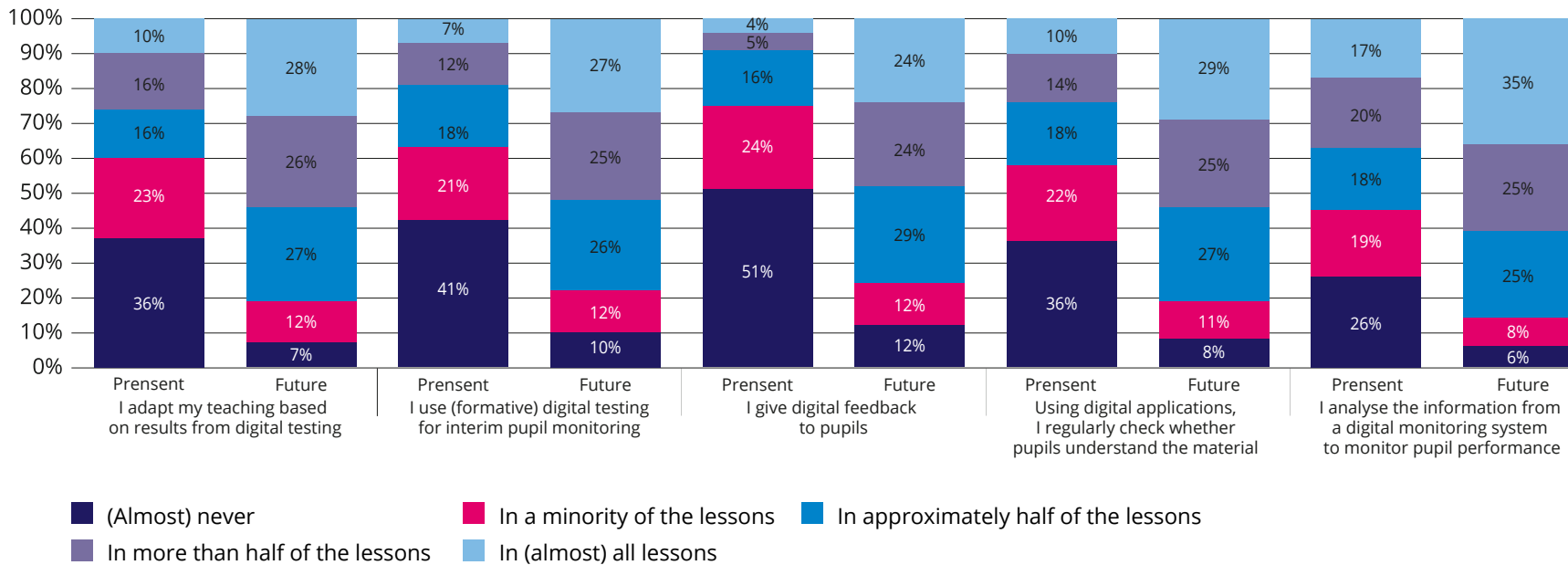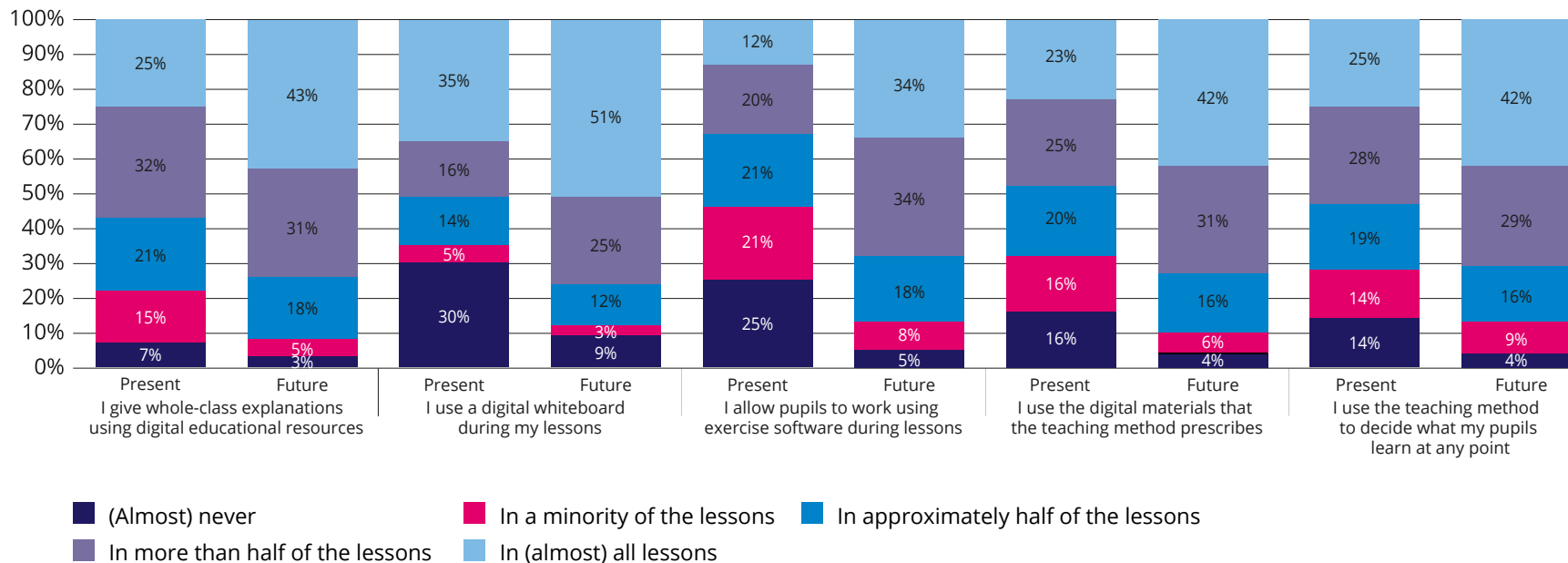
4.3 Teacher-oriented application and pupil-oriented application

The survey asked about the way in which ICT is used. A distinction was made here between teacher-oriented ICT application, such as explaining in class with the aid of digital educational resources or using a digital whiteboard, and pupil-oriented ICT use, in which the teacher caters for the needs of the individual pupil or gives the pupil more autonomy.

Teacher-oriented use of ICT
Figure 4.4 shows that 78 percent of the teachers give explanations in whole-class teaching using digital educational resources in about half of the lessons or more. Sixty-five percent of the teachers regularly use the digital whiteboard during their lessons and 53 percent let their students work with exercise software during the lesson. Furthermore, 68 percent of the teachers indicate that they occasionally to (almost) always use the digital material prescribed by the teaching method and 72 percent regularly use the teaching method to determine what their pupils will learn and when.

Figure 4.4 Please fill in how often you pay attention to the following aspects during lessons. Please also fill in the number of lessons in which you are planning to do this in the future

Legend:
- (Almost) never
- In a minority of the lessons
- In approximately half of the lessons
- In more than half of the lessons
- In (almost) all lessons

In the future, 92 percent of the teachers anticipate giving explanations in whole-class teaching using digital educational resources in at least half of the lessons. Eighty-eight percent of the teachers are planning to regularly use a digital whiteboard during their lessons. A large majority (86 percent) also wants students to work with exercise software in about half of the lessons or more often. Eighty-nine percent of teachers want to pay more attention to using the digital material prescribed by the teaching method in the future. Finally, 87 percent of teachers would like to use the teaching method more often to decide what pupils should learn at what point in time.

In general, we may conclude that the teachers are indicating that they expect to do more in all aspects in the future. Slightly less than half (46 percent) of the teachers indicate that in the current situation they (almost) never use exercise software, or only do so in a minority of lessons. In terms of future expectations, this applies to only 13 percent of the teachers. The majority of teachers also indicate that they would like to work with and make more use of a digital whiteboard in the future.

Pupil-oriented use of ICT

Figure 4.5 shows how often teachers pay attention to pupil-oriented usage during lessons. Eighty-four percent of the teachers supervise their pupils individually in their learning process in about half of the lessons or more often. Seventy-nine per cent of teachers regularly give pupils the room to discover for themselves how they learn best, and a small majority encourage pupils to choose for themselves when they want to learn something in half of the lessons or more often (52 per cent).

Furthermore, 62 percent of the teachers indicate the frequency with which they give their pupils feedback on their work as between sometimes and very often. A minority of the teachers regularly use digital learning environments in which pupils work together(44 percent). Finally, 44 percent of the teachers indicate that they let pupils work together using ICT in approximately half of the lessons or more, e.g. using online software and other digital tools.

In the future, teachers want to pay more attention to these aspects Thus, 93 per cent want to guide their pupils individually in their learning process in at least half of the lessons and give pupils the room to discover for themselves how they learn best. A majority of teachers also want to encourage pupils to choose for themselves when they want to learn something (79 percent). Eighty-nine percent of the teachers would like to allow pupils to give feedback to each other on their work more often during the lesson. Furthermore, 83 percent of teachers indicate that they would like to use learning environments in which pupils are able to work together in at least half of the lessons or more, and 81 percent are planning to let students work together more often using ICT.

