

The world is your classroom.
Teach, inspire and innovate with our technology.

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The rise of digital is unstoppable and unquestionable. Industry around the country, and indeed around the world, is changing to keep up. And education is no different. With Minister of Education, Johanna Wanka's DigitalPakt^{#D}, our schools will undergo huge changes.

» Because now, it's not enough just to know how to use a laptop or a tablet.

To thrive in a digital world, our young people must be ready for it. And that's the challenge our schools now face. But how can they prepare students for this world, when they aren't part of it yet?

In the next five years, we can expect our schools to fully embrace digital education. All students will have access to high tech equipment. Teachers will have more inventive, immersive ways to impart their knowledge. And schools will provide an education worthy of the 21st century. They may even grow to be like Saarbrücken's Smart School¹.

Because now, it's not enough just to know how to use a laptop or a tablet. We must teach our children how to be good digital citizens. We must teach our teachers how to get the most from this new technology. And with the power of the DigitalPakt behind us – it's finally achievable.

This is a fundamental shift in the way IT integrates with our education system. Computers and technology are no longer limited to being the subject of dedicated IT lessons. They are now enriching and augmenting our children's lessons, making them more interactive and inspirational.

¹<https://www.bmbf.de/de/startschuss-fuer-die-erste-smart-school-deutschlands-3601.html>

Our education expectations

Let's think about what we expect our education system to deliver to our children. Many of our expectations are intangible. We hope our schools, colleges and universities ignite our children's imaginations, and inspire them to fulfill their potential. Pragmatically, we want our children's education to prepare them for their future lives and careers.

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Their world will bristle with hyper-connected technology. And classrooms must teach them the skills they'll need to thrive in that environment. They are digital natives. They will never know a world where a man can land on the moon using less computing power than that found in a typical Internet of Things device.

So how can education establishments prepare students for a world that doesn't yet exist? How can we teach our children to do jobs that aren't yet invented?

The answer is that we cannot. However, what we can provide is a strong foundation of core learnings and ethics, upon which they can build. They can learn critical assessment, and given a framework that will allow them to continually acquire new skills throughout their lives. They must also be given the opportunity to learn with technology. And this must enhance and supplement their education.



Challenges to the take up of technology in education



The needs of our young people have changed. So, our education establishments must change too. A change of this magnitude will present many challenges for organizations and individuals alike.

» How can schools and colleges get the benefits that an innovative and greater use of technology can bring, if they can't afford it?

One of the challenges slowing the uptake of technology is overcoming reluctance. Some educators don't want to adopt new techniques, largely caused by a lack of training and support. So, how can we demystify technology and enable them to fully embrace it the way their students do?

In some cases, this is simply a generational issue that will be addressed naturally over time. But we can also address this challenge by recognizing the anxiety and lack of comfort that some teachers and lecturers experienced. And then we can focus on easing these concerns through structured training programs.

Budgets are also a major challenge. Technology is expensive, and with finances already squeezed, buying new equipment can be low on the priority list. When tech solutions are bought, they tend to be proven techniques that demonstrate their benefits. With the assistance of DigitalPakt#D, this will hopefully become a lesser issue.

This poses a real issue. How can schools and colleges get the benefits that an innovative and greater use of technology can bring, if they can't afford it? The answer might be in industry. Industry will benefit from improved education – so industry will need to take an active role in financing solutions, through schemes such as partnerships.



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A digital education



Across the globe, access to the internet has revolutionized learning. We are moving to a world of constant interaction and peer support, which can be facilitated and encouraged by both schools and parents at home. Social media will play an increasingly important role in education, enabling teamwork and the sharing of ideas. Perhaps most importantly, it will act as a conduit for discussion and debate, providing students with valuable life skills.

» The internet makes it easier for students to plagiarize and copy existing content, robbing them of investigative skills and the thought processes required for understanding.

And learning from others via the internet isn't just restricted to the younger generation. In the UK, a man unskilled in the building trade constructed his own home. How did an untrained individual accomplish this? He simply watched instructional videos on YouTube and then put into practice what he had observed.

The term 'digital natives' is often used to describe today's students. They have grown up in a world full of technology, and are comfortable with how to use it. However, this doesn't mean they know how to use it to further their education. Indeed, the internet makes it easier for students to plagiarize and copy existing content, robbing them of investigative skills and the thought processes required for understanding.

Our children are operating in two separate digital environments. The first is the controlled environment provided by the education system, where they are protected and safe. And the second is the uncontrolled environment they may have on their phone or at home, which potentially exposes them to threats and requires them to be cautious.

