ICT Rich Learning And Teaching: The Role Of Leaders

Creating a focus on ICT supported learning and teaching.

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Introduction: Learning, Teaching And ICT

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In an article entitled 'Digital Technologies and Educational Change', Sancho points out that technology has been hailed over the years as the saviour of education, '…promising to move learning from the teacher to the learner.' Yet he adds a note of caution, all developments '…have fallen short of initial expectations…'

In this context, many school leaders may have experienced a sense of **frustration** over the development of ICT over the years, perhaps to do with its limited use by teachers or concerns that it has not yet delivered promised quality learning outcomes for all pupils.

Yet Sancho is clear about one thing:

'… today's digital technologies are different.'

While some school leaders might in the past have ignored the onset of ICT developments in their school, grudgingly making money available when necessary, or letting developments be run by a few enthusiastic members of staff, now it **cannot be ignored.**

The ICT educational contexts that leaders face are both **complex** and **challenging**. There are ICT advances in both hardware and software that are appearing at an exponential rate. Five years ago there were hardly any **smart phones**, now smart phones are putting computers in the hands of nearly everyone and pupils are at the forefront of this development. Moreover many pupils are making extensive use of platforms like **Facebook** and **Twitter** and these are are changing the way we communicate. These developments, and others, can present huge challenges and dilemmas for school leaders. For instance, do they integrate pupil learning with their smart phones or do they ban them?

However the support for the development of ICT enhanced learning in schools does not take place in a vacuum. Those leaders who successfully harness its potential will do so by **interweaving** it with many other demands being made, as part of a compelling vision of what school can mean for every child. For instance, this can be about ensuring that all our children have the knowledge, skills, values and attitudes to engage, contribute and thrive as global citizens in an increasingly technological society. This means 'nesting' the development of ICT assisted learning:

- within strategies for **improving learning outcomes**
- as part of **rich** and **varied learning environments**
- that **meet the individual needs** of pupils and staff

This is leadership that is **attuned** with learning and teaching and is keen to explore and address, side by side with colleagues and pupils themselves, the possibilities and challenges of ICT assisted learning in meeting the many and diverse needs of pupils in a knowledge society.

Source

J. M. Sancho, 'Digital Technologies and Educational Change', *Springer International Handbooks of Education* Volume 23 (2009), pp. 433-444, p.433. Accessed at www.springerlink.com/index/RJ40862208X1PG32.pdf [23 March 2013].

Checklist: Developing ICT Across The School To Improve Learning

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School leaders can sometimes feel intimidation when faced by a range of ICT challenges. The following checklist has been devised to help them when leading and managing ICT across the school to improve learning. It is by no means an exhaustive list. While the checklist has been divided into 3 sections for ease of use, there are clear and significant overlaps:

1. Developing Vision, Policy and Planning

2. Developing Staff

3. Developing the School

1. Developing Vision, Policy and Planning

- Do we have a **clear vision** of where we want to go with ICT in terms of improving learning and teaching?
- Is our **ICT policy explicit** in terms of ICT's role in improving learning and teaching? Is it 'grounded in a vision of education and ICT integration' and does it 'address the capacity of the school as an organisation to support the development of teachers' classroom practices and pupils' learning activities'? [1
- **Are all teachers involved** in the production of the policy?
- Are there **timelines** in place for revision and updating of the policy?
- Are we **clear in our improvement planning process** about our priorities and required resources?
- Is ICT planning **closely aligned** to learning and teaching planning?
- Does our planning establish a **coherent approach** to ICT skills development in terms of challenge and progression across stages, subjects and transitions between primary and secondary sectors?

2. Developing Staff

- Is the use of **external support** for staff development and training leading both to improved learning by teachers and pupils and contributing towards sustainable methodologies?
- Are there robust methods in place to continuously **collect data** about staff needs in terms of ICT and are these used to effectively inform professional learning opportunities and developments? For instance, Vanderlinde, Dexter and van Braak highlight three schools that survey: '…teachers' ICT competencies or teachers' ICT training needs, paying attention to technical and didactical aspects. Based on this school-specific data, the three schools formulated clear actions concerning teachers' ICT professional development.' [2]

- Are there opportunities for staff to **collaborate** within and beyond the school through PLCs, peer support, coaching around ICT and opportunities to engage with colleagues in each other's classrooms around ICT and its effective use?
- Do all staff **understand and appreciate their role** in the effective use of ICT?
- Are all staff aware of the **benefits** to their context of ICT?
- Are leaders at all levels focused on **encouraging and working with colleagues** to develop the effective use of ICT for learning and teaching?
- Are there opportunities for teachers to **develop their ICT skills for learning and teaching** in the specific contexts they work in such as stage or subject?
- Is there an ICT **infrastructure** in place to support teachers in terms of their Learning and Teaching practice and technical needs?
- Is there a school culture for staff to experiment and innovate around ICT leaning and teaching methodologies?

