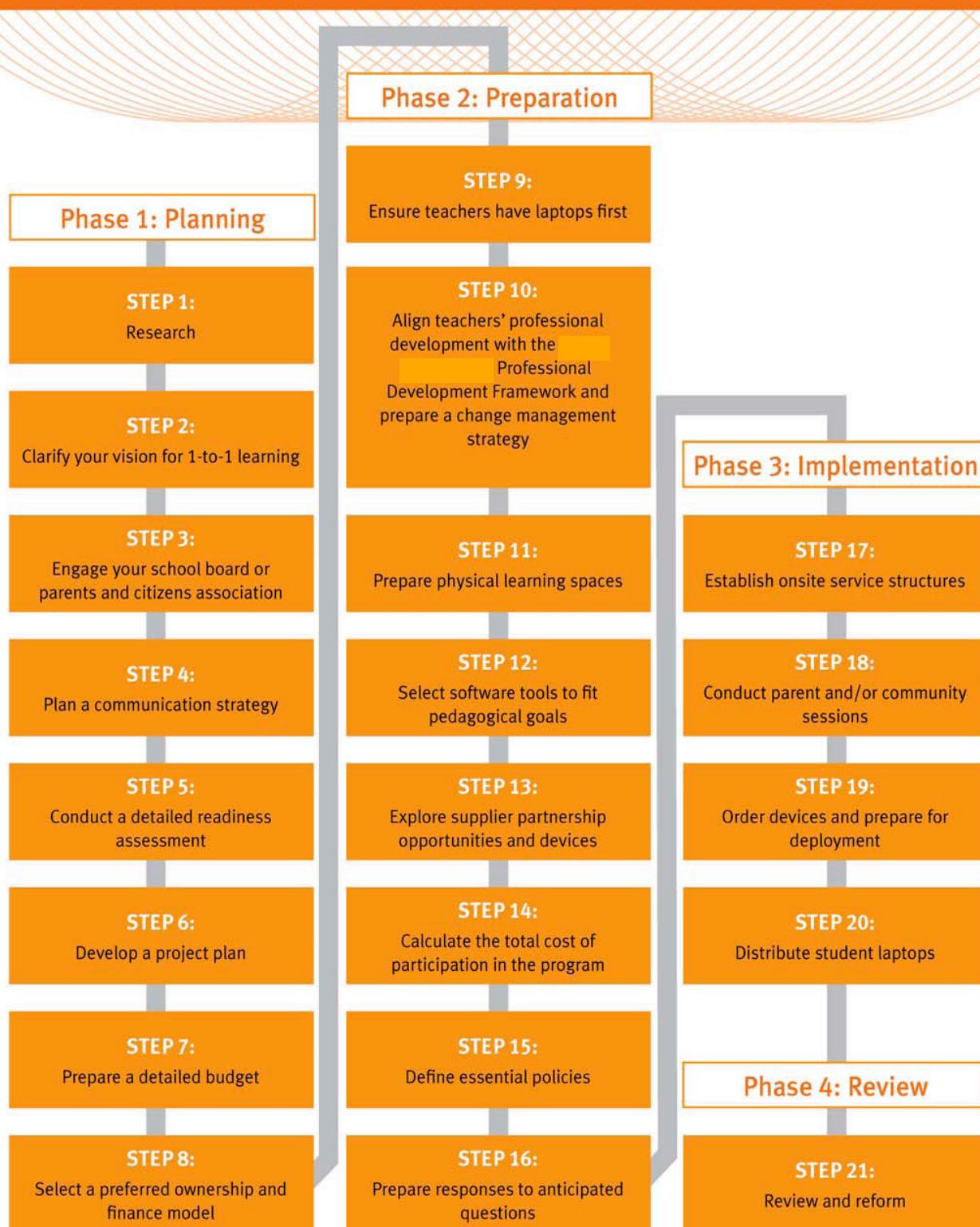


In a nutshell

The four phases of, and 21 steps to, 1-to-1 success



Overview: The 21 Steps in Summary

The 21 Step sequence is inter-relational and iterative... and may be considered out of this printed order. These steps simply provide guidelines to those leadership teams considering implementing 1-to-1 programs.

In implementing 1-to-1 learning programs, all that matters is what the experience becomes for students. If we lose our way in implementing such initiatives, if we are distracted by technology or if we are stalled by bureaucracy, we do our students a gross disservice. However, if we get these initiatives right, we will have a profound impact on learning for all young people—not only now, but also for a long time to come. Therefore, we need to be clear about our purpose, focus, and our strategy to make it happen.

This document has been designed for the people who can make it happen.

The first section is focused on school leadership. Ideally, this includes school and district leadership in public schools and the principal and deputy in private schools. It may also include district or school board members. The discussion centers on vision, philosophy, and the need to build a shared belief in the objective of your 1-to-1 initiative. As obvious as this focus might appear, it is the area that has been addressed least by educational leaders worldwide.

To create the educational changes that can make a significant difference in learning, it is simply not good enough to infer that economic imperatives demand that students have laptops for 21st Century learning. That inference is ambiguous. It can—and is-- interpreted in many ways, leaving a lack of coherence and accountability about the effectiveness of the initiative. Once we clarify our vision within the context and culture of the local school community, we must translate that to specific expectations from which we can build evidence of the effectiveness of our undertaking.

Clarifying our vision and translating it into specific expectations leads us to build policy around the initiative. We need to clearly define the guiding principles to ensure we stay firmly aligned with our vision. This initial section also covers some of the fundamentals for project scope, and covers the essentials that the implementation team needs. Finally, it outlines the vast array of tasks that need to be considered to develop an effective timeline for implementation.

The next phase includes a briefing piece around several areas focused on equity for the business or chief financial officer (CFO) of the school or district. It covers the breadth of the major funding and financial issues that must be considered in a 1-to-1 initiative; most notably these relate to the principle of equity. Ideally, schools want to open participation to all students in a school or district. But this is possible only if the business manager is fully engaged in the project from the outset. He or she also needs to be well advised of the options and ideas that have made the ideal possible in the diverse community of schools that have implemented 1-to-1 initiatives worldwide.

Further steps outline the major considerations that the school or district technology director or chief information officer (CIO) need to understand. These considerations range from the more obvious ones related to the laptop itself, to issues about connectivity, school and district infrastructure, and the options for comprehensive and accountable technical support in a technology-rich learning environment.

The final steps cover the critical factors that pedagogical leaders (or curriculum directors) must consider in a 1-to-1 program, where the richness of access to technology can significantly change the learning dynamic—and on which the success or failure of an initiative rests. In the past, too much emphasis has been placed on being able to use the technology, rather than on the critical pedagogical foundations that *must* underpin a program.

Step 1: Research

Learning how schools locally, nationally and internationally have implemented 1-to-1 programs is an essential first step in 1-to-1 reform.

For more than 15 years, schools throughout the world have been documenting and sharing the way they implement 1-to-1 programs.

Exploring available research and case studies will help you:

- build a strong vision for how your program will greatly improve student learning outcomes
- gain broad support by demonstrating the link between moving to a 1-to-1 program and improving student learning outcomes
- prepare proactive responses to likely change resistance and uncertainty in your school community
- understand the scope and complexity of successfully implementing a quality 1-to-1 program.

Focus on the Learning Outcomes	
<input type="checkbox"/>	Have you seen examples of 1-to-1 programs that clearly demonstrate improved student learning outcomes? How will you model these in your school?
<input type="checkbox"/>	How were improvements in learning outcomes measured? What other criteria or assessments indicate the programs you have researched were successful?
<input type="checkbox"/>	What advantage is there in using computers in all areas of curriculum, including literacy, mathematical analysis, science and history?
<input type="checkbox"/>	What were the major obstacles faced in the implementations you researched and how will these impact your school?

Reading One-Tipping Point: The rise and rise of 1-to-1 computing in schools

Have we been asking the wrong questions about computer use in schools?

In reviewing the market opportunities within K-12, let's first bring some fresh logical thought to the process. Start by imagining someone surveying computer use within Microsoft by asking

Does your office have access to the internet?

What is the ratio of computers to workers at Microsoft?

Do you use a computer at work?

As absurd as it sounds, these are the types of questions that are regularly asked in surveying computer use in schools.^{1,2}

We need to urgently rethink our analysis of computer use in schools.

Asking the wrong questions, means we get the wrong information, and if we are not careful, we make the wrong decisions about where market opportunities lie. Such is the story regarding the growth of the 1-to-1 laptop market in the United States.

Having a school connected to the internet can have a minimal impact on the value a student will get from using a computer there. Without knowing whether the access actually extends to the student's classroom, and then in turn knowing whether in fact the student's occasional access to a computer there will enable him to complete any authentic task as a result of it, it is an almost irrelevant statistic.

Similarly we have done students a gross injustice by allowing politicians and bureaucrats to largely measure their commitment to 21st century education by quoting the inevitable student-computer ratios.

Student-computer ratios simply measure \$ input, not value-added output.³ And above all, there has been minimal research to measure the extent to which teachers have capitalized on the opportunity computer access offers their students; and it is only through this kind of research that we would have to ask the tough questions, and disappointingly they have not been asked often enough.

Such is the part of the story as to why the largest single technology market opportunity in education has gone unheralded, and caught many in the computing industry, by surprise.

While we were sleeping...

Despite a stream of quite high profile case studies (Henricho, Maine, Michigan) over the past 4 years, there is little evidence of any significant industry initiatives that seek to address the emerging 1-to-1 opportunity, with the possible exception of some new marketing investments by Apple.

Indeed, despite being the pioneers, or in Gartner terms, "pulling the Technology Trigger⁴" for 1-to-1 programs in the US through the founding Anytime Anywhere Learning programs in 1996, many computing manufacturers appear to have taken an almost "passive" role in this emerging market.

And while we were "sleeping"...

¹ <http://www.qeddata.com/MarketKno/ResearchReports/nta.aspx>; IDC 2004;

² Multiple reports in <http://nces.ed.gov/>

³ Ironically if we knew that 200 computers in a school of 1000 students (the magical 5:1) meant that the 200 computers were laptops that were only going to be used by 200 students, we could expect to see value from our investment from 20% of the school's population!

