



Let ICT work for education

Kennisnet Strategic Plan 2015-2018

Kennisnet

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1. Introduction

1.1. Education with (ICT-related) aims

‘Education is the most important building material that the Netherlands has. Education allows us to build livelihoods, prosperity and wellbeing, innovation and progress, but it also allows us to become active citizens and to participate broadly in society. Dutch education is thriving. Thanks to the efforts of a great many individuals, we still have one of the better education systems in the world, at every level. But the Netherlands does not intend to rest on its laurels. The Netherlands wants more.’ (Stichting van het onderwijs, Ministerie van OCW, 2013)

A first-rate education gives pupils the chance to grow and develop; it challenges them, anticipates differences, and prepares today’s pupils for the world of tomorrow. Education needs to be modernized continuously to keep up with trends in society and with pupils’ individual needs. Education professionals must also be given enough freedom in a challenging environment in which they too can grow and develop.

The aims that education has set for itself are described in the various sector agreements. These also explain what is needed to achieve those aims.

1.2. Let ICT work for education

There is a broad agreement that education urgently needs to be modernized as soon as possible. To do this will require the efficient and effective use of ICT. This is not something that can be achieved on the strength of enthusiastic individuals alone; it requires vital changes that will impact every facet of education. It will involve comprehensive assessments and decisions for which school boards are responsible, something that also demands support throughout the entire organization.

Kennisnet supports schools in letting ICT work for education. The education sector shapes Kennisnet’s strategic agenda. The sector councils play a key role in this respect. Working with and on behalf of their members, they identify the aims of the education sector and the conditions necessary to achieve those aims. At the request of the sector councils and the Ministry of Education, Kennisnet ensures that a number of these conditions are in place in the public domain. Kennisnet is responsible for the basic ICT infrastructure at national level; it makes relevant knowledge more generally available; and it can support or set up sector-wide programs. It works with other public-sector parties and attunes activities to trends and developments in the market. For example, Kennisnet works to improve the way ICT supply chains operate in education, helps apply available knowledge to increase success rates in education, and helps the sectors (and their councils) coordinate matters so that the aims of education can be achieved. These are important conditions for ensuring that ICT leads to even better education – education that brings out the best in both pupils and education professionals.

To do this, Kennisnet has chosen to remain a wholly public body. That way, it is clear what all the parties operating within and in association with the education sector can expect from Kennisnet while avoiding any conflicts of interest.

The goal for the coming years is to scale up and accelerate the use of ICT. That way, schools can utilize what we already have, what we can already do, and what we already know on the broadest possible scale. And there is no time to lose. Kennisnet’s challenge is to match the pace that the various sectors expect of us, the pace at which education can achieve its aims.

1.3. Guide to this publication

Kennisnet's strategic plan is based on the aims identified by the education sector, the role that ICT plays in achieving those aims, and the need for support as expressed by the sector councils. Chapter 2 looks into these matters.

Chapter 3 describes Kennisnet's role in letting ICT work for education and which strategic choices are necessary to help the various sectors achieve their ICT-related educational targets in the years ahead.

The fourth chapter looks specifically at how we will ensure that ICT works for education in the coming years. Each year, we draw up an annual plan specifying our targets for the year and which activities we intend to undertake. The activities planned for 2015 have been included in this strategic agenda as examples.

The final chapter discusses multi-year financial matters.

The appendices describe the specific trends and requirements in each sector, as well as developments in technology.

2. Education and ICT

The education sector wishes to make more and better use of ICT. The collective needs of education are the starting point for determining Kennisnet's focus over the next few years.

2.1. ICT use: from individual to collective

The various sectors readily acknowledge the importance of ICT. It is no longer 'a fun pastime' but has become absolutely vital to providing and continuing to provide top-quality education. Only a few years ago, whether ICT was used and how depended largely on individual teachers, but in recent years a growing number of schools, led by inspiring school managers, have begun utilizing ICT on a more structured basis. Today, school boards and the sector councils are also promoting its use, as the sector agreements and the Education & ICT Breakthrough Project have made clear. The sector councils and the Ministry of Education are responsible for meeting the aims that they have identified in the years ahead.

With ICT being high on the sector councils' list of priorities, upscaling and acceleration become possible. This also means that ICT use will be more closely aligned than ever with the sectors' strategic agendas. This marks a transition from individual issues to collective needs.

2.2. Education and ICT issues

The education sector wishes to offer every pupil the opportunity to discover, develop, and make use of his or her talents. The aims set in primary and

secondary education and in vocational education and training (VET) are largely similar. Each one aims to pay closer attention to pupil and student talent; each one has made professionalism a priority; and each one is working on making education viable and forward-looking. When it comes to the specifics, however, there are clearly differences between the sectors, with each one emphasising the specific needs and characteristics of its own pupils and institutions.

ICT plays an important role in many of these aims. Its utilization has become a strategic choice. School boards set the course, create the framework, and make time and resources available to facilitate implementation within the institutions. The sector councils are also focusing on ICT and the collective activities needed to let it work within education itself.

Kennisnet's role in these issues varies and also differs from one sector to the next. This chapter briefly reviews the needs of each sector, while the appendices look in greater detail at trends and developments in each one. Kennisnet produces an annual plan describing which activities it is undertaking to meet collective needs.

Primary education

It is partly up to schools to ensure that children grow up into mature, healthy, properly educated adults who are able to take responsibility for themselves and the world around them. Advances in technology make it both possible

and necessary to improve and innovate education. Over the next few years, the collective issues in primary education are as follows:



Support in drawing up implementation and investment plans:

Designing support structures for school boards to help them understand their aims and make the right choices.
Making examples, specific methods, comparative information and expert knowledge available.



Infrastructure at schools:

Upgrading and maintaining the infrastructure within institutions (including procurement of laptops and tablets).
Supporting the sector and school boards in tendering procedures and in creating procurement mass.



Forward-looking range of subjects:

Reflecting on a forward-looking range of subjects: Tomorrow's skills in relation to attainment targets.
Utilization of digital educational resources in inquiry-based/exploratory learning, with pupils also learning to apply their creativity in problem-solving.



Educational resources:

Improving the traceability, usability and availability of digital educational resources using sophisticated meta-data.
Improving the free market for educational resources and software to enable differentiation by concentrating the collective demand of school boards (for example focused on developing core methods).
Ensuring a sufficient supply of educational resources for special and inclusive education.



Accountability, governance and quality assurance:

Making institutions' performance (including its implications) transparent through Schools on the Map [*Scholen op de Kaart*].
Improving availability and use of quality information for quality management purposes.
Utilizing learning and pupil characteristics when designing individualized approaches (learning management).



Continuous learning pathway from primary to secondary education:

Simple and secure digital transmission of data and feedback through the Education Transfer Service [*Overstapservice Onderwijs*] and Progress Monitor [*Doorstroom monitor*].

Secondary education

Secondary education focuses on the needs and demands of society and acts as its own coordinator in making education future-proof. The sector is ready and willing to improve and modernize education.

The key is to individualize education so that it offers more benefits or added value. In secondary education, this leads to the following collective (ICT-related) issues.



Support for implementation:

- Supporting all institutions in getting more out of ICT-related investments by sharing knowledge and joining forces.
- Having a better understanding of the costs and benefits of ICT-related investments and offering guidance in making investment plans.



Understanding the benefits of ICT:

- Pooling knowledge from educational practice and research and turning this into ideas for practical applications and models for organizing learning (differently).
- Interpreting technical trends for educational practice.



Up-to-date facilities:

- Having enough sophisticated and affordable learning material that can be individualized (in particular in inclusive education).
- Getting the infrastructure right (within and outside the institution).



Accountability, governance and quality assurance:

- Make institutions' performance (including its implications) transparent through Windows of Accountability [*Vensters voor Verantwoording*].
- Improving the availability and use of information for school and school board quality assurance cycles (information management).
- Utilizing learning and pupil characteristics when designing individualized approaches (learning management).



Broad education and coordination between sectors:

- Focusing on democratic principles, basic social values and non-cognitive skills such as cooperation, creativity and entrepreneurship.
- Meticulous, sound and secure digital transmission of data through the Education Transfer Service and Progress Monitor.

Vocational Education and Training

Vocational education and training (VET) supports the idea of making vocational education more challenging for pupils. There are three main objectives in that regard: improve the quality of vocational education and training, simplify the system, and bring order to the system of governance and management.

The following collective ICT-related needs have been identified:



Modernize education:

- Logistical consequences: iFoV program activities, reform of the qualifications structure.
- Didactics (and e-didactics): matching educational content, methods and ICT and other resources (knowing what works)



Reduce the administrative burden:

- Efficient national information management system (e.g. ongoing development of the BRON, ROSA systems).
- Practical vocational training: Improving communication/guidance and registration of certified apprenticeships.
- Using the iAgenda to influence the impact of measures.



Educational resources:

- Improving/maintaining the free market: there is enough qualitatively excellent learning material available that satisfies the needs of education.
- Designing/organizing digital exams and tests: what does that mean, both centrally and locally?



Shared facilities:

- More freedom of choice and flexibility (and lower costs) through the VETcloud.
- Reducing the administrative burden by automating processes, for example digital signatures.
- Improving transparency for governance and accountability through VET-transparent [MBO-transparent].



Information security:

- Secure and responsible data management and data transfer.

Chapter 3 explains Kennisnet's strategy for the coming years. The fourth chapter specifies what Kennisnet intends to do.

3. Kennisnet

The previous chapter described what the education sector expects from its use of ICT. Kennisnet is helping education achieve these aims. The overall point of departure is collective demand.

3.1. Mission and positioning

Although many things are changing for Kennisnet, one thing remains the same: the mission ‘Kennisnet lets ICT work for education’ will remain our focus in the years ahead. We will get ICT working for primary and secondary education and VET and in doing so help these sectors achieve their aims.