3. Developing the School

- Does our ICT committee providing **clear direction** around the effective use of ICT in learning and teaching, is it closely aligned to the learning and teaching committee and is it representative? For instance in one school: Our ICT steering committee has worked out the ICT policy plan of the school. We meet monthly and the group consists of teachers and parents. I think we are the pivot when it comes to ICT, because we communicate upstairs to the school leader and the school community, and downstairs to the other teachers…' [3]
- Do formal leaders and other key colleague **share clear whole school roles and responsibilities** around ICT in terms of whole school policies and strategy. For instance is there an identified ICT coordinator?
- Are there **clear and regularly updated communications** on the range of available hardware and software available in the school?
- Are there **support structures** in place to mange such things as user accounts, personal file storage, the school's network, e-mails, discussion forums, the school website and access to range of software and ICT learning and teaching materials?
- Do we have structures in place to implement our plans for ICT, to **sustain development** and **monitor the effective use of ICT** around learning and teaching?
- Are school leaders actively engaged in **monitoring** and **reviewing the impact of ICT supported learning and teaching** on learners' experiences and using this to identify and identify next steps and overcome barriers to progress?
- Is there a clear **overview** of ICT supported activities taking place throughout the school and of the range of ICT supported resources available?
- Are **mechanisms** in place to meet with individuals returning from external ICT training programmes in order to capture the learning for the school and support the individuals concerned with their next steps?

- Do our policies and procedures take adequate account of issues that relate to **safe use** of ICT for Learning and Teaching and give guidance on appropriate use of such things as the internet, computers, mobile phones, digital cameras and so on?
- Is there a **code of ICT behaviour** for both pupils and staff?
- Are procedures in place that address all necessary **safety** and **security** issues while at the same time encouraging learners' needs, both pupils and staff, for independent learning?
- Are there opportunities to **support the understanding, appreciation and expertise of parents** around ICT through such things as newsletters, the school website, consultation on ICT policies and procedures, ICT committees membership and involvement with their children's learning through ICT. For instance, Claire Jones, ICT Co-ordinator at Southwark Primary School, in an area of considerable social disadvantage, highlights two particular areas of successful parental engagement: 'We have recently started using a learning platform and this enables us to extend our learners' ICT experience beyond the school gates. It allows parents and pupils to access software programmes and school work from home, encouraging them to discuss topics we are covering in class…Providing training for parents in how to use the technology pupils do have access to at home has also been vital for us and is an ongoing focus.'

Sources

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Innovation And Creativity: The Challenge For Leaders In Developing ICT

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Headteachers and school staff are constantly encouraged to be innovative and creative in their work. Similarly, they are exhorted to take risks and think 'out the box'. As one publication, '21st Century Skills: Creativity', puts it:

The call for creativity and innovation in education has been highlighted as one of the most important developments needed. The challenges of participating in the 'knowledge economy' which require new interactions between people, resources and ideas; the opportunity to create and produce, and the need to interact with, a wide variety of media; to the need to find creative approaches to dealing with global challenges: there is a need to find both creative approaches to teaching and learning, and to find new ways to foster creativity and innovation in learners. [1]

The fact that the world we live in is uncertain is highlighted in the **Shift Happens** video clip that states:

'We are currently preparing students for jobs that don't yet exist…
using technologies that haven't yet been invented...
in order to solve problems we don't even know are problems yet.'

Both the **pace and depth of change** are having far reaching consequences- economically, social and culturally- across the world and nowhere is this more apparent than in the development of information and communications technology.

Ian Jukes and Anita Dosaj in an article entitled 'Understanding Digital Kids' show this picture (page 9) from the 300 old Arab market in Singapore. The sights, sounds smells and vibrancy have little changed from three centuries ago. The picture shows an 11 year old girl sitting on a bolt of cloth patiently waiting while her mother barters for fabrics. In her hand is a palm-sized wireless device she's using to surf the web. As Jukes and Dosaj say, digital kids 'can be doing their homework, talking on the phone, listening to music, downloading movies, surfing the Web, and maintaining multiple simultaneous conversations on a chat line.' [2]

Our birth dates of our digital pupils can be compared as follows with some of the significant developments on the web in recent years as follows:

Our 'digital' pupils in 2013?	
Expedia, eBay (1995)	Sixth form pupil born
Google (1998)	Year 10 pupil born
iTunes, wikipedia (2001)	
MySpace (2003)	
Facebook (2004)	Year 4 pupil born
YouTube (2005)	

Twitter (2006)	Year 2 pupil born

These ‘digital’ pupils are :

‘…fundamentally different to previous generations in that they have grown up with digital communications and have different expectations and needs in terms of how they engage, converse and expect information to be presented. The internet is a key part of young people’s lives today – it is completely natural to them. It is so much a part of them that they can be said to be living hybrid lives, combining the physical and virtual in a seamless network of communication, information, entertainment
and sharing. Young people use a number of digital devices, and different modes of communication, at the same time – a mobile phone, a television, a laptop – to build very complex and deep ‘tapestries’ of connectivity to one another and internet locations.’ [3]

These pupils present **dilemmas** to heads and other school leaders who themselves are not sure about the benefits or uses of ICT in the classroom. They are not **digital natives** like their pupils. They are better described by the phases **digital immigrants**, trying to come to terms with a new culture, facing up to technologies that are themselves changing rabidly and trying to figure out with their staffs the best way to make use of them. So when the call comes to be more innovative, to be risk-takers in response to the challenges of the twenty-first century it is all too easy to sign off orders for expensive equipment and software programmes regardless of our lack of knowledge or concerns.

Yet the language of **risk** and **innovation**, easily applied to the world of business, where ‘innovate or die’ is the maxim, sits uncomfortably with the world of education where we like to deal with certainties. We don’t gamble with the safety and well-being of our children and the whole concept of ‘risk assessment’ in schools is about managing and reducing risk. We like order, structured timetables and predictability.