⁴ With apologies to Gartner Research for use of the term.

- ◆ Revenue from the K-12 notebook market has grown 895% from \$92m in '99 forecast to \$920m in '07. During the same period revenue from desktops has grown just 20%.⁵
- ◆ Popularity of notebooks is predicted to surpass desktops in K-12 by 2007⁶
- ◆ Revenue from laptop sales in Higher Ed has grown by a similar order of magnitude; \$126m in '99 forecast to \$964m next year⁷. (HE 1-to-1 programs in fact commenced in 1993 at the University of Minnesota, Crookston.)
- ◆ None of these statistics include the “hidden” growth coming from *family or non-school purchases of laptops for school use*, which is becoming a very significant growth area for private school initiatives, and some public schools have also sought some contribution from families, even if it is only for insurance.
- ◆ Several states and many school districts across the US are either implementing or planning to implement student 1-to-1 programs, including...
 - Maine (60k), Henrico VA (23k), Michigan (5k), Indiana (2.9k), Massachusetts (500k), Illinois (169k), New Hampshire (7th Grade), New Mexico (pilot), Greene County NC, Manatee County FL, Irving Independent (8k) TX, Clovis Unified, San Lorenzo Unified Garden Grove Unified, Fullerton School District - CA, Beaufort County SC, Jefferson County, KY (3k), Stillwater MN, Schaumburg School District IL, Hopkins School District MN, Carroll Community School District IA, Texas Technology Immersion Pilot TX, Quaker Valley School District PA, ...to name just a few.
 - Many more States (Florida, South Dakota) and Districts have already implemented teacher laptop programs⁸.
- ◆ Additionally, by September 2003, Apple claimed to have supplied iBook laptops to over 100 1-to-1 initiatives across the US.⁹

This revenue growth also does not account for the increased revenue from software and infrastructure that is growing significantly as the density of computers in schools increases. For example, dial-up access is just passable for a small elementary school with a handful of computers, whereas a 1-to-1 school requires dramatically increased bandwidth and associated technologies.

Additionally there are limited statistics available regarding the growth of other devices in US schools. In their 2004 Technology Counts survey, Edweek report that, 8.4% of US schools have handheld PDA programs for their teachers, while 3.8% of schools had similar programs for students. Again these are simply \$ input measures, rather than value-added output, but we will discuss that later in this paper.

What we can say is that there is limited accurate data on exactly how many schools are now deploying 1-to-1 initiatives across the US and indeed the world. Aside from a statistical random survey that has just been announced¹⁰, the recently formed Anytime Anywhere Learning Foundation will by the middle of the year be the best source of detailed information regarding this market through a database they are developing of US and global 1-to-1 initiatives.

We can, however, draw some inferences from Higher Ed from an up to date list of US Colleges that have implemented a notebook¹¹ or laptop initiative¹². As of December '05, we know at least two hundred and twenty-one North American colleges have such programs, ranging from smaller single

⁵ Source: IDC, 2004

⁶ Notes from Microsoft Research from IDC, 2004 statistics

⁷ Ibid.

⁸ While not normally called “teacher 1-to-1” programs, it should be assumed every teacher does receive their own laptop in these programs.

⁹ <http://www.macobserver.com/article/2003/09/10.4.shtml>

¹⁰ <http://www.eschoolnews.com/news/showStory.cfm?ArticleID=6060>

¹¹ For the purpose of this paper we will be consistent and use the term laptops to describe such programs.

¹² <http://www.cmu.edu/teaching/resources/PublicationsArchives/StudiesWhitepapers/LaptopStudyReport-2006.pdf>

faculty programs such as the Columbia University Business School and the Duke University School of Medicine, to whole campus initiatives where all entering students are required to have a laptop at Carnegie Mellon University and Wake Forest¹³. Additionally, schools such as the University of Texas in Austin and San Jose State University have undertaken extensive Tablet pilots.

Such initiatives now raise the bar of expectations for freshman computing competence, and at the same time are helping to build the image of the laptop as an “essential tool for learning.”

Tipping Points: The paradigm shift in educational computing

“1-to-1 laptop initiatives are approaching the “tipping point” — the point where the exception becomes the rule and a new technology becomes commonplace.

....While some will look through the lens of the digital immigrant and wonder, How can we afford this?, the digital native will come along and wonder, How could they not have funded this? ¹⁴

“Today, there is a new buzz in the air.....the mobile revolution is finally here....It will feature new strategies, practices, tools, applications, and resources to realize the promise of ubiquitous, pervasive, personal, and connected learning.”¹⁵

Growth by an Order of magnitude, and accelerating

There are several deceptive aspects about the growth of the 1-to-1 market...

- ◆ Where a school has initiated a laptop program there is *an order of magnitude growth in the technology spend*, far beyond traditional annual growth. It is by the very nature of leapfrogging from say 5:1 to 1:1, that the technology spend will go up at least 5 times.
- ◆ Such an order of magnitude spend growth is rarely predicted, and is often supported by non-traditional sources of funding, for example, federal funding, exceptional one-off funding (such as the tobacco settlement in Maine), a special bond issue, parent or community contributions.
- ◆ Following such a move, much of the traditional capital component of the school technology spend becomes reassigned as expenses, which makes future budgeting simpler, and more predictable.
- ◆ The lack of comprehensive reporting of the scale of the 1-to-1 market has hidden the acceleration in the growth of it. The first schools in North America commenced programs in 1996; starting with around 20 initial pilot schools, in less than 10 years, the number has grown to hundreds of thousands of students now being involved in 1-to-1 initiatives.

X:1 to 1:1

To date, far too much money has been spent on tracking computer ratios in schools, and in addition to the implied failure of those statistics to genuinely measure the impact on learning, there are some very poor assumptions made through the process...

- ◆ A school with lower student-computer ratios will spread the benefit, if there is any, evenly and equitably to all students; often this is not the case.

¹³ <http://www.cmu.edu/teaching/resources/PublicationsArchives/StudiesWhitepapers/LaptopStudyReport-2006.pdf>

¹⁴ http://images.apple.com/education/mobilecomputing/pdf/5042PI_PBLaptopInitiative.pdf

¹⁵ Ellen D. Wagner,
<http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume40/EnablingMobileLearning/157976>

- ◆ More computers means better learning outcomes: little or no substantial evidence to this effect, due mainly to the same extraneous variables that relate to the class size debate - the ability of the teacher to change practice to leverage the benefit.
- ◆ Is the benefit scale logarithmic, exponential or unpredictably related? In other words, is 5:1 twice as beneficial as 10:1?.... who knows?!
- ◆ The hyperbole associated with such ratios stops people from realizing the magnitude of the investment required to make the number even close to 1:1 using traditional models. Going from 10:1 to 5:1 requires a repeat of the total investment already made to date!
- ◆ The need to schedule access to a lab takes away any possibility of spontaneous or immediate access to a computer to what can best be described as **occasional** use; this compares unfavorably with the benefits derived from the **essential** role of a computer within a 1-to-1 program. Again this dilemma is summarized by this quote from the Digital Divide report by COSN¹⁶...

"(Our) findings beg the question: Who is benefiting from the reported classroom computing power and speed?

If most students have to go to computer labs and media centers to get online, Internet access does not seem to be an easy or everyday activity — underscoring the finding that schools have yet to fully integrate technology with classroom teaching and learning.

(Our) findings suggest that classroom technology is either widely underused or in need of maintenance, upgrading, expansion or replacement."

Expanding device options- from mp3 players to tablets

"Wherever one looks, the evidence of mobile penetration and adoption is irrefutable: cell phones, PDAs, MP3 players, portable game devices, handhelds, tablets, and laptops abound. No demographic is immune from this phenomenon.... people are increasingly connected and are digitally communicating with each other in ways that would have been impossible to imagine only a few years ago¹⁷".

Accelerating the growth of 1-to-1 is the extension of what a 1-to-1 device might look like, and what functions it has. Ranging from mp3 players and ipods, through cellular phones, games devices, PDA's, Origami, and laptops, it now extends to the ultimate option, the tablet.

At the same time there is a cross-over of the influence on educational software development. In particular, gaming has taken the wireless world by storm, and there is every reason to believe that educational gaming may provide mobile learning with its first big "win" in terms of adoption. In a March 8, 2005, talk given at the Game Developers Conference (GDC) held in San Francisco, Robert Tercek¹⁸, co-chairman of GDC Mobile, said that 6 million people download games to their mobile devices each month and that 18 million Americans play wireless games.

What this range extension has done is create more affordable options for schools to consider in reviewing the viability of a 1-to-1 initiative. This has contributed to an even more rapid escalation in the programs. At the same time, not as much emphasis is being placed on the value-add each level of device offers to learning, with many schools making significant unrealistic pedagogical compromises in the name of equity; but more of that later.

Always on, always connected; wireless, cellular, 3G, 4G and more...

The rapid expansion of wireless coverage has contributed significantly to the growth in 1-to-1 initiatives.

According to the Telecommunications Market Review and Forecast, published by the Telecommunications Industry Association (TIA), total U.S. spending on wireless communications will

¹⁶ http://www.cosn.org/resources/grunwald/digital_leadership_divide.pdf

¹⁷ Ibid.

¹⁸ Robert Tercek, welcoming remarks, Game Developers Conference, San Francisco, California, March 8, 2005

grow 9.3 percent in 2005, to \$158.6 billion. The report predicts that the wireless market will grow at a 10 percent compound annual growth rate through 2008, reaching \$212.5 billion. Revenue in 2004 totaled \$145.1 billion, up 11.6 percent from 2003¹⁹

Yet even with the steady expansion of wireless networks and services, mobile experiences in the United States lag behind the connectivity options available in other countries. For example, in South Korea, acknowledged by many as the most connected country in the world, citizens are far more likely to have broadband Internet access in the home. They are also more likely to carry a mobile phone with broadband access, enabling rich mobile services. A recent *San Francisco Chronicle* article noted that about 76 percent of households have broadband access in South Korea, compared with 30 percent in the United States. Similarly, approximately 75 percent of South Koreans have a mobile phone, whereas only 60 percent of Americans have a mobile phone²⁰. Accordingly there is still a lot of room for significant growth within the US.

