



Bring Your Own Device To School

The consumerisation of IT has accelerated a new model for 1-to-1 learning, where every student brings their own device. This discussion paper examines potential deployment models from teaching, learning and IT management perspectives.

Bruce Dixon, Anytime, Anywhere Learning Foundation
Sean Tierney, Microsoft Corporation



Windows[®]
in the classroom



Executive summary

The ongoing debate regarding the Bring Your Own Device (BYOD) model in schools warrants deeper analysis to help educators and institutions understand this provisioning model and its potential benefits and pitfalls for learning.

This discussion paper sets out to investigate the myths and understand which questions should be addressed when considering allowing students to bring their own devices, and which option might be best suited to a school or system's culture. It is intended to stimulate discussion around what constitutes best practice 1-to-1 learning.

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1-to-1 learning programs are not new

1-to-1 learning programs have been evolving over the past two decades. While some have amounted to little more than replacing pencil cases with laptops, properly structured, they can deliver strong benefits and redefine learning. These gains should be used to benchmark today's Bring Your Own Device environments.

The adoption of Bring Your Own Device (BYOD) models in schools is largely the result of two factors: school budget constraints and the consumerisation of technology.

As school budgets have been cut, so the prices of laptop-like devices have dropped dramatically with the introduction of netbooks, apps-based tablets and e-books. Smaller devices, such as tablets and smartphones have become internet-enabled, with a variety of apps that seem full of promise. And then there is the simple reality that more and more students are coming to school with their own devices in their backpacks.

This confluence of conditions has fostered the idea that students could use their own device at school. The appeal, of course, is that on the surface, BYOD seems to provide a way for schools to have a 1-to-1 program but not pay for it – a sort of 'have your cake, and eat it, too'.

But this assumption requires deeper scrutiny. As a starting point, it's essential to bear in mind what makes 1-to-1 learning successful and how it has challenged classroom practice over the past few years.

From a tentative start in the early 90s, 1-to-1 learning has become a worldwide phenomenon reaching millions of students. In their evaluation of six major 1:1 initiatives in the US, Argueta, Huff, Tingen and Corn¹ reveal that teachers and students agreed laptops increase student engagement, with students reporting an increase in the amount of work they are doing both in and out of school. But more importantly, 1-to-1 learning has shifted the focus from teaching to learning. Rather than teachers controlling process and knowledge, students have become empowered learners and active proponents of their understanding and ability to connect ideas in new ways.

Informal observation and classroom experience also suggest that, when students have their own laptops, learning is deeper and they engage in more intellectual, conceptual, analytical, creative thinking.

Rapidly evolving technology has also influenced the nature of 1-to-1 learning programs. For example, the Internet has become richer and more accessible, opening new ways to collaborate, communicate and connect to ideas and people, including, but not limited to:

- Redefining learning communities, as well as where, when and how learning took place.
- Creating new paths between students and intellectual guides/experts beyond the classroom.
- Introducing a world of disciplines beyond those defined in the traditional curriculum.
- Demonstrating the power of individual contribution to bring about large-scale change through collective action e.g., DeforestACTION.

Cloud computing – in concert with powerful laptops and software that continue to function when the Internet connection is lost – has also been able to deliver a seamless computing experience; not just setting the preconditions for anywhere, any time learning, but shaping its very nature by introducing rich new ways for students to research, learn and collaborate. And that is a critical factor for teachers, principals and parents to bear in mind when considering a BYOD model.

After many years of teaching and measuring learning in a 1-to-1 environment, both educators and researchers have been able to identify what constitutes a successful model. Their findings have been clear. Simply equipping students with their own devices and digitising existing curriculum is not the right approach. Instead they see the purpose of 1-to-1 learning as being to create confident, flexible, self-directed, life long learners. Any successful BYOD program needs to embrace and support this core premise and not detract from it.

1/ Argueta, R., Huff, J., Tingen, J. and Corn, J., 2011. "Laptop Initiatives: Summary of Research Across Six States." The William & Ida Friday Institute for Educational Innovation <<http://1to1atoc.wikispaces.com/Research>>. p. 7.