A digital education is a vital part of any curriculum. Not only must our children learn how to use technology efficiently and effectively, but they must also learn about the threats. They must be taught the characteristics of good digital citizenship, and the practical behaviors they can demonstrate in order to protect themselves online.



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Technology to tailor the learning experience

No two students have the same educational needs. So, it stands to reason that students will learn best when an educational program meets their needs. However, very few students will enjoy the privilege of one-on-one tutoring. The majority will share their learning environment and teachers with many other students. The opportunities for a bespoke approach have traditionally been limited. How can education establishments support young people at their own capability level?

» Technology will let us customize aspects of our children's learning.

Like it has done in other spheres such as entertainment, technology will let us customize aspects of our children's learning. There are always multiple ways to teach. Educational applications can play a role in supporting the teachers by demonstrating various techniques, and then allowing the pupils to practice using the technique that makes the most sense to them. This also allows a rapid feedback loop for the teacher, giving them swift and accurate visibility of the areas that pupils are struggling with.

Technology also allows educators to more easily and regularly use a concept that has long been used by teachers to drive learning through competition – gamification. Aspects of game design, such as progression, problem-solving, attainment, collaboration, and cascading information, can be introduced to the software to make learning more engaging. This is a real growth area, and has been demonstrated with the educational application of Minecraft.

With the increased use of technology in education, exam boards must re-evaluate how they ascertain levels of learning and understanding. Given that our students are unlikely to use pen and paper in their careers, is that still a relevant medium to use for examinations?

Technology offers possibilities for monitoring and improving education standards. Remote video observations are already used in some countries to provide feedback to teachers. This may well be adopted more widely to offer a supplementary capability or to replace in-person observations and assessments.

But can technology offer solutions where teachers themselves are in short supply? In 2013, the One Laptop Per Child organization tried an experiment. They identified two remote Ethiopian villages where children had no access to education, and gave the children a tablet device. No instructions were provided, other than to some adults on how to use the solar charging station. The tablets were pre-loaded with specialist software developed by MIT. Through experimentation and interaction with the tablet, the children learnt the alphabet, read books, watched video clips, and played educational games. After several months, the children in the village were seen singing the alphabet song.

Technology also has an important role to play for students with special needs. Here, technology can level the educational playing field. It can help to give all pupils an opportunity to reach their full potential in an inclusive environment. Technology has been improving the lives of pupils with disabilities for many years, but this equipment often came with a hefty price tag. However, modern consumer devices can now provide the same functionality that previously required specialist equipment. Examples include tasks such as speech recognition and text-to-speech. Specialist appliances are being replaced by downloadable apps for a fraction of the price.



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So, is technology a cure-all?

There is a clear belief that the integration of technology into the education of our children will provide a net benefit to their learning. However, a recent study has shown that this may not be the case. The study showed that education systems that provided more access to computers were actually improving less than those that limited access.

» The role that IT plays in the education of our children is increasing with every passing day.

This result is at first counter-intuitive. How can greater access to technology, with all the benefits of a more immersive and interactive experience, produce a lower quality result? The truth is that technology is not a golden bullet. While it's true that technology can contribute to an enhanced learning environment, its mere presence doesn't do this automatically.

We must ensure that where technology is implemented, it is made reliable and easy to use – dealing with technical issues robs a class of valuable learning time. The move to digital must bring obvious improvements.

Choosing which technologies to implement will depend on several factors:

- what the learning situation is
- the available budget
- relevance to the setting
- how the technology can enhance the learning experience.



Flourishing in a digital world



Technology is an enabler. It lets students access information faster and collaborate in ways never before possible. It allows them to create their work more quickly and efficiently, but more importantly, it also helps them think. Through technology, they can collect and organize vast data sets. It gives them toolsets that allow them to perform meaningful analysis and interrogation of data, allowing them to draw meaningful conclusions.

» But this exciting journey cannot be completed without teachers. Their job is one of the most vital in our society, and will continue to be.

The classrooms of our children bear little resemblance to those we remember. The digital transformation is now underway, and there are no keener adopters nor more avid users of technology than our young people. Technology helps them feed their insatiable appetite for knowledge, and offers opportunities to tailor the learning experience for the needs of each individual.

Now, with DigitalPakt#D, schools across Germany can take education up a level. They can give our young people the education they need, and the education they want. As Minister of Education, Johanna Wanka, explained during the 10th National IT Summit, students need to understand digital technology and use it cleverly. If they can do this, they can flourish in a digital world.

But this exciting journey cannot be completed without teachers. Their job is one of the most vital in our society, and will continue to be so no matter how much technology permeates our education establishments. Their role in unlocking our children's creativity and imaginations is vital to ensuring they all reach their full potential.

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