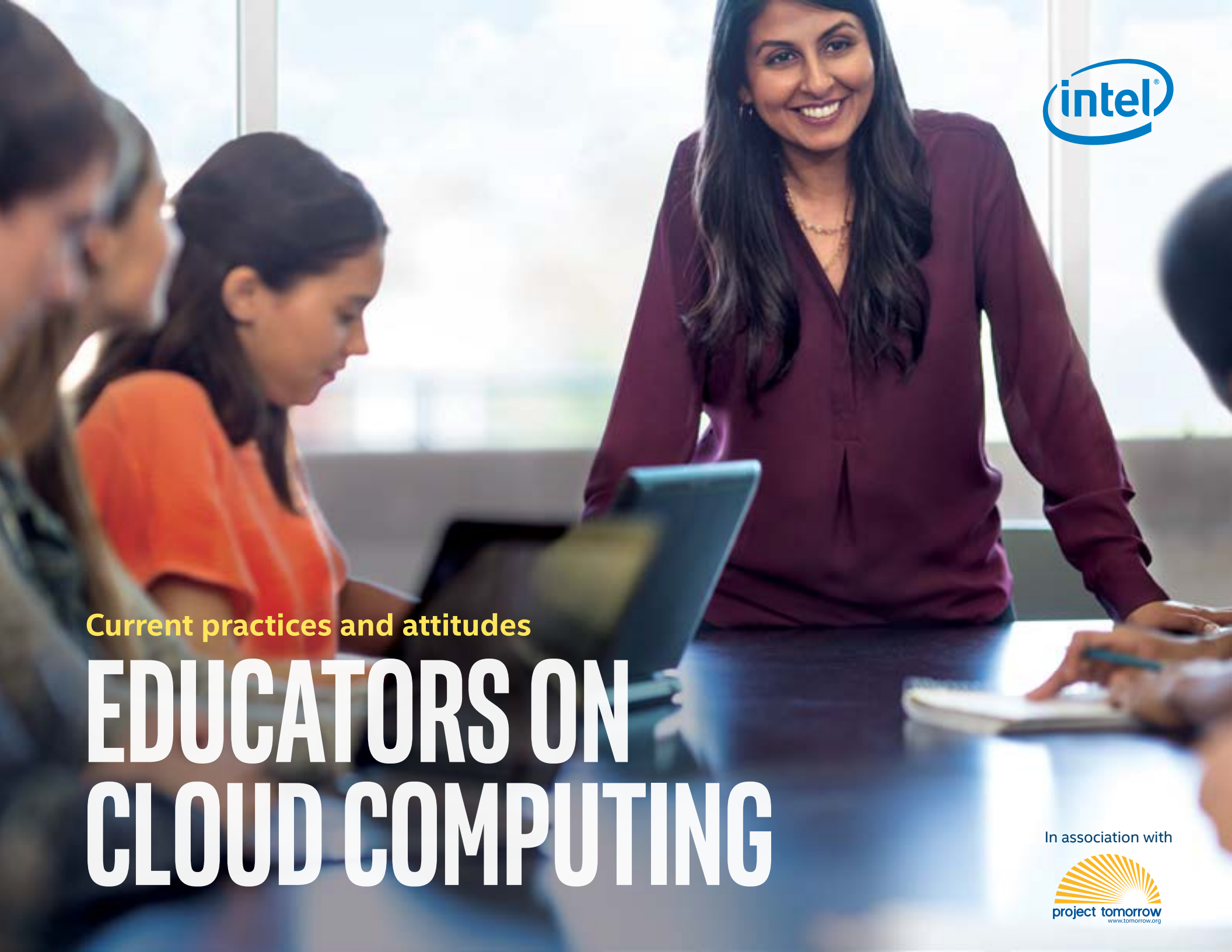


Current practices and attitudes

EDUCATORS ON CLOUD COMPUTING

In association with

project tomorrow
www.tomorrow.org

Current practices and attitudes

EDUCATORS ON CLOUD COMPUTING

In a continuing effort to advance the conversation about leveraging the cloud in schools, Intel has partnered with **Project Tomorrow**, a national 501(c)(3) nonprofit organization with a 19-year history of impacting education.