Taipei, Taiwan, is close to completing the world's first "wireless net" across the city, making wireless internet access available to all citizens in the city, including schools and their students²¹. All 1600+ schools in the state of Victoria, Australia, now are completely wireless campuses, to compliment the 37,600 laptops with which teachers in the state have been provided since 1998.

Indeed in reviewing the potential market opportunity for laptops in schools McKinsey states..²²..

¹⁹Telecommunications Industry Association, *2005 Telecommunications Market Review and Forecast*, <<http://www.tiaonline.org/media/mrf/>>.

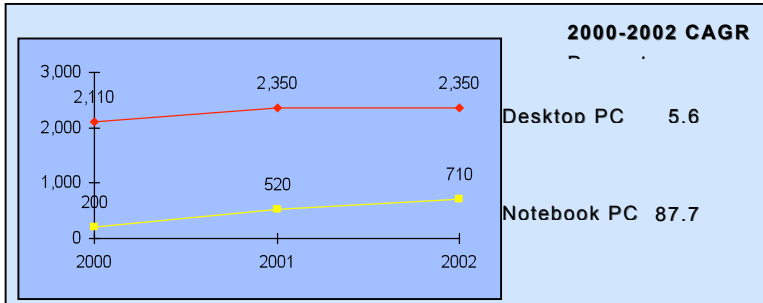
²⁰"Waiting on Mobile," *San Francisco Chronicle*, March 15, 2005, C1.

²¹http://online.wsj.com/public/article/SB113762531033150131-LyZ5YIVTT2q9vd6jT9zctH2moFQ_20060218.html?mod=tff_article

²²McKinsey. June 14, 2005.

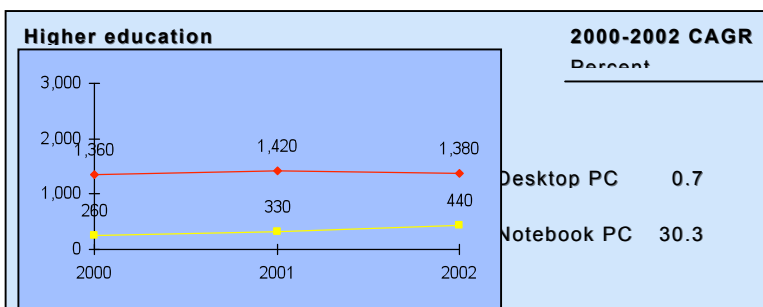
...the **KEY** hardware solution in the U.S. Education market is the *wireless-enabled notebook PC*

Shipments Thousands



Popularity of wireless LAN computer labs is driving state and local governments to

Ubiquitous wireless connectivity will drive



• Mobile PCs not first choice for computer labs and back offices because of high cost and complexity of supporting them

Source: Gartner

Reading Two: The Top Ten drivers to 1-to-1

*"Why is it important for each child to have a computer? What's wrong with computer labs or community-access centers?...one does not think of community pencils - kids have their own. They are tools to think with, sufficiently inexpensive to be used for work and play, drawing, writing, and mathematics. A computer can be the same, but far more powerful"*²³.

So what is the reason schools are moving to 1-to-1 at such a rapid rate? The answer is that there are many, and their variety underpins the scale and scope of the rapid movement to 1-to-1.

1. Economic

There are several very simple arguments that make economic sense as why we should ensure every child has a laptop of his or her own. Maine Governor King said, in launching his statewide program for all middle school students in 2000.

*"For more than 100 years, Maine has always been in the bottom third of states -- in prosperity, income, education, and opportunity for our kids. In my 30 years of working on Maine economic issues, no idea has had as much potential for leapfrogging the other states and putting Maine in a position of national leadership as this one -- giving our students portable, Internet-ready computers as a basic tool for learning."*²⁴

Variations on this theme extend to the notion of the skills required for 21st Century learning, and the value that can be gained from a student who learns to use his or her laptop as an "instrument whose music is ideas."²⁵

2. Assessment

The ongoing public debate around accountability underpins a natural driver towards 1-to-1. Nowhere is this more evident, than in the rationale behind the move by Henrico School District to give every one of its 28,000 students a laptop.

Here it was believed that once every student had a laptop they could be more comprehensively tested and their performance tracked more effectively. To a point there is some truth in this driver, good technology deployment should permit teachers to better manage evaluation in a more effective formative manner. The fact that Henrico's initial experience decried this approach and was built around online testing regimes is possibly irrelevant to the argument. What has since followed has been their development of a sophisticated range of new assessment tools that are yielding interesting benefits.

However the most significant driver for assessment comes from the interrelationship between teacher and student and the ease of access to more effective formative assessment regimes.

3. Narrowing the Digital Divide

It's a straight forward and very strong argument to suggest that, contrary to the thought that laptop programs may represent privilege, they actually "level the playing field" and close the digital divide, ensuring all students are learning with access to the same tools.

Our laptop program narrows the digital divide. We have a diverse population in our county; some students come to school with every amenity, others do not have routine

²³ Nicholas Negroponte. <http://laptop.media.mit.edu/faq.html>

²⁴ <http://www.edutopia.org/computer-every-lap>

²⁵ <http://www.stager.org/articles/thecaseforcomputing.html>

access to public libraries or print materials. A laptop program was the way to help all students while also preparing them for an increasingly technological world²⁶.

A similar rationale underpinned the Mott Hall laptop initiative in District 6 in New York, and many other inner urban communities.

There are now more than 41 proof of concepts or pilots in developing countries around the world driven by either the OLPC initiatives or Intel's Classmate program. In Uruguay alone, some 345,000 students from grades 1 to 6 will have their own XO computer by the end of 2009.

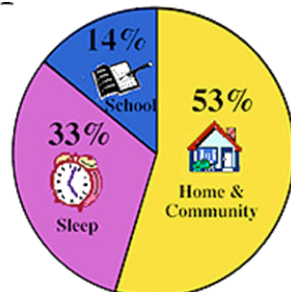
4. Research on the impact on learning.

The first question asked of every school embarking on a 1-to-1 program is "does it increase student achievement?"

The honest answer is two-fold. In the first instance, there are now numerous research studies²⁷ that point to "increasing test scores", attributable in part to the introduction of 1-to-1 programs. However, it is also fair to point out that the vast majority of these are testing competency in traditional pen and paper learning, rather than trying to ascertain whether 1-to-1 students in fact develop different, more powerful insights and ideas as a result of their access to technology on demand. We know that learning happens in new and different ways with ubiquitous access, and we need to reframe our research agenda to more clearly define and report on that.

5. Budgets

The most obvious driver for 1-to-1 initiatives can be discovered when examining the impact they can have on school and district budgets, and the argument that can be developed around where the biggest benefit is delivered - in the home, as the pie chart below shows.



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Allowing for sleep, 180 school days a year, and 6.5 hours of lessons within those days, the graph clearly shows that students who are in programs that allow home access for their laptops derive the greatest benefit while away from school. This in fact underpins the rationale adopted by some schools to ask parents to make a contribution to the cost of ownership, even if it is not 3 times the school's level of contribution. Such a disbursement of costs keeps equity, and allows for the school budget \$'s to be significantly leveraged with non-school funds.

Additionally there have been surprisingly few schools or districts that have reengineered their existing technology budgets and reallocated these funds to support 1-to-1, in this case simply a much more effective use of funds. In Henrico's case they were able to initiate, support and sustain their program for 23,000 students *by simply increasing the technology proportion of their budget to 4-5%*²⁹.

²⁶ <http://lh102.k12.sd.us/MSET/LeadershipProj/One.doc>

²⁷ www.rockman.com; <http://www.eschoolnews.com/news/pfshowStory.cfm?ArticleID=4882>; PISA- Are Students Ready for a Technology-Rich World? 2005. OECD.

²⁸ Bransford et al, 2000. How People Learn, p: 148 Washington, National Academy Press

²⁹ http://images.apple.com/education/mobilecomputing/pdf/5042PI_PBLaptopInitiative.pdf

6. Textbook replacement

Though for many the most obvious driver to 1-to-1, it has been possibly the most poorly executed! To many publishers simply transferring text to a screen was going to offer a reason for every student to have a laptop, but very quickly they found that not to be the case. It has only been in recent times in fact, that publishers have started exploring³⁰ innovative concepts around “digital textbooks.”³¹

There seems to be some value for teachers in possibly hanging on to the notion of textbooks, even if it is only in a metaphoric sense; however, the investment required to engage 21st Century students will be significant.

7. Competitive

Competitive drivers are certainly the shallowest of drivers to 1-to-1, but too often an underlying component of a school's decision. By default a school adjacent to a 1-to-1 school has pressure on it from its community to justify why it hasn't implemented a 1-to-1 program, and similarly if the program is district, or even state wide, as has been the case in the Northeastern states following Maine's initiative.

The defensive position is usually built on alternative technology deployment options - more labs, laptop-cart programs, benefits of home use tied to school use by means of memory sticks, or concerns over security. Student enrolment options vary from state to state, but where some portability is allowable, pupil transfers can then build up competitive pressure further. If nothing else, the introduction of a 1-to-1 initiative challenges neighboring schools or districts to thoroughly evaluate their rationale for computer use, and what their vision is.

8. Pedagogy

*“It's one of the most compelling school-change interventions we have seen in decades, but it isn't about laptops—it's about what students do when they have full-time access to powerful tools, the same tools found in offices and on the desks of professionals in all fields.”*³²

... and yes, above all there is growing evidence that 1-to-1 programs offer teachers a unique pedagogical medium for enhancing learning within their classrooms.

Though much harder to articulate or define than the previous drivers, this is potentially the most powerful. In mathematics it can be a bridge from the concrete to the abstract, particularly through the use of simulations; it can scaffold learning such that complex ideas are made more accessible,³³ and it can offer students a medium for communication and collaboration that had previously not been thought possible.