Do schools still need to provide computers?

It's a question that hard-pressed schools are asking themselves. However, careful analysis reveals that even small devices can have large implications.

With today's rapidly accelerating consumerisation of technology and the proliferation of affordable apps-based tablets and smartphones, the concept of shifting to a Bring Your Own Device (BYOD) provisioning model has obvious appeal.

Both perception and statistics indicate that a large number of students have a 'smart enough' phone that could connect to the Internet. The thinking behind BYOD is that these devices could now come out of the backpacks, policies could be rewritten and, at some level, students' own technology could be used by every student in the classroom.

By identifying student-choice BYOD as a solution to today's financial challenges, there have been attempts to rationalise the decision, retrofitting the BYOD solution to criticisms of today's schools. One such claim is that the real drive to BYOD is to empower students by letting them make choices about their learning tools.

Unfortunately, with this model BYOD does not seem to be about either self-directed learning or personalising instruction, since its focus is not to provide each student with the best tool for a specific task, but rather whatever their families can provide.

The decision of what device each student should use is not being made with an eye to optimising the pedagogical use of the device but, rather, is based on preferences, which can be driven by trend and fashion or, more significantly, on what the student can afford. This has significant pedagogical implications as it also implies:

- If devices are used for a class activity, the teacher needs to cater to the least powerful device in the classroom.
- Often the least expensive devices are designed for consumption, rather than creation. Even when creation is possible, it is difficult. So for those who can only afford one of the smaller devices, creating is more difficult.
- All students cannot use the same program/application, even if the teacher determines it has pedagogical value.

Therefore, before embarking on a BYOD program, it's important to spend time discussing the pedagogical objectives of school computing with all of the teaching staff. The following table could form the basis of this discussion.

Smartphones

Pros: Video, camera, Internet browser, GPS, lightweight

Cons: Small screen, voice calls or texting during class, control (it's hard to verify what students are really doing on their phones) insurance (who is liable).

In a limited way, student smartphones can support learning. Students can research online if there is an Internet connection. Video and still cameras can be used to record observations and presentations. Students can record classes to play them back later and they can also communicate and collaborate with each other and use educationally sound applications and ebooks for revision or learning.

Apps-based Slate/Tablet

Pros: Video, camera, Internet browser, lightweight, larger screen

Cons: Does not support digital pen so students have to 'write' with their finger or type. May not have the processing power or compatibility to run demanding education applications. Digital keyboard can be cramped.

For slightly more cost, slates add the ability to use a digital keyboard for note taking and provide a larger screen that makes it easier to write, draw and read. There are also opportunities for content creation, as well as communication and collaboration.

Computing Capability Taxonomy



Smartphone



Apps-based
Slate/Tablet



Laptop PC



Slate/Tablet PC
with Pen

Sample capabilities*

Sample capabilities*	Smartphone	Apps-based Slate/Tablet	Laptop PC	Slate/Tablet PC with Pen
Internet research.	Yes	Yes	Yes	Yes
Voice, video and audio recording conferencing and collaboration.	Yes	Yes	Yes	Yes
Supports small amounts of typing.	Yes	Yes	Yes	Yes
Video and audio capture and editing.	No	Yes	Yes	Yes
Supports music composition, playing in, composing and so on.	No	Yes	Yes	Yes
Supports typing of longer assignments. Multitasks for complex research and knowledge building.	No	Yes	Yes	Yes
Supports fully functional software for CAD, Web and graphic design.	No	No	Yes	Yes
Supports programming and handwriting recognition for Maths, Music, Chemistry and Asian characters.	No	No	Yes	Yes
Note taking with digital pen, intuitive and natural remote learning, fluent mind mapping, prototyping and complex visual thinking.	No	No	No	Yes

Pedagogical Potential – basic to advanced

* Reference as of July 2012, Sean Tierney, Microsoft Corporation

Laptop PC

Pros: Video, camera, Internet browser, full keyboard, runs educational applications, mouse control

Cons: No handwriting recognition

Laptops take learning to a higher level with their higher performance levels that enable them to run educationally sound applications for music composition, graphics, and so on. The full keyboard also provides students with an easier way to take notes and manage their work.