Figure 4.5 Please fill in how often you pay attention to the following aspects during lessons. Please also fill in the number of lessons in which you are planning to do this in the future
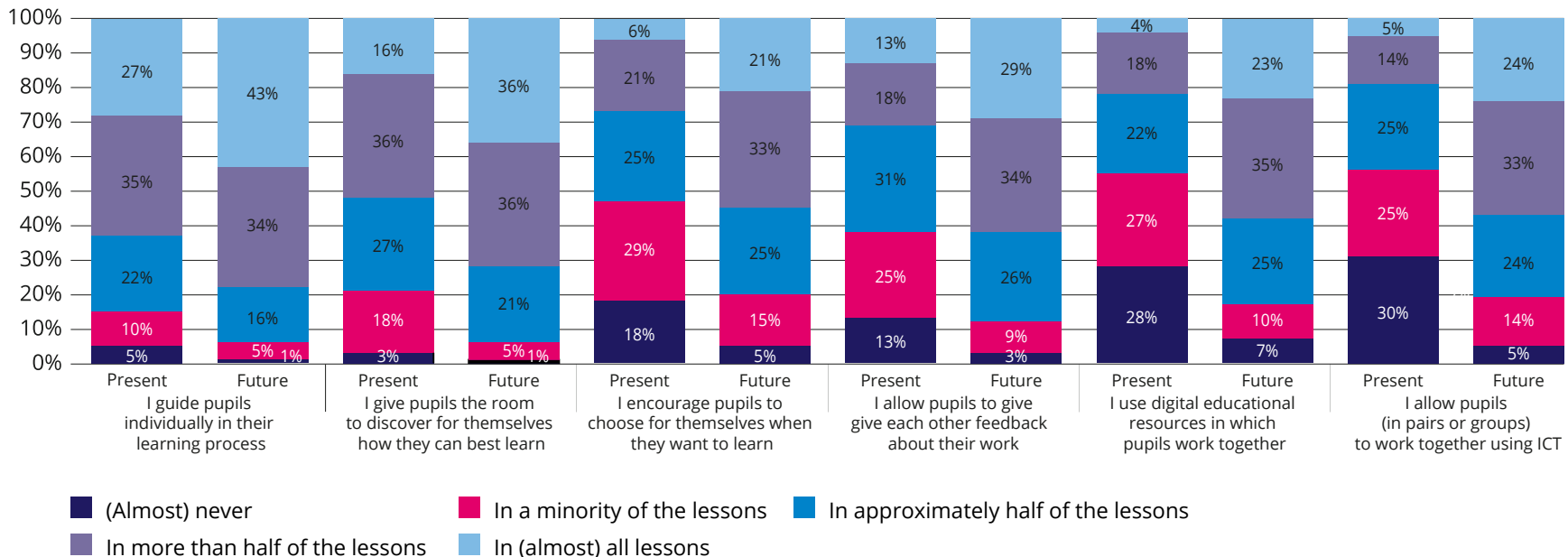
4.4 Attention to pupils' digital literacy

Figure 4.6 relates to the attention to pupils' digital literacy. Digital literacy covers the skills that ensure that pupils are sufficiently digitally prepared for society so that they are self-sufficient in this regard. They should learn to use digital applications sufficiently safely, effectively, critically and consciously and prepare themselves for a digital future.

The four items from the questionnaire correspond to the four domains of digital literacy: basic ICT skills, media literacy, digital information skills and computational thinking *(Digital Literacy Handbook, 2021)*. Despite the fact that these four sub-areas were questioned using a single item, this can provide a picture of the different domains of digital literacy on the islands.

Sixty-three percent of the teachers indicate that they (almost) never help pupils to use general computer programs or only in a minority of the lessons, while 36 percent do this more often. A small majority of teachers help pupils to find and evaluate information on the internet less often or hardly ever (54 percent), compared to 46 percent who do this regularly. Furthermore, a majority of teachers pay attention to social media and internet safety less often or (almost) never (66 percent), compared to 34 percent who pay attention to this regularly. Finally, 78 per cent of teachers say they (almost) never pay attention to learning to build logical reasoning through programming or coding or only in a minority of the lessons, while 22 per cent do this in about half of the lessons or more.

Figure 4.6 shows that, according to teachers, most attention is paid to the domain of digital information skills (item 2), followed by media literacy (item 3) and then by basic ICT skills (item 1). The least attention is paid to computational thinking (item 4).

The interviews show that in general schools pay attention to developing the digital literacy of their pupils in different ways. Thus, there are schools that choose to pay attention to digital literacy by offering separate subjects in which these aspects are central. There are also schools that provide the skills in a cross-curricular and integrated fashion. In addition, there are schools that do not currently pay explicit attention to digital literacy or indicate that pupils are offered a device.

Figure 4.6 Please fill in how often you pay attention to the following aspects during lessons

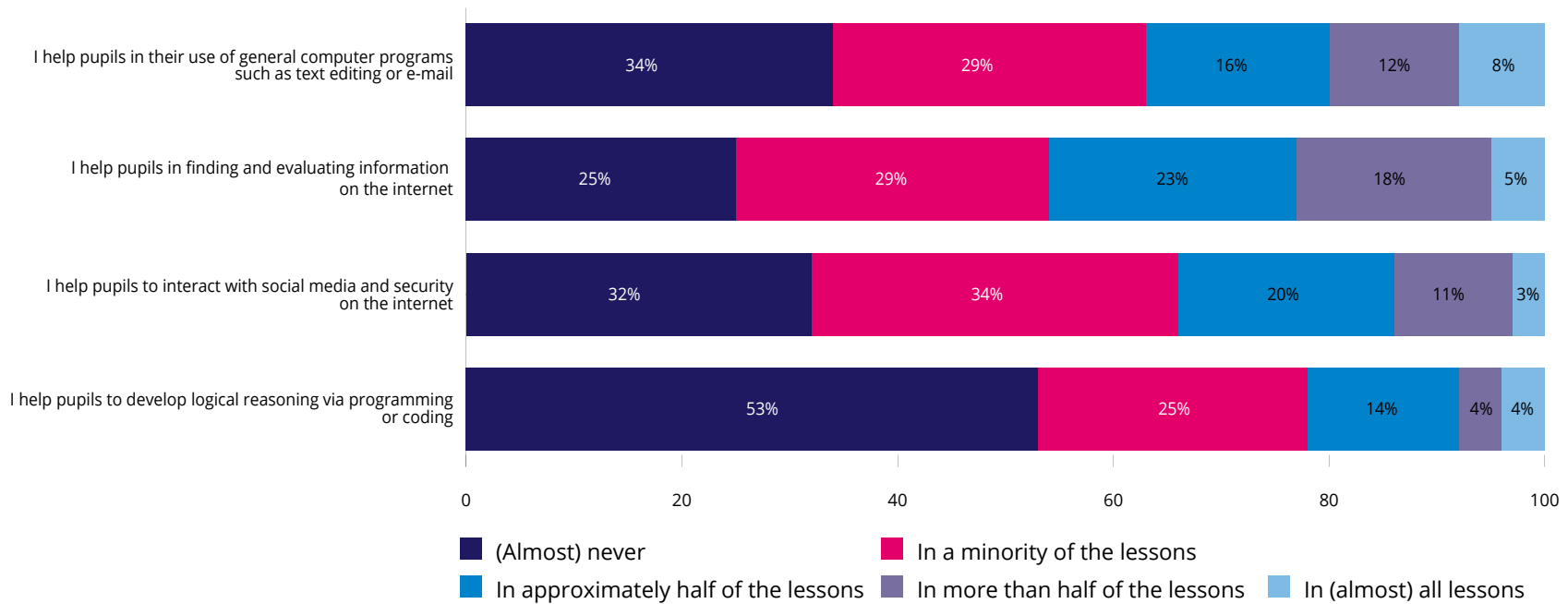| Aspect	(Almost) never	In a minority of the lessons	In approximately half of the lessons	In more than half of the lessons	In (almost) all lessons
I help pupils in their use of general computer programs such as text editing or e-mail	34%	29%	16%	12%	8%
I help pupils in finding and evaluating information on the internet	25%	29%	23%	18%	5%
I help pupils to interact with social media and security on the internet	32%	34%	20%	11%	3%
I help pupils to develop logical reasoning via programming or coding	53%	25%	14%	4%	4%

Figure 4.7 shows the future expectations of teachers regarding attention to pupils' digital literacy. A large proportion of teachers (79 per cent) agree or strongly agree with the statement that they intend to help pupils with the use of general computer programs and with the statement that they intend to help pupils find and evaluate information on the internet. In the future, 71 percent of teachers want pupils to learn how to deal with social media and internet safety. Finally, half of the teachers are planning to teach students to develop logical reasoning through programming or coding. Compared to figure 4.7, it can be seen that teachers expect to apply their teaching to the four domains of digital literacy more than they do in current teaching practice.

4.5 Reasons for using digital resources

Figure 4.8 shows the added value of digital educational resources compared to paper learning resources. According to most teachers (91 percent), digital educational resources are more attractive to pupils. Furthermore, 79 percent of the teachers believe that digital educational resources enable them to offer more variety in learning activities and that pupils are better able to work independently. One percent of teachers see no added value compared to paper educational resources.