*The goal of technology is not just to enable access to information, but to collaborate with others in creating something new and useful.*³⁴

So given the above multiplicity of reasons, we can provide every child with a computer.....Prof. Seymour Papert talks of three imperatives that can lead to change:

The Economic Imperative (part 2)

Digital technology in the workplace requires a new definition of "basic skills". The transformation of work requires much more than a mastery of a fixed curriculum inherited from past centuries. Success in the slowly changing worlds of past centuries came from being able to do well what you were taught

³⁰ http://www.harcourt.com/about/news/articles/021104_holt_henrico.pdf

³¹ <http://www.kineticbooks.com/>

³² Rockman, S. *Learning from Laptops*, Threshold, Fall 2003, 25

³³ www.schoolkit.com

³⁴ Ben Shneiderman <http://www.educause.edu/ir/library/html/erm/erm99/erm9933.html>

to do. *Success in the rapidly changing world of the future depends on being able to do well what you were not taught to do.* Already a great number of Americans are doing jobs and using skills that did not exist when they went to school -- soon it will be the majority.

9. The Social Imperative

As the slow evolution of school lags further and further behind the rapid evolution of society, increasing numbers of students all over the world see school as irrelevant to life. Many drop out. Many more drop out mentally, emerging from school with poor skills and negative visions of themselves and the society they are entering.

10. The Moral Imperative

Another perspective on the Digital Divide. Having a personal computer and the freedom to use it to follow personal learning gives each of us access to a new world of knowledge. If some are left out, the gap between the "haves" and the "have-nots" will grow exponentially.³⁵

Notes:

³⁵ http://www.papert.org/articles/Vision_for_education.html

Step 2: Building a Strong Vision for 1-to-1 Learning

Your vision statement should provide guidance, serve as the foundation of your decisions and inform the direction of all stakeholders involved in the program's implementation. It will articulate how and why your 1-to-1 program will lead to improvements in student learning outcomes.

The vision statement needs to:

- clarify the mission and provide a sound basis for decision making
- provide purpose and direction that can be shared with all stakeholders
- provide a standard against which the project can be measured.

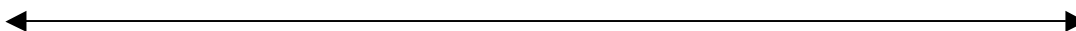
Moving to 21 st Century Learning Models	
<input type="checkbox"/>	What will 21 st Century Learning look like in your school?
<input type="checkbox"/>	How will classroom practice leverage technology to improve student learning outcomes? What is the students' interface to learning?
<input type="checkbox"/>	What advantage is there in using computers in all areas of curriculum, including mathematical literacy, science and history?
<input type="checkbox"/>	To what extent should the introduction of a 1-to-1 initiative improve teachers' ability to address diversity and better personalise students' learning?
<input type="checkbox"/>	What are your plans to continually improve your understanding of what 1-to-1 learning might make possible for students?

Reading Three: Scoping your Vision

It is in this context that we offer some thoughts and background on the nature of change itself:

Fundamental change or incremental improvement: The real question is not just which is preferred, but rather why has there been so little debate around the question itself?

Professor Seymour Papert³⁶



Technology has fundamentally changed the way business functions, and yet when we are confronted with Papert's question, we should not only be disappointed at the lack of debate, but we should also be careful with how we interpret the two dimensions of change that he alludes to. So what is the difference?

Incremental improvement is just that. Continual small changes to the way a school functions can provide measurable improvement. This concept has its ultimate manifestation in W. Edwards Deming's constant improvement³⁷ philosophy, which spurred much of the quality movement in manufacturing around the world.

The parallel for incremental improvement in our schools pales by comparison; today, many schools have a mission to seek to improve incrementally, building on the successes of their past.

Fundamental change, however, looks very different. It is not "tweaking" at the edges; it isn't doubling the length of classes or developing cross-curricular programs. Rather than build on the successes of the past, fundamental change requires a complete rethinking of the nature of school and learning from the "ground up".

So if we now have the continuum of the dimensions of change—a range of change—where does your school fit on that continuum?

What should our schools look like? What role has technology played, if any, in our views of what our educational institutions could be? What is possible, if we take time to truly re-imagine school?

In *Learning Beyond the Classroom*, Tom Bentley³⁸ sets forth a vision for reform and transformation in education and learning, much like what is now happening across the United Kingdom under the Building Schools for the Future (BSF) program. Central to his thesis (and to any number of similar calls for reform) is the assertion that, "learning will not take place only inside schools and colleges, but in communities, workplaces and families".

Bentley suggests that the shift to thinking about learning beyond the classroom requires "a shift in our thinking about the fundamental organizational unit of education, *from the school*, an institution where learning is organized, defined and contained, *to the learner*, an intelligent agent with the potential to learn from any and all of her encounters with the world around her."

Whatever the reasons, our schools are increasingly failing to deliver an authentic, relevant and— in many ways—a viable education to their students. Barely a week goes by that we are not confronted by research and media reports providing indisputable evidence of the failure between what our schools offer, and what their students need.

³⁶ Conversation with Seymour Papert in Sydney, May 2004 with the author.

³⁷ http://www.deming.org/theman/articles/articles_50influenced02.html

³⁸ Bentley, Tom (1998) *Learning beyond the classroom: education for a changing world* (DEMOS)

So why do it? Why implement a 1-to-1 initiative?

Only you and your school community can answer this question, but the answer that embraces most goals may be the following:

...to allow us to significantly improve a student's opportunities for learning by creating compelling learning experiences for all students.

First, you want to articulate a clear shared vision, then set clear expectations backed by a strategy to achieve them -- and, finally, ensure that they are met. As we gain more knowledge about what technology makes possible, we can't be more specific in defining our expectations. These definitions can be found in answers to questions such as:

- How can technology best address *learner diversity* and create opportunities for truly differentiated instruction?
- How can you best develop a school culture that promotes *innovative pedagogy*?
- In what ways will the ubiquitous technology significantly enhance *teacher effectiveness*?
- Aligning with innovative pedagogy causes us to *rethink assessment*. How will we best create evidence that more significant learning has occurred as a result of the ubiquitous access to laptops?

A Vision for 21st Century Learning

Schools decide to implement 1-to-1 programs for many reasons. Some schools are drawn to the potential for more effective learning. Others are responding to a need to change the way they use technology. Nearly all schools recognize that increased access to technology is essential to our children's future and that a laptop program can give students and teachers access to technology whenever and wherever they need it.

Whatever your school's impetus, it is important that your laptop program be guided by a clear, well-supported vision that maps directly to the mission of the school or district. In this section, you'll find guidelines to help you construct your vision.

Who should develop your program's vision and philosophy?

In many schools, the vision statement is developed by a single individual, usually the principal or superintendent. In other schools, the vision statement may be created by a small team that includes district administrators, staff representatives, and members of the community. Whatever the case, the vision must be driven from the top.

The ideas and motivation for your initiative will require the full support of administrators and other decision makers. What's more, as school leaders you need to understand and endorse the vision of a learning community with connections within and between schools in an information-rich, collaborative environment. While many earlier models of technology planning were "owned" by technology or computing coordinators, this new approach to learning requires the backing and collaboration of key instructional personnel at your school and at the district level in order to succeed.

How detailed should your vision be?

The vision statement should be general enough to withstand change. If your vision statement is too detailed, it's likely to become obsolete quickly. Stress the broad benefits to and results in the learning process sought from the technology implementation in your school environment. If you find yourself talking about specific hardware and software features, you're probably getting more detailed than you need to be. And stick to lay language; don't assume that your audience is familiar with any particular technology.

A Framework for Effectively Implementing 1 to 1

What should your formal vision include?

The vision and objectives for your program need to be drawn from the curriculum rather than from the technology itself. Curriculum must drive your goals; technology merely provides the most effective means of achieving those goals. Laptop technology will enable teachers to significantly improve the learning opportunities in their classrooms and to harness the power of 1-on-1 computer use to better equip students for learning.

When drafting your vision and philosophy, remember that it must serve many needs:

- Your vision statement will provide direction, serve as the logical basis of your decisions, and stimulate the thinking, energy, and motivation of every person helping to implement your program.
- Your vision must be farsighted enough to extend beyond the introduction of laptops into the classroom. It should capture the essence of a program that will serve your school for years to come.
- Your vision also serves as a marketing tool and a means of building consensus, support, and funding. Share your vision with teachers, students, administrators, parents, school board members, and business and community leaders. Make the communication process interactive, and secure the endorsement of influential members of your school community. To help bring the vision to life for outside constituencies, offer scenarios and examples that show technology in action.
- Keep the vision statement in mind as you move from planning to implementation to the program itself.

...and a final thought...

"Although mobile learning certainly brings its own unique challenges, the good news is that many of the antecedents of mobile learning have prepared educational technology stakeholders for the journey ahead.

- ♦ *With online learning—and later with e-learning—we discovered how to extend the boundaries of the institution and to reach outside the parameters of the four walls of the classroom.*
- ♦ *We also found ways to take advantage of connectivity, connections, and content-distribution capabilities to give learners alternatives for pursuing their academic ambitions via online courses and programs.*
- ♦ *Learning objects helped us consider ways that we could disaggregate the course to use content elements as components.*
- ♦ *We accepted the premise that modularity makes it easier to update outdated or inaccurate sections of a major work.*
- ♦ *We also saw great possibilities for customization and personalization of learning experiences by being able to access "just the right content, on just the right device, for just the right person, at just the right time."*
- ♦ *By separating content from course, we demonstrated that the notion of flexible learning content is highly tenable and peer-reviewable."*³⁹

³⁹ Ellen D. Wagner,
<http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume40/EnablingMobileLearning/157976>

So with much of the contemporary educational literature focusing on learner-centeredness, and personalization, it is somewhat surprising that technology is not seen as a natural enabler to make it possible. Whether in small or large classes we have two factors at play, one administrative, one pedagogical. Tracking student performance can be irrefutably made easier and more effective if a teacher can work well with a tablet and the right SIS system, while computers can also offer students a range of learning environments and learning styles that embrace much of the diversity that exists in every classroom. Such benefits again have been too often not well articulated.