Part of education and for education

Kennisnet not only works for education, it is also part of education. The themes that it focuses on are proposed by the sector councils and reflect the issues that preoccupy school boards. Kennisnet supports the sectors in achieving the aims identified in their sector and school board agreements and in the Education & ICT Breakthrough Project. We contribute to making education more stimulating for pupils and help improve their performance.

To ensure that Kennisnet’s activities reflect the needs of education professionals, the sector councils must articulate their needs precisely. That not only requires expertise in education and ICT, but in particular knowing what sort of support school boards require, both now and in the future. That is why the sector councils invest in networks to help them understand these needs, and in expertise to interpret what trends and developments mean for their sectors.

It is important for Kennisnet to continue testing the practical relevance of activities and to align them to market trends. That requires painstaking evaluation but also ongoing contact with users (teachers, ICT managers, school managers, school boards) and stakeholders when developing specific activities.

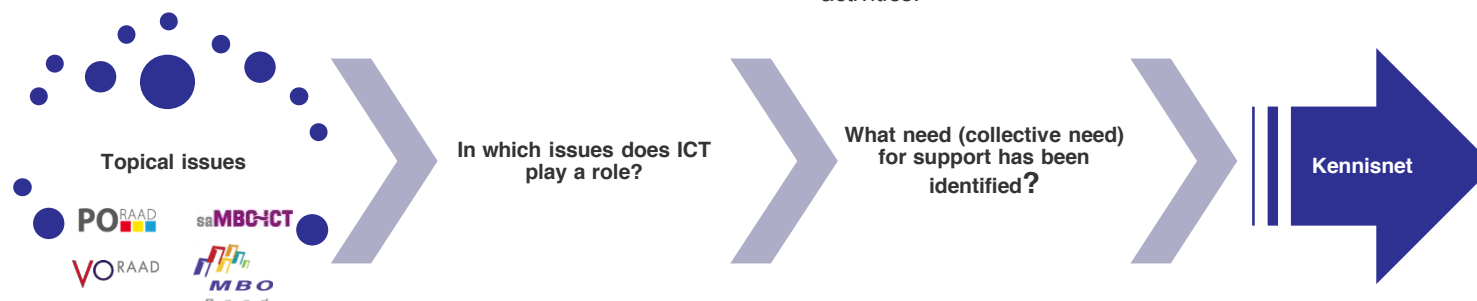


Figure 1: Issues in education and strategic agenda

Public support

Kennisnet is a public-sector organization funded by the Ministry of Education. It is part of a system intended to support educational institutions. This system is responsible for a number of defined tasks, giving schools as much freedom as possible to focus on their primary process.

The Government feels it is vital to offer schools a centralized form of support to ensure the proper utilization of ICT in education. That is why the Ministry of Education makes funding available to maintain a multi-school, multi-sector basic ICT infrastructure. This basic infrastructure consists of a number of technical facilities and the relevant standards, sources of knowledge, and expertise. (Ministerie van OCW, 2013)

To provide the education sector with a satisfactory level of support, Kennisnet must cooperate with other organizations within and outside of education, both in the public and private sectors. So that it can operate as effectively as possible in this regard, Kennisnet has chosen to remain a wholly public body and does not pursue commercial activities. This clarifies what all the parties can expect of Kennisnet.

Cooperation as the key to success

To ensure that ICT works for education, Kennisnet must join forces with other organizations and initiatives. Cooperation is crucial and in fact goes without saying. It allows the education sector to derive maximum benefits from ICT. It is, however, up to the sector to direct developments and to ensure that the necessary collective conditions have been met. That is why Kennisnet works with a large number of parties in the public and private sector, in both short-term and long-term partnerships.

In primary and secondary education, Kennisnet works with Schoolinfo. Administrative arrangements will be made regarding the relationship between Kennisnet and Schoolinfo for the coming years. In addition, to ensure sound

short-term support for education (annual plan for 2015), the two organizations will coordinate their activities, allowing them to optimize their services and avoid duplication.

A number of large-scale projects have been initiated that are meant to make a difference in the years ahead. For example, the SION alliance is streamlining information management in the education supply chain. Its work is leading to agreements that will be recognized and used throughout the chain, taking the pressure off education and optimizing information use.

The Primary and Secondary Education Councils, the Ministry of Education, and the Ministry of Economic Affairs have joined forces in the Education & ICT Breakthrough Project, with Kennisnet lending its support. The purpose of the project is to achieve a breakthrough that will make personalized learning possible. A range of different public- and private-sector parties are working together to remove obstacles and to capitalize on opportunities.

The education sector itself has developed standards to enable or facilitate data-sharing. The organization entrusted with the task of developing and managing these standards is Edustandaard, a public-private partnership between SURF, Kennisnet, and stakeholders in the public and private sectors. Joining forces across the entire education sector and making public-private governance agreements will guarantee both commitment and continuity.

To implement the agreed standards, public and private parties participate in iECK, an organization made up of representatives of education, publishers, distributors, software suppliers and Kennisnet, all working together to ensure the accessibility and distribution of digital learning material. Having public-private partnerships conclude agreements about implementation ensures the commitment of all the parties involved and influences the entire field of education.

Participants in the Mediawijzer.net expertise centre, set up to support media literacy initiatives, are the NTR broadcasting organization, the SIOB sector

3.2. Functions

Kennisnet supports education based on three functions that reflect collective ICT needs. We are responsible for developing and managing a public, national ICT infrastructure. We also help the education sector coordinate developments in ICT (and the availability of ICT tools) and identify an effective (collective) strategy. Kennisnet further serves as an expert source,

organization for public libraries, the Netherlands Institute for Sound and Vision, the Electronic Commerce Platform Nederland (ECP) and Kennisnet..

helping the education sector make better use of ICT and the available ICT infrastructure.

The different functions are mutually reinforcing and closely coordinated.

Function	National public ICT infrastructure (generic facilities, platform services, standards & architecture)	Strategic advice (for sectors)	Knowledge and expertise
Purpose of function	Facilitate the work of ICT supply chains: <ul style="list-style-type: none"> - Improve the availability of digital educational resources - Streamline information management - Reduce the administrative burden 	Enhance the position of education	Improve how education (and educational institutions) utilize ICT

Figure 1: Kennisnet's functions

The tasks of improving the availability of digital learning material, streamlining information management, and reducing the administrative burden all depend on having a public national ICT infrastructure. This infrastructure consists of a number of platform facilities, generic services, and standards used by both public- and private-sector parties.

Kennisnet works closely with the education sector and the market to identify the best way to manage the national ICT structure within the scope of its public tasks. To live up to its role as developer and manager of essential services, it must ensure that those services meet the very highest standards (of certification) and other quality and availability criteria.

The purpose of strategic advice is to enhance the position of education, for example by making sense of developments in the market and by adapting technology trends for educational practice. This enables the sector to continue building its coordinating role with respect to ICT in education and to guide developments in the public and private sectors at national level. In terms of expertise, Kennisnet's task is to ensure that existing knowledge is available to education and can be utilized by it. Knowledge about what does and does not work must be accessible so that we can improve success rates in education. The same is true of expertise concerning the impact of technology on education and how this influences institutional choices concerning the efficient and effective use of ICT without ignoring privacy, security and other aspects.

3.3. Kennisnet Foundation

Organization

Kennisnet is the ICT-support organization for the education sector. This means that we know which trends in ICT and education are and will be relevant for education. We also know how ICT can be used to help education achieve its aims. Kennisnet can respond rapidly and appropriately to issues in the field of education. We expect our staff to be flexible, committed and professional, to know what is expected of them, and to deliver the results that education wants. As of 1 January 2015, our organization consists of 77 full-time equivalents. A total of about ninety people work for Kennisnet.

Governance

Education is in the driver's seat at Kennisnet. We see this in Kennisnet's governance structure. The Kennisnet Foundation is organized according to a supervisory board model. The duty of a supervisory board is to oversee the policies of the executive board and the general course of affairs within the foundation. The supervisory board makes recommendations to the executive board and serves as its adviser and sounding board. It monitors the decision-making process within the foundation so that the latter's strategy and

associated activities reflect the sector councils' policy agendas. The supervisory board tests whether the long-term strategy laid out in this strategic agenda has been developed in close consultation with the sector councils. It is also responsible for approving the foundation's annual plan, budget, and annual report.

The supervisory board has five members and an independent chairperson. The sector councils appoint three of the members, ensuring that Kennisnet continues to be part of and work for education. The two remaining members are independent, ensuring that the supervisory board remains in dialogue with the rest of society.

Kennisnet is funded by the Ministry of Education. Each year, Kennisnet applies for funding based on its annual plan. The Ministry evaluates the application by considering whether Kennisnet's activities respond adequately to the collective needs of education, how much its activities are in line with its public tasks, and how efficiently it spends its budget. The annual report provides for accountability

Accountability

The following chapter of this strategic agenda describes the objectives set for education and ICT based on more general educational targets. We then indicate how Kennisnet contributes to achieving these objectives. The annual plan then addresses Kennisnet's specific activities.

With a view to accountability, it is important to analyse Kennisnet's effectiveness. Have the predetermined targets for each activity been achieved? Has Kennisnet (therefore) delivered on its intended efforts? Are we closer to achieving the targets set for education and ICT? What impact has Kennisnet had in achieving the educational targets?

We cannot produce hard evidence in every instance. After all, objectives are largely qualitative in nature. Moreover, Kennisnet does help achieve the educational targets, but it also needs other public- and private-sectors parties to realize the sector's ambitions. Success further depends on the efforts of the education sector itself.