Figure 4.7 Please fill in which aspects you are planning to apply in the future
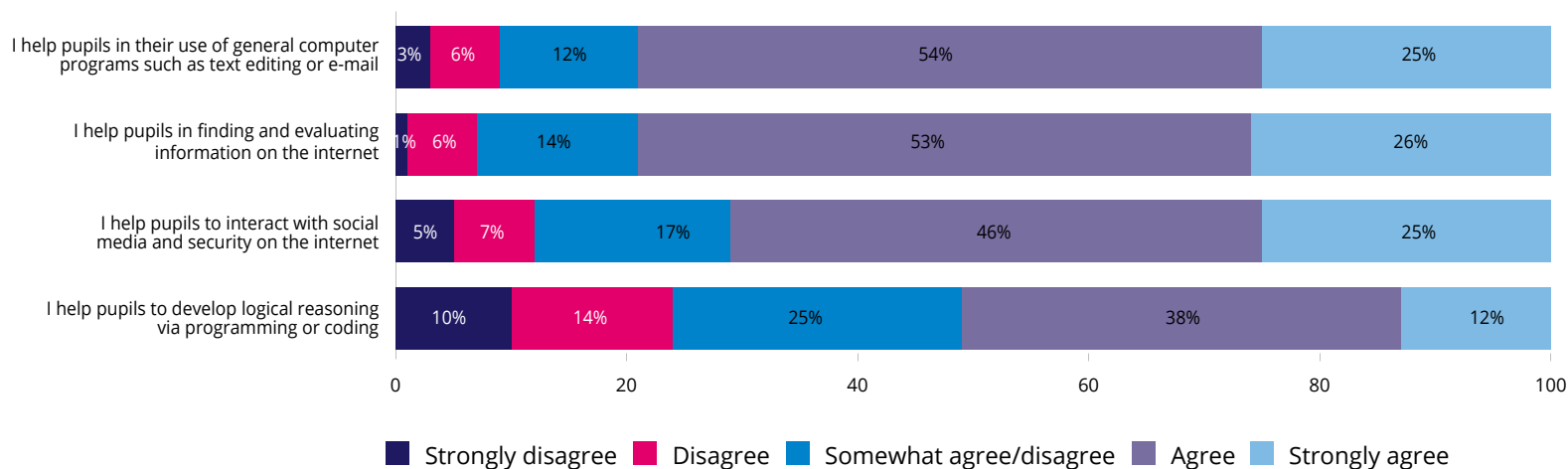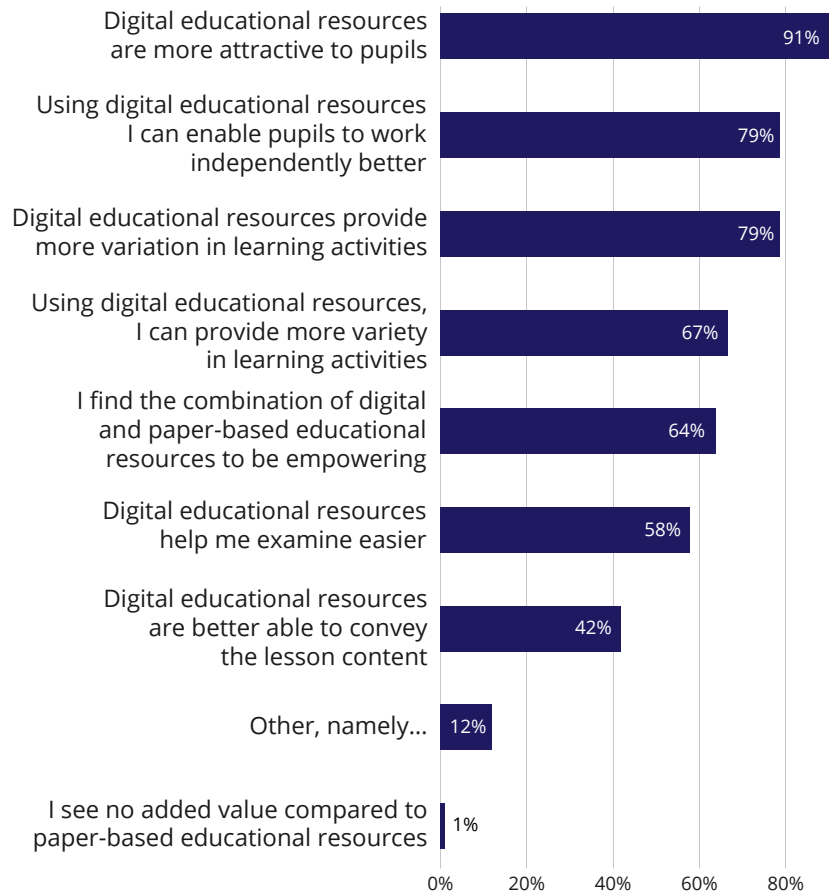
Figure 4.8 What in your opinion is the added value of digital educational resources compared to paper educational resources? More than one answer is possible

Digital educational resources are more attractive to pupils — 91%

Using digital educational resources I can enable pupils to work independently better — 79%

Digital educational resources provide more variation in learning activities — 79%

Using digital educational resources, I can provide more variety in learning activities — 67%

I find the combination of digital and paper-based educational resources to be empowering — 64%

Digital educational resources help me examine easier — 58%

Digital educational resources are better able to convey the lesson content — 42%

Other, namely… — 12%

I see no added value compared to paper-based educational resources — 1%

Teachers had the opportunity to respond with an open answer under the 'other, namely…' option. Various aspects were mentioned here. E.g. it appears that teachers find teaching with digital educational resources more current and that digital educational resources are used more often because they contain a larger amount of information and material that is also better suited to Caribbean society. They also mentioned that the internet connection is extremely important for optimising the added value of digital educational resources. See Annex 1 for the open answers given.

From the interviews with the school leaders and ICT coordinators, it appears that the main reason for using digital educational resources is that they align more closely with the experiences of the pupils and the changing society in which ICT will be a permanent fixture. Eleven of the seventeen schools give this as the main reason. Four schools use the argument that digital resources are more sustainable and environmentally friendly, as less printing is needed. Some schools also indicate that digital resources offer an easy overview for the teacher, that there is immediate feedback for the pupil and that these resources are easier to set up remotely.

4.6 Benefits of ICT

The teachers were asked how often they see an effect from the use of ICT in the lesson. Figure 4.9 shows that a majority of the teachers regularly to very often observe that through the use of ICT pupils have a better overview of their own learning process (67 percent) and that they themselves have a better overview of pupils' progress (68 percent). Approximately 70 percent of the teachers regularly to very often see that pupils receive teaching that is suited to them in terms of content, form of instruction and pace, and that teaching is made more efficient. A majority of teachers also see that pupils learn quicker and that learning performance improves (68 per cent and 63 per cent respectively). Furthermore, most teachers (82 percent) regularly to very often observe that pupils are more motivated through the use of ICT.

Conclusions

The educational resources and teaching materials used the most are a PC or laptop. Method-related educational resources are used about as often as non-method-related educational resources and teaching materials. A majority of the teachers on Sint Eustatius indicate that they almost never use a digital whiteboard, whereas teachers on Saba do this more often.

A majority of teachers use digital analyses of test results and results from digital educational resources for the assessment of pupils (almost) never or in a minority of the lessons. Also, a majority (almost) never uses digital testing for pupil assessment, or does so less often.

Figure 4.9 How often do you observe that through the use of ICT ...

Legend: Occasionally or never · Sometimes · Regularly · Often · Very often or every lesson
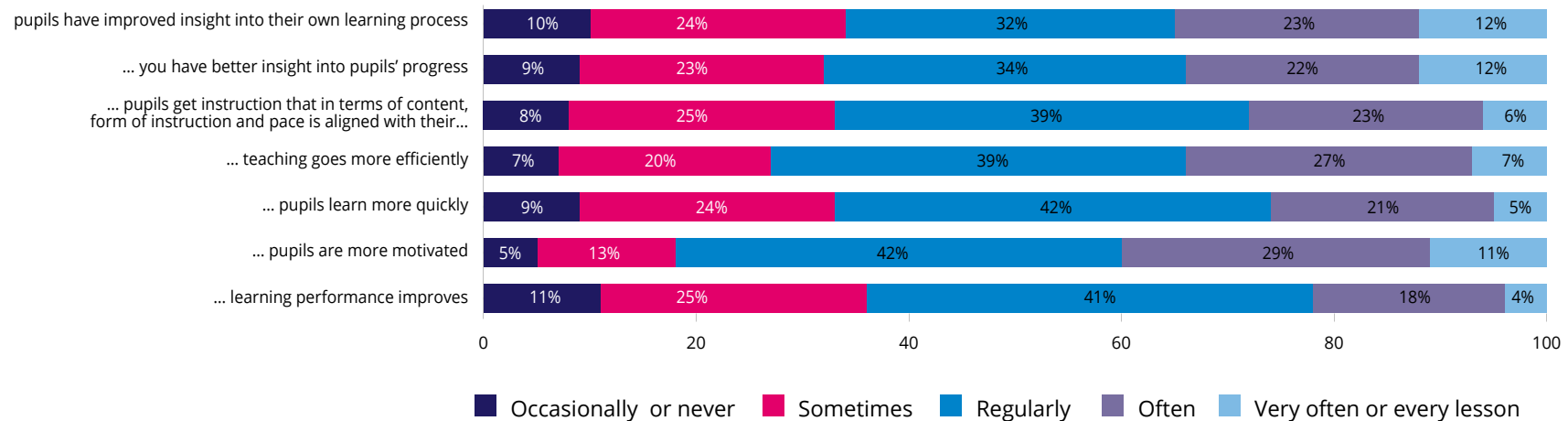
School leaders and ICT coordinators indicated in the interview that more work is needed, in particular on thinking about and practising the skills associated with the use of digital educational resources. Some of them also think that more should be invested in professionalisation, such as attending workshops or using in-service training.