Yet **creativity and innovation should be at the heart of developments around ICT in schools**. If we are not trying out new ideas and taking risks, how are we going to achieve our aim of meeting the needs of every child in our care and engaging them in a relevant curriculum fit for the twenty-first century? New ideas are by definition **untried** and **mistakes will be made**. But it is in the making of mistakes that we learn. It is the difference between ‘theatre’ and ‘drama’. ‘Theatre’ is about an end product that has to be right on the night. In ‘drama’ it is about a process of trial and error, where new ideas and approaches are explored and developed in the light of new experiences- good and bad. This should be part and parcel of developing ICT. Roger von Oech, author of *A Whack on the Side of the Head*, argues that ‘We learn by trial and error, not by trial and rightness. If we did things correctly every time, we would never have to change course, and we’d end up with more of the same.’ [4]

The **cultural contradictions** throughout school often make this sort of change difficult. On the one hand we teach our children that making mistakes is all part of the learning process but on the other hand high marks in tests and exams are the result of not making mistakes. Similarly, while inspectors are exhorting heads and other school staff to be innovative and risk takers, leadership ‘failure’ in an inspection will result in a very public report outlining deficiencies.

Carol Dweck found that children, for whom success in a task was everything, often gave up easily when faced with a challenge they couldn’t at first overcome. The threat to their **self-image** was such that they would rather not learn anything new in case they were seen to fail. However, those children who were praised for their effort in addressing a task, and not rewarded for only getting things right, were more willing to tackle difficult challenges. [5]

To paraphrase Dweck’s ground breaking work, do head teachers and other school leaders for whom performance is paramount want to look successful even if it means not learning something new in the process? Do we refuse to take chances or try out new ideas in order not to be seen to fail? Sternberg, a past president of the American Psychological Association, argues that **if you're afraid of making mistakes, you never learn on the job**, and your whole approach becomes a defensive ‘I have to make sure I don’t screw up.’ [6]

At a conference in 2005 [SETT], Sir Ken Robinson picked up this fear of failure. He said:

"Ask people at a dinner party how creative they are – you will find that they are pretty modest in their answers. Kids are not modest in this regard. Young children have a great self-belief. Adults tend to lose it."

He told the story of a group of 6 year old children in a drawing class. One girl was completely absorbed in her drawing. The teacher, curious, went up to her:

"What are you drawing?", the teacher said.

"I'm drawing a picture of God," was the reply.

"But no one knows what God looks like", said the teacher.

"They will in a minute", was the girl's response.

For Robinson this confidence displayed by children that "They will in a minute", tends to deteriorate as people get older. School leaders in particular start to worry about being wrong and making a mistake and appearing foolish. If we become afraid of the consequences of failure – whether criticism, embarrassment or blame - this fear can inhibit our skills and, as Robinson says, we simply "choke". Either that or we **play for safety** and take too few risks, which only leads to under-achievement. This can be all too true of ICT developments

At the centre of all the developments around ICT is the need to develop each school staff's **confidence** in trying out ideas, in being ambitious for their children, of exploring new ideas and not being afraid of mistakes. This is not about taking risks with terrible consequences. Rather it is about taking the risk that things will not be perfect as we first try out new ICT approaches, knowing that we will learn through the process alongside our children and colleagues. School leaders need the self-belief to aim high, without the terrible fears that cause people to act conservatively and in a limited way. A piece of graffiti, allegedly seen on the New York underground, sums up the challenge for school leaders here:

'If you only do what you do you'll only get what you've got'

Not only do school leaders owe it to their children to do more than this, they owe it to themselves.

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Advice For Leaders In Terms Of Developing ICT Supported Approaches To Learning And Teaching

Keywords: it | technology | school leadership

"In recent years many have argued that the use of new technologies to improve the efficiency of traditional instructional methods will result in limited progress at best. This view holds that the real promise of technology in education lies in its potential to facilitate fundamental, qualitative changes in the nature of teaching and learning." (American President's Committee Of Advisors on Science And Technology, Report to the President on the Use of Technology to Strengthen K-12 Education In the United States, 1997)

1. What is your **vision**, along with your colleagues, for the learning of your pupils? This should underpin all your engagement around ICT supported learning in the school. This is not about creating space 'to do' ICT, but rather it is about the role of computer science, control technologies and a range of ICT supported learning and teaching practices to enhance the learning of pupils and teachers. As Reich says:

'Teaching any particular technology (which will surely be eclipsed by something else one day) in isolation from learning goals and pedagogical models is just teaching people to click buttons.' [1]

To avoid this problem leaders need to be aware of what the specific technology can and cannot do. Key questions here are:

- What is the **purpose** of the learning?
- What is the **potential learning** that can be facilitated through ICT?
- Are there **alternatives** that are more effective in both cost and learning benefits?

Resnick offers a note of caution here that is useful for school leaders:

'…while new digital technologies make a learning revolution possible, they certainly do not guarantee it. Early results are not encouraging. In most places where new technologies are being used in education today, the technologies are used simply to reinforce outmoded approaches to learning. Even as scientific and technological advances are transforming agriculture, medicine, and industry, ideas about and approaches to teaching and learning remain largely unchanged.' [2]

A clear vision does not mean that examples such as the above do not happen. What it does mean is that the ICT supported learning vision of the leader or leaders helps **drive actions** that remedy the situation and ensure clear learning benefits. Without this clear vision around learning and teaching the status quo remains untouched by the introduction of ICT and nothing really changes.

2. Ensure purposeful use of ICT that is **research based**, **justified** in terms of effective learning and **open to regular scrutiny** and revision. Pay close attention to factors that can influence the effective use of ICT in certain contexts such as class size, professional development opportunities, expertise of teacher in both digital and non-digital contexts, length of class period and so on.