Slate/Tablet PC with Pen

Pros: Video, camera, Internet browser, full keyboard, digital pen for handwriting input, runs educational applications

Cons: Tablet PCs offer the best of all worlds.

They're fully featured for learning, and they have the important extra ability of the digital pen that opens up a whole range of pedagogical opportunities including writing chemical and mathematical formulae as well as Asian language characters. They can also jot notes that can be converted to text.



Bring your own device – five potential models

Although BYOD is often referred to as one single model, there are many interpretations. It's important to match yours to the school's pedagogical goals.

BYOD models take many forms. Given that most 1-to-1 learning programs are built around students having 24-hour access to their own laptop, the options primarily become who chooses what type of student devices and how they are funded.

Having the school define a single laptop model is currently the most common and by far the most successful 1-to-1 learning model. Although it can be described as BYOD because students use their 'own' laptop at school and at home, this provisioning model was developed well before the term became popular.

Central to this model is the concept that the school defines the required minimum specifications for student laptops. Schools usually specify a brand of manufacturer and model, which includes a single operating system or platform. And the family purchases the laptop – with or without funding support.

In these cases, the school may negotiate with a distributor to make laptops meeting these specifications available for purchase, often through the school, or directly from the distributor but under the school's purchasing agreement. By working with a distributor, the school is usually in a better position to also negotiate an effective and accountable service policy.

In some schools, there may be scope to define different form factors or models for different grade levels or age of students. For example it is not uncommon for schools to specify a fully functional laptop for Junior

Secondary, or Middle school students, and a pen and touch-enabled tablet for senior grades or High School students.

While this format of BYOD does provide for the school to clearly define the device, this does not in any way diminish consideration of the needs and preferences of students, who may often be involved in the specification process as 'interested stakeholders'.

In many of the earliest 1-to-1 programs, the debate around school-owned versus student-owned laptops involved discussion on student's sense of ownership, both in terms of the learning possibilities and care and handling of the computer. The pedagogical goals were, however, always at the forefront in determining the minimum specifications.

Where purchase is facilitated through the school, a variety of financial models have been developed, ranging from back-to-back leasing to rental and hire purchase usually depending on the financial governance of the school or school system.

In addition to this model several others have been proposed. To help you evaluate which one is most appropriate for your school setting, they are explored in more detail following. They can form a useful basis for discussion.



1.

School-defined single platform laptop

The school defines the required minimum specifications for student laptops.

Who determines the technology choice?

School in consultation with stakeholders

What are the funding options?

Can be parent or school funded, or a combination of both, as a co-contribution.

Benefits

- Student computers all have the same capabilities, so no student is working with an inferior tool and teachers can plan learning activities around these capabilities
- The specification of a single model and brand offers the best volume buying power, simplifies servicing arrangements significantly, and lowers costs accordingly.
- Devices are fully functional laptops, which can be used for the full range of learning activities.
- For the school – all the costs for the laptop are paid by the parent or through a significant co-contribution from the parent. Within this model there usually is a process for the seamless provision of support for less financially able families.
- The school network manager can easily manage connections and server.
- If a student has a technical problem, support at the school is familiar with the hardware and/or other students in the class can help.
- The service provider can be held to account for efficient turnarounds.
- The school can negotiate with the service vendor for loaner laptops for any extended service needs.
- Significant cost benefits in the total package for parents from bulk purchasing, servicing and licensing.

Considerations

What is the percentage contribution from families?

- This can range from 100%, with parents shouldering the cost of a full-featured laptop as well as service, warranty and replacement for each of their children at school, to a partial or co-contribution model. Under the 2010 Victorian Netbook initiative, parents contributed 30% of the cost of the netbook.
- Since the cost of providing computers shifts away from schools under these models, school technology budgets can be used to co-contribute to the cost of each student's laptop, support equity access programs for less financially able families or to provide an enhanced level of both infrastructure and/or hardware service support.
- Depending on the financial model used, ownership at the end of the product's life cycle must be clearly outlined before the commencement of any program. While this usually defaults to the families, other options are available.
- Where the provision model also includes coverage of high-speed broadband Internet access at home (e.g., Portugal), this may provide for a possible contribution from a telco or government body under an ongoing national funding initiative.