Most teachers adjust their teaching less often to (almost) never based on the results of digital testing. They also use digital testing less often to test the level of pupils in the interim. Furthermore, three quarters of the teachers indicate that they give digital feedback less often to (almost) never.

In their lessons, teachers use the digital material prescribed by the teaching method the most, followed by giving pupils room to discover for themselves how they want to learn and guiding them in their individual learning process. Slightly more than half of the teachers allow pupils to work with exercise software during the lesson.

In the future, most teachers anticipate giving explanations in whole-class teaching using digital educational resources in at least half of the lessons. Teachers indicate that they would like to pay more attention to the digital material of the teaching method, the use and application of the digital whiteboard and working with exercise software. They also want to focus more in the future on encouraging pupils to choose for themselves what they want to learn. In the future, they want to guide pupils more individually in their learning process and give them the room to discover for themselves how they learn best.

According to the teachers, most attention is paid to the domain of digital information skills, one of the four domains of pupil digital literacy. After this, teachers focus on media literacy and basic ICT skills. The least attention is paid to computational thinking. Almost all teachers indicate that the four sub-areas will be given more attention in the future. School leaders and ICT coordinators state that attention is paid to the development of pupils' digital literacy in various ways. Thus, at some schools pupils take examinations in digital literacy and EDPM (Electronic Document Preparation and Management. Some schools assume that if pupils work with a device that this means they are digitally literate, although of course that does not meet the four domains of digital literacy outlined above. Most schools are not yet devoting enough attention to the digital literacy of their pupils.

The overwhelming majority of teachers regard digital educational resources as more attractive than paper educational resources, for themselves and for the pupils. Four out of five teachers also consider digital educational resources to have added value because they enable pupils to work more independently and/or because they are able to provide more varied learning activities with these educational resources. School leaders and ICT coordinators mention that the main reason for using digital educational resources is that they align more closely with the experiences of the pupils and the changing society in which ICT will be a permanent fixture. They also mention the argument that the educational resources are more sustainable and environmentally friendly.

5. ICT competence and professionalisation

5.1 General digital skills

The teachers were asked about their own digital skills. Table 5.1 shows how teachers mark themselves for their use of ICT in the classroom. This shows that they give themselves a 7 on average, on a scale of 1 to 10 (SD=1). The minimum score here is a 1, with the maximum score being 10.

Figure 5.1 shows the extent to which teachers consider themselves competent in the use of ICT. A majority of the teachers regard themselves as competent in the use of ICT in daily life (55 per cent agree and 21 per cent strongly agree). A majority also regard themselves as competent in finding information online (58 per cent agree and 26 per cent strongly agree). A minority of teachers (32 percent) agree or strongly agree with the statement that they are knowledgeable about new technologies.

Table 5.1 If you were to give yourself a mark for your use of ICT in the classroom, what would it be?
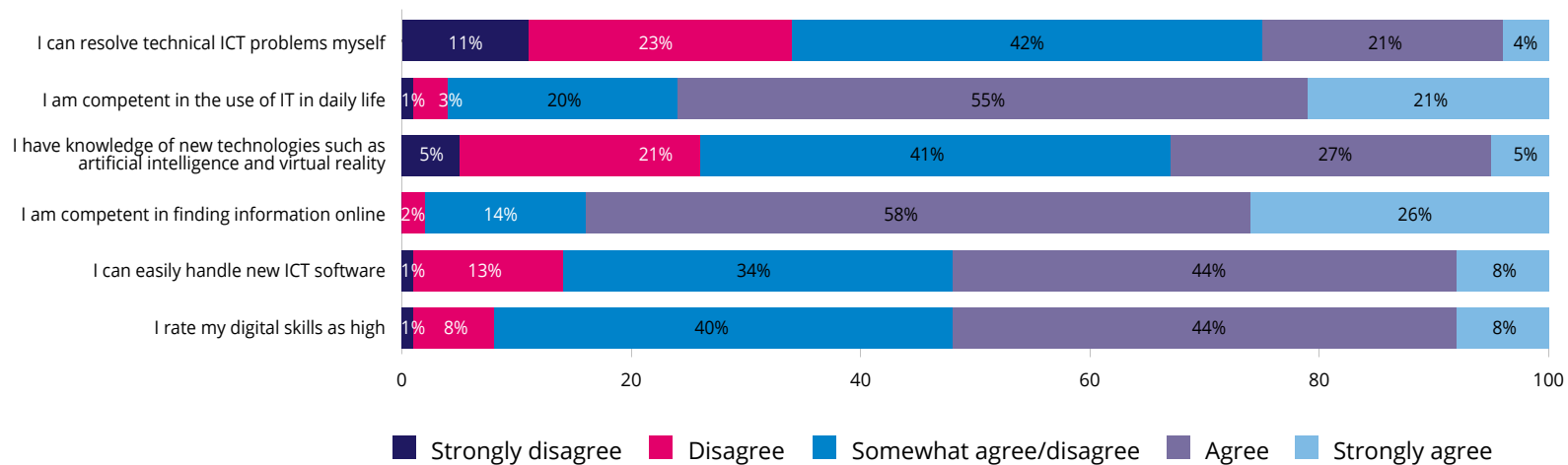
Average	Std. deviation	Minimum	25%	50%	75%	Maximum	n
7	1	1	6	7	8	10	146

A small majority can easily utilise a new ICT program (44 per cent agree and 8 per cent strongly agree) and rate their digital skills as high (44 percent agree and 8 percent strongly agree). We can conclude that the teachers in this study generally consider themselves digitally competent.

Figure 5.1 Indicate the extent to which you agree with the following aspects

| Aspect	Strongly disagree	Disagree	Somewhat agree/disagree	Agree	Strongly agree
I can resolve technical ICT problems myself	11%	23%	42%	21%	4%
I am competent in the use of IT in daily life	1%	3%	20%	55%	21%
I have knowledge of new technologies such as artificial intelligence and virtual reality	5%	21%	41%	27%	5%
I am competent in finding information online		2%	14%	58%	26%
I can easily handle new ICT software	1%	13%	34%	44%	8%
I rate my digital skills as high	1%	8%	40%	44%	8%

5.2 Teaching skills

Not only were teachers asked to indicate how digitally competent they are in general but also how digitally competent they consider themselves to be in terms of teaching with ICT. Figure 5.2 shows that a majority of teachers find it easy to vary the (digital) teaching materials (60 percent), know how to choose suitable digital educational resources (59 percent) and know where they can find them on the internet (67 percent). Fifty-seven percent of teachers are comfortable using digital educational resources and fifty-nine percent can assess which media are suitable for use in distance learning.

In addition, a majority of teachers know how to apply ICT in education in order to develop in different directions (62 percent), 65 percent consider themselves competent in the use of ICT as a teaching tool and 66 percent know how to use ICT to monitor pupils' learning progress.

Finally, a small minority of teachers indicate that they can integrate ICT effectively into lessons (45 percent) and that they know how to use new technologies in education (49 percent).

Figure 5.2 Indicate the extent to which you agree with the following aspects
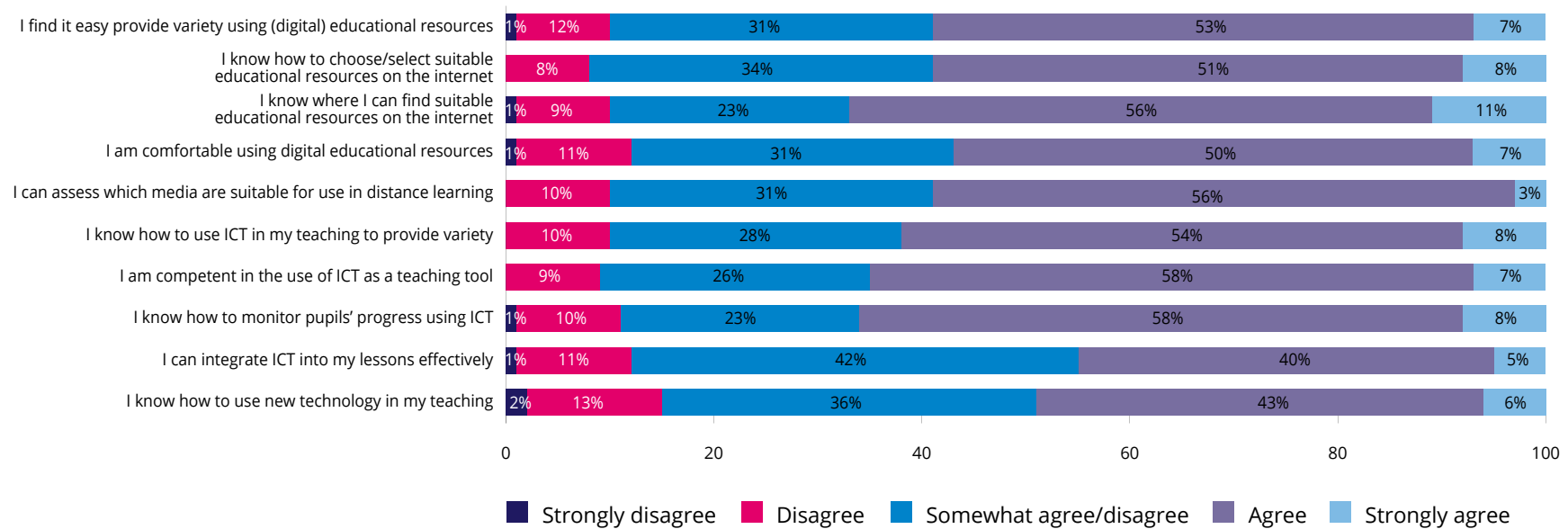
5.3 ICT competence of teachers according to school leaders

The interviews show that the school leaders believe that in general their teachers are sufficiently to averagely competent in ICT (table 5.2). Two schools indicate that their teachers are not sufficiently competent to apply ICT properly in their teaching.