Based on research conducted by Project Tomorrow, this book offers insights for educators who want to learn more about how their peers are using the cloud.

In this book:

CLOUD COMPUTING BENEFITS

1. MOVING TO A CENTRALIZED MODEL

In this book:

Districts take the lead.

Cloud computing has provided technology leaders with a unique opportunity: to discontinue the distributed approach to digital learning that was enabled by mobile devices in favor of a new, centralized, district-level approach to product procurement, implementation, and maintenance. District leaders appreciate how the move to cloud allows them to take control back from schools and classrooms, and to standardize on certain products, services, and processes.

Source: http://www.slideshare.net/rapidscale/cloud-computing-stats-cloud-for-education

2. SAVING TIME AND WORKING SMARTER

In this book:

- **Cloud Benefits**
- Cloud Challenges
- Open Questions
- Future of the Cloud

New thinking and new efficiencies.

For technology leaders with infrastructure responsibilities, the gains in time and efficiency that the cloud offers are almost universally lauded. The ability to move away from the maintenance of school servers and the updating of device-dependent applications has helped technology leaders take on new roles.

Tech leaders appreciate the **REDUCTION OF INFRASTRUCTURE MAINTENANCE**

Teachers have less to worry about too. With cloud computing, they need no longer concern themselves with where an application is resident and if they have the latest version, or wonder how their students will access that same application outside of school. These shifts also provide teachers an opportunity to explore other applications and resources, and to think more critically about addressing student needs.

3. SIMPLIFYING PROCESSES

In this book:

- **Cloud Benefits**
- Cloud Challenges
- Open Questions
- Future of the Cloud

New allocation of responsibilities.

An increase in the use of digital tools means higher demands for consistent access to applications. Additionally, with cloud computing, technology leaders only have to concern themselves with district connectivity—leaving the management of applications to the cloud vendors themselves.

Freedom from server maintenance offers other benefits too: with no limits on the amount of storage allocated to each student and teacher, there is no more stifled creativity. That translates to a lot of innovation in the classroom.

4. INTEGRATING MORE TECHNOLOGY

In this book:

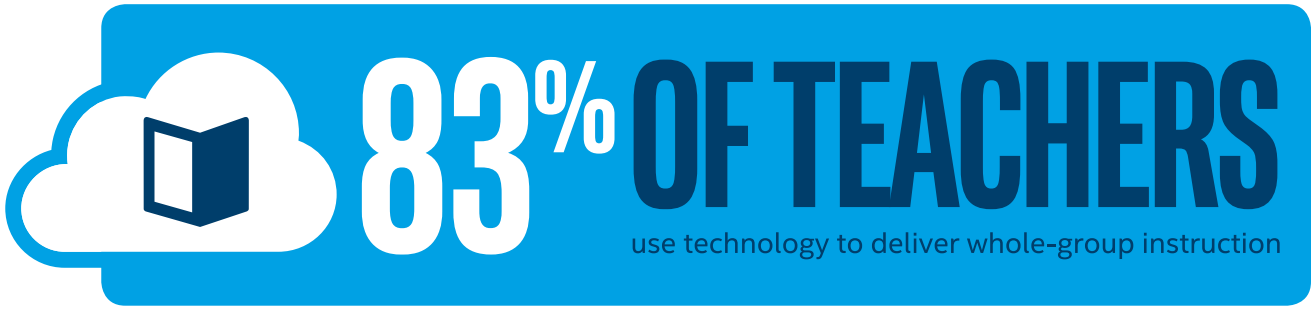
- Cloud Benefits
- Cloud Challenges
- Open Questions
- Future of the Cloud

A more modern classroom.

Many district technology leaders noted an inherent ease of use with cloud applications and services. They felt that despite a perceived lack of understanding of cloud computing on the part of teachers, the district was seeing advancements in how the teachers used technology.

Cloud has become a new driver for increased digital learning experimentation and usage in the classroom.

This is also true in terms of how real-time data is informing both instructional practices and individualized support for students.