2.

School-defined single platform laptop, plus another device

This is often referred to as 1-to-2, or 1-to-many. In addition to the single platform laptop defined by the school, the student is permitted to bring other 'devices' such as a smartphone, e-book or touch tablet.

Who determines the technology choice?

School in consultation with stakeholders. Additional 'device' is usually the choice of student.

What are the funding options?

Core device is parent or school funded, or a co-contribution. Additional 'device' is 100% parent or student funded.

Benefits

- It can be used to 'legalise' smartphones in schools and allow for school policy to more effectively guide appropriate use.
- When used as supplementary devices, this format allows for flexibility and personal choice, while ensuring there is a common standard across a class.
- School or jurisdiction has the option to manage software licensing on devices.

Considerations

- Smartphones, as with 3G or 4G enabled modem sticks, are unfiltered.
- Additional devices can be seen as distracting.
- Maintenance of any additional device is entirely the responsibility of families usually through consumer channels.

3.

School-defined multi-platform laptops

Similar to Model One, but the laptop, which must adhere to a minimum specification level, can be provided for several platforms or manufacturers.

Who determines the technology choice?

School in consultation with stakeholders.

What are the funding options?

Can be parent or school funded, or a combination of both, as a co-contribution.

Benefits

- Parents or students who prefer one platform or manufacturer over another have a choice.
- School or jurisdiction has the option to manage software licensing on devices.

Considerations

- More work for the network manager to manage a variety of laptops
- Buying power and bulk discount purchasing options are diminished, for both hardware and service accountability
- Teachers and tech support staff need to be familiar with several platforms
- Not all programs are available across platforms, although many are, although with some differences due to platform standards

4.

Student-choice of laptop or tablet

Students can bring a laptop (no matter what form, including netbook) with full PC functionality, or a tablet

Who determines the technology choice?

Students and/or families with limited consultation with school.

What are the funding options?

100 % parent funded.

Benefits

- Parents and students who prefer one platform or device over another have a choice.

Considerations

- Student devices do not all have the same capabilities. Some have inferior tools and teachers must plan learning activities around the lowest capabilities.
- Some devices can't do consumption and production/creative tasks or even input full sentences easily.
- Much more work for the network manager to manage a variety of devices.
- Teachers and tech support staff need to be familiar with several platforms and many devices
- Buying power and bulk discount purchasing and licensing options are significantly diminished, for both hardware and service accountability. Consumer-level service expectations. Need to rethink service process to ensure viability.
- Most programs/applications are not available across all platforms and devices or function very differently across various devices.

5.

Bring your own whatever connects to the Internet

When people speak broadly of BYOD, this is the option they are usually referring to. This model allows students to bring any device that connects to the Internet – smartphone, e-book or 5-year-old laptop from their parents. There are no minimum specifications for screen size, keyboard, storage, ports and so on.

Who determines the technology choice?

Students and/or families with limited consultation with school.

What are the funding options?

100 % parent funded.

Benefits

- Parents who prefer one platform or device over another can choose what they prefer.

Considerations

- Student devices do not all have the same capabilities. Some have inferior tools and teachers must plan learning activities around the lowest capabilities.
- Some devices can't do consumption and production/creative tasks, or even input full sentences easily.
- Much more work for the network manager to manage a variety of devices.
- Buying power and bulk discount purchasing and licensing options are significantly diminished, for both hardware and service accountability. Consumer-level service expectations. Need to rethink service process to ensure viability.
- Teachers and tech support staff need to be familiar with several platforms and many devices.
- Most programs/applications are not available across all platforms and devices or function very differently across various devices.
- Wide variety of devices and device functionality engenders considerable complexity in the classroom.



Myths and misperceptions

There are many assumptions around BYOD, so deeper thinking is required to ensure that the full implications of various deployment models in a school environment are understood.