Table 5.2 Data from interviews: to what extent are the teachers in your school competent in ICT?

	Bonaire (N = 11)	Saba (N = 2)	Sint Eustatius (N = 5)
Sufficiently competent	2	2	2
Averagely competent	8	-	2
Insufficiently competent	1	-	1

5.4 Professionalisation opportunities and requirements

Current professionalisation opportunities
The interviews with school leaders show that 15 out of the 17 schools have the budget, time and space to become more professional in the field of ICT and education in the form of additional study, courses or training sessions. This means that two schools indicate that there are no such opportunities. In all schools, the responsibility for and organisation of these opportunities for becoming more professional lie with the headmaster or school leader, or with the manager in the overall administration.
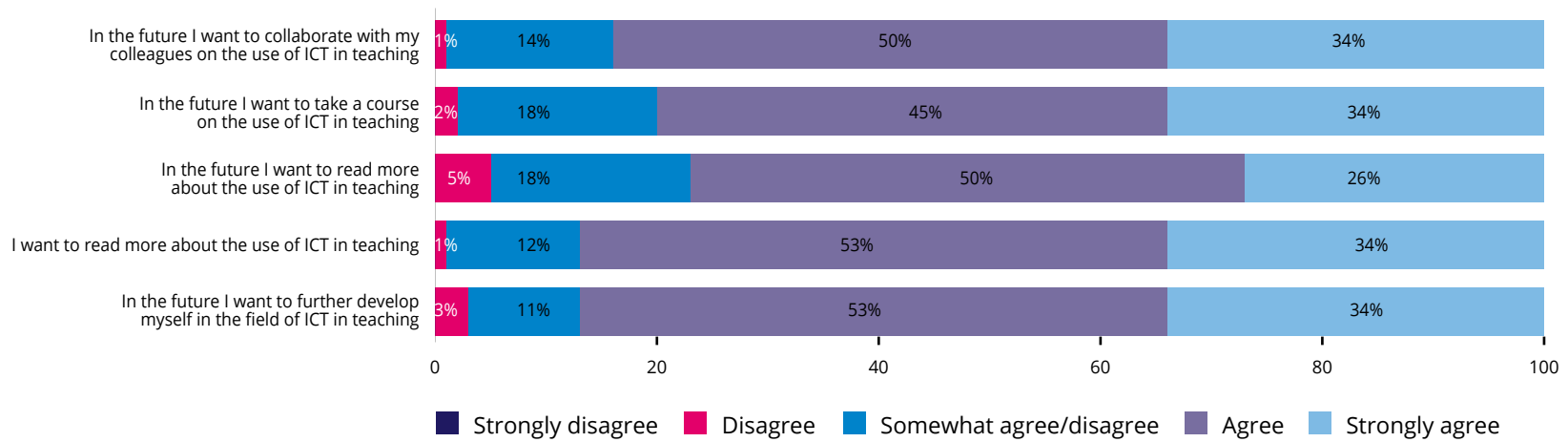
Professionalisation requirement of teachers
Figure 5.3 shows that in the future 84 percent of the teachers want to collaborate with colleagues in thinking about the use of ICT in education. Seventy-nine percent also want to take a course on the use of ICT. Seventy-nine percent of the teachers are planning to read more in the future about the use of ICT in education and eighty-seven percent would like to learn more about it. Furthermore, 87 percent of the teachers indicate that they would like to develop themselves in the field of ICT in education in the future. In general, most of the teachers who participated in this study want to continue developing in the field of education and ICT.

Figure 5.3 Indicate the extent to which you agree with the following aspects

	Strongly disagree	Disagree	Somewhat agree/disagree	Agree	Strongly agree
In the future I want to collaborate with my colleagues on the use of ICT in teaching	1%		14%	50%	34%
In the future I want to take a course on the use of ICT in teaching	2%		18%	45%	34%
In the future I want to read more about the use of ICT in teaching		5%	18%	50%	26%
I want to read more about the use of ICT in teaching	1%		12%	53%	34%
In the future I want to further develop myself in the field of ICT in teaching	3%		11%	53%	34%

5.5 ICT competence of school leaders and ICT coordinators

The interviews indicate that 50 percent of the school leaders and ICT coordinators consider themselves to be averagely competent in ICT. 44 percent rate themselves as sufficiently competent (table 5.3).

Table 5.3 Data from interviews: how would you rate your own competence in ICT?

	Number	%
Sufficiently competent	8	44%
Averagely competent	9	50%
Insufficiently competent	1	6%

Conclusions

The results of the questionnaire show that, on a scale from one to ten, teachers give themselves on average a seven for their general digital skills. Approximately four out of five teachers consider themselves skilled in the use of ICT in their daily life and sufficiently skilful in finding information online. Half of the school leaders and ICT coordinators rate themselves as averagely competent in ICT.

On average, teachers indicate that they possess teaching skills in the use of ICT and digitisation in daily educational practice. Almost all teachers find it easy to keep things varied using digital educational resources, are skilled in the use of ICT as a teaching tool and know where to find suitable digital teaching materials on the internet.

The interviews show that the school leaders believe that in general their teachers are sufficiently to averagely competent in ICT. This also shows that fifteen out of the seventeen schools have the budget, time and space to become more professional in the field of ICT and education in the form of additional study, courses or training sessions. In all schools, the responsibility for and organisation of these opportunities for becoming more professional lie with the headmaster or school leader, or with the manager in the overall administration.

In the future and in coordination with their colleagues, teachers would like to think more about the use of ICT in education and they would like to take a course on the use of ICT. Four out of five teachers are planning to read more in the future about the use of ICT in education and would like to learn more about it.
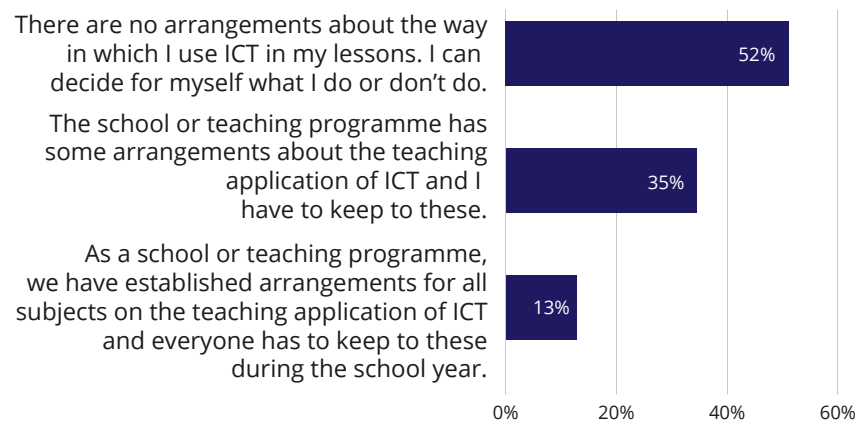
6. Vision and school's arrangements

6.1 Vision and school's arrangements

Figure 6.1 shows which description best characterises the use of ICT at the school or in the study programme. A majority of the teachers indicate that there are no arrangements for how ICT is used in the lessons and they can decide for themselves whether they make use of it and, if so, in what way (52 percent). A smaller group (35 percent) has some arrangements imposed by the school or educational programme on the use of ICT in teaching. Furthermore, 13 percent of the teachers have made arrangements for the application of ICT for teaching all subjects. On examination of the response from the various islands, we can observe that it is the teachers on Saba who are subject to the most arrangements for the application of ICT in teaching (33 percent).

Figure 6.1 Which description best fits the use of ICT in your school or study programme?

There are no arrangements about the way in which I use ICT in my lessons. I can decide for myself what I do or don't do. — 52%

The school or teaching programme has some arrangements about the teaching application of ICT and I have to keep to these. — 35%

As a school or teaching programme, we have established arrangements for all subjects on the teaching application of ICT and everyone has to keep to these during the school year. — 13%

It is clear from the interviews that a majority of school leaders and ICT managers indicate that the vision for ICT use mainly revolves around preparing pupils for a future with ICT. Several interviewees regard this as an important factor for integrating the use of ICT into the educational curriculum. A number of school leaders and ICT managers mention that the 'equal opportunities' aspect has been included in the school's vision. Irrespective of their home situation, every pupil must be able to maintain progress in ICT. The availability or otherwise of devices should not influence the opportunities that pupils have. Several school leaders also mention that there is no specific vision on the use and application of ICT within their organisation.