We use a combination of tools to ascertain Kennisnet's added value. We make product use transparent, survey user satisfaction, and ask stakeholders what they think of Kennisnet (and its efforts). This is how we demonstrate the importance that Kennisnet attaches to cooperation. Each year, we ask practitioners in education to tell us to what extent they have achieved their educational and ICT-related targets and what Kennisnet has done to help them.

Finally, we also sit down with the sector councils for an appraisal. Based on the outcome, Kennisnet produces a concise self-evaluation. This document is freely available to other parties for perusal.

We naturally use the input that we collect for accountability purposes to revise our plans (annual plans).



4. Letting ICT work for education

ICT plays an important role in achieving education's aims. We are no longer asking whether education will make use of ICT, but rather how ICT can actually help improve success rates in education. Kennisnet supports education in this respect.

4.1. ICT working for first-rate education

Based on the sector agreements and collective needs, the education sector has identified a number of targets that Kennisnet will help achieve in the years ahead. The purpose of our efforts is to use ICT to improve the quality, effectiveness, and efficiency of education. Kennisnet is responsible for developing and managing the necessary basic ICT infrastructure and acts – within certain boundaries – as a source of knowledge and expertise.

Kennisnet keeps a close eye on the underlying conditions, for example the availability of good quality educational resources and better interconnectivity between the various information systems. But it is also interested in using empirical evidence about the impact of ICT on education to improve the return on investment. This is how Kennisnet contributes to forward-looking education.

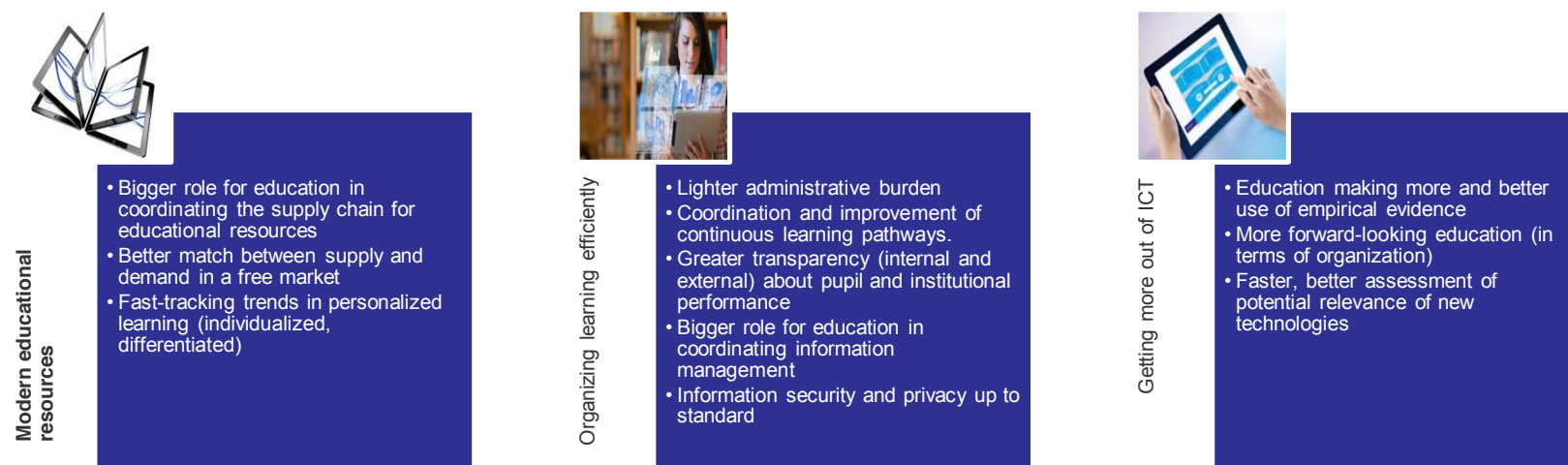


Figure 4: Educational and ICT-related targets

The following sections describe Kennisnet's efforts to ensure that these targets will actually be met.

4.2. Modern educational resources

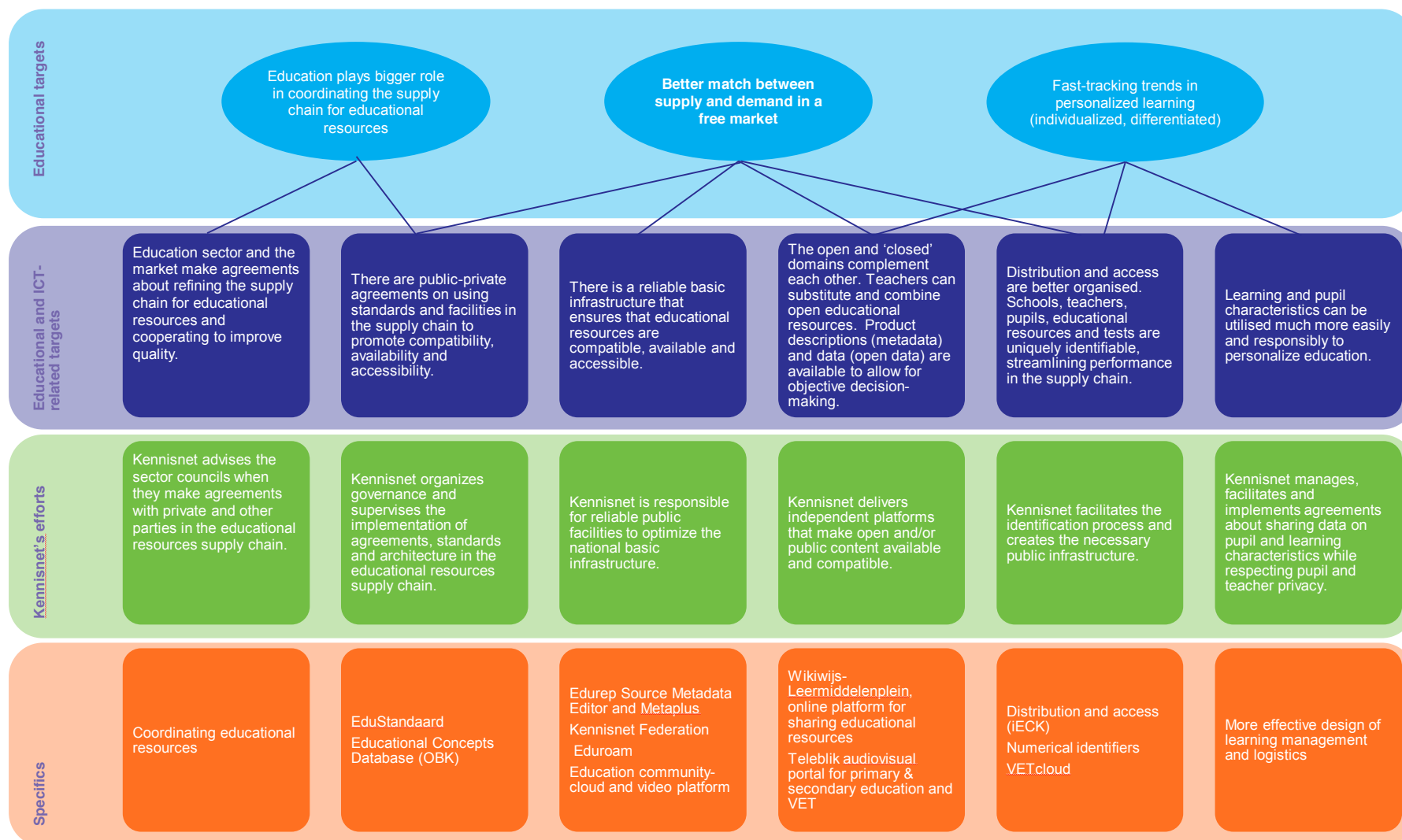
Up-to-date, stimulating education is only possible if there are enough appropriate educational resources available. To ensure that ICT benefits the primary process, educational resources must be aligned with teaching practices and learning objectives. This is only possible if teachers are able to identify and actually use the best combinations of resources for pupils or groups of pupils. Where necessary, teachers should have support in applying digital teaching methods.

Cooperation with a wide range of organizations is needed to ensure that modern educational resources are available to teachers. This is not only about affordability and access, but more particularly about ensuring that the available material satisfies the specific needs of education. That means having enough digital learning material to cover all the learning objectives, and having material that is appropriate for different teaching methods and can be adapted to a certain extent (the information/exercises can be adapted to

pupil needs and learning characteristics). The shared aim of primary and secondary education to continue personalizing teaching and learning plays a role in this context.

In the education sector itself, coordination is increasingly coming to lie with the sector councils. It is they that consult commercial parties, with Kennisnet contributing its expertise. We also manage and develop a number of public technical facilities and arrangements needed to ensure a healthy free market.

There is no strict dividing line between educational resources and how learning is organized (see Section 4.2). Learning material can generate valuable information for the teacher, the school, and the pupil. The results (both scores and test results as well as information about the learning process) can be used to optimize pupil learning. The same data and information can be used for school governance or accountability purposes.



4.3. Organizing learning efficiently

When the secondary process is efficiently structured, primary processes produce greater benefits. ICT can help organize the underlying conditions more efficiently and effectively, helping to alleviate the administrative burden. It allows schools and teachers to make better use of available data (about pupils and their performance) and helps schools make their choices and results more transparent.