Notes:

Step 3: Engage parents, the wider school community and the school board.

A move to a 1-to-1 learning model may challenge many people's paradigm of what learning is. Gaining support from your school board or parent body may be challenging.

Ensure the parent body is behind the move before planning becomes too advanced. Ensure you are positioned to manage expectations.

The more support you have, the easier it will be to implement your plan. You can boost your chances for success by communicating early and often with all the people involved.

Good strategies will ensure support is aligned and consistent between:

- long-term strategy of the school board
- principals
- teachers
- students.

Be Transparent and Concise	
<input type="checkbox"/>	Can you provide your school board with research and stories from other 1-to-1 schools?
<input type="checkbox"/>	Do parents understand the reasons for moving to 1-to-1 and support your decision in this reform?
<input type="checkbox"/>	Has the school board participated in the building of your vision for 1-to-1 learning?

Notes:

Step 4: Building a communication strategy

A successful communication strategy requires the full involvement of your information and communications technologies (ICT) committee, key staff and other interested people.

Meet with these people to determine the strengths, weaknesses, opportunities and the potential obstacles in implementing your vision.

Then, prepare a communication strategy. Train the people carrying out the strategy on the importance of being knowledgeable, courteous and responsive to questions from others.

Effective, economical ways of reaching out are available in every community. Try as many of the following as are practical, given your time and resources:

- speak to parent groups
- speak at club, business and community meetings
- produce a newsletter that promotes your vision for ICT in education
- write articles for the district newsletter
- develop a school or district brochure that explains your ICT vision
- promote your ICT vision to your school or district website.

Build Understanding And Ongoing Support For Your Vision	
<input type="checkbox"/>	Is your vision understood and supported by staff prior to you going public? Can your staff articulate this vision for you?
<input type="checkbox"/>	Have you developed a communication strategy?
<input type="checkbox"/>	Have you conducted parent information sessions (with handouts)?
<input type="checkbox"/>	How will you publicly celebrate successes?
<input type="checkbox"/>	Have you been transparent and open in providing information on the project?

Notes:

Step 5: Conduct a detailed readiness assessment

You must understand where you currently stand before building a strategic path to where you want to be. Do this by preparing a readiness assessment that considers your current resource position on:

- ICT and infrastructure
- personnel
- facilities.

Another approach to readiness assessment could be structured under the following five headings:

- **Infrastructure and technology and its readiness to support effective learning**
- **The classroom experience, including classroom management and impact on learning**
- **Pedagogical readiness and effective professional development strategies**
- **School organization and Program Implementation Strategy**
- **Impact on the Wider School Community.**

The focus of the readiness assessment then is to gain an objective snapshot of the readiness of the school to initiate a 1-to-1 program, its strengths and areas requiring attention.

A key element of the assessment is the completion of a Technology Audit, which should review all existing technology and infrastructure and make recommendations with regard to the relative preparedness of the various components.

One common report format uses the following Action Hierarchy:

- **Observations**

These are comments which are simply part of the report text, *but which have been italicized*. They are often a statement of support for existing policy or practice, where it was felt there was a need to highlight the importance of such to the ongoing success of the laptop program.

- **Considerations**

These are recommendations from the readiness assessment that are considered worthwhile of further investigation. They then may or may not be adopted depending on additional circumstances that will influence the decision.

- **Recommendations**

These are recommendations for action that are seen as necessary, but in the process of reviewing their potential implementation, there still may be due reason why they may not be acted on. However, for the most part, they are considered important and there should be serious consideration to any rejection of them.

- **Strong Recommendations**

These are recommendations that are considered essential to the ongoing success of the laptop initiative at the school. They should be considered as fundamental to the continuation of the program.

Conducting this assessment will provide a structure you can use to form the basis for your ongoing project plan.

Define The Scope Of The Project	
<input type="checkbox"/>	What ICT is being used now, and how much of that ICT can be redirected to support the ICT plan?
<input type="checkbox"/>	How many staff have adequate skills/ICT Pedagogical competence?
<input type="checkbox"/>	What can your school's wiring and electrical system support?
<input type="checkbox"/>	Is there sufficient air conditioning and security in the rooms?
<input type="checkbox"/>	What is the standard of routers, hubs, servers, CD towers and other key network equipment?

Notes:

Step 6: Develop a project plan

Include a manageable timeline for project implementation: typically 6–12 months for planning, but projecting out 3 years. Ensure you include the communication plan within the structured project plan.

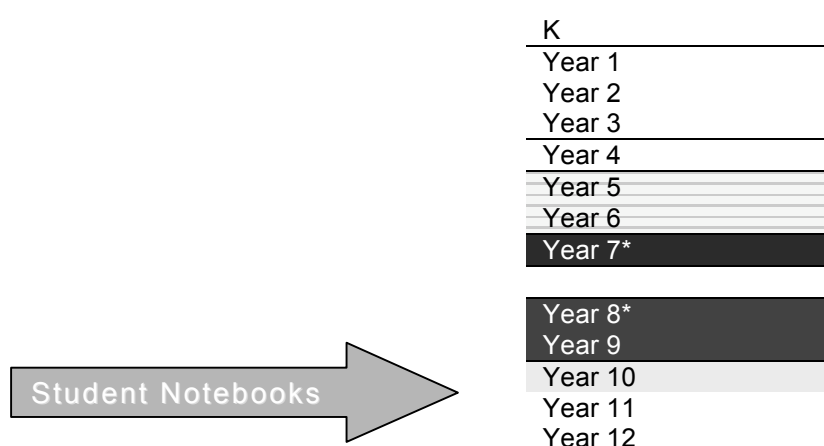
One of the first tasks in establishing a project plan is to set up milestones to mark its progress. As part of the planning process, the project team should propose the timeline needed to implement the plan, including dates for when each task should be completed.

When selecting an ICT leadership team, don't feel you must only choose experts in computer and networking technologies. It is a benefit if your designated planning leader is an ICT expert. If your leader is not an expert, support them with outside expertise. Either way, it is important the ICT leader has a clear vision of how ICT can improve education outcomes for students.

Part One: Scoping the program and Assessing the most appropriate model for implementation

Program Scope

Possible Notebook Program Scope



Scoping Program Options

Several possible alternatives are outlined below. They are premised on consideration of several key questions...

- What are the defining criteria that should be considered in defining the scope of the program? Student readiness, potential for most impact on student learning, teacher readiness, the impact of external assessment, or parent affordability?
- Ideally, at what grade level should the student notebook program commence, and when, if at all should it terminate, or be made non-compulsory..if at all?
- What would be the implications of a second or even third, notebook purchase by parents?
- How does the program's scope impact on the various student intake years?
- As a further option, it might be asked whether the cost of the notebook be absorbed into fees, and a new notebook be provided every second year?

However, above all, as is always the case in introducing a student notebook initiative, the major focus of parent's concern is simply the extent to which they believe such an initiative will significantly improve their son's learning opportunities and outcomes.

Below is a representation of five possible options...

Option One	Option Two	Option Three	Option Four	Option Five
A Framework for Effectively Implementing 1 to 1				

Year 6	Year 6	Year 6	Year 6	Year 6
Year 7*	Year 7*	Year 7*	Year 7*	Year 7*
Year 8	Year 8	Year 8	Year 8	Year 8
Year 9	Year 9	Year 9	Year 9	Year 9
Year 10	Year 10	Year 10	Year 10	Year 10
Year 11	Year 11	Year 11	Year 11	Year 11
Year 12	Year 12	Year 12	Year 12	Year 12

Legend

	Shared sets of notebooks between classes
	School owned student notebooks
	Optional use of notebooks
	Little or no notebook use/School Lab/Class computer option
	Introduction of student notebook program
	Second purchase of student notebooks

Any scoping decision needs to account for many variables...

- Access to notebooks for students in lower grades.
- With Option Four the expectation is that the notebooks would be used for three years and new notebooks purchased at the commencement of Year 10.
- Option Four means all students entering Middle School at year 6 would receive a new tablet. This does to some extent alleviate the current intake challenges.
- Option Five means that all students would get a new tablet as they enter Senior school at Year 9. This might also add new enthusiasm for both students and teachers. The four-year ownership period does present some not insurmountable challenges regarding warranty, etc.
- Option Five assumes that students would keep the second notebook that is purchased for four years. Within the current “assessment class ceiling,” this might, sadly, seem a reasonable option.

A final option which is not included above, would be to rethink the pricing strategy to parents, and include a notebook levy, and paid in the same way, with this option allowing the school to “roll over” the notebooks every two years, and maintain current machines and software more easily...for an overall increase in cost.

Furthermore, in determining the effective life of a student’s notebook, and the most cost-effective way to manage notebook life with student needs, several items should be considered...

- Most school programs schedule a three-year cycle for their student notebooks. This has largely been built on performance of student notebooks over the past 10 years, however, it must be said that the feature and development creep of the 90’s and early 00’s has “plateaued” significantly in recent years. Accordingly, from a pure performance perspective, most notebooks can be used effectively by students for at least four years.
- Insuring four year old machines can be very costly, and without insurance the notebooks cannot be leased.
- Extending a standard three-year warranty to a fourth year is a significant cost, and reflects the OEM’s judgment on the risk of machine failure.
- The experience at 1-to-1 schools across a long period of time shows that repairs during the third year of a notebook’s life increase by up to 50% over the previous two years.

- It is *strongly recommended* that *Lithium Ion batteries in notebooks are replaced after two years*, that memory capacity is reviewed at that time, and possibly upgraded, and that consideration is given to re-imaging a machine if not every year, at least every second.

Part Two: Forming a Project Team

It takes time to build support for technology in schools, especially in curriculum development. In early stages, new technology-based programs are likely to encounter resistance. It is therefore crucial that the team in charge of implementing the laptop program be enthusiastic and committed, be able to withstand scrutiny, and clearly understand what it takes to be successful. Assembling the right team might be the most important element of a successful laptop program.