School leaders and ICT coordinators mention various aspects of their school's vision when it comes to teaching with ICT. However, a majority of teachers (52 per cent) state that there are no arrangements and that they are allowed to decide for themselves on the use of ICT in daily teaching practice.

6.2 Quality of ICT usage in the future

School leaders and ICT coordinators were asked where their priority lies in the future as regards enhancing the quality of ICT usage. A majority of school leaders and ICT coordinators indicate that their main priority is to develop the effective usage of existing applications.

They also mention often that the digital skills of teachers and staff should be given higher priority in the future. Occasionally, it is stated that more devices are needed per pupil (with the aim of combating inequality between pupils) or that more money or a better electricity connection is needed.

Conclusions

Just over half of the teachers indicate that there are no arrangements for how ICT is to be used in the lessons. They state that they are allowed to decide for themselves what they are doing / will do. For one in three teachers there are some arrangements about the use of ICT in teaching.

A majority of school leaders and ICT managers indicate that the vision for ICT use mainly revolves around preparing pupils for a future with ICT. Some also mention that the equal opportunities aspect is part of their school's vision in which, irrespective of the home situation, every pupil must be able to maintain progress in ICT.

Most school leaders and ICT coordinators also indicate that the effective use of existing applications and the development of the digital skills of teachers and staff should be prioritised in the future.

7. Covid

7.1 COVID-19 in retrospect

On the advice of the Caribbean Outbreak Management Team that met on 30 March 2020, various measures were taken to combat COVID-19 in the islands of Bonaire, Sint Eustatius and Saba. Various inter-island collaborations took place to keep infection rates as low as possible. For nearly 18 months, the measures kept changing, with various alternating forms of lockdown. Moreover, school closures meant that teachers and pupils on the islands had to engage in distance learning.

During the first lockdown, schools continued to find the preparations for remote teaching difficult; during the second lockdown, teachers were already better prepared. The interviews with the school leaders and ICT coordinators show that forced remote teaching subsequently went well for most schools. Even so, some problem areas were also mentioned. Thus, school leaders and ICT coordinators indicate that it was not always possible to maintain good contact with all pupils due to certain home situations, e.g. when they had no device or internet connection at home. Also, many students were not sufficiently digitally skilled to connect online every day. Parents were often mentioned as a problem, specifically parental involvement or the ability of parents to support where necessary. This problem was a factor for several schools.

In terms of skills, it was shown earlier (Section 5) that 57 per cent of teachers are comfortable using digital educational resources and 59 per cent can assess which media are suitable for use in distance learning.

7.2 Working from home

In the majority of schools, working from home is still possible, if the situation demands it (table 7.1). This means that teachers teach from home or school, and pupils follow lessons from home. In almost all schools there are also devices (on loan) that both teachers and pupils can use. In a few schools, the policy is for this to be arranged for only one of these two target groups. At two schools, there is no facility for working from home and following lessons at home. In the interviews, several schools mentioned that working from home is a possibility and that devices can be borrowed, but that often there are not enough devices to provide every teacher and pupil with the right equipment.

Table 7.1 Data from interviews: was it possible to work from home? And were there any backup devices available for teachers and pupils?

	Number	%
Working from home is possible. Devices available for teachers and pupils.	14	78%
Working from home is possible. Devices available for teachers.	1	5.5%
Working from home is possible. Devices available for pupils.	1	5.5%
Working from home is not possible.	2	11%

Conclusions

The interviews with the school leaders and IT coordinators show that generally speaking remote teaching went well during the lockdowns. However, a number of problems were experienced, such as the home situation of pupils, the availability of devices and the internet connection, the digital competence of pupils and parental involvement.

Most schools mention that, should it become necessary again, working from home will be possible, but that there are often not enough devices for every pupil and teacher. This corresponds to the calculated device/pupil ratio which was described earlier in this report.

8. In-depth analyses

8.1 Differences between the teachers

Below we present significant differences between groups of teachers. We performed chi-square tests and ANOVAs and calculated correlations. The group of teachers in primary and secondary education was examined and compared (Tables 8.1 and 8.3). The teachers were also divided into three groups in relation to how they perceived the quality of the school's infrastructure (Tables 8.2 and 8.4).

In the current situation, there is a significant difference in the ICT competence of teachers in primary education and those in secondary education (table 8.1). In this study, teachers in primary education (PE) rate themselves on average to be less IT-competent than teachers in secondary education (SE) do.

Table 8.1 ICT competence of teachers currently ($p < 0.01$)

Sector	M	SD	n
PE	1.96	0.84	89
SE	2.50	0.85	48

The professionalisation requirement of teachers in this study are related to the quality of the infrastructure (Table 8.2). The more poorly the infrastructure is rated, the significantly greater the teacher's requirement for professionalisation.

Table 8.2 Professionalisation requirement of teachers (p < 0.05)

Quality of infrastructure	M	SD	n
Good	2.94	0.61	61
Moderate	3.21	0.67	72
Poor	3.49	0.65	13

There is also a significant difference between the teachers in primary and secondary education with regard to the teacher-oriented usage of ICT (table 8.3). On average, teachers in primary education indicated that they make more use of teacher-oriented provision (M = 3.40) compared to teachers in secondary education (M = 2.90). This means that teachers in primary education give more instruction using ICT or a digital whiteboard, and allow pupils to use exercise programs more than do teachers in secondary education.

Table 8.3 Teacher-oriented use of ICT (p < 0.05)

Sector	M	SD	n
PE	3.40	1.11	89
SE	2.90	1.06	48

As well as the difference between the groups of teachers from primary and secondary education, there is a also significant difference between the groups of teachers who indicate that the infrastructure at the school where they teach is of good, moderate or poor quality (Table 8.4). Teachers who think that the infrastructure at their school is poor indicate that they use less teacher-oriented ICT in their current teaching practice (M = 2.48) compared to the group of teachers who think that the infrastructure is moderate (M = 3.09) or good (M = 3.51).

Table 8.4 Teacher-oriented use of ICT (p < 0.01)

Quality of infrastructure	M	SD	n
Good	3.51	0.94	61
Moderate	3.09	1.12	72
Poor	2.48	1.28	13

8.2 The relationship between the use of digital educational resources and teaching materials and the teachers' teaching methods and views.

The use of digital educational resources appears to be related to the teachers' teaching methods and views. Correlation analysis was used to determine which significant relationships are present. The use of digital educational resources is related to the teachers' faith in their own ability (self-efficacy) in terms of general digital skills and the application of those skills to teaching methods, testing and assessment using ICT, teacher-oriented use of ICT, and teachers' views on the benefits of ICT. Firstly, there is a positive correlation between the number of educational resources used by teachers and their self-efficacy in terms of their general digital skills (r = 0.269) and their application of those skills to teaching methods, (r = 0.297). This means that when teachers think they are digitally skilled either in general or in the application of those skills to teaching methods, they use more digital educational resources in their daily teaching practice.

There is also a slight correlation between the quantity of digital educational resources and teaching materials that teachers use and testing and assessment using the support of ICT currently (r = 0.166) and in the future (r = 0.215). Teachers who use a lot of digital educational resources and teaching materials now or will do so in the future will also use them for testing and assessment using the support of ICT.

There is a positive correlation between the quantity of digital educational resources and teaching materials that teachers use and the use of teacher-oriented application of ICT, such as giving presentations with presentation software, currently (r = 0.297) and in the future (r = 0.275). This means that teachers who use a lot of digital educational resources and teaching materials now or will do so in the future will use them primarily for teacher-oriented application of ICT.

Finally, there is a positive correlation between the number of digital educational resources and teaching materials used by teachers and their views on the benefits of ICT use (r = 0.297). When teachers use more digital educational resources and teaching materials, they are often more positive about the benefits of using ICT: it is then more common for them to see the added value of using ICT in lessons.

Conclusions

It appears from the in-depth analyses that teachers in primary education rate themselves on average to be less IT-competent than teachers in secondary education do. It also appears that the poorer the teachers rate the infrastructure, the greater their requirement for professionalisation. Moreover, teachers in primary education indicate on average that they make more use of teacher-oriented application of ICT compared to teachers in secondary education. This is similar to the group of teachers who experience the infrastructure as good. On average, this group works using more teacher-oriented ICT than the group that experiences the infrastructure as poor. For example, the first group gives more instructions using ICT or a digital whiteboard.

The use of digital educational resources also appears to be related to the teachers' teaching methods and views. Teachers who rate themselves as digitally skilled either in general or in the application of those skills to teaching methods use more digital educational resources in their daily teaching practice. Teachers who use a lot of digital educational resources now or will do so in the future will also use them for testing and assessment using the support of ICT. Teachers who use a lot of digital educational resources now or will do so in the future will use them primarily in the form of teacher-oriented application of ICT. Finally, teachers who use more digital educational resources are more positive about the use and benefits of ICT in the lessons.

9. Scaled scores

First, we will briefly consider the assessment of the validity and reliability of the scales. Then we will present the mean and distribution of scaled scores in the sample.