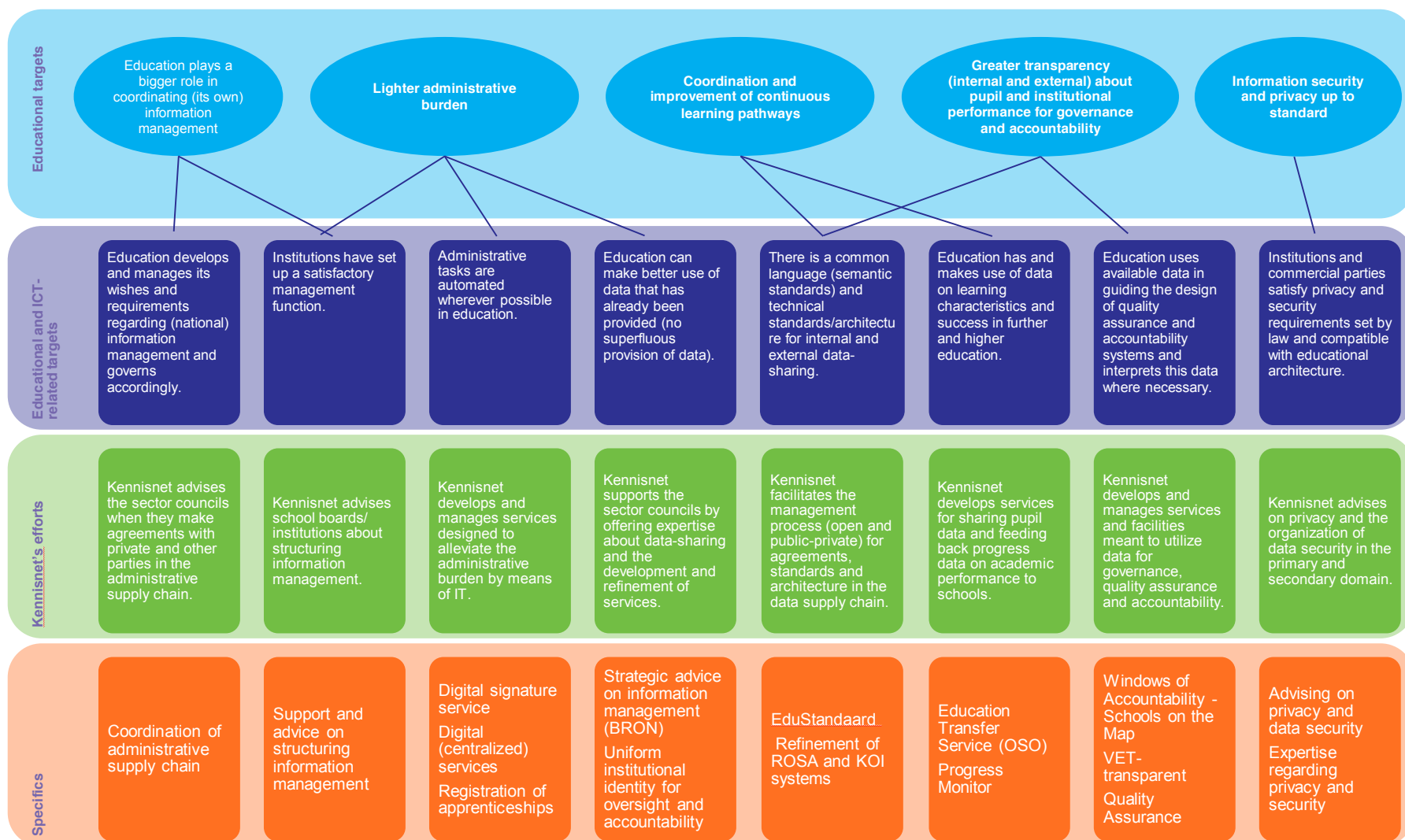
Educational institutions spend a lot of time (and money) on administrative processes. At the same time, the demand for information is growing steadily. Teachers can use data on pupil learning processes to track them and offer individualized teaching. School boards and managers can use objective data to make evidence-based choices that will improve the effectiveness and efficiency of education. Data also plays an important role in budgeting, accountability, and oversight.

Coordinating and streamlining administrative systems and processes makes them more efficient. This means that the various administrative systems at

schools (whether concerned with the primary or secondary process) must be able to share data.

This is also important with regard to continuous learning pathways. Pupils do not attend the same institution for their entire school careers; they move from a primary school to a secondary school, and from there go on to VET, higher professional, or university education. Relevant information about a pupil must be transferred from one institution to the next to make good education possible. Basic information, for example name and address, should not have to be re-entered each time.

It is important in this context to consider data security and privacy. The risks have increased precisely because more and more data (about learning content, examinations, and pupil details) is being stored and transferred digitally. The relevant issues are: organization (who stores what?), access (who can see which information and when?) and protection (how are agreements enforced or monitored?)



4.4. Getting more out of ICT

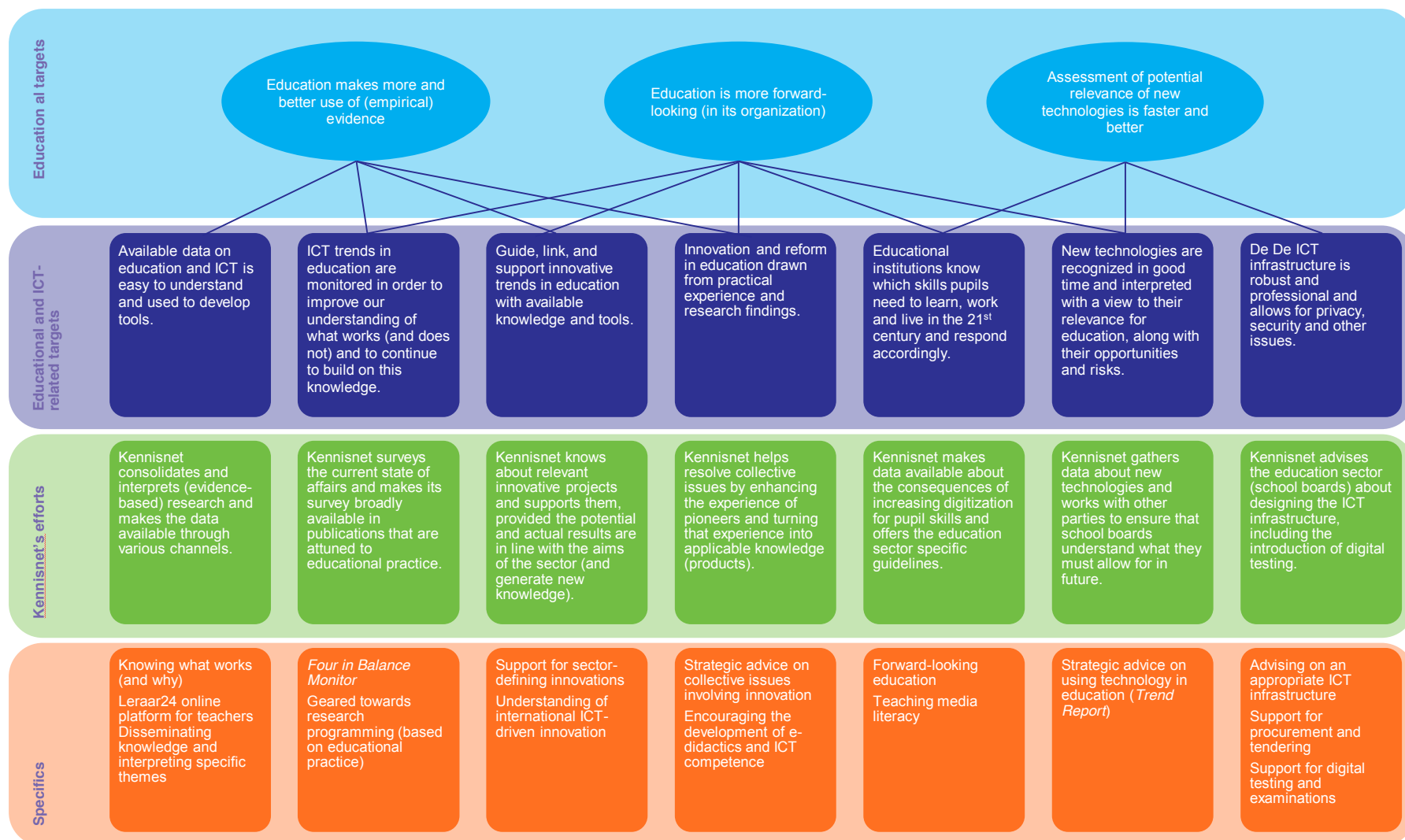
Up-to-date educational resources and efficient processes are not enough to get ICT working for education. To get more out of today's learning materials and streamlined processes, we need to know what does and does not work with ICT. We also need to know about the design of the ICT infrastructure and relevant advances in technology. This knowledge must be applied when considering implementation questions in education, the use of ICT in the classroom, and the development of products and services for education.

Kennisnet collects data from evidence-based research, practical experiences and technological advances and analyses the implications for educational practice. This knowledge is then made widely available so that school boards, school managers and teachers can immediately apply the relevant tools. By utilizing its expertise, Kennisnet can assist the sector councils in their coordination tasks and in supporting school boards. We also share available knowledge where possible in online media and in publications, for example our Trend Report, our Children in the 21st Century Monitor, and our Four in Balance Monitor.

Modern and forward-looking education not only involves utilizing ICT in learning, but also considering broad education and the impact of technological and other trends on society and the labour market.

The importance of 21st-century skills is increasing and the education sector wishes to respond to this trend. ICT skills are required in almost every job these days, whether that be in a garage (onboard computer technology), in education, or in journalism. Pupils must be able to deal responsibly with media and social media (media literacy) and acquire information skills and basic programming skills. By teaching them such skills, education can prepare pupils for a networked, information-driven society.

The significance of parents in all this should not be underestimated. It is not only schools but also parents who are responsible for teaching children to deal safely with social media (for example cyberbullying and online privacy)



5. Multi-year budget

Kennisnet's activities are funded by the Ministry of Education. In its budget, the Ministry of Education makes an annual €12 million available to maintain and continue developing the national basic ICT infrastructure. Kennisnet applies for funding every year by submitting an annual plan and budget. In addition, it also receives one-off grants in connection with a number of projects that receive additional funding, such as SION and specific activities focusing on 'green' education. If these projects require an extra effort from Kennisnet, the staffing expenses are charged to the projects. This allows Kennisnet to maintain sufficient staff to carry out its basic activities. The budget below includes €300,000 charged to external projects in 2015

In the next two years, Kennisnet will be drawing on its reserves temporarily in an effort to accelerate and drive ICT in education forward. This will allow us to respond to current needs in education. The details are set out in our annual plans.