3. **Work closely with your colleagues**. School leaders don't need to be 'experts' in ICT, but they do need to be involved in discussions and closely monitor developments. Classroom observation focused on the effectiveness of ICT supported learning and teaching methodologies is vital in this regard,

enabling leaders to see at first hand what is happening and be involved in discussions with colleagues are regards benefits and challenges.

4. Leaders should create the conditions for collaborative enquiry, decision-making and development of ICT based methodologies to enhance learning and teaching. Collaboration is not just with teachers, pupils have a role to play here and ICT assisted methodologies enable pupils to transform their role from passive consumers of teaching to co-creators with the teacher and other pupils around their learning (digitally and non-digitally).

5. **Create a climate of creativity and innovation** around development of ICT. Encourage experimentation around this with your colleagues, engage with colleagues around learning from mistakes and use these as a springboards for further developments.

6. Identify your **early adopters** and work hard to help them disseminate their learning to other colleagues. Remember too, just because a colleague is an early adopter does not mean that they are ideal in terms of working with other colleagues. Ensure that the right colleagues are in a position to work with other staff members and ensure that these colleagues receive support to do this effectively.

7. Encourage **self-help groups** around the development of ICT approaches to Learning and Teaching. Consider action research and enquiry based models to explore the effective use of ICT. Where necessary, bring in outside support to help with the development of enquiry methodologies.

8. **Look beyond the school** for advice and support as appropriate. Leaders should judiciously tap the experiences and expertise of colleagues beyond the school. Outside expertise should, always be used with an emphasis on their role in helping establish sustainable capacities within the school around the school. Universities in particular are doing a lot of interesting research around effective use of ICT to promote learning in ways that deliver clear added value.

9. **Teachers are central to the development of ICT enrichment of Learning and Teaching** throughout the school. Leaders should make high quality learning of teachers around ICT supported Learning and Teaching approaches a focus of their actions through:

Ensuring **high quality opportunities** for all teachers to engage and experiment with ICT supported approaches to Learning and Teaching. Central to translating teacher learning into improved learning and teaching are regular opportunities for teachers to try out ICT assisted approaches in their daily classroom practice. Porrit says in this context: 'The 'follow up' to professional learning is about converting what colleagues have learned into improved, developed and sustained practice. It is this sustained improvement, rather than a quick fix for one lesson, that leads to improved learning for pupils and what can more effectively be understood as professional development.' [3]

The principles and processes outlined here are highly relevant in the context of leaders supporting the conditions for the high quality learning of teachers around ICT rich learning and teaching approaches:

- Breaking down the **isolation** and **fears** that some teachers feel around technology by supporting collaborative mechanisms, identifying sources of support and advice and nurturing effective professional learning opportunities.
- **Encouraging and supporting colleagues** to explore the potential of online learning communities, discussion boards and electronically available resources to support their own learning. In the context of professional learning Reich says: '…don't just talk about technology; instead, always ensure that technology in the service of learning goals.' [4] (See the useful diagram in http://blogs.edweek.org/edweek/edtechresearcher/2012/08/teaching_teachers_to_tweet_part_ii.html.)

- Ensuring **access** to examples of effective ICT practice related to teachers' contexts from within school and beyond.
- Encouraging colleagues not to think in terms of ICT and technologies based learning as separate from other approaches to learning within the school, but as **processes that help facilitate their understanding** of all learning, whether digital or non-digital.

In conclusion, Bannister quotes Mills, who in the context of change and the curriculum says:

'There are only two things that really matter. The first is what goes on in classrooms – the quality of the learning experience. You can plan for deep, rich, purposeful learning experiences for children and design a learning experience rather than deliver curriculum content. 'The second is how teachers take an interest as learning takes place. How they question, model, support and nurture children through their learning. There is a long list of research saying that this strategy works.' [5]

This is good advice for school leaders when applied to ICT developments.

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The Promise Of ICT Supported Learning

Keywords: it | technology | school leadership

Sancho sums up the wave of expectations that surround ICT development in schools as follows:

'It is commonly claimed that these technologies could considerably improve learning results and economic modernisation if used in the right way and if educators were able to use their full potential.' (Ogilvy, 2006) [1]

There are certainly many stories that highlight the impact ICT can make. For instance, Claire Jones, ICT Co-ordinator at Southwark Primary School in Nottingham, says in the context of using ICT to **encourage** student-centred learning:

'Promoting the wider use of ICT in school enables teachers to encourage children to take more responsibility for their learning. This, in turn, helps to create more confident, independent learners who will boost their own knowledge and skills using different technologies.' [2]

Other perceived benefits of ICT suggest that it:

- **supports** a range of innovative teaching approaches
- **provides opportunities** for teachers to collaborate within the school and in online communities
- encourages **motivation** and **independent** learning of pupils
- provides pupils with **opportunities for collaborative learning** and teamwork
- enables more **individualised and personalised approach** to pupil learning
- benefits groups with **specific** needs for instance, pupils with specific learning needs
- provides **interest, relevance and meaning** to pupils' learning
- facilitates **easy access** to a range of content material and resources for both students and teachers
- supports **enquiry based learning approaches** for students
- develops pupils' skills in **group work, problem-solving and creativity**

Yet the full potential of ICT in this is not yet being fully realised across every classroom or every school. For instance, Sancho acknowledges that research gives a mixed picture of the impact of 'digital technologies' on learning and teaching and Mishra and Koehler sum up the situation as follows:

'The advent of digital technology has dramatically changed routines and practices in most arenas of human work. Advocates of technology in education often envisage similar dramatic changes in the process of teaching and learning. It has become clear, however, that in education the reality has lagged far behind the vision. Why?' [3]

While there are often significant problematic issues to address, sometimes related to issues of funding and access, even when these have been addressed some leaders can feel that **costly ICT expenditure is not being translated into improved teaching and learning for pupils**.