9.1 Assessment of validity and reliability

The items in the questionnaire shown in Table 9.1 form the scales for this study:

Table 9.1 Distribution of items over scales

Scale	Items
Development of pupil's digital literacy	I teach pupils to develop logical reasoning through programming or coding
	I teach pupils how to deal with social media and safety on the internet
	I help pupils find and assess information on the internet
	I help pupils to use general computer programs, e.g. word processing or e-mail
Teachers' self-efficacy in relation to general digital skills	I rate my digital skills highly
	I can easily handle a new ICT program
	I am skilled in finding information online
	I am informed about new technologies, such as artificial intelligence and virtual reality
	I am skilled in the use of ICT in daily life
	I can solve technical ICT problems myself
Teachers' self-efficacy in relation to the application of digital skills to teaching methods	I know how to use new technologies in my teaching
	I can integrate ICT effectively into my lessons
	I know how to monitor pupils' progress in learning using ICT
	I am skilled in the use of ICT as an aid to teaching
	I know how I can apply ICT in my teaching for developing in different directions
	I can evaluate which media are suitable for use in distance learning

Scale	Items
	I am comfortable using digital educational resources
	I know where to find appropriate digital educational resources on the internet
	I know how to choose/select appropriate digital educational resources
	I find it easy to keep things varied with (digital) teaching materials
Professionalisation requirement of teachers	I want to develop myself in the future in respect of ICT in education
	I want to learn more about the use of ICT in education
	In the future, I want to read more about the use of ICT in education
	In the future, I want to take a course on the use of ICT in education
	In the future, I want to collaborate with colleagues in thinking about the use of ICT in education
Testing and assessment using the support of IT*	I make use of digital analyses of test results (or exercise software for example)
	I use the results from digital educational resources to assess pupils
	I use digital testing to assess pupils
Testing and assessment: formative testing using IT*	I adjust my teaching based on digital test results
	I use (formative) digital testing to monitor pupils' interim levels
	I provide digital feedback to pupils
	I regularly check pupils' understanding of the material using digital applications
	I analyse information from a digital student monitoring system to track student performance
Teacher-oriented use of IT*	I provide classroom instruction using digital educational resources
	I use a digital whiteboard during my lessons

Scale	Items
	I let pupils work with exercise software during lessons
	I use the digital material that the teaching method prescribes
	I use the teaching method to decide what my pupils learn at what time
Pupil-oriented use of IT*	I guide students individually in their learning process
	I give students the room to discover for themselves how they learn best
	I encourage pupils to choose for themselves when they want to learn something
	I let pupils give each other feedback on their work
	I use digital learning environments in which pupils work together
	I let pupils (in pairs or in groups) work together with ICT

Scale	Items
Benefits of ICT use observed by teachers	How often do you observe that the use of ICT improves learning performance?
	… pupils are more motivated
	… pupils learn quicker
	… lessons go more efficiently
	… pupils get teaching that in terms of content, form of instruction and pace is tailored to their individual talents
	… you have improved insight into pupils' progress
	… pupils have a better view of their own learning process

These scaled scores were calculated twice, because the items were queried for both the current situation and for future expectations

To examine whether the scales are an accurate reflection of the underlying variables, factor analysis was applied. In addition, we examined the reliability of the scales by calculating Cronbach's Alpha for each scale.

The scales we are using in this study are based on scales from previously used tools that have been modified on a number of points. Because the scales are based on previously used tools, a confirmatory factor analysis was carried out. This analysis shows that the chosen scale fits the data well (Comparative Fit Index [CFI] = 0.996; Tucker-Lewis Index [TLI] = 0.995; Root Mean Square Error of Approximation [RMSEA] = 0.037).

As a comment on these analyses, it should be noted that normally a larger number of respondents is needed to perform a confirmatory factor analysis. Because a previous study showed that the scales were appropriate, we expect that even with a larger number of respondents, the scale would be a good fit for the data. This can be further investigated in a possible future study.

Table 9.2 illustrates the reliability of the scales. We see here that the Cronbach's Alpha scores for these scales vary between 0.79 and 0.93 (acceptable to excellent).

Table 9.2 Reliability of the questionnaire: Cronbach's Alpha for the scales

Scale	Number of items	Cronbach's Alpha	Assessment*
ICT competence of teachers (current)	4	0.79	Acceptable
ICT competence of teachers (future)	4	0.79	Acceptable
Teachers' self-efficacy in relation to general digital skills	6	0.87	Good
Teachers' self-efficacy in relation to the application of digital skills to teaching methods	10	0.93	Excellent
Professionalisation requirement of teachers	5	0.94	Excellent
Testing and assessment using the support of ICT (current)	3	0.86	Good
Testing and assessment using the support of ICT (future)	3	0.90	Excellent
Testing and assessment: formative testing using ICT (current)	5	0.85	Good
Testing and assessment: formative testing using ICT (future)	5	0.93	Excellent
Teacher-oriented application of ICT (now)	5	0.84	Good
Teacher-oriented application of IT (future)	5	0.89	Good
Pupil-oriented application of ICT (now)	6	0.84	Good
Pupil-oriented application of IT (future)	6	0.90	Good
Benefits of ICT use observed by teachers	7	0.93	Excellent

* We have used the following rule of thumb for the assessment:
< 0.5 = unacceptable; 0.5 - 0.6 = poor; 0.6 - 0.7 = questionable; 0.7 - 0.8 = acceptable; 0.8 - 0.9 = good; > 0.9 = excellent.

9.2 Difference between current situation and future

This section provides insight into the differences between the current situation and future expectations for teachers' ICT competence, testing and assessment using ICT, teacher-oriented application of ICT and pupil-oriented application of ICT. We also examined whether there is a difference in the degree of self-efficacy in relation to general digital skills and the application of digital skills to teaching methods. We have assessed differences (and where the are significant marked them with a star).

It is noteworthy that on all scales the average score that teachers give themselves for the future is significantly higher than the score they are giving currently. Figure 9.1 shows the difference between the teachers' ICT competence now and in the future, with teachers expecting to be more ICT competent in the future than they are currently.

Figure 9.2 shows that there is a significant difference between testing and assessment using the support of ICT in current practice and in the future. This also applies to formative testing using ICT (figure 9.3). Teachers expect to do more testing in the future (including formative testing) using ICT.

Figure 9.1 Difference between ICT competence of teachers (current situation) – ICT competence of teachers (future)
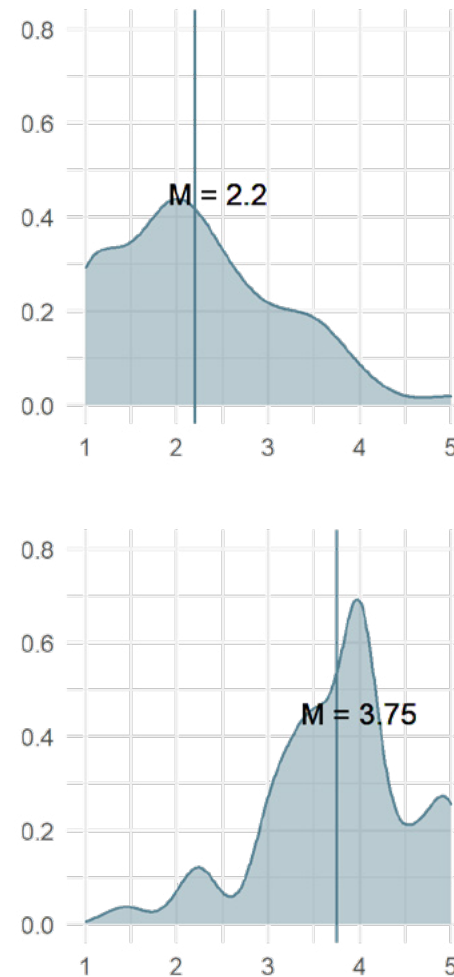
Figure 9.2 Testing and assessment with support of ICT (current situation) – Testing and assessment with support of ICT (future)

M = 2.41

M = 3.75
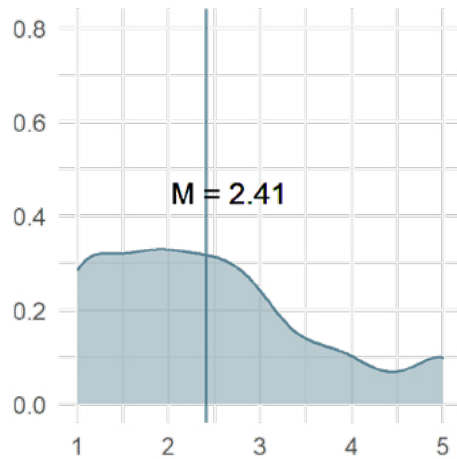
Figure 9.3 Formative testing with ICT support (current situation) – Formative testing with ICT support (future)