The multi-year budget below shows roughly how we spend our basic funding. The budget does not take price or wage movements into account.

(x €1.000)		2015	2016	2017	2018
Facilities	Generic platforms - management	2,040	2,050	2,050	2,050
	Generic platforms – refinement	1,615	1,630	1,700	1,700
	Collective services - management	300	300	300	300
	Collective services – refinement	1,125	1,120	1,120	1,120
	Architecture and standards	710	750	780	780
	Total	5,790	5,850	5,950	5,950
Strategic advice	Strategic advice (for sectors)	1,365	1,350	1,350	1,350
Expertise	Collective accrual of expertise	1,595	1,600	1,575	1,575
	Knowledge-sharing	990	950	900	900
	Total	2,585	2,550	2,475	2,475
Organizational expenses		2,260	2,250	2,225	2,225
Total		12,000	12,000	12,000	12,000

Appendix 1: Issues by sector

Primary education

'Children are the citizens who will shape society later. It is partly up to schools to ensure that children grow up into mature, healthy, properly educated adults who are able to take responsibility for themselves and the world around them. Helping children learn. That is the task that society has set for primary education.' (PO-Raad, 2014)

The aim identified in the above quote makes heavy demands on education. Primary schools have improved greatly in recent years. Most primary schools are of satisfactory quality. The number of weak or very weak schools has declined. This provides a sound enough basis for future growth.

The Primary Education Council and the Ministry of Education have made agreements to this effect in the Primary Education Sector's School Board Agreement. In the coming years, schools would like to use more digital educational resources in their lessons; they also want to recognize talented pupils sooner and stimulate them more. The sector intends to focus on improving the didactic skills of classroom teachers, including entry-level teachers. It will also work on improving the level of professionalism, for example by ensuring that more teachers have a Master's degree. (PO-Raad, ministerie van OCW, 2014)

These points have been elaborated in four interrelated action categories, each with its own aims.

- **Stimulate pupils to develop their talent:** To equip pupils for the 21st century, education needs to focus on individual talent more than it does at present.

- **Take a broad approach to making lasting improvements in education:** We can improve the quality of education by considering data concerning the benefits of education and based on self-evaluations. Centralized and decentralized performance data is available to provide guidance and can help improve transparency.
- **Professional schools: Pupils, parents, teachers, school managers and the school board together constitute a school.** The quality of education depends on the efforts and skills of all these stakeholders, with the quality of the teacher being paramount. Teacher quality is enhanced by a stimulating work environment in which professional development is a priority. That makes demands on school managers but also on school boards within the context of their HRM policy.
- **Continuous development pathways:** Schools and school boards seek ways to support children's continuous development pathways. Schools are eager to facilitate the smooth transition from primary to secondary education so that pupils receive the guidance they need during this important transition. That is important not only in mainstream but also in special education.

The aims described above have been defined by a sector that is undergoing a far-reaching transition. Achieving these aims will require an all-out effort, and it is up to school boards to take responsibility in this process. It will be necessary for all the stakeholders to join forces. With respect to ICT in particular, the sector must take a firm stand vis-à-vis the various providers and continue making the right choices in a rapidly changing supply chain. It is important to know what works and to tap into innovations at the right time...

ICT as a tool in learning

No one disputes the added value of ICT as a tool. Modern educational resources and individualized learning material give teachers the chance to differentiate at multiple levels and therefore to allow for differences between children. ICT helps teachers design their own teaching practices instead of simply going through a program imposed from the top down. ICT also improves their understanding, streamlines their feedback, and allows them to decide for themselves how to guide what, how, where, and when pupils learn.

To ensure that ICT really does add value, the sector will need to act in unison. This will help providers customize their products. Schools differ considerably in how they use ICT. At some, pupils use a few computers in the corridor to study a single subject; at others, every pupil brings his/her own device. The Primary Education Council coordinates matters for its members, with the aim of ensuring that every school has a proper basis from which to start. The ICT infrastructure must be up to standard, both around the country and in specific schools. To offer assurances for the longer term, a multi-year perspective is important (financial and otherwise).

Together with the primary education sector, Kennisnet has drawn up sector-specific guidelines for educational resources and the underlying terms of reference. The terms of reference clarify schools' requirements and wishes when it comes to digital educational resources, for example allowing for more variety. The guidelines also identify the underlying conditions for the supply chain: a healthy free market, scope for new providers, and guaranteed privacy. Finally, they describe the efforts that schools themselves must make. At the same time, they allow for a great deal of freedom. Providers are free to offer new services, and schools are free to work according to their own educational concepts. The terms of reference will be finalized in the period ahead so that schools and providers can use them in practice. This process

will be undertaken in the Education & ICT Breakthrough Project, among others.

In addition, schools need help in implementing their ICT choices. The starting point is to have a solid implementation and investment plan. The Primary Education Council will take the lead in this respect and work with Kennisnet on developing a suitable offer of support for all its members.

ICT for organizing, governance and accountability

ICT is equally useful when it comes to organizational matters, governance, and transparent accountability regarding actual results. Once again, the sector is taking steps in this context. Those involved in the SION programme and facilities such as the Education Transfer Service (OSO) and Schools on the Map (Windows in Primary Education) are working hard to reinforce the foundations. These services and facilities will reduce the administrative burden for school managers and school boards, give them better governance information, allow for benchmarking, and enable them to be transparent about the results achieved and methods used. This too will help improve the quality of education.

The existing facilities and underlying conditions must be improved and extended in the years ahead. For example, the Windows in Primary Education project is meant to produce decentralized indicators revealing the overall quality of a school. Interesting and accessible data will help parents choose the right school for their child. The Education Transfer Service focuses on adding information to the dataset about pupil performance compared to benchmarks. This helps ensure a smoother transition between primary and secondary school.

Need for support in primary education

Support in drawing up implementation and investment plans

- Designing support structures for school boards to help them chart progress toward their aims and make the right choices in that respect.
- 2015: The Primary Education Council will initiate a move to provide sector-wide support for primary school boards. Kennisnet will contribute its expertise and develop tools that meet the needs of the Primary Education Council.
- Making examples, specific methods, comparative information and expert knowledge available.
- 2015: Kennisnet will support primary school boards with generic tools and knowledge products. This includes responding to school board questions about drawing up implementation and investment plans.

Infrastructure at schools

- Upgrading and maintaining the infrastructure within institutions (including procurement of laptops and tablets).
- 2015: Kennisnet will contribute its knowledge about cost-efficient acquisition of the right connectivity and help the Primary Education Council design facilities enabling schools to cooperate more closely when purchasing devices (and other ICT facilities).
- Supporting the sector and school boards in tendering procedures and in creating procurement mass.
- 2015: Kennisnet will support the Primary Education Council in drawing up and applying terms of reference for primary school boards' procurement and tendering procedures so that the education sector can coordinate current and future supply.

Forward-looking range of subjects

- Reflecting on a forward-looking range of subjects: tomorrow's skills in relation to attainment targets.
- 2015: Kennisnet will explain the consequences of the digitization of society and the labour market for education (and its targets).
- Utilization of digital educational resources in inquiry-based/exploratory learning, with pupils also learning to apply their creativity in problem-solving.
- 2015: Kennisnet will collect and explain the implications of (evidence-based) research and clarify how ICT (including social media and apps) can contribute to better education.

Educational resources

- Improving the traceability, usability and availability of digital educational resources using sophisticated meta-data.
- 2015: Kennisnet will help improve opportunities to add meta-data to materials and to use meta-data in searches.
- Improving the free market for educational resources and software to enable differentiation by concentrating the collective demand of school boards (for example focused on developing core methods).
- 2015: Kennisnet will help draw the attention of school boards to primary education's existing terms of reference and support the Primary Education Council in discussions with providers, in partnership with the Breakthrough Project.
- Need for support in primary education.
- Ensuring a sufficient supply of educational resources for special and inclusive education.
- 2015: Kennisnet will help develop terms of reference for pupil information management systems in special education and explore the potential for improving ICT-driven data-sharing within partnerships.

Continuous learning pathway from primary to secondary education

- Simple and secure digital transmission of data and feedback through the Education Transfer Service and Progress Monitor.
- 2015: Kennisnet will be responsible for managing and refining the Education Transfer Service and will help institutions with implementation.
- 2015: Kennisnet will work on providing school boards with feedback from the Progress Monitor.

Secondary education

Secondary education wishes to focus on the needs and demands of society and to coordinate efforts to make education future-proof. Trends such as individualization, digitization, the low birth rate, the ageing population, and globalization have enormous repercussions for education. The sector is ready and willing to improve and modernize education. The key is to individualize education so that it offers more benefits or added value. The question is whether individualized education is possible, given current regulations and the present system of year groups, classes and rosters. At the same time, however, schools have more freedom than they are using; some of the aims that secondary education has set for itself can already be attained (VO-raad, 2014). The key concepts in this sector are 'governance' and 'transparency'. These are the findings of the Secondary Education Council's 'VO2020 tour', which involved a dialogue between the council, school boards and school managers about secondary education in the future. The input from the tour has provided the basis for the Secondary Education Sector Agreement concerning objectives, measures, and investment in the sector in the years ahead (VO-raad, ministerie van OCW, 2014).