When evaluating BYOD it's important to depart from a pedagogical perspective. A good start is to consider the three core principles of successful 1-to-1 learning programs:

- Any investment in devices must be aligned with an investment in professional development.
- The initiative must be scalable.
- The initiative must be sustainable. This normally includes making sure those who benefit from the initiative make a co-contribution.

Some of the key myths around BYOD programs go against these principles and their core underpinning, which is equity of access for all students.

Myth 1: BYOD is always financially sustainable.

In pursuing their vision of 1 to 1, many schools relied on grants and government largesse as sole sources of funding. In this case, changing government priorities means the funding often stops, and, potentially, so does the 1-to-1 initiative.

A family co-contribution, on the other hand, provides ongoing support. It need not be onerous, and gives students and their families a sense of ownership of the program while leaving the decision of selecting an appropriate pedagogical tool in the hands of the educators.

Although many schools worried about asking families to contribute, BYOD models are frequently based on a 100% contribution by families, which may not be either sustainable or reasonable. There is often a case raised by the school community that says schools or governments should not ask parents to contribute to the cost of public education. Indeed, in some Nordic countries it is illegal.

Myth 2: BYOD is cheaper.

Although BYOD may seem, on the surface, to save money, does it really? Network, security and technology management become more complex with widely different devices. The greater the complexity, the greater the costs for support. In fact, in talking to schools in Australia who have moved to BYOD, Microsoft has heard that some have found the total cost of ownership for BYOD models is 25-30% higher than before – though this is hidden by moving some of the costs to parents. If the school absolves itself of responsibility then students may not be able to participate in class.

Professional development remains a priority no matter how the technology is provided, and requires ongoing investment. What additional forms of professional learning are required when there's a more challenging multi-device environment?

Myth 3. Just get the devices in their hands.

The myth is that today's students intuitively know how to use technology for learning. Schools that implement student-choice BYOD with this belief in mind often:

- Fail to envisage what constitutes great, technology-rich learning.
- Base their programs on technology rather than true pedagogical transformation.

Although it is true that many students are comfortable with technology and not timid about trying new applications, this does not mean they know how to find the most pedagogically appropriate technology tools. It is the job of educators to provide this type of guidance and support, and this job is made more difficult when there is a range of devices with diverse capabilities.

In many ways, student-choice BYOD and the technical problems it creates can be a classroom distraction rather than a pedagogical benefit.



To BYOD or not to BYOD?

Choosing a school provision model requires a responsible and thorough examination of the broader issues that experienced schools have addressed in order to implement successful 1-to-1 learning programs.

The following questions can help to establish the preconditions for BYOD programs and sharpen focus on readiness, planning, and specific implementation procedures.

Readiness

1. Does your school have a high level of expertise, resources and budget to effectively manage a variety of technologies across a variety of platforms and devices?

Managing a variety of platforms and devices is more difficult and time-consuming than managing a regular 1-to-1 learning program.

If you do not have the expertise, resources and budget to effectively manage a variety of technologies across a variety of platforms it is imprudent to embark on a student-choice BYOD model.

2. Does your funding model ensure equity for all students?

The basic foundation on which 1-to-1 learning was established was equity and universal access. In fact, if the initial concept of 1-to-1 learning had simply been built around the idea of allowing any student fortunate enough to have a laptop at home to bring it to school, (BYOD if you have one), the idea would have joined the exceptionally long list of failed educational innovations.

There is an assumption today that BYOD means every student will have some type of technology to use at school. The inference here is that schools can use the money they save not buying laptops to provide devices for any students who do not own them. This requires having options in place to avoid the creation of a digital divide within the classroom. These initiatives require strong visionary leadership. The financial challenge of implementing a 1-to-1 learning program can be daunting, but schools should be very wary of seemingly easy answers that do not serve the interests of all their students.

3. Does your BYOD program ensure that all students have access to devices and software that provides the same level of functionality?

Successful 1-to-1 learning programs are based on the principle that any software application used within a school had to provide the same level of functionality not just for the affluent, gifted or financially challenged, but for every single student.

4. Are your teachers comfortable and confident about managing a technology rich and diverse classroom?

Even the most competent and technologically literate teacher would prefer to teach without the distraction of explaining how to do the same thing across multiple devices. Clearly, a move to a mixed environment can add an extra level of complexity.