Source: tesglobal.com, Teachers and Technology Survey, 2015

5. READYING STUDENTS FOR TODAY AND TOMORROW

In this book:

- **Cloud Benefits**
- Cloud Challenges
- Open Questions
- Future of the Cloud

A smarter future.

Cloud applications are instrumental in helping students develop online collaboration skills. Districts are seeing the obvious value in embracing cloud applications, which itself opens the door for further justifiable investigations of cloud as a strategic focus.

District leaders noted that the use of cloud applications and services is helping students gain proficiency in the kinds of productivity tools that businesses are using today—proficiencies they will expect to see in new graduates. This is a tangible and contextually relevant example of how the cloud is enabling workplace skill development for students.

6. SAVING MONEY

Two sides of the coin.

Without the need for storage devices, servers, and programmers to create, maintain, and update applications, many districts are reporting cost savings.

Others though, see a need for more service-oriented solutions and processes, which require a larger time investment than previously thought. In many ways, the district technology leaders were less focused on cost savings as a key benefit and more interested in increased efficiency and opportunities for digital learning.

7. CHANGING ROLES FOR IT DEPARTMENTS

In this book:

- Cloud Benefits
- Cloud Challenges
- Open Questions
- Future of the Cloud

From servers to service.

Some of those interviewed felt that the implementation of cloud computing would result in a shift in the skills required for district IT employees. The respondents saw IT departments moving more toward customer service, with staff overseeing cloud applications and services.

The district, then, would no longer need to hire staff with high IT proficiencies, but might instead look for those with stronger customer service résumés and simply teach them the IT skills required for the new environment. This could potentially instigate a change in the culture of IT departments, which may in turn shape the relationship between IT staff and instructional leaders and teachers—a change that could be beneficial to the entire district.

CLOUD COMPUTING CHALLENGES

1. BANDWIDTH NEEDS

In this book:

Changing capacity for changing needs.

With an increase in classroom usage of the internet and cloud-based services and applications, schools must have sufficient bandwidth capacity. This issue has been quite vexing for some technology leaders whose districts had invested in Chromebooks only to find themselves unsure of their capacity needs, or caught short-handed once Chromebook usage increased.

Districts need to align their **BANDWIDTH CAPACITY** with their **CLASSROOM NEEDS**

Districts see this as a remediable concern, but they know proper solutions will take funds, time, and strategic planning, some of which can be lacking. An associated challenge is that districts may not be in control of update and upgrade schedules, a situation that may impact classroom practices and teachers' willingness to use cloud applications if the tools are changing too rapidly or without notice.

2. PRIVACY AND SECURITY

In this book:

Ensuring the safety of important data.

Though it is not a new concept for schools, the issue of data privacy caught some district technology leaders offguard. The ever-increasing availability of cloud-based services and applications, along with the marketing of such products to teachers, has created a problematic situation for districts. In many cases teachers are unaware of their district's policies on data privacy and/or their lack of legal standing to secure these products for classroom use.

3. EDUCATING TEACHERS ABOUT THE CLOUD

In this book:

- Cloud Benefits
- **Cloud Challenges**
- Open Questions
- Future of the Cloud

Adoption relies on information.

Teacher awareness and understanding of the cloud is typically assumed to be low, unless their districts have offered explicit training on cloud computing principles. Consequently, many teachers continue to want online curriculum (resident in the cloud) to be printed for them.

Teachers are also reluctant to accept system breakdowns or failures of cloud services and applications. As one district leader noted, if a teacher's planned lesson is interrupted by an internet failure, it is doubtful that he/she will try that activity or use that content again. If a second failure occurs, even with different content, the teacher will walk away from cloud applications altogether. As most leaders pointed out, the failure is most often with district connectivity, and not the cloud service, but the teachers do not realize or appreciate the difference.

4. BEGINNING AT THE TOP

In this book:

- Cloud Benefits
- **Cloud Challenges**
- Open Questions
- Future of the Cloud

Administrators and board members need to buy in.