Ready for the future

Individualized learning, talent development and personalized learning are priority themes in the sector agreement, which has been used to draw up the **Agenda for Secondary Education 2014– 2020** [VO-agenda 2014-2020]. The Agenda for Secondary Education sets out agreements concerning secondary education's aims for the next few years and what schools, government and the Secondary Education Council will do to attain these aims. The five main aims are:

- put **pupils at the centre of everything**: offer more individualized learning so that the focus is on developing the talents of individual pupils;
- **up-to-date facilities**: a breakthrough in and faster supply of digital learning material, and teachers who are skilled at assembling and using such material;

- more time and attention devoted to **broad education**: to prepare pupils for the world of tomorrow, we need to focus on non-cognitive skills such as cooperation, creativity and entrepreneurship;
- improved **integration with the community**: closer integration between the school and the community and accountability toward stakeholders such as parents;
- Teacher occupies a position in a **professional school**: teachers have a sense of ownership/co-ownership, something that requires freedom to act, confidence in a learning environment, and sound leadership.

In other words, what society needs from education is changing. Pupils and parents want forms of individualized learning and guidance that were not possible before. Because the technological threshold is being lowered and commercial parties are keying into these trends, both traditional and new providers are making more and more digital facilities and digital learning material available. These changes are creating new opportunities and new issues in education, requiring close cooperation between schools and teachers based on pedagogical and didactic principles.

Ict in secondary education

ICT plays an important role in many of secondary education's aims. The sector agreements and Agenda for Secondary Education address the collective activities needed to let ICT work within education itself.

ICT is being used as a tool to support personalized and more individualized learning in secondary education. This requires more and better ICT facilities (ICT infrastructure, devices), satisfactory personalized learning material that makes individual learning paths possible (policy on educational resources), more opportunities for adaptive testing, and more support for and expertise among teachers. An integrated approach will allow the sector to make optimal

use of personalized learning, with the effects being apparent to both teachers and pupils. The most important ICT-related themes are:

- **Educational resources.** The aim is to achieve a situation in which the institutions have access to affordable (digital) educational resources that are consistent with their priorities, wishes and requirements. That is not the current situation in the market. That is why the secondary education sector has drawn up policy guidelines for educational resources that schools can use in their own setting. Within the context of the Breakthrough Project, the Ministry of Education, the Ministry of Economic Affairs, the Primary Education Council and the Secondary Education Council have consulted providers and are now ensuring that digital educational resources will be made available as quickly as possible and in sufficient supply. For example, they are encouraging providers to describe the level, discipline, subject of their educational resources and the extent to which they satisfy the attainment targets defined by law. The Secondary Education Council also coordinates activities meant to ensure that the sector can make use of open educational resources (OER).
- **ICT infrastructure** - including the availability of **devices** - that contributes to trouble-free use and helps reduce the administrative burden.
- Acquiring knowledge and experience regarding ICT-supported **personalized learning**. The aim is to understand how institutions can implement responsible, personalized ICT-supported learning. For example, research is now being conducted into organizing learning in a new way.
- Teachers must have satisfactory **skills**. The responsibility for this lies with the schools.

ICT also plays an important role in governance and accountability. Examples include digitizing processes and managing information flows to reduce the administrative burden, and simplifying information-sharing between institutions, between institutions and the Ministry of Education/Inspectorate/DUO, and between institutions and society. Public accountability becomes easier in this way. The data made available also gives institutions more insight into their performance, something that they can use as they work on developing a learning organization and culture of ongoing improvement.

That is why the sector must be able to rely on various agreements and standards that will be developed, managed and, above all, applied, ensuring that systems are compatible and that no information or data is lost. There is also a need for expertise and advice about do's & don'ts in this area. The aforementioned themes also require close coordination between supply and demand in the market. Until recently, the commercial market was supply-driven. Now, the secondary education sector is increasingly making its position clear with respect to important aspects of ICT by coordinating its demand, for example with regard to digital educational resources. That demand must be specified in other respects as well, and then interpreted in terms of functional wishes and requirements, for example with regard to professionalism (ICT used as a didactic tool), with providers, publishers and suppliers responding by offering suitable products. Pushing these changes forward requires a sector-wide support structure, as noted in the Sector Agreement. The support structure must help all the parties achieve the aims on which they have reached agreement. There are a number of organizations within the support structure that are active in education and ICT. Besides Kennisnet, they include SLO, VO-content and the Schoolinfo Foundation. The Secondary Education Council is responsible for coordination

Need for support in secondary education

Support for implementation

- Supporting all institutions in getting more out of ICT-related investments by sharing knowledge and joining forces.
- 2015: Kennisnet will support the 'learning labs' used in the Breakthrough Project by making relevant findings available.
- Having a better understanding of the costs and benefits of ICT-related investments and offering guidance in making investment plans.
- 2015: Kennisnet will increase our understanding of which ICT applications and infrastructure are needed and the costs involved.

Understanding the benefits of ICT

- Pooling knowledge from educational practice and research and turning this into ideas for practical applications and models for organizing learning (differently).
- 2015: Kennisnet will publish and distribute a new *Four in Balance Monitor*. In consultation with the sector, it will consider how available knowledge can be applied to create tools.
- Interpreting trends in technology for educational practice.
- 2015: Kennisnet will keep track of technological trends and assess their implications in partnership with education. The results will include a new *Trend Report*.

Up-to-date facilities

- Having enough sophisticated and affordable learning material that can be individualized (in particular in inclusive education).
- 2015: In consultation with the Secondary Education Council and in relation to the Breakthrough Project, Kennisnet will ensure that school boards are familiar with and make use of the terms of reference. Kennisnet will also support the discourse between the sector councils and providers.
- 2015: Kennisnet will support school boards and partnerships in using ICT in teaching and in organizing such use within the context of inclusive education.
- Getting the infrastructure right (within and outside the institution).
- 2015: Together with the Secondary Education Council and Schoolinfo, Kennisnet will support school boards in getting the infrastructure right (devices and connectivity), for example by concentrating demand.

Accountability, governance and quality assurance

- Make institutions' performance (and the implications) transparent through Windows of Accountability.
- 2015: Kennisnet will take over management of Windows of Accountability. It will reach agreement with the Primary and Secondary Education Councils and Schoolinfo about its work in this context.
- Improving the availability and use of information for school and school board quality assurance cycles (information management).
- 2015: Kennisnet will help ensure better utilization of information, for example within the context of SION, boost the position of information management, and disseminate information about the way that ICT applications can contribute to quality assurance.
- Utilizing learning and pupil characteristics when designing individualized approaches (learning management).
- 2015: In relation to the Breakthrough Project and other initiatives, Kennisnet will clarify insights into relevant pupil and learning characteristics and ensure more compatibility between systems by means of standardization.

Broad education and coordination between sectors

- Focusing on democratic principles, basic social values and non-cognitive skills such as cooperation, creativity and entrepreneurship.
- 2015: Kennisnet will represent education within the Mediawijzer.net partnership. Relevant knowledge will be disseminated via kennisnet.nl and MKO ('My Child Online').
- Meticulous, sound and secure digital transmission of data through the Education Transfer Service and Progress Monitor.
- 2015: Kennisnet will be responsible for managing and continuing the technical refinement of the Education Transfer Service and Progress Monitor.

Vocational Education and Training

VET is making efforts to improve the quality of vocational education. The Focus on Skills [Focus op Vakmanschap] action plan (Ministerie van OCW, 2011) is the first step along the road to more stimulating vocational education. There are three main objectives in that regard: improve the quality of vocational education and training, simplify the system, and upgrade governance and operational management. Implementation is well under way. Compact and high-intensity educational programs are more appealing to students and offer a good alternative to the senior general secondary education route. The reform of the qualifications structure should ensure that vocational education provides more of what the future labour market will require. The dossiers are more transparent (shorter and better organized) and more flexible (easier to update). To improve efficiency, there will be fewer qualification dossiers.

A policy document recently issued by the Ministry of Education, Visiebrief mbo: Ruim baan voor vakmanschap: een toekomstgericht mbo (Ministerie van OCW, 2014) marks a shift in emphasis toward updating vocational education. It is precisely because innovation depends largely on skilled specialists that we must continue to work on improving the quality of vocational education and training. For example, the trend toward high-intensity, compact educational programs set in motion by the Focus on Skills action plan will be followed up by extra programs for talented students.

The policy document also looks at what ICT can contribute to flexible education that is based on the student's learning needs. Digital learning material can have a positive impact on learning results. In addition, a growing number of platforms make personalized possible by linking learning objectives and content, specifically at individual level. In addition, ICT can support educational institutions in their quest for flexibility and individualized learning. The VET sector has itself now taken steps at administrative level to coordinate the supply of high-quality learning material.

VET is seeking ways to use the various measures to achieve lasting improvements in education. This involves focusing on teacher and school manager professionalism and on teaching skills that are more responsive to student needs. ICT is one of the aspects that are being addressed in this context.

In the School Board Agreement (MBO Raad, Ministerie van OCW, 2014), the Ministry of Education – acting on behalf of the State Secretary of Economic Affairs – and the VET Council have reached agreement on quality standards and the budget available for investment. One point that they have addressed is a reduction in regulatory pressure and the administrative burden.

The iAgenda (saMBO-ICT, 2014) offers a review of all policy measures and activities that have consequences for the supply of information in the VET sector. The first version was developed in cooperation with various parties (DUO, SBB, the Ministry of Education, and saMBO-ICT). For each policy measure or activity, the iAgenda describes the impact on data-sharing or the administrative organization within institutions. The VET Council has prioritized measures that have an impact on budgeting, the reform of the qualifications structure, and the organization of practical vocational education.

ICT in VET

In its multi-year plan for 2013-2015 (Meerjarenplan 2013-2015 Samen sterk met saMBO-ICT), the independent representative organization saMBO-ICT describes its current objectives and main activities. It has prioritized activities that contribute to achieving the objectives of the Focus on Skills action plan, for example in the iFoV program (saMBO-ICT, 2013), designed specifically with these objectives in mind. The iFoV program highlights the consequences related to information and systems for VET institutions and ensures that they have consistent support while implementing their plan.