M = 2.35

M = 3.55
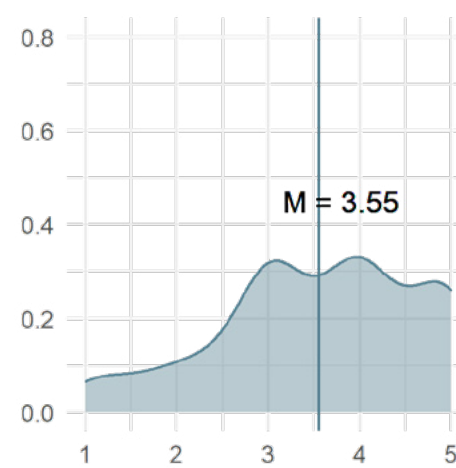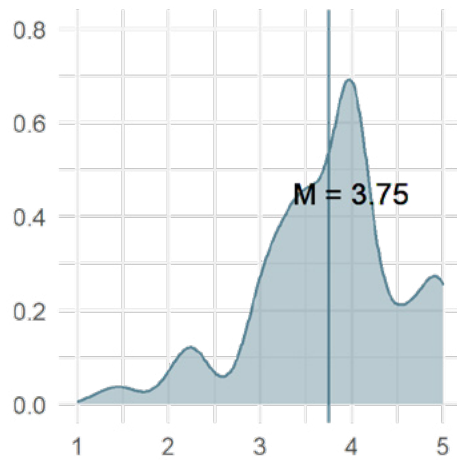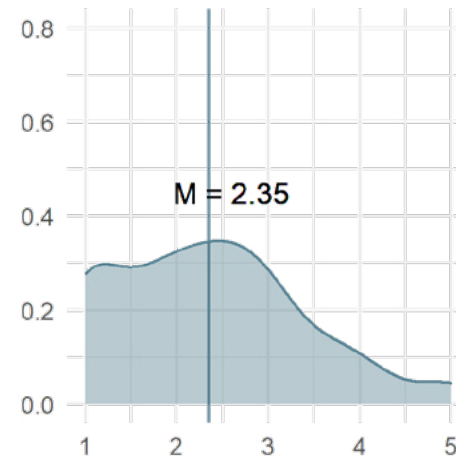
Figure 9.4 depicts the significant difference between the teacher-oriented application of ICT currently and in the future. The ambition to use more teacher-oriented ICT in the future is higher (M = 3.98) compared to the current situation (M = 3.21). This also applies to the pupil-oriented application of ICT (figure 9.5).

No significant difference was found between self-efficacy with regard to general digital skills and the application of digital skills to teaching methods (Figure 9.6). Teachers who think they are digitally skilled also think they are skilled in the application of digital skills to teaching methods.

Figure 9.4 Teacher-oriented application of ICT (current situation) – Teacher-oriented application of ICT (future)
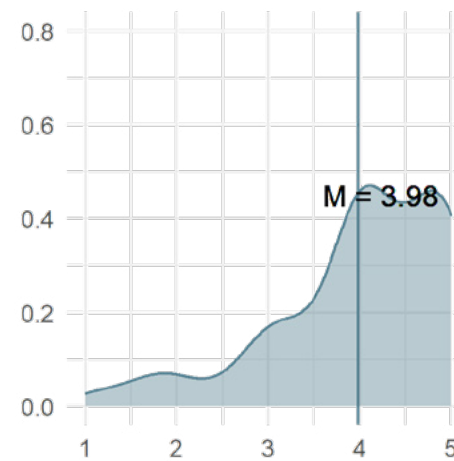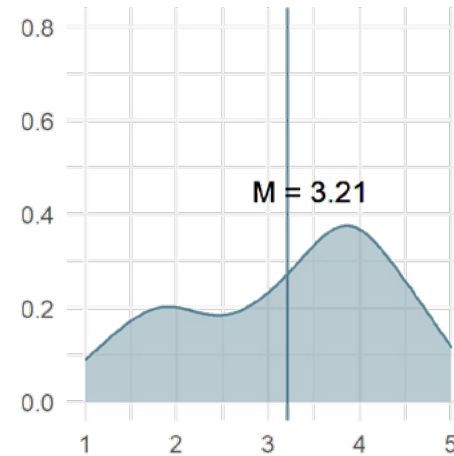
Figure 9.5 Pupil-oriented application of ICT (current situation) – Pupil-oriented application of ICT (future)
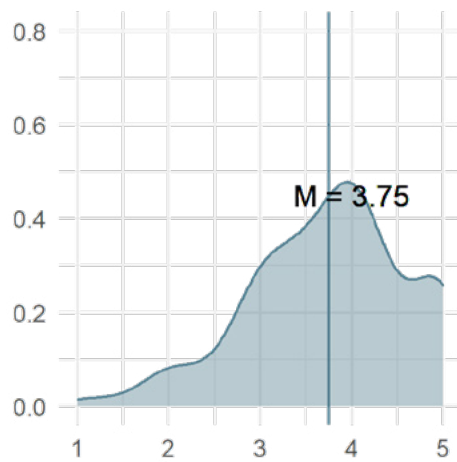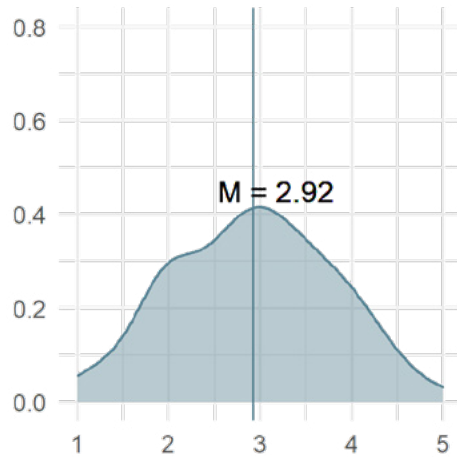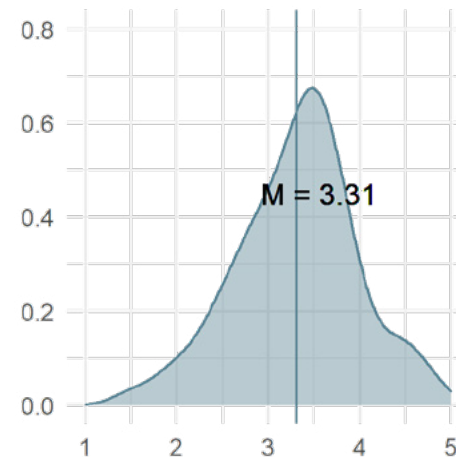

Figure 9.6 Teachers' self-efficacy in relation to general digital skills (current situation) – Teachers' self-efficacy in relation to general digital skills (future)
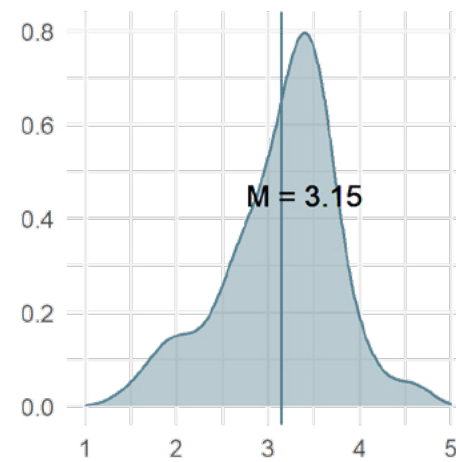
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Annex 1. Answers to open question

What in your opinion is the added value of digital educational resources compared to paper educational resources?

Below are the open answers from the 18 respondents who chose 'otherwise, namely...' to the question: what in your opinion is the added value of digital educational resources compared to paper educational resources?

Table 1 Open answers from respondents to the question: what in your opinion is the added value of digital educational resources compared to paper educational resources?

Other, namely...
Necessary: Constant (all buildings) teaching guidelines that increase autonomy for *blended learning* (digital together with paper).
Digital educational resources can be a useful tool for practising in different ways, for developing in different directions or for getting acquainted with the subject matter. ICT must be a means and not an end in itself. I cannot wait to welcome Bee-Bots, augmented reality, virtual reality and tablets.
I can do all kinds of things with digital educational resources. And I can use it to provide more practical examples to make the subject matter clear for the pupils
It helps to motivate students and keep them on task.
I am a PE teacher and make no use of digital educational resources. If I have to do this on account of Covid-19, then I am ready to learn how it is done and do my best then.
I can monitor my pupils' development and I have a better picture of how they are developing.
It makes teaching topical and internationalisation easier.
My profession comes alive and there are more creative possibilities (music).
Pupils can work in their own time and at the teacher can provide feedback when the time is right.
Something digital, but as a teacher of the PRO SLP department, our pupils are very far behind in terms of language in Dutch as well as in English and Papiamento.
The paper-based resources are no longer very effective, so I want to learn how to maximise digital provision.
I think you need to combine, not only paper, but also ICT.
There are more exercises for pupils to practice on.
Students are prepared with ICT skills for the future.
Because we work with Dutch books (daily experience), it is somewhat easier to show them the material/examples digitally.
It would be ideal if those of us in JICN could have digital resources. We have a couple of laptops but without the internet. The only thing they learn is how to work with Word, Publisher and PowerPoint.
In order to do this, the internet connection at SGB will have to be improved a lot. Interruptions and low WiFi and fixed connection speed regularly get in the way of teaching.
Digital charts make it easier to discuss pupils' progress and efforts with parents and the pupil.

Colophon

State of affairs for ICT in the Caribbean Netherlands

About Kennisnet
A good education lays the foundation for living, learning and working, and challenges students to bring out the best in themselves. This requires an education that responds to social, economic and technological developments. Kennisnet supports management boards in primary education, secondary education and vocational education in professionally implementing ICT and is the guide and builder of ICT foundations for schools.

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