And this is really at the **core of the challenge** for school leaders. It is not about developing more ICT use in their schools, but rather **harnessing the potential of ICT** in the service of learning and teaching. **Key to this is not the technology but the people.** This is about leaders supporting and enriching the interactions between teachers and pupils, pupils and pupils and teachers and teachers around ICT assisted Learning and Teaching.

And increasingly there are clear examples of how this can be done, encouraging leaders and their colleagues to integrate more effectively the use of technology in the classroom and, indeed, within and beyond the school to promote learning. Spires, et al. paint the following very clear picture of the sort of rich Maths class teaching that develops pupils learning and social skills in what they call the **1:1 class**:

> 'For example, in a 1:1 math class, students have constant access to technology tools for gathering and sharing information, visually and interactively exploring mathematical objects and relations, formulating conjectures, creating justifications or proofs, and presenting findings to peers. Imagine the following scenario: The bell rings, students walk into the classroom, start up their computers, go to the course wiki to see what conjectures were posted by peers last evening related to an investigation about the medians of a triangle. Some of the conjectures posted include: 1) The medians intersect in a single point; 2) The point of intersection is always in the interior of the triangle; 3) The medians divide the triangle into six smaller congruent triangles of equal area; and 4) The point of intersection divides a median in a ratio of 1:2. Students begin placing their names next to particular conjectures on the wiki, form subgroups in class, move their desks and huddle with their teams to gather data using a dynamic geometry program to confirm or refute the selected conjecture. Some conjectures are easy to disprove by finding contradictory evidence; others seem to be true, but it is not clear why. Another is true in some types of triangles but not others, so the conjecture needs to be refined to be true.
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> The teacher circulates around the classroom, listens to students' conversations, and interjects key questions for students to consider so they are looking at all relevant cases. As she notices students reaching conclusions, she focuses their attention back to the front of the room where she displays a student's computer screen from one of the groups working on the first conjecture. The group members use the smart board to demonstrate different triangles they considered and note that the medians will always intersect. Another group member says she searched the Internet and found several sources that named this point the "centroid." A third group member uses coordinate geometry to demonstrate that the medians of any triangle will always intersect in a single point. Some students are unclear about this aspect of the proof, and group members offer explanations.
>
> In this situation, students are clearly engaged in learning. They have tools that enable them to develop conjectures, and in this community they are encouraged to refine, prove, or disprove the conjectures created by classmates. This activity mirrors the activity of mathematicians, who often begin by exploring a problem and then create conjectures, seek evidence that confirms or disproves those conjectures, and build formal justifications that they communicate to peers.' [4]

This sort of example presents a compelling vision of what can be achieved with existing digital technologies. It is about **high quality learning experiences** for each and very child. This is much more than the integration of technology into existing learning and teaching methodologies. It illustrates the **potential** of ICT to remodel key processes in our schools, leading on one level to radically different ways of teaching and learning from traditional conceptions of the classroom. And yet on another, it is about **energising the processes** that should always be at the heart of effective learning and teaching, rich and productive relationships between teachers and pupils that nourish the learning of each and every child. In this context Sancho is clear:

'The key question is how technology can help transform schools into cutting edge educational institutions ready to cater for students' individual and social needs.' [5]

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ICT Complexities And Teacher Capacities

Keywords: it | technology | school leadership

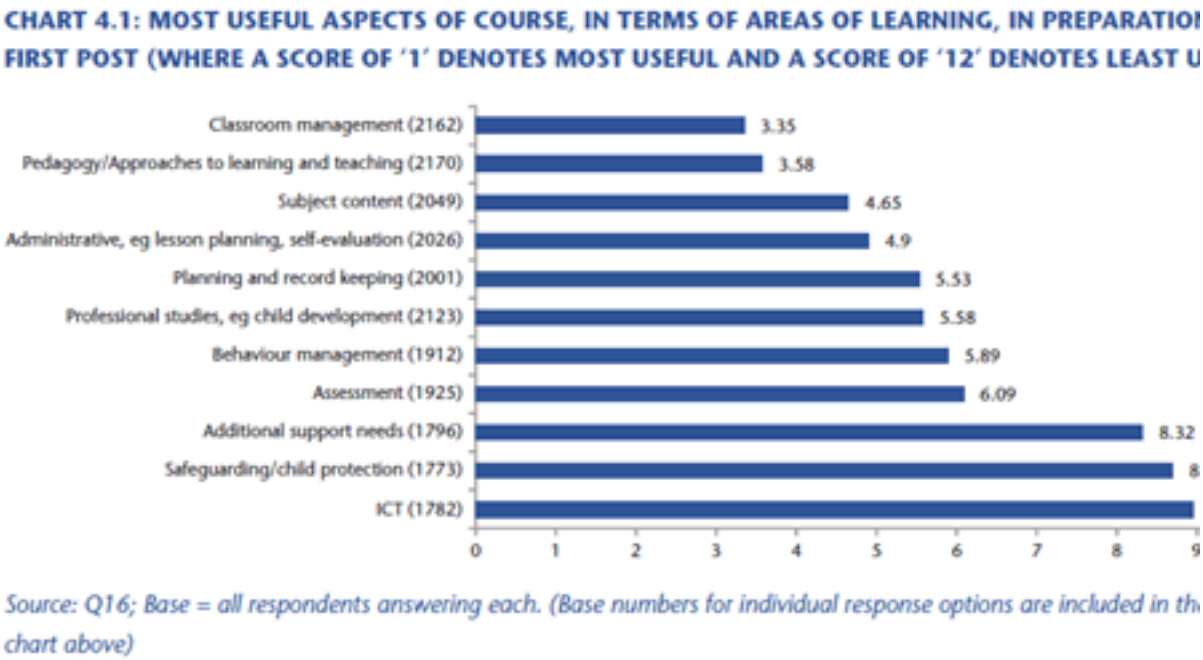
Darling-Hammond, et al. are clear that:

'Efforts to improve student achievement can succeed only by building the capacity of teachers to improve their instructional practice and the capacity of school systems to promote teacher learning.' [1]

In the context of ICT, this is about leaders **supporting the development of a high quality-learning environment** for teachers focused on utilising the potential of information and communication technologies to enhance the learning of children. However, the experiences of some teachers in this area are not positive ones, as highlighted in the following American report:

Most teachers say they have access to, or are periodically able to participate in professional development related to technology, but most report they are not satisfied with the training they receive or the level of ongoing professional support they can get at their school. Teachers say that they do not get adequate training on specific technologies or about how to more fully integrate technology into their teaching. Nearly half of survey respondents cited inadequate training as a reason they would not use technology to support their teaching. [2]

Moreover, the following chart shows that Scottish teachers found that the least useful aspect of their initial teacher training in terms of their learning was ICT preparation.



[3]

Even without the dimension of ICT, the whole area of continuous teacher learning has always been a challenging one for school leaders. How can they effectively support the nourishing conditions for teacher colleagues that:

- support and develop **reflective capabilities**
- continuously **challenge thinking** and current ways of doing things
- lead to **new knowledge** and **skills development**
- **change practice** in the classroom
- and **impact significantly and sustainably on children's learning**

The addition of ICT to the above mix adds substantially to the complexity of the challenge for school leaders. Part of the reason for this is that supporting the effective development of teachers' ICT assisted learning and teaching approaches can be described as a **'wicked problem'.**

Wikipedia describes a 'wicked problem' as one '..that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognise. ..Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems.' Spires, et al. quote Koehler and Mishra in this context when they say: [4]

'They argue that teaching with technology is a "wicked problem" with solutions being difficult to realise because of "complex interdependencies among a large number of contextually bound variables".' (Koehler and Mishra, 2008, p.9) [5]

Koehler and Mishra [2006] outline a model around teaching with technology that '…emphasises the connections, interactions, affordances, and constraints between and among content, pedagogy, and technology. In this model, knowledge about content (C), pedagogy (P), and technology (T) is central for developing good teaching.' [6] To add to the complexity, according to Koehler and Mishra [2008] teachers have to integrate and develop the following four particular areas in order to deliver effective ICT supported learning and teaching. [7] These are:

1. pedagogy + content knowledge = pedagogical content knowledge [PCK]
2. technology + content knowledge = technological content knowledge [TCK]
3. technology + pedagogy = technological pedagogical knowledge [TPK]
4. technology + pedagogy + content knowledge = technological pedagogical content knowledge [TPACK]

Harris, Mishra and Koehler highlight these relationships in the following diagram: [8]