Other main themes in saMBO-ICT's multi-year plan include 'more for less' (how can institutions improve the quality of ICT while paying less?) and 'the promise of ICT' (how can institutions ensure that ICT actually makes a valuable contribution to the teaching-learning process?).

Collective support

VET is highly diverse, not only in terms of students but also with regard to the educational institutions themselves. Some have more than 20,000 students spread over multiple locations, but there are also many smaller institutions. For example, agricultural colleges and trade schools have an average of 2000 students. Every institution will benefit by joining forces and cooperating with others, but in practice there will be differences in focus. The VET sector cooperates closely within saMBO-ICT, an independent organization of and for all VET institutions that has close ties with the VET Council and Kennisnet. The main aims of saMBO-ICT are representation, knowledge-sharing, and joint projects.

To make effective and efficient use of ICT in the years ahead, VET will require assistance (by the public sector) in reducing IT costs (e.g. by setting up collective facilities like the VETcloud), alleviating the administrative burden (e.g. by improving data-sharing and automating processes) and improving the way the free market operates with regard to digital educational resources.

There is also growing interest in the way that ICT can effectively support new and existing teaching methods and the demands this makes on teachers and other staff.

Kennisnet will help examine these issues in the coming years, making allowance at every step for 'green education'. We are working to improve the performance of ICT supply chains by emphasizing standardization, by developing, refining and managing facilities, by advising the sector on strategic issues, and by collecting, interpreting and disseminating information about effective and efficient ICT use.

Our annual plans describe how we intend to undertake these activities, including in close cooperation with other organizations. VET institutions, for example, use the connectivity and related services provided by SURFnet. In 2014, cooperation between the VET sector and SURFnet was formalized so that every VET institution can connect to SURF.

Organizations such as SBB, MBO15, the Ministry of Education, and DUO are also working to improve ICT in the VET sector.

Need for support in vocational education and training (including agricultural colleges)

Modernize education

- Logistical consequences: iFoV program activities, reform of the qualifications structure.
- 2015: Kennisnet will survey applications for streamlining logistical processes (assembling curriculums, scheduling, etc.). Which options are available to an institution and how do systems work together?
- Didactics (and e-didactics): matching educational content, methods and ICT and other resources (knowing what works).
- 2015: Kennisnet will monitor ICT skills and work with saMBO-ICT to get the topic of e-didactics on the agenda of VET boards and HRM managers. Kennisnet will link existing initiatives and help take the debate about e-didactics to another level.
- 2015: Kennisnet will make special products and tools available that address changes in the way education is organized, for example the Online Learning in Balance model [*Online leren in balance*].
- Continuous learning pathways
- 2015: Working within SION, Kennisnet will develop facilities such as the Progress Monitor to improve the exchange of learning and pupil data.

Reduce the administrative burden

- Efficient national information management system (e.g. refinement of the BRON, ROSA systems).
- 2015: Kennisnet will advise saMBO-ICT and the VET Council on changes in the administrative supply chain so that the sector can coordinate trends and developments.
- Practical vocational training: improving communication/guidance and registration of certified apprenticeships.
- 2015: Kennisnet will consult with SBB about simplifying the registration of apprenticeships and advise on using ICT to supervise students.
- Using the iAgenda to influence the impact of measures.
- 2015: At the request of saMBO-ICT, Kennisnet will advise on how best to implement measures.

Educational resources

- Improving/maintaining the free market: there is enough qualitatively excellent learning material available that satisfies the needs of education.
- 2015: Together with saMBO-ICT, Kennisnet will draw up terms of reference and work on building support.
- 2015: Kennisnet will work with other organizations such as SURF to develop standards and facilities for the supply chain (iECK, VETcloud).
- Designing/organizing digital exams and tests: what does that mean, both centrally and locally?
- 2015: Kennisnet and the education sector will together to build expertise about digital testing and examinations and disseminate this among school boards. The focus will be on the costs and benefits (investment, effort).

Shared facilities

- More freedom of choice and flexibility (and lower costs) through the VETcloud.
- 2015: At the request of saMBO-ICT, Kennisnet will work with SURF (and SURFnet) on creating the VETcloud. The VETcloud will be delivered in phases to ensure that it meets all the sector's needs.
- Reducing the administrative burden by automating processes, for example digital signatures.
- 2015: Within the context of SION, Kennisnet will create a facility for digital signatures.
- Improving transparency for governance and accountability through VET-transparent.
- 2015: Kennisnet will manage VET-transparent and ensure that it is developed and refined in line with the sector's wishes. The VET Council will provide guidance.

Information security

- Secure and responsible data management and data transfer.
- 2015: Kennisnet will support the information security program with its expertise. A VET testing framework will be set up, along with a benchmark. The knowledge gained from these activities will be disseminated actively.

Appendix 2: Developments in technology

Technology is advancing rapidly. It is important to identify the opportunities and weaknesses of the various technologies and to know which educational objectives they will impact. The hype cycle below shows which technologies

will be relevant for education in the next five years and at which point large-scale use of these technologies will be possible (Kennisnet, 2014).

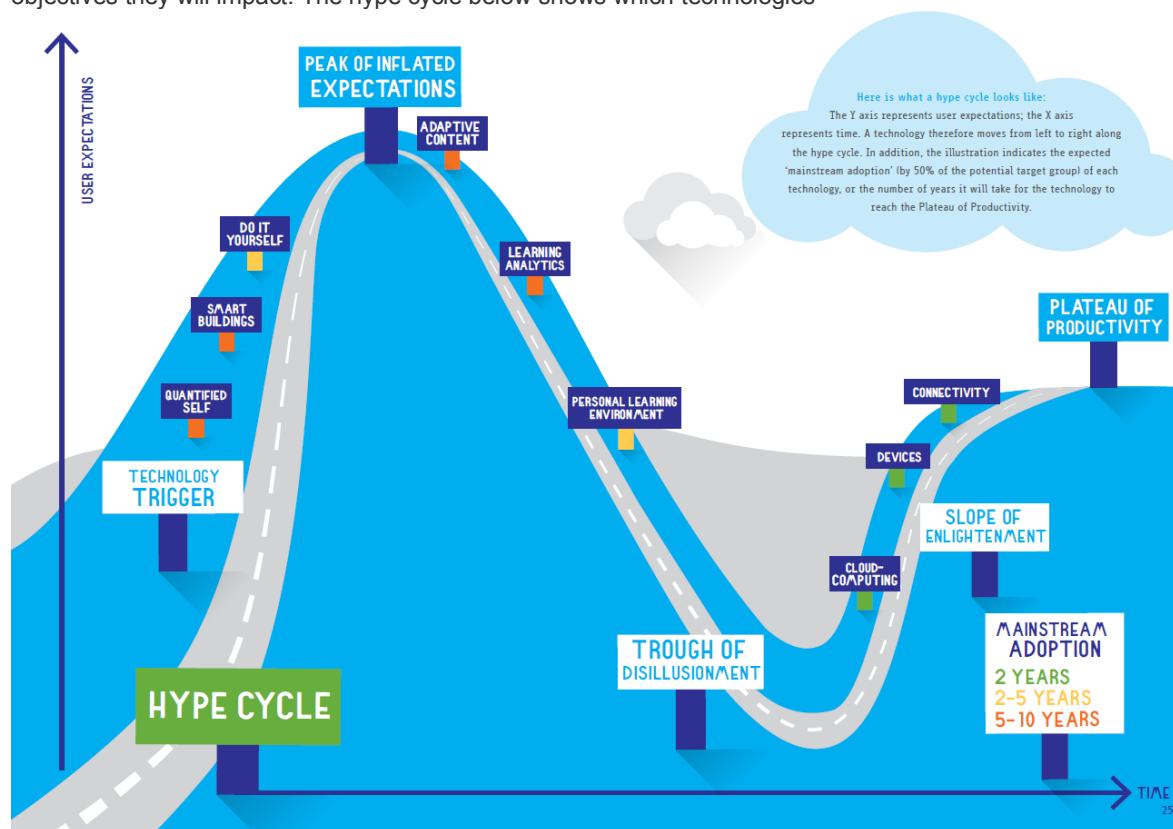


Figure 2: Technology trends

Basic ICT facilities

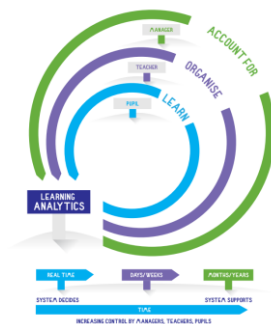
The education sector needs good basic facilities to optimize the potential of ICT in education. By basic facilities, we mean devices, connectivity, and cloud-computing. A growing number of software packages (pupil information management systems, pupil administration systems, and electronic learning environments) and digital learning materials are no longer stored locally, but in the cloud. That is not only more flexible (applications and data can be accessed from any location), but it also saves time and money. The transition from a local to a cloud infrastructure does require the redesign of the IT function. In addition, aspects such as ownership, data compatibility and privacy must be considered when setting up cloud facilities.

Cloud services require devices (usually tablets or laptops) and an internet connection to access data. School boards and school managers must make the right choices when selecting basic ICT facilities that fit in with their school's context.

Data-driven instruction

Schools are already using masses of data generated during the learning process, and that will only increase in future. Certain ICT applications such as the personalized digital learning environment can make this simpler and ease the demands on teachers. Using smart digital learning material makes it possible to collect all sorts of data on learning processes and success rates. Adaptive learning materials use learning analytics to provide pupils with the most appropriate exercises, explanations or support.