The ability to scale the development of confident users of technology across whole school staffs has, to date, been a major weak point. Too often attention is focused on the 'innovators' – those who are very comfortable with technology – rather than working with the true transformers.

These are teachers who will want simplicity and focus on pedagogy. These are the teachers who should be nurtured at all costs, for they ultimately are the ones who will bring whole schools on board. They do not want or need the distraction of figuring out whose machine can do what, or whether or not a needed application will run on a diverse range of computer models, platforms, and device forms within their classrooms.

5. Does your school support all aspects of self-directed learning, giving students a voice in how, what and when they learn and not just in the choice of a device?

If the rationale for a BYOD initiative is to support the concept that students should be able to select the digital tools they will use for their learning, there needs to also be some alignment within the school vision and mission about who makes the decisions around what, when and how the students learn.

If the vision includes assigning responsibility for such matters to students, in a truly self-directed manner, then there would be a case for having students choose their own device.

However, caution needs to be exercised to ensure that selection is based on pedagogical support rather than other uses (to listen to music or use as a phone) and, most importantly, price.

Planning

BYOD may be seen as a way to shift the cost of 1-to-1 learning to parents. However, it is beneficial to reflect on the following to ensure the decision is being made in the best interests of the students, and that it fits with your school's vision and goals.

1. How do you develop criteria to clearly define your student's personal computer requirements?

BYOD should not be based on the myth that any device is appropriate as long as it puts the power of the Internet and digital learning into each student's hands.

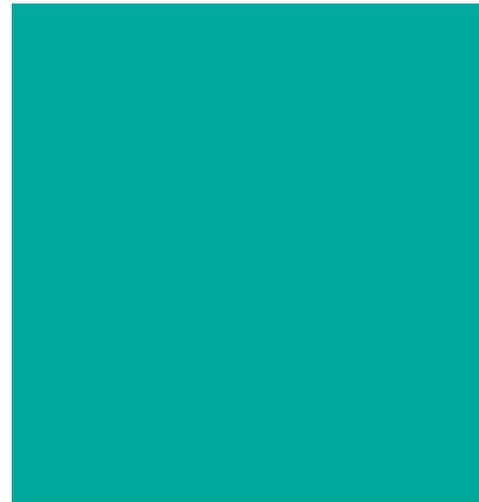
The decision about which model, which make, even which platform to buy is never easy. Indeed, with the number of large-scale countrywide and school-based programs, product assessment is becoming a science in itself. It is important to build a robust process around this decision and establish strict criteria based on what will best meet the pedagogical needs of students and teachers over the ensuing three or four years so that students have the best possible devices.

Although there is no doubt that cost is important, the experiences of schools around the world over the last two decades has shown that cost should not be the major reason a model, platform, or device type is chosen. A less expensive device that does not meet the learning needs of students or provide support for the teaching practices within a school wastes valuable financial resources and, in the long term, is more costly.

What should never happen is that teaching practice be determined based on the functionality of the least powerful BYOD device in a classroom.

After criteria based on learning and teaching needs, the most important criteria for device selection has been service turnaround and machine reliability and usability. Equally important is being able to assess a supplier's ability to meet SLAs for the life of the selected device.





2. How have you communicated your vision to stakeholders and involved them in the planning process?

If your stakeholders do not know or understand your vision of the learning opportunities 1-to-1 learning makes possible, they may believe any device will be appropriate for learning and not provide the strong support you need.

Therefore, the engagement of stakeholders is essential, not only with an eye to potential funding support or added technical expertise, but also to ensure that the 1-to-1 learning program is supported and owned by the whole school community. Without this, there is the likelihood of friction and scepticism, and an emphasis on cost rather than outcomes.

All communications to parents must fully outline the provision model, the rationale, benefits and the advantages it provides all students. A communication plan must include frequent communiqués to parents and community members, that anticipate parental concerns, respond to questions, and provide opportunities for stakeholders to witness the 1-to-1 initiative in action to understand the pedagogical value of the decisions made.