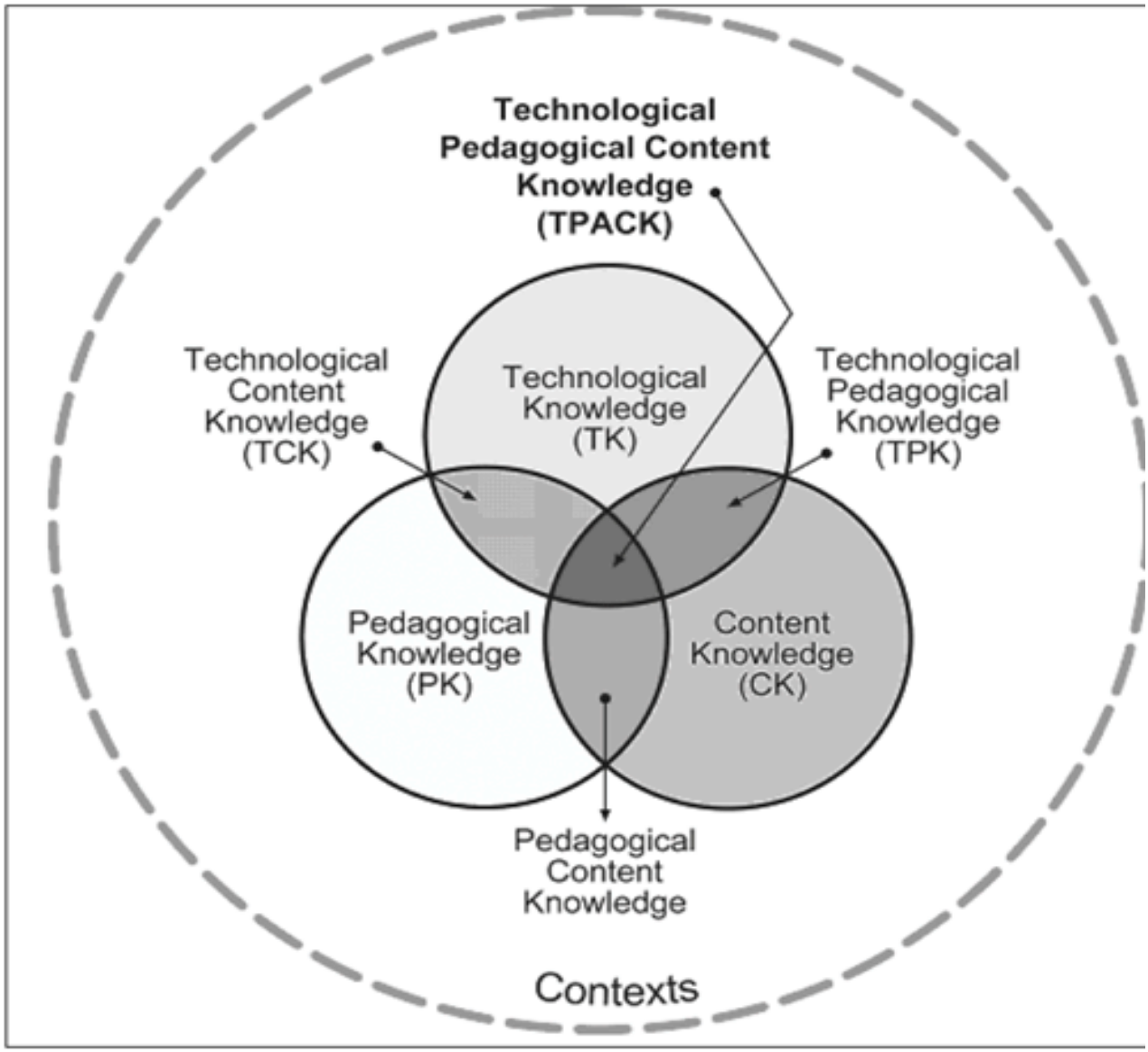


Figure 1: The TPACK Framework and Its Knowledge Components (Adapt
from Koehler & Mishra, 2008)

From Koehler and Mishra's work it is clear that it is not enough for school leaders to encourage and support the development of teachers' skills in one of the areas without reference to the others and this has been a problem with so much of the early CPD developments around ICT. These focused too narrowly on developing teachers' technical skills in using the technology in isolation from content knowledge and pedagogy. In contexts like this, some teachers simply used the technology as a **technical aid** to their teaching, for instance in the worst cases having children copy down information from a whiteboard. In other cases, teachers experienced real frustrations as their use of ICT with pupils had **very little impact on the learning**. Experiences such as these have left a legacy among some teachers that still see some accord little value to ICT supported learning and teaching approaches.

However, leaders have to be aware of the **difficulties** faced by staff when confronted with new technology and an expectation that they will use it effectively. Moreover, Spires, et al. suggest that the arrival of a computer in a class or classes can cause 'pedagogical disruption' for the teacher or teachers where:

‘For example, in situations where all students have computers, teachers may initially ask simple questions: What can I do in my social studies class now that students have continual access to Google maps? What can I do in my math class now that all students have access to Excel and can create a scatter plot? It is important to note that with such examples, content or pedagogy could easily drive the use of technology, but realistically, most teachers will begin with the technology.’ [9]

There are very real and ‘wicked’ challenges facing leaders who wish to support the professional learning of their colleagues around using information and communication technologies to enhance the learning of children. However this situation is not beyond the influence of leaders. It is amenable to **innovative and creative solutions** that can take leaders and their colleagues away from traditional and stereotypical conceptions of CPD training, such as staff in a passive role in front of an ‘expert’ presenter. For those leaders prepared to establish collaborative cultures, and who are prepared to experiment alongside their colleagues with new approaches to professional learning, there are clearly benefits in terms of improving expertise around ICT supported learning and teaching. To explore further ideas on what leaders can do in this area see the article entitled Focusing on Teachers’ Professional Learning.

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Focusing On Teachers' Professional Learning

Keywords: it | technology | school leadership

There are a number of things that leaders can do to successfully address the complexities and challenges posed in developing ICT enabled learning and teaching approaches and highlighted in the article entitled ICT Complexities and Teacher Capacities.

Primarily, this is through teachers' **professional learning** and **supporting a learning culture** for school staff to enable and develop high-powered ICT assisted learning for children. For Livingstone 'The end goal of teacher professional learning is improvement in pupil learning and school-based professional development brings the action and the goal closer.' [1] However she says that:

'This aspiration is unlikely to be realised if a better infrastructure is not put in place to enable teachers to connect to a variety of support and supporters (in school, locally and nationally) and link CPD activities according to specific learning needs. Without an infrastructure, professional development opportunities will remain haphazard, unrelated and not relevant or effective.' [2]

The following suggestions are focused on leaders' roles in developing a professional learning infrastructure **to enable staff to develop and nurture high-powered ICT assisted learning for children.**

1. Connect ICT to the practice of learning and teaching

Leaders should ensure **access** to high quality learning opportunities for teachers that simultaneously develop their skills around content, pedagogy and technology and, crucially, the interplay between all three.