Besides teachers, other interested parties may also lack sufficient knowledge to effectively manage or plan for cloud computing down to the classroom level. Some district technology leaders noted that since most teacher evaluations do not include technology integration or effective use of cloud resources among their key metrics, there is no impetus or accountability for effective and sustained usage.

Technology leaders also worry about inadvertent lapses in security protocols on the part of administrative staff. And school board members' unfamiliarity with cloud computing can also impact technology leaders' ability to strategically plan for cloud computing investments.

5. DUPLICATING CLOUD SERVICES AND APPLICATIONS

Managing and consolidating important resources.

The efficiency of cloud computing can be undermined if there are too many disparate products or services at play within the district. Individual departments will frequently select multiple services, creating redundancies that result in wasted time, money, and IT resources. And teachers, empowered with 1:1 mobile devices and school-wide internet connectivity, can be lured by the appeal of the next big thing in classroom mobile apps. Getting end users to appreciate the commonality in various products and to standardize wherever possible has been difficult, but it is a worthy goal.

By avoiding redundancies, organizations can save

TIME, MONEY, & IT RESOURCES

6. HOMEWORK GAP

In this book:

- Cloud Benefits
- **Cloud Challenges**
- Open Questions
- Future of the Cloud

A stark and potentially disruptive reality.

With the increase of digital tools and cloud applications in the classroom comes an increased demand for safe and consistent access to the internet for students while they are *outside* of school. However, for many communities, that access poses a real challenge. Some schools are allowing students to come in early or stay at school longer to do cloud-based homework, but that solution is not always satisfactory.

Cloud proponents worry that if schools and districts cannot find a way to address the inequities of out-of-school access, they will fall back on their old ways and abandon the increased emphasis on digital learning. District leaders understand that additional thought and strategic planning are needed to solve this problem.

7. FUNDING REALITIES

In this book:

- Cloud Benefits
- **Cloud Challenges**
- Open Questions
- Future of the Cloud

Aligning funding models with cloud computing.

District leaders are facing two main funding challenges. First, many of the innovative products available in the cloud are cost-prohibitive. While the sophistication of the products is appealing, the price tags and licensing fees are inconsistent with those of other traditional products. The free/OER arena offers comparable solutions, but they are often made by very small companies—thus creating concerns about sustainability and tech support—or are not as comprehensive as the district would like.

Second, the school funding models prohibit multiyear investments. **Districts use one-time monies to license products for year one, and then lack the funds to continue the licenses.** This is not only disruptive, but it presents a strategic challenge to achieving tangible outcomes like cost savings.

47% of education leaders in K-12 schools **CITE BUDGET CONSTRAINTS** as the top barrier to cloud adoption

Source: CDE survey of 221 K-12 and higher education leaders conducted in January 2016

7. FUNDING REALITIES
(continued)

It is also difficult for districts to convince their communities and school boards that spending more money now will save money in the future. Many districts rely upon local school bonds to fund technology infrastructure projects like data centers and new servers. But with annual licenses on cloud computing investments, bonds are not a good mechanism for funding. Therefore, districts need to rethink their other budget line items (capital vs. operating costs) to determine a sustainable pathway for cloud expenses.