Implementation Procedures

The need for, and design of, implementation procedures is more complicated when implementing a BYOD initiative because lines of responsibility are less clearly delineated. Therefore, it's useful to consider the following procedures and policy questions first.

1. Who is responsible for maintenance of student devices?

Student-choice BYOD programs are often sold on the apparent advantage that responsibility for laptop or device maintenance moves from the school to the students and their parents. However, this assumption warrants deeper analysis.

A good starting point is to establish what the standard process will be for students having their laptops repaired, and if a 'standard' school policy can actually be enforced when responsibility for upkeep lies outside the school.

Successful 1-to-1 initiatives have always been built around service level agreements (SLAs) that meet rigorous key performance indicators, such as a turnaround of 95% of repairs in 24 hours. They also include contingency plans, usually loan devices that are swapped on premise to rapidly get students up and running. These kind of agreements will be harder to establish and enforce without the collective bargaining power of whole school agreements.

If an organised maintenance plan cannot be established then, inevitably, there will always be a percentage of students who cannot participate fully because their device is under repair, lost or malfunctioning, making classroom management challenging.

2. Who determines device life cycles?

Device life cycles are also an important consideration. While three- or four-year rollovers are standard in most school-based programs, it's difficult to enforce upgrades under a student choice BYOD plan. The challenge becomes teaching across different generations of technology and feature sets. Teachers are placed in the unenviable position of trying to leverage contemporary technology, without excluding students who don't have it.

3. How will you manage Help Desks and in-house support services?

Experience shows that a well-run Help Desk is central to the smooth running of a 1-to-1 learning initiative. This is because 60-70% of all problems tend to be software, rather than hardware related, making a help desk an important first base.

In a student-chosen BYOD environment, the role of the Help Desk is vastly expanded to cater for multiple devices and operating systems. Student-manned Help Desks can be a practical solution, but it's important to ensure that processes and systems are in place so that support can be provided promptly and efficiently.

4. Re-imaging, viruses, security

In a student-chosen BYOD environment image recovery, which, in a school-managed environment is embedded in the school management systems, becomes challenging. It is the same for security authentication and virus protection for devices that will connect to (and potentially infect) school networks.

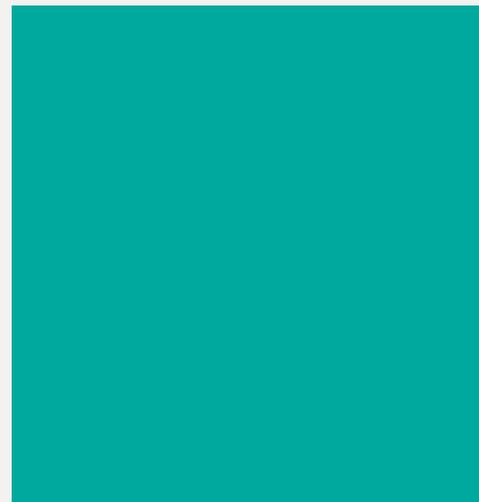
Within any provision model, it is important to assign responsibility for managing compatibilities, images, viruses and security. Whether this be the student manned Help Desk, the manufacturer, the service agent or students, what matters is that there is clarity in understanding who is managing these matters.

5. Will extras, such as extended warranty and insurance, be mandated or optional?

Experience tells us that in a school environment a percentage of student laptops and other devices will inevitably be dropped or knocked – and break. When that happens, the student needs to know the device can be repaired immediately, without any discussion about insurance assessment, or argument about whether the damage was intentional, or without any demarcation at any point between the insurance company, the the manufacturer warranty provider, and the repairer, as too often happens on individual claims.

Therefore devices within any 1-to-1 initiative need to be covered by full warranty and insurance for the full term that they will be used at school.





Warranty management can be similarly challenging. Many laptops are sold in retail with a one-year warranty, and extra years can be expensive. For a four-year cycle, a fourth year warranty can be prohibitively expensive at retail, and it is often only the weight of numbers in a school-based program that makes the pricing viable.