Your project team will set the implementation schedule. The team will need to oversee such rudimentary tasks as recording serial and asset numbers, determining electrical wiring needs, designing security procedures, processing the laptop orders, and organizing laptop maintenance and repair. At the same time, the team must tackle such complex issues to:

- Gain parent and community consensus
- Ensure that plans for integrating laptops into the curriculum align with learning goals and outcomes
- Work with teachers to create professional development opportunities
- Raise funds

Ultimately, the success of your effort will depend on the talents, experience, personality, conviction, enthusiasm, and creativity of the people you involve. In selecting team members, keep in mind the vision statement that you have created and the learning goals you have defined.

The project leader

The first important issue is choosing the person who will lead the team. Your school's superintendent or visionary should select the project leader. For instance, if your program will be implemented at a single school, the visionary principal should appoint the project leader. If the program affects the entire district, however, the superintendent may need to appoint a district-level leader.

The person chosen for the job needs to have respect, influence, and passion in at least two areas: project administration and instruction. Ideally, the project leader should also have experience working with parents and community leaders. If necessary, consider appointing two people to lead jointly.

Team members

The project leader or leaders select the other members of the team. The team should include representation from all groups that will be affected by the new program: faculty, curriculum development, administration, technology, academic and vocational education, libraries, the school board, parent volunteer groups, business leaders, community colleges, and computer-literate students.

Ensure that the members you select will give you the best chance at gaining support for your plan and building a consensus among differing groups and viewpoints. Parent involvement is essential to the success of the program.

Staff members selected for the project team should be interested in the project and need to have the time to devote to it. Focus your energy on staff members who are willing to grow with the project. Give potential team members an accurate indication of how much time they should set aside for project activities.

You will need to allocate enough relief and/or substitute time to help teachers and other staff members balance their schedules. To minimize scheduling conflicts or misunderstandings, it's crucial for the team to clearly identify milestones to which all team members can commit.

A Framework for Effectively Implementing 1 to 1

The program/implementation manager

Early on, assign one of your team members to be the program implementation manager. This person will oversee the entire program for the next few years—from its beginning through its growth into a mature program. For this position, look for excellent program management skills, including the ability to handle many details at one time. The program manager will play many roles to:

- Coordinate, implement, and report project milestones
- Negotiate and coordinate with vendors
- Design and implement an internal support and diagnostics process for the laptops
- Coordinate service arrangements for the laptops
- Publish progress reports and communicate with the project team
- Facilitate staff training
- Develop presentations and informational material for parents

The Technology Coach-a KEY role

Your project team should also include an instructional integration coach or Tech Coach. The schools that pioneered 1-to-1 initiatives identified curriculum integration professional development as the area in which they needed, and continue to need, the most help. Many schools found that the best person for this role wasn't always the most obvious candidate. In fact, because the instructional integration coach does not require a thorough knowledge of the technology, the individuals who are best suited for this role are innovative curriculum-development staff members. Choose a **Tech Coach** who:

- adapts easily to new situations.
- Is creative.
- Is able to see the range of teaching and learning opportunities that laptops offer teachers and students.
- Is a great team player and team builder.
- believes strongly that laptops can play a powerful, creative role in curriculum development and delivery.

The Technology Coach will facilitate the use of new technology within the curriculum, first by helping teachers learn how to use the software and apply the new tools to their classroom instruction, and then by helping to transform students from consumers of information to producers of information. The instructional integration coach will have the key attributes listed below.

Key Attributes of a good Technology Coach

- Good listener, with excellent social skills, and able to work closely with staff.
- Enough depth and breadth of pedagogical knowledge and strategies to help teachers who are at various stages of technology integration.
- Knowledge of how to organize/structure a technology-rich classroom and awareness of relevant classroom management skills.
- Plans technology rich activities or projects with individual teachers
- Knowledge of effective grouping strategies and able to partner with staff in developing integration opportunities.
- Knowledge of curriculum framework and how technology can support it.
- Recognized by staff as a strong teacher - perhaps an outstanding teacher - who will keep teachers up to date with current research on issues related to the integration of learning technologies.

The Diagnostic Support Technicians

Appoint a Diagnostic Support Technician (DST) as soon as possible. Because this person will troubleshoot and diagnose simple hardware and software problems, he or she should have experience with computers and a good level of technology experience, be able to converse comfortably with the computer reseller, and be able to understand and translate computer industry jargon for those team members who are less familiar with it. They can ideally be a carefully selected team of students. The support technicians will:

- Provide first-line support and diagnosis of any problems that occur with the laptops, including rectifying simple software and connectivity problems and recognizing and facilitating necessary service and repairs.
- Coordinate all repairs carried out externally.
- Facilitate modifications to or installation of additional software.
- Oversee maintenance, utility software such as virus protection, communications devices on laptops, and software upgrades.
- Maintain an accurate registry of all equipment including full user details, serial numbers, insurance registration details and claims, and service profiles.
- Provide a simple help desk for users, such as a student help desk.

A note about in-school service facilities

What will you do when major repairs are needed? Should you consider setting up your own in-school service facility?

In general, the answer is no. For problems other than simple repairs, you are better off sending the computer to a hardware service provider. Most schools that have set up an in-school facility have come to regret it. In general, they've found that the overall effort—managing and financing a spare parts inventory, administering insurance and warranty issues, and continually updating the skills of repair staff—is beyond the scope of what they can reasonably provide. Moreover, this type of activity has little to do with the business of schools.

Establishing a Plan, Timeline, and Milestones

While there are many differences in how 1-to-1 programs are implemented and managed, one aspect that is common to all successful programs is a well-developed plan. A good plan addresses how the school will establish a solid technology infrastructure for the laptops, how the laptop program will satisfy the school's teaching and learning goals, and how the program will move into other schools as the students progress through grade levels. It also outlines a timeline of milestones. The following will assist you in writing an implementation plan and establishing a timeline.

The timeline

Once you've outlined the implementation, you need to develop a realistic timeline with measurable milestones. Remember that not all milestones are linear. Many tasks can be accomplished simultaneously, allowing you to shorten your implementation schedule without overlooking critical objectives.

The following is a rather complete list of suggested milestones from which to form your timeline. Remember to assign specific dates to all of your milestones and action items and monitor them routinely:

- Define your school's vision.
- Select the project leader.
- Identify team members (see previous section for roles and responsibilities).

A Framework for Effectively Implementing 1 to 1

- Identify the affected school or schools, the size of the implementation, and the date by which teachers and students will be using laptops in the classroom; work backward to establish milestones.
- Begin documenting the implementation (that is, keep a journal of your efforts). You can use this later to mentor other schools or to publish weekly, monthly, or quarterly progress reports.
- Research pioneering 1-to-1 schools similar to your own to learn from their experiences. (Refer to Anytime Anywhere Learning Foundation website www.aalf.org)
- Establish focus groups with participating teachers.
- Develop the budget and identify the budgetary resources and fund raising required to complete your vision, including financing partners.
- Prepare teachers early and maintain ongoing preparation. Outline the process of curriculum integration and develop the teachers' training schedule.
- Develop and review content.
- Form a core group of teachers for collaboration and training.
- Include time for teachers to train in the schedule and budget.
- Evaluate hardware and service vendors, and then order the teachers' laptops.
- Develop the training for digital literacy skills, or request assistance from your hardware reseller. Schedule training early for teachers and later for students, parents, and the broader community.
- Estimate how many students will order laptops and when these will be ordered.
- Address issues of equity.
- Determine how many laptops your program will order, lease, or purchase.
- Define your insurance policy.
- Identify the participating school(s) and audit their infrastructure(s).
- Determine the required number of electrical outlets and surge protectors as well as the required amount of amperage in classrooms.
- Determine the required level of connectivity and network wiring, as well as whether telephone dial-up to an Internet service provider is required.
- Determine whether charging stations and special furniture will be required.
- Address security issues, such as where students will store laptops.
- Define the maintenance, repair, and help-desk procedures.
- Set up the asset-tracking and repair database, so that you can track serial numbers, asset numbers, personal ownership, installed software, repair records, and so on.
- Order and install virus, security, and other utility software.
- Schedule routine maintenance and software upgrades.
- Set expectations for parents and students.
- Schedule parent nights to disseminate information and facilitate the ordering process.
- Devise the Internet- and network-access policy.
- Address parents' concerns about laptop storage and security. Discuss how students will transport the laptops to and from school. Discuss insurance requirements.
- Inform parents of the supplies needed, such as flash drives, network connectors, power cords, surge protectors, and additional software.
- Plan the distribution of laptops.
- Publish care and maintenance policies and procedures.
- Tailor the plan according to grade level:
- In elementary/grade school, parents and students assume joint responsibility.
- In middle school/junior high, responsibility is teacher-directed and based on the curriculum and addresses battery, fragility of the equipment, and supplies.
- In high school, responsibility is teacher-directed and based on the curriculum and addresses the above issues as well as security issues such as leaving laptops in the car during after-school events.
- Establish a crisis management plan.
- Adopt a policy for reporting lost or stolen laptops.
- Organize public relations campaigns.
- Allow time in your implementation schedule to communicate your school's progress.
- Plan your communication strategy ahead of time so that you can relate your achievements as they happen.

- Survey the satisfaction of parents, students, teachers, administrators, and community partners, and refine the implementation process during its early stages.
- Consider an evaluation process that measures the program's effect on teaching and learning.
- Make necessary adjustments to improve the program.

Identify Key Project Components	
<input type="checkbox"/>	What are the key milestones and deliverables of your project?
<input type="checkbox"/>	Who will be the project manager?
<input type="checkbox"/>	What is the implementation timetable?

Notes:

Step 7: Prepare a detailed budget

One way of gaining experience in forecasting future ICT expenditure is to measure where your school, region or district's ICT funding is currently being spent.

While no singular checklist can capture every possible school environment, general categories can be monitored to track current expenditures and plan for future ones.