A NEW APPROACH TO LEARNING

requires

A NEW APPROACH TO FUNDING

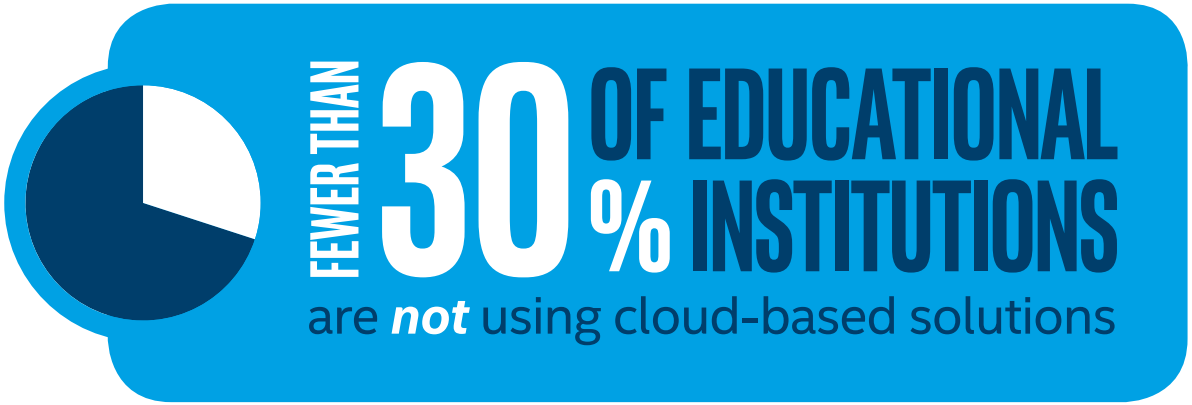
8. OBSTACLES TO INNOVATION

In this book:

- Cloud Benefits
- **Cloud Challenges**
- Open Questions
- Future of the Cloud

School and district cultures get in the way.

Current attitudes in educational systems run counter to the culture around cloud computing. In order to initiate an effective and strategic use of cloud computing and realize the many benefits, schools and districts must develop an entirely new approach to teaching and learning. If this does not occur, it's likely that only minimal benefits and ROI will be achieved. However, district leaders are encouraged by the efforts being made, particularly in the classroom.



Source: "Education Meets the Cloud" webinar Jan. 28, 2016 (Center for Digital Education)
http://hub.insight.com/h/i/210912657-the-state-of-the-cloud-in-education

OPEN QUESTIONS

1. SECURITY AND RISK

In this book:

What goes in the cloud, what stays out?

School districts have a dilemma: identifying which applications are appropriate for the cloud and which are not.

District leaders agree that applications like learning management systems, staff and student email, and productivity tools such as Office 365 and Google for Education are appropriate for the cloud. Some districts are also experimenting with moving their inventory management, professional development facilities, and substitute teacher systems to the cloud as well. However, many districts are hesitant to use cloud applications to support financial systems, personnel records, and student services. District leaders are also examining personal and organizational risks should security not be fail-safe.

2. SELECTING CLOUD APPLICATIONS

In this book:

- Cloud Benefits
- Cloud Challenges
- **Open Questions**
- Future of the Cloud

Teachers or districts: who makes the decisions?

Another debate among district technology leaders is around the level of autonomy teachers should have in selecting cloud applications for the classroom. The variety of opinions on this question reflects the lack of cohesion on best practices.

At one end of the spectrum are the district leaders who strongly endorse the centralization of technology decisions within the district office. Many of these districts have strict policies in place prohibiting teachers from installing cloud applications in their classrooms. In districts with "no gray area" guidelines, a failure to comply will result in punitive action. Many districts are therefore creating elaborate vetting processes where teachers nominate applications for approval by a district team. A few districts have even been recognized for their development of such screening processes.

2. SELECTING CLOUD APPLICATIONS
(continued)

At the other end of the spectrum are districts that are proactively giving teachers autonomy. Such efforts seem to focus on helping the classroom teacher not only evaluate digital content and cloud applications but also vet those applications against the core curriculum. In such environments, the district technology leader is not the warden of approved applications but rather a service provider with a focus on providing professional development and network services.

> "I am not an instructional guru—what do I know about what curricular applications are best for any particular classroom? **THAT IS THE JOB OF THE TEACHER.**"
>
> *–District CIO*

Proponents on both sides acknowledge risks and challenges. Many are concerned that if teachers are not allowed to choose applications for their own classrooms, they may lose their zeal for using technology in general. As noted earlier, however, district leaders continue to question teachers' capacity to make decisions that respect student privacy and network security.

3. TRUSTING VENDORS

In this book:

- Cloud Benefits
- Cloud Challenges
- **Open Questions**
- Future of the Cloud

Do they really know more than we do?

District leaders are aware that firms both large and small are rushing into the cloud application business, and that many are woefully unfamiliar with K-12 data systems and infrastructures. Despite having innovative features and functionality, many of these applications are not compatible with pre-existing LMS and SIS. And some apps lack the comprehensive support structures to provide 24/7 service to schools.