6. How will you manage software licensing?

In recent times the availability and cost of software applications has changed dramatically. With the advent of Web apps, plug-ins, and so on, there are a large number of applications that can be obtained for little or no cost. Issues around affordable licensing for 1-to-1 learning programs have largely been resolved. Microsoft licensing schemes offer a number of ways to license students for the core software they use – including Windows® and Microsoft® Office – even on their own devices.

However, there are still specialist applications such as virus protection or those focused on specific subject areas such as Mathematics, Music and Science, that may require school licensing. Schools need to ensure that school software is covered for home and school use and updated regularly.

Finally, there is the matter of cost. Be wary of some of the sometimes misleading claims associated with ‘freemiumware’, as the trade-off for ‘free’ is often associated with some form of advertising, which in itself raises ethical issues that should be thought through and be in line with school policy.

7. Can school policy still dictate what is on students’ devices and how they are used?

With school-based 1-to-1 learning programs, policies around personal use are the responsibility of the school. With student-choice BYOD, it is usually not so clear. In fact, the assumption often is that if parents or students choose and buy the device, they are free to determine what is installed on it and when and how they use it.

Well before you initiate your 1-to-1 learning program, therefore, it’s important to develop a clear policy for your school in conjunction with parents and students. This should be reviewed at least annually and widely communicated. It should also cover a wide range of areas relating to the effective use of the students’ laptops, including:

- Will laptop insurance be mandatory or optional? Will it cover the device at home, at school?
- Who will define and/or review the data limit for downloading versus purchasing more credit?
- What is the process for reporting lost and stolen devices?
- Should Web 2.0: Facebook , Twitter, and so on be allowed, restricted or banned? Why?
- What is the school’s personal software policy?
- Who is responsible for ensuring batteries are fully charged, and are there any options if they are not?
- What is the process when devices are left at home?
- What is the process for virus protection / removal (cost of re-imaging)?
- Who is responsible for secure storage?



Conclusion

BYOD is a trend that needs to be carefully examined in an education context to ensure that the models we deploy are successful. At the heart of good 1-to-1 learning is equity to ensure that all students have equal access to technology-rich experiences, and simplicity to ensure that it is easy to manage and sustain.

Between equity and simplicity, however, come considerations of cost. So while today's confluence of affordable devices, cloud computing and innovative technology dangles a tempting prospect in front of us, educators face a number of difficult decisions before we finally deliver student learning experiences as broad, deep, relevant, complex and creative as we would like them to be.

This discussion paper presents some of the varying BYOD models, their nuances and the considerations that accompany them. 1-to-1 access to technology is challenging traditional ideas about teaching and learning, and the arguments herein emphasise that BYOD decisions need to be education-based, not purely technology-based. They need to deliver tangible benefits for student learning.

The arguments also ask us to question a number of assumptions about BYOD. In particular, we question whether BYOD really reduces the total cost of device use in schools, or whether that cost has been hidden; that is to say, passed on to parents.

At the moment, BYOD presents more questions than answers. Hasty decisions made today risk casting a long shadow and undermining some of the important achievements made to date.

Most importantly, there needs to be agreement on the equitable and sustainable provision of technology so that the core ideas of 1-to-1 learning, refined over many years of classroom experience, are not lost in the stampede to a new deployment model. This is especially

important, given that previous educational innovations have taught us that early reports of success can overlook complexities that only become apparent over time.

Poorly executed BYOD learning environments, for example, are at risk of amplifying the mass inequity that is already evident across so much of our educational systems with the best technology only available to those with the means to afford it. At the other end of the scale, it is equally inappropriate to set the use of computers within a class at the lowest common denominator simply because four or five students are using devices that are not able to complete the work required.

Without clear and strong leadership, schools could introduce inequity, complexity and costly support and insurance issues into their technology programs – completely undermining their goal of making computing simple, powerful and accessible to all.

If our goal with universal access to technology is to empower our students to be successful citizens in the 21st century, then we must ensure that our deployment models do not compromise this goal.

Schools need to be vigilant and protective of the foundations of equity of access on which all of our education systems are firmly founded. With this in mind, all stakeholders – teachers, parents, students and principals – need to work through the tough decisions early to drive home the best outcomes for all students at all times.

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