Costs associated with implementing school and district ICT programs fall into the following categories:

- hardware
- software
- infrastructure improvements
- telecommunications costs
- ongoing technical support for teachers and administrators
- professional development
- system maintenance and upgrading.

These budget categories are a starting point. They focus on an array of ICT found in networked environments.

Understand What Resources Will Be Required	
<input type="checkbox"/>	Have you listed <i>all</i> the components that your 1-to-1 program will require, including the individual laptop, software and bag; servicing and insurance costs; technical support and infrastructure costs; and initial and ongoing staff development costs.
<input type="checkbox"/>	Have you considered one-off grants and ongoing funding strategies?

Notes:

Step 8: Addressing Equity: Select a preferred ownership and finance model

There are three possible ownership models: school owned, parents and citizens association owned or parent owned.

You should seek guidance on the range of finance models available to support your school or parents and citizens association in managing an equitable and manageable program.

Refer to the Shared Cost Funding Model spreadsheet from the workshop for more detail.

Ensure The Model Is Viable and most critically sustainable	
<input type="checkbox"/>	What parent contributions will be required and expected?
<input type="checkbox"/>	Is the funding model sustainable?
<input type="checkbox"/>	Have you considered all possible options for receiving supplemental funds, such as parent contributions, government grants for items such as one-off infrastructure costs, and corporate or philanthropic support?

Notes:

Step 9: Address staff technology needs

Ideally, teachers should have laptop computers for a minimum of six months before students use them in class.

The school can provide laptop computers to all teaching staff working two or more days a week. This enables teachers to become sufficiently comfortable with ICT to adjust to the requirements of 21st Century learning.

Provide Teachers With The Necessary Tools Of Their Trade	
<input type="checkbox"/>	What training will be provided to support teachers with their new laptop computers?
<input type="checkbox"/>	Is your curriculum ready for eLearning?
<input type="checkbox"/>	Have you developed a strong community of practice / mentors?
<input type="checkbox"/>	What support structures exist for change-resistant staff?

Notes:

Step 10: Develop a Professional Development Framework and prepare a Change Management Strategy

While it is easy and natural to focus on the logistics of ICT integration, professional development is the critical priority. A comprehensive professional development program can boost confidence, build competence and foster commitment among teachers.

A Continuous Professional Development Framework should provide clear expectations for teachers about how they can effectively use ICT to support and extend student learning.

Manage change carefully, in a sustained, ongoing program. Allow multiple pathways for teachers to build their professional knowledge, practice, values and relationships in making ICT integral to learning. *This involves thoroughly exploring new forms of assessment, teaching and learning.*

In developing this strategy, consider how you will provide:

- support for change-resistant staff
- incentives to ensure all staff members embrace change
- flexibility to enable gradual and rapid change.

Identify teacher–champions to lead change. Build teams of teachers with complementary skills and levels of expertise. Create team incentives to foster high achievement.

Know The Skills Profile Of Your Staff	
<input type="checkbox"/>	How many teachers in your school hold the ICT Pedagogical Licence?
<input type="checkbox"/>	Who are the teacher ‘champions’ within your school?
<input type="checkbox"/>	What is your school’s ongoing professional development plan?
<input type="checkbox"/>	What peer network support structures have you considered or have implemented?

Notes:

Step 11: Prepare physical learning spaces

Effective 21st Century learning spaces are not limited to the traditional teacher-centred model that many schools are limited to. Research confirms students conform to physical spaces.

In a 1-to-1 'anywhere, anytime' learning model, learning spaces are transformed to enable a new, more complete learning experience. Spaces are flexible, interesting, inspirational and cater to a range of learning styles and modalities.

There has been significant research undertaken to support schools in understanding 21st Century learning spaces. One good reference site is www.designshare.com

Prepare The Interface To 21 st Century Learning Described In Your Vision	
<input type="checkbox"/>	Do your learning spaces cater to different learning modalities?
<input type="checkbox"/>	Are the spaces flexible and engaging? What do your students think of the design?
<input type="checkbox"/>	Is your classroom a symbol of your educational philosophy?

Notes:

Step 12: Select software tools to fit pedagogical goals

Before purchasing additional software, be clear on the learning objectives you are seeking in each class and how software will support these objectives.

Software companies now are developing more appropriate licenses for laptop initiatives, and it is also worth exploring applications that may support your objectives without requiring additional expenditure such as Flickr, Google Earth etc

Select Software To Improve Curriculum Delivery	
<input type="checkbox"/>	What are your educational objectives of each class, and will the software support these objectives?
<input type="checkbox"/>	Does the software have enough functionality to support your present and future needs?
<input type="checkbox"/>	What are the limitations of your software licenses? Can software be used at home and at school? How many devices can be loaded with the software?
<input type="checkbox"/>	Are you selecting the type of software that your students will encounter (and need to be familiar with) in the business world?
	Have you considered cross-platform issues that may arise, such as Mac v. PC or XP v. Vista?

Notes:

Step 13: Explore supplier partnership opportunities and form factors

There are two essential considerations when selecting the best device.

1. Selecting a device suitable for students. Many low cost devices are unsuitable for student use. Devices must be selected to provide students with a reliable, flexible and long term (3 year) option.
2. Selecting a supply partner. A decision to engage a supplier should not be made purely on price. The supplier should have a vested interest in ensuring the program works, the devices are maintained and students have a reliable 1-to-1 experience.

Select a Project Partner, Not Just a Supplier	
<input type="checkbox"/>	Is the device strong enough, durable enough and light enough for students?
<input type="checkbox"/>	Will the device offer sufficient speed and memory to run required applications?
<input type="checkbox"/>	Can the supplier offer a suitable guaranteed turnaround time?
<input type="checkbox"/>	What are the performance measurement criteria for your partnership with the supplier and how often will the partnership be reviewed?

Notes:

Step 14: Calculate the total cost of participation in the program

An accurate and detailed total cost of participation must be provided to parents and guardians before inviting them to join the program.

It is acceptable to advise a higher cost of participation than expected to allow for contingencies, and then to adjust the cost down, if possible.

It is not acceptable to advise a lower cost and then ask parents to provide a greater contribution when costs were forgotten or not included.

The golden rule is to *always* under promise, then over deliver.

Be Thorough In Your Calculations	
<input type="checkbox"/>	How much will additional technical support cost?
<input type="checkbox"/>	How much will additional bandwidth cost?
<input type="checkbox"/>	What are your additional power, physical security/storage and infrastructure costs?
<input type="checkbox"/>	Will you factor in additional costs for new software / upgrade costs?
<input type="checkbox"/>	Will you quote parents for additional costs such as USB drives, hard cased school bags, spare power cables / batteries etc?

Notes:

Step 15: Define essential policies

There are about 40 policies that need to be considered and defined by your school before conducting parent nights (also referred to as *out-of-box* or *open-the-box* nights).

These policies should be discussed at length with the relevant members of staff and the school community and with other schools to find out how they deal with some of the major issues including:

- insurance – mandatory v. optional and school v. home
- parental training – mandatory v. optional
- internet and network policy (in line with existing departmental policy): home v. school
- data limit for downloading v. buying more credit
- email – MIS v. Yahoo v. Hotmail v. other
- reporting lost or stolen laptops
- chat (Yahoo, MSN, other) – allowed v. restricted v. banned
- electronic games policy
- personal software policy
- battery charging – student v. parent responsibility, swap-out batteries, penalties
- devices left at home – spare devices, penalties
- backup and data storage – division of responsibility (home v. school); CD v. DVD v. server v. other)
- virus protection and removal, including the cost of re-imaging computers
- storage – mandatory v. optional secure storage
- allocation of storage to students v. students in specific Year levels or subjects
- school-based service and support – cost, level of support and supplier agreements
- transport – responsibility between home and school
- printing credits – school-supplied v. student-purchased
- device model flexibility – single unit v. limited range options
- service and support policies, including pricing and guidelines
- school bags – mandatory v. optional (durable hard case alternatives)

Prepare a Handbook of Policies	
<input type="checkbox"/>	Have you discussed your policies with a range of audiences?
<input type="checkbox"/>	Do these policies support student learning possibilities?
<input type="checkbox"/>	What process will ensure policies are updated and reviewed?
<input type="checkbox"/>	How will policies be enforced?

Notes:

Step 16: Prepare responses to anticipated questions

Preparing answers to anticipated questions will maximize your chances of gaining broad community support for your initiative. Also, it will demonstrate your school's preparedness to move to a 1-to-1 program.

AALF have identified more than 160 questions you may be asked during this phase, which can be accessed from the website www.aalf.org

Be Prepared	
<input type="checkbox"/>	Are you confident you can answer most questions from parents?
<input type="checkbox"/>	How will you address questions you don't have answers to?

Frequently asked questions

Below is a list of questions to which you should have answers that are consistent with both the values and culture of your school, and the vision that you have for your 1-to-1 initiative. They are the issues, ideas and challenges that can be raised by staff, students, or your parent or business community.

General questions

- Will my child have to take the computer to school each day? My child already has to take a lot of bags to school anyway for sports, music, and other activities.
- Why do we need laptops, anyway? After all, the school has considerable resources and many students have access to a computer at home.
- What computer skills will be taught this year and when?
- Will total conformity in computer equipment be required?
- What software will be used?
- Under what conditions can we purchase the required laptop computer through the school?
- Will the software used on the laptops be the same as that currently being used at school? If not, when will training start?

Questions about daily usage in the classroom

- Will you keep us informed about the integration of laptops into the curriculum? How?
- How many classes will the laptops be used in?
- What percentage of the school day will the kids use their laptops?
- Will you evaluate learning outcomes differently?
- How will the overall program be evaluated?
- How will you train the teachers?

Finance, interest rates, and insurance questions

- What purchase/rental plans does the school offer?
- How will the program be financed? What interest rate are we paying over the period of the loan?
- What does the insurance cover? What doesn't it cover?
- How will the payment of the deductible be handled?
- Can the school get group insurance for these laptops?
- Wouldn't my household insurance cover the laptop?
- What's the life expectancy of the laptop hardware? What about the software?