Some districts have engaged promising companies only to find that the hooks for syncing cloud data with mission-critical applications are not available, and the company is not equipped to respond to failures or support the urgency of K-12 operations. Some districts are even looking to cloud application vendors to be their "experts," and while some are actually fulfilling that role, district leaders are learning to be more circumspect.

Districts tend
TO AVOID SHARING BAD OUTCOMES
for fear they may reflect badly on their own due diligence

4. CLOUD-READY SCHOOLS

In this book:

- Cloud Benefits
- Cloud Challenges
- **Open Questions**
- Future of the Cloud

Is the right culture in place to support cloud?

District technology leaders see today's cloud computing and IT environments as significantly different than pre-cloud environments, and rightly so. The culture, too, around teaching and learning in a cloud computing environment requires change.

Success with cloud involves new thinking. It requires a new approach to both IT and teaching. And while it may seem uncharacteristic for a technology leader to wax poetic about school culture, there were many district leaders who brought culture into the discussion. This may be the result of initial cloud implementations that turned out to be premature—meaning that the right culture to support digital learning was not yet in place. This concept of cultural readiness is worthy of future study.

Our respondents identified several components of

A CLOUD-READY CULTURE

that could be used as the foundation for further research

THE FUTURE OF CLOUD

1. A POSITIVE OUTLOOK

In this book:

- Cloud Benefits
- Cloud Challenges
- Open Questions
- **Future of the Cloud**

Cloud in the coming years.

Overall, district technology leaders are optimistic about the future of cloud computing in K-12 education, and they believe that increasingly, we will see more applications moving to the cloud.

They feel that new programs, policies, and processes will be developed based on experiential data, as districts work through challenges. In this way, cloud application management will become more sophisticated.

There were varying estimates regarding timing for this transition to ubiquitous cloud computing in K-12 schools. While some respondents said they expected big advances in one to two years, most of the district leaders view this as a four- to five-year evolution.

2. NEW FRONTIER AHEAD

In this book:

- Cloud Benefits
- Cloud Challenges
- Open Questions
- **Future of the Cloud**

Cloud pioneers move forward.