For instance, school leaders and their colleagues, keen to make effective use of ICT in the classroom, might start with a **focus on developing teachers' skills around supporting pupils in project-based enquiry approaches that make use of technology**. The natural alignment between project skills and ICT is illustrated by the following example:

'"I would like to see more project-based instruction," said Cheryl Davis of Acalanes Union High School District (CA). "I would like to see all kinds of technology in the hands of students. We should wrap new and mobile technologies into lessons so that students have access to a variety of tools during the school day to access the internet, to research, and to create content."' [3]

Here teachers not only require to understand the technology but also require a repertoire of approaches 'to challenge students to engage in complex thinking and to pose creative and innovative solutions during project-based inquiry' and develop pupils' '…problem solving, communication, collaboration, planning, and self-evaluation skills.' [4]

This is not about developing teachers' technological skills, nor is it about introducing some technology into learning and teaching practice. It is about teachers **learning about learning and teaching through their engagement with technology**. Where leaders effectively support this and other alignments between technology with content and/or pedagogy this can help transform practice and lead to powerful learning for pupils.

2. Focus on time and depth

Developing ICT and its relationship to pupil learning requires **time and depth**. Hammond et al say that 'episodic workshops disconnected from practice do not allow teachers the time for serious, cumulative study of the given subject matter or for trying out ideas in the classroom and reflecting on the results.' [5] If the potential of ICT supported learning is to be achieved then leaders need to ensure **sustained learning** over a period time on a focus areas connected to ICT supported learning as well as space for teachers to come together, reflect and implement ideas in the classrooms. **Effective access to a range of dedicated ICT resources and online learning platforms** is also important here.

3. Support modelling opportunities

Darling-Hammond et al highlight that '…researchers have found that teachers are more likely to try classroom practices that have been modelled for them in professional development settings.' [6] This is about a range of professional learning approaches that include

- **lesson observation** and the discussions that follow
- **classes** where particular aspects of technology that support pupil learning are demonstrated
- **group observation** of practice
- teachers **trialing** approaches and feeding the learning back to other teachers
- **links with other schools** to share ideas and practice
- **videos** of lessons used for training purposes
- action research processes
- leaders encouraging and using ICT supported approaches when they are actively **engaged with their colleagues** in professional learning situations (the successful use of ICT to support and nurture their own learning will develop understanding and expertise that teachers can apply in the classroom)

A good example of a slightly different approach to teacher learning that is ideally suited to developing the ICT skills of teachers to support pupil learning, is the Japanese lesson study method:

'Lesson Study (or kenkyu jugyo) is a teaching improvement process that has origins in Japanese elementary education, where it is a widespread professional development practice. Working in a small group, teachers collaborate with one another, meeting to discuss learning goals, to plan an actual classroom lesson (called a "research lesson"), to observe how it works in practice, and then to revise and report on the results so that other teachers can benefit from it.' [7]

The **group observation of practice**, and the subsequent discussions that analyse strengths and weakness and develop new thinking around the challenges presented it is a powerful form of staff learning. Moreover, the lesson can be repeated with another teacher taking on board the ideas from the discussion and the cycle of learning can be repeated. It is particularly useful in terms of exemplifying the interaction between content, pedagogy and technology.

Leaders themselves can provide **powerful models to colleagues** by making more frequent use of ICT in formal staff development sessions that they themselves facilitate. While this might provide a challenge to those school leaders who have become comfortable speaking to an audience 'from the front', it enables them to **experiment** directly with the potential of ICT to support staff learning and develop whole school capacities around learning and teaching.

4. Nurture collaborative cultures

Leaders' **lack of expertise** around ICT can in fact be a blessing, encouraging them to work with fellow colleagues around shared approaches both to professional learning and ICT developments to support learning and teaching. Other mechanisms leaders should nurture include:

- **professional learning communities** addressing issues of ICT supported learning and teaching
- opportunities for various colleagues to **lead** on developments and initiatives around ICT
- **training and professional development opportunities** delivered by staff
- **mentoring and coaching** to enable individual support around ICT. This especially important for newly qualified teachers who should receive substantial support in this area as well as induction around ICT supported learning and teaching approaches
- encouraging staff to join **online learning communities**

As Spires, et al. say:

'Obviously, with emerging technologies come new possibilities for how educators can use virtual environments for professional exchanges and learning experiences. As online professional learning communities become more pervasive, teachers will have increased options to connect with professionals from around the world to enrich their knowledge and teaching expertise. Teachers will create their own personalised interlocking networks as they sample from a variety of resources and become more sophisticated consumers of online learning opportunities.' [8]

5. Support innovation and learning

The **pace of change** in terms of ICT will not slow up as new technologies continue to open up new possibilities. The answer is to **encourage a culture of innovation** where staff and pupils are willing to experiment with their learning. The nature of the challenge is summed up with the explosion in mobile phone use, with many pupils now carrying what is in effect a 'computer in their pocket'. As one American district administrator says:

"We see a lot more cell phone use coming, we're not sure how to take advantage of it." [9]

Yet these devices may be the tip of a real and sustained revolution in teaching and learning across all our schools. The **challenge** for school leaders is in nurturing capacities around ICT supported learning that can **continuously** and **effectively react to changes** in a way that leads to sustained improvements in learning and the realization of the school's vision. The emphasis here is on the role of the leader as one of 'capacity builder', supporting the professional leaning of his or her colleagues as self-directed learners focused simultaneously on the practice of teaching and how children learn effectively in an ICT context. In this context, Porrit, in How to ....lead and support innovative professional development, [10] suggests a particular way of conceptualising CPD that is highly relevant to leaders supporting the conditions for the high quality learning of teachers that can be applied around ICT rich learning and teaching approaches.

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