Questions that address affordability, price, and equity

- What are the pricing details and their options?
- Will the school purchase the hardware in bulk to reduce costs?
- I have twins in the grade taking this program. Is there a discount for buying two laptops?
- I would like my child to be involved in the program, but I can't afford to make the monthly payments. Is there any support for parents in my position?
- I just purchased a computer for my child at home, why should I buy another?

Viruses

- What security and virus-checking procedures will be implemented?
- How often will these virus-checking programs be upgraded?

Loss of basic skills

- Aside from word processing and accessing data, what advantage is there in using computers for other areas of the curriculum, such as mathematical analysis, science, and history?
- What about handwriting? Won't my child's handwriting suffer from using a keyboard all day long?
- Won't the students be able to cheat by using the spelling checker? What effect will that have on their spelling skills?
- Don't computers isolate kids?

Infrastructure

- How does the school plan to use the Internet? Do students currently have access to the World Wide Web? Is the school library making use of the Internet?
- What provisions will there be for printing?
- How are the students expected to charge their laptop batteries?

Platform issues

- Is it possible to use Macintosh computers?
- I have an Apple printer at home. Will my child be able to use it with the laptop?
- Will my child be able to transfer files from my Macintosh at home onto these laptops?
- Why aren't you recommending Apple Macintosh computers?
- Why specify a particular brand of laptop?

Obsolescence and upgrades

- What will be done to ensure that the hardware and software get updated in a timely and cost-effective manner to keep up with developments in the computer industry?
- Will there be a change in the demands on equipment and software? How soon is such a change likely to take place?
- How long before the laptops and software will need to be replaced or upgraded?
- If there is a change in the required equipment, how will teachers be able to teach new computer applications if the students' equipment is out-of-date?
- Technology advances very quickly. What level of hardware and software are parents expected to buy? Will multimedia be needed? Will modems be required? What about wireless?
- How long will it be before you require us to replace (or upgrade) the hardware or software?
- Who is to use the laptops?
- Will it be appropriate for students in other grade levels to use laptops?
- When does the school intend to introduce laptops for the entire school?
- If not now, when will students in other grades begin using laptops? Aren't those other grades missing out?

Security

- Even with the best intentions, children still lose things. How do we cope with a lost laptop?
- Student lockers are inadequate for storing laptops safely. How will the school deal with this problem?
- How do we ensure the personal safety of the students carrying these valuable items in public?

Service

- Who will be servicing the laptops? How long will it take to complete repairs and have a laptop back to the student?
- How do you decide if a repair is a warranty or an insurance claim?
- Is the school going to offer any service or support facilities?

Classroom Computer Use?

- Will students be working collaboratively? If so, you will need to provide a way for them to send messages and files to each other.
- Do you want to establish a central store of information that will be available to all students? If so, you will need to provide some way of connecting the laptops to a server.
- How will students connect to printers, scanners, digital cameras, and projectors?
- How will students charge their laptop batteries if the batteries run low during class?
- Should students and teachers have e-mail accounts? What level of security do you need to regulate student browsing of the Internet?
- What level of security do you need to safeguard your network against unwanted access from the Internet or other sources outside the school?
- Do you want to create a network over which students can communicate with teachers? If so, how will you establish a secure environment for the teachers' laptops?
- What type of network access do you want your students to have? Should students be able to change or delete files on other PCs and laptops?
- Should students be able to change hardware settings on their laptops?
- Do you want to provide e-mail so that students and teachers can send files and attachments—for example, homework assignments—to students who aren't in the classroom? Or do you want to restrict e-mail to in-school use only?

Cabling and network topology

- Will the laptops and PCs have any form of peer-to-peer connection (e.g., Bluetooth), or will they connect to a server?
- Will you establish a LAN (local area network) at each school site?
- Which PCs and laptops will be connected to the network?
- Do you have an existing LAN to which you want to connect your laptops?
- Will you have limited network stations in the classroom or one stand-alone PC connected at all times?

If your plan includes more than one school, will your schools be connected over a WAN (wide area network) and will this allow for internet filtering?

- How will you make the trade-off between increased bandwidth and increased cost of cabling?

Questions around software selection and use?

When selecting software, it is important to consider the following questions.

- What are your educational objectives of each class, and will the software support these objectives?
- Does the software have enough functionality to support both your present and future needs?
- Is the software an integrated suite of products that can be expected to work well together?
- Can you minimize the number of manufacturers that you have to deal with?

A Framework for Effectively Implementing 1 to 1

- Are you selecting the type of software that your students will encounter—and have to be familiar with—in the business world?
- What is the quality and reputation of the software products?
- Will the software come preloaded, or will you need to set up the software yourself?

Hardware questions...

- How much hard disk space will you need for students? Whose responsibility will it be to backup? The students or the schools? How will the backups be managed?
- What processor speed will be sufficient to run the applications you've selected? How much RAM will your applications require?
- How fast does your CD-ROM drive need to be? Or DVD? Do we need DVD writer?
- What about wireless and Ethernet connectivity?
- What is the minimum warranty? The warranty length should be the same as the lease length—generally, three years.
- What is the absolute minimum battery life and maximum laptop weight?
- How comfortable are you about the durability of the laptops you have selected? Will they last 3 or 4 years in students' hands? Compare the durability of competing manufacturers' equipment.
- How will you get the equipment fixed and install new hardware or software? How have you selected your channel partner?
- Which software comes preinstalled on the laptops?
- Partnership. What type of commitment to education does the manufacturer have? What is its experience in the educational market and specifically with 1-to-1 programs in schools?
- Program. Are you receiving more than just a computer when you purchase from your chosen manufacturer? Does it have a specific and complete program for schools implementing 1-to-1 programs?

Notes:

Step 17: Establish onsite service structures

Introducing additional devices into any school will have a significant impact on technical support staff and resources.

Providing adequate onsite technical support and service is essential in ensuring a 1-to-1 program runs smoothly. Therefore, ICT support must be carefully planned. Providing a physical space as a first contact point is an important first step.

Refer to the AALF Service Model spreadsheet for assistance in calculating service level performance metrics.

Quality On-Site Support	
<input type="checkbox"/>	Have you taken steps to ensure enough staff to support the devices when they arrive?
<input type="checkbox"/>	Have you considered recruiting student helpers and trainees?
<input type="checkbox"/>	Will you carry an inventory of spare parts or stock?
<input type="checkbox"/>	Do you have processes to ensure effective support, including job log facilities and remote imaging capabilities?
<input type="checkbox"/>	Have you allocated and prepared a physical location for onsite support?

Notes:

Step 18: Conduct parent and/or community sessions

A 1-to-1 program can impact significantly on parents. Therefore, they need to support the program. Additionally, research shows students with interested and involved parents demonstrate better educational outcomes.

A series of well-structured parent information sessions will ensure your 1-to-1 project is supported and embraced.

To obtain a positive result, use a combination of communication tactics, including written documents, parent meetings and opportunities for one-on-one discussions.

How Will You Enrol Parent / Guardian Support?	
<input type="checkbox"/>	Can you demonstrate to teachers some of the exciting things students may use their laptops for in class?
<input type="checkbox"/>	Will you provide parents with some basic training on the use and care of the devices?
<input type="checkbox"/>	Have you considered timing implications in releasing information? For example, a 1-to-1 program may save a parent from buying a home computer for a Christmas present.
<input type="checkbox"/>	Ensure you step parents through the school policies related to the program and answer all their questions.
<input type="checkbox"/>	Have you provided a range of opportunities for parents to learn about the program?

Notes:

Step 19: Order devices and prepare for deployment

There are several tasks that need completion before you can distribute devices to students including testing, imaging, registering etc.

These tasks can be time consuming. Order devices early to help make additional technical available during this process.

Will You Be Ready For Your Devices?	
<input type="checkbox"/>	How much time will you allow for possible delays in delivery?
<input type="checkbox"/>	Have you built a <i>software image</i> to ensure devices will be connected to internet, printers, other peripherals?
<input type="checkbox"/>	How much time have you allowed for technical staff to apply software to all devices?
<input type="checkbox"/>	Who will track serial numbers and register devices in the School Management System?
<input type="checkbox"/>	Will students be required to have a certain school bag or laptop case before devices are distributed?

Notes:

Step 20: Distribute student laptops

Set up formal agreements with parents and guardians about students' use of laptop computers.

Manage the deployment very closely to ensure students receive the correct devices as per the signed agreements with their parents or guardians.

Carefully consider the timing of the deployment to minimize disruptions to classroom practice and the functioning of each device.

How Will You Control The Deployment?	
<input type="checkbox"/>	Will you provide student training immediately on deployment?
<input type="checkbox"/>	Will additional training (e.g., keyboarding) be incorporated into the curriculum in initial stages of program?
<input type="checkbox"/>	Will laptops be sent home on distribution, or will there be a period of in-school training first?
<input type="checkbox"/>	What provisions will be made for students entering or leaving the school mid-term?

Notes:

Step 21: Review and reform

As with every aspect of your 1-to-1 program, build on the things that work and improve the things that don't.

Establish a review group to oversee progress and resolve problems. Accept there are risks as well as learning experiences and a need for adjustments. Also, be sure to note and acknowledge your successes.

Your 1-to-1 program will fundamentally change the dynamics of the classroom, so it will challenge entrenched habits and behaviour. Be open to constructive reviews of your achievements and opportunities for improvement.

Formal evaluation gives you credible feedback, which you can provide to sponsors, program supporters, critics and parents. It gives you convincing evidence to support you in continuing and expanding your program. It also helps you identify any missteps that may have occurred during the initial implementation, so you can make corrective courses of action.

How Will You Measure Your 1-to-1 Success?	
<input type="checkbox"/>	Have you kept a learning journal / repository?
<input type="checkbox"/>	What unexpected impact has the program had on student learning?
<input type="checkbox"/>	Will you use an external party (such as critical friend) to assist in reviewing your program?
<input type="checkbox"/>	What were the major issues and how will you overcome these?

Notes:

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