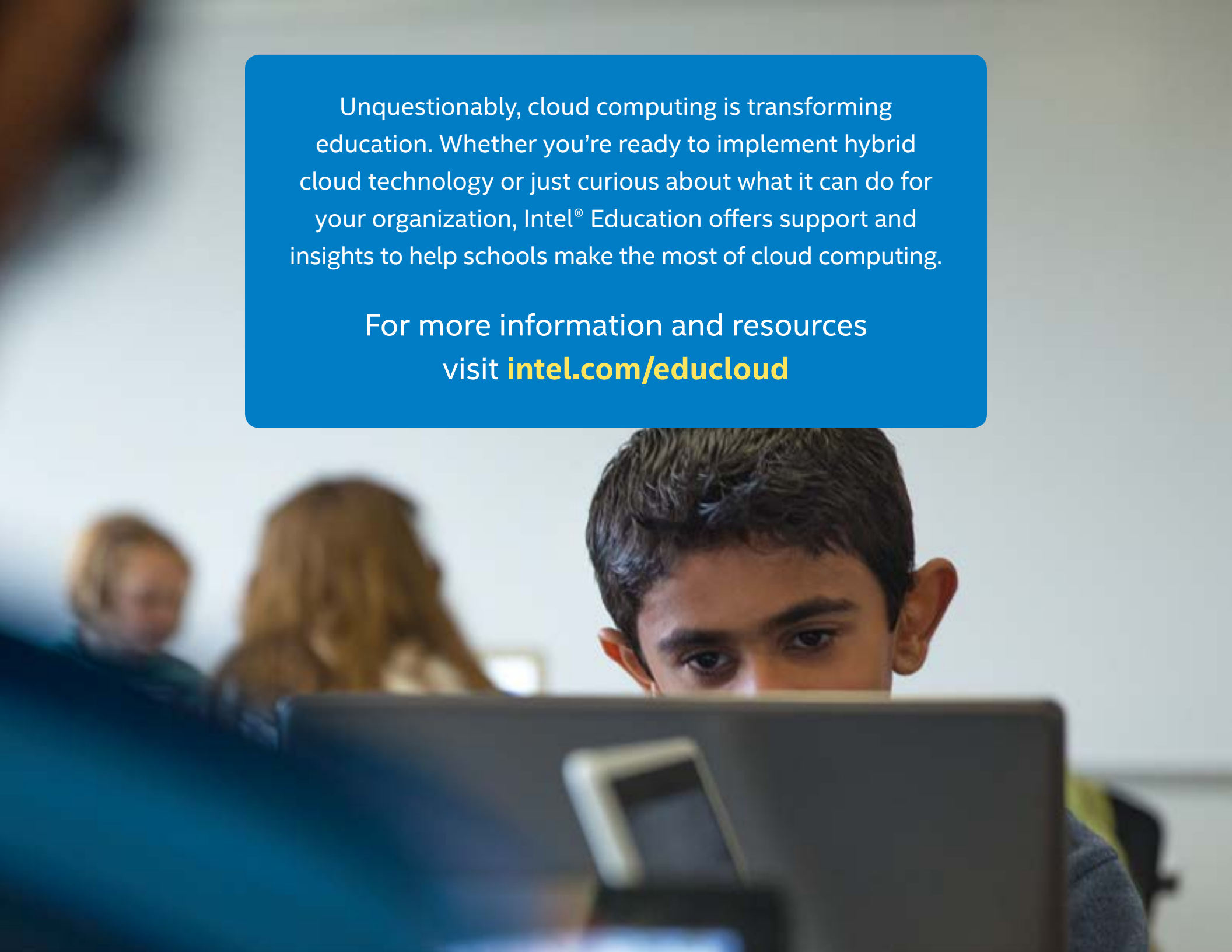
One reason that estimates vary on the time needed to move teachers toward more digital and online content is that some districts—particularly those with significant data center investments—base their timelines on financial or ROI considerations. These districts may require those four or five years to move beyond the data center business and effectively write off their investments in both hardware and physical space. Still other estimates are based on the implementation of policies that can support a secure cloud environment.

The nascent tenor of cloud computing is not lost on district leaders. They have their own growing pains, but they also want to be responsive to staff, teachers, students, and parents. As one respondent said, "Cloud computing today is the wild, wild West, and we are the cowboys."

District leaders expect that

TIMEFRAMES AND PLANS WILL BE MODIFIED

as new applications and uses are identified



Unquestionably, cloud computing is transforming education. Whether you're ready to implement hybrid cloud technology or just curious about what it can do for your organization, Intel® Education offers support and insights to help schools make the most of cloud computing.

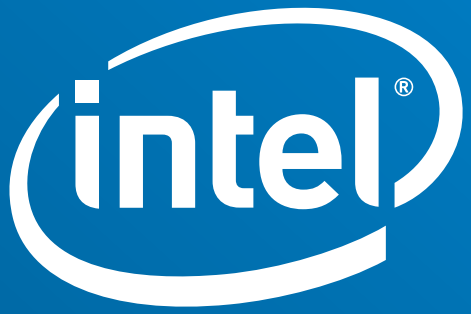
For more information and resources visit **intel.com/educloud**

project tomorrow
www.tomorrow.org

Project Tomorrow initiated a series of focus groups and interviews, the goal of which was to collect firsthand information and insights about the state of cloud computing in K-12 education in the US. The interview cohort included district technology leaders on the front lines of this trend, with representatives from school districts of varying size, demographics, geography, technological sophistication, all in various stages of cloud computing.

In total, the research included over ten hours of input from eighteen district-level technology leaders: nine individuals from seven local school districts in Orange County, California took part in the focus groups, and an additional nine technology leaders identified through the Speak Up network took part in one-on-one interviews. Both the focus group and the interviews were semi-structured discussions in which the facilitator began with general, open-ended questions and then followed up with more specific inquiries. The follow-up questions were based upon the respondents' answers.

All information courtesy of Project Tomorrow, unless otherwise noted.


intel