Data on the learning process and success rates can give pupils more insight into their own learning process. Based on this information, the teacher can tailor his or her instruction to individual pupils and groups. The data that



becomes available can also be used to explain the learning process within the school, to parents, or more widely. In future, schools will also make more use of smart sensors to analyse and optimize learning and the learning environment.

Do it yourself

A society in which ICT and technology plays a prominent role needs pupils who are media literate and skilled in ICT. The ability to deal with ICT and technology and use them to teach programming and computational thinking is becoming increasingly relevant in education. The advent of Do It Yourself technology in education – in other words, learning by making – can make a valuable contribution in this regard and spur the development of 21st-century skills. DIY technology is more than programming; it also involves creativity and cooperation

Consequences

Technology continues to open up new opportunities in education, which in turn implies new choices and concerns. For example, to what extent are institutions responsible for supplying their teachers and pupils with devices? How much freedom do they have when using school-owned devices? If a school decides on a BYOD (Bring Your Own Device) policy, which devices and applications are most effective and responsible? In addition, schools have come to expect a great deal of data-driven education and other new approaches. Eventually, these approaches may even exceed their expectations, but it will take a few more years before that happens. Nevertheless, now is the time to align technology with education and use it to meet education's needs. The sectors must explain what they need, for example to improve their ability to differentiate. Agreements must also be made concerning standards for necessary or useful information-sharing, for example within the context of accountability. Only by coordinating innovative trends right now can we ensure that they will reflect the context and aims of education and help the sector improve its effectiveness and quality.

Appendix 3: Terms and organizations

Organizations

	Description
AOC Raad (Council of Agricultural Colleges)	The Council of Agricultural Colleges is the sector organisation for all agricultural colleges (AOCs) in the Netherlands.
Beeld en Geluid (Netherlands Institute for Sound and Vision)	The Netherlands Institute for Sound and Vision has one of the largest collections of audio-visual material in Europe.
DUO	DUO is central government's executive agency for education, DUO collects and manages data on education and uses meta-data to turn it into information products.
GEU (Education Publishers Group)	The Education Publishers Group is the trade association of educational publishers in the Netherlands.
KBb-educatief	KBb-educatief is a group of educational book vendors within the Dutch book trade federation (KBb) that have joined forces to promote educational books.
MBO Raad (VET Council)	The VET Council represents all institutions for vocational education (secondary) and training (for adults).
MBO15	MBO15 program management supports institutions in achieving the objectives of the 'Focus on Skills' action plan.
Ministerie van EZ (Ministry of Economic Affairs)	The Dutch Ministry of Economic Affairs.
Ministerie van OCW (Ministry of Education)	The Dutch Ministry of Education, Culture and Science.
NRO	The NRO is the national coordinating body for educational research. It works to improve and revitalize education by coordinating and funding educational research and by bridging the gap between research and practice.
Onderwijscoöperatie (Education Cooperative)	The Education Cooperative is an association of teachers run by teachers for teachers. It was formed by a partnership between five professional associations (AOB, CNVO, FvOv, Platform VVVO and BON).
PO-Raad (Primary Education Council)	The Primary Education Council is the sector organization for primary education.
saMBO-ICT	saMBO-ICT is an independent organization of and for all VET institutions. It represents the sector's interests across a broad field, for example with regard to data-sharing, the design of information facilities, and IT.
SBB	SBB brings the business community and vocational education together to work on issues such as the qualifications structure, examinations, practical vocational training, and available programs.
School aan Zet	School aan Zet helps schools in special, primary, and secondary education to develop into more professional learning organizations capable of ongoing improvement.

	Description
Schoolinfo	The Schoolinfo Foundation initiates and develops information products, especially in conjunction with the primary and secondary education sector and their partners in the supply chain.
SLO	SLO is the Netherlands' expertise centre for curriculum development. Its task is to bridge the gap between policy, practice and research. SLO is an independent, non-commercial organization. It operates on a national basis and works for many different parties in policymaking and in the field.
SURF	SURF is the higher education and research partnership for ICT in the Netherlands. Since 2014, the VET sector has also been connected to SURF.
VDOD	VDOD is an association that allows service and system suppliers in education and ICT to work together where necessary and useful for its members/suppliers.
Vereniging Hogescholen	Vereniging Hogescholen is an interest organization and employers' association for Dutch universities of applied sciences.
VO-content	The VO-content Foundation works on behalf of secondary schools to ensure that publishers develop, maintain and update open digital learning pathways (the 'Stercollecties').
VO-raad (Secondary Education Council)	The Secondary Education Council is the sector organization for secondary education.
VSNU	The VSNU is the Association of Universities in the Netherlands. It has fourteen members. The VSNU represents the interests of the universities in government, politics, and civil society.

Samenwerkingsinitiatieven

	Description	Participants
Education & ICT Breakthrough Project www.doorbraakonderwijsenict.nl	The purpose of the project is to achieve a breakthrough in the use of ICT and make personalized learning possible. It is meant to break through obstructions and impediments and develop a transferrable, integrated and affordable approach for primary and secondary schools that will allow them to make their own choices and take steps towards individualized learning using ICT.	Primary and Secondary Education Council, Ministries of Education and Economic Affairs Support: Kennisnet and Schoolinfo
Edustandaard www.edustandaard.nl	The education sector has developed various standards to allow or facilitate data-sharing. EduStandaard is a public-private partnership facilitated by SURF and Kennisnet for the development, refinement and management of standards, application profiles and vocabularies. Joining forces across the entire education sector and making centralized public-private governance agreements guarantee both commitment and continuity.	SURF, Kennisnet and stakeholders (both private distributors and suppliers of educational software and learning material and public organizations such as the Ministry of Education, the Royal Netherlands Academy of Arts and Sciences, SLO, DUO, Schoolinfo and saMBO-ICT).

	Description	Participants
iECK ((implementatie Educatieve ContentKeten) http://www.educatievecontentketen.nl	Public and private parties participate in iECK to implement the standards to which they have agreed in the educational content supply chain. This organization is made up of representatives of education, publishers, distributors, software suppliers and Kennisnet, who work together to ensure the distribution and accessibility of digital learning material and to share learning and test results. iECK participants agree on implementation processes and timeframes and work on developing or refining other arrangements. Implementation agreements concluded by a public-private partnership foster commitment and have a direct impact on users in education.	
SION (Samenwerkingsplatform Informatie Onderwijs) http://www.sionderwijs.nl	SION is a cooperative platform coordinated by the sector councils and set up to streamline information flows in the educational supply chain. The agreements reached are valid throughout the administrative chain in education. This allows the education sector to optimize its use of information so that it can take the pressure off institutions and ensure continuous learning pathways for pupils and students across sectors.	Primary, Secondary and VET Councils, Council of Agricultural Colleges, Vereniging Hogescholen and VSNU Support: Kennisnet, Schoolinfo, saMBO-ICT, SURF and Ministry of Education/DUO
VETcloud	The VETcloud program has developed a strategic agenda for using the cloud in vocational education and training. It disseminates this agenda and coordinates the relevant activities of the various parties involved. With SURF's assistance, it is developing and creating a collective facility for VET at the request of saMBO-ICT. This collective approach is improving efficiency and effectiveness. The objectives of VETcloud are to achieve greater transparency in the market for educational resources and more flexibility in education by providing fast, easy access to resources and services.	saMBO-ICT, Kennisnet, SURFnet
Mediawijzer.net www.mediawijzer.net	This program is meant to connect and enhance initiatives related to media literacy. The Mediawijzer.net expertise centre supports network partners and draws attention to the issue of media literacy.	NTR, SIOB, Netherlands Institute for Sound and Vision, the Electronic Commerce Platform Nederland (ECP) and Kennisnet

Appendix 4: Sources

This appendix lists our sources (documents and interviews). There is a separate list for each sector.

Primary education: For pupils

Documents consulted	Interviews
<ul style="list-style-type: none"> ➤ Beleidsagenda 2014-2018 - Om de leerling, (PO-raad, 2014) ➤ Bestuursakkoord (PO-raad, ministerie van OCW, 2014) 	Sept Primary Education Council Bureau 18-9 Educational Innovation and ICT Network 7-10 Primary Education Council Executive Committee 11-11 Primary Education Council Board

Secondary Education: Ready for the future

Documents consulted	Interviews
<ul style="list-style-type: none"> ➤ Sectorakkoord VO (Ministerie van OCW, 2014) ➤ VO-agenda 2014-2020 ➤ Interne notitie VO-raad t.b.v. issuegroep 	Sept Secondary Education Council Bureau 7-10 Issue group 5-11 Secondary Education Council Executive Committee 12-11 Secondary Education Council Board

VET: Focus on skills

Documents consulted	Interviews
<ul style="list-style-type: none"> ➤ Focus op Vakmanschap 2011-2015 (Ministerie van OCW, 2011) ➤ Focus op Vakmanschap: de basis is op orde, nu de lat omhoog (MBO2015, 2014) ➤ Visiebrief mbo (Ministerie van OCW, 2014) ➤ Meerjarenplan saMBO-ICT (saMBO-ICT, 2012) ➤ iAgenda (saMBO-ICT, 2014) ➤ iFOV (saMBO-ICT, 2013) ➤ Sectorakkoord (MBO Raad, Ministerie van OCW, 2014) ➤ Techniekpact 2020 	Sept saMBO-ICT and VET Council Bureau 9-9 saMBO-ICT Board (outline) 4-11 saMBO-ICT Board 4-11 VET Council Board

General

Documents consulted	Interviews
<ul style="list-style-type: none"> ➤ Lerarenagenda, ministerie van OCW, 2014 ➤ Trendrapport, Kennisnet, 2014 ➤ Nationaal Onderwijsakkoord, 2013 ➤ Brief taakstelling onderwijssubsidies, 2013 ➤ Brief 'Onderwijs persoonlijker maken met ict', ministerie van OCW, 2014 	Ministry of Education