Naace

The Education Technology Association

ADVANCING EDUCATION

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BSF in Hull, CC BY SA, (Modified)
Vision and Reality, A computer generated image of one of the schools built in Hull under BSF in 2010.

link

ISBN: SSN 2050-1331

About Advancing Education

'Advancing Education' is a leading journal comprised of an eclectic mix of academic and action research papers and reports from members, sponsoring partners and other expert guests on the innovative uses of digital technologies in education. As such it reflects the wide-ranging interests of members and sponsors and all those passionate about EdTech in all phases of education. The journal is published online twice a year.

Editorial

Since the advance of austerity, the change to the Computing curriculum in 2014 and a lack of emphasis on EdTech from the Department of Education, much of the broader remit of Information and Communications Technology we used to know has been lost.

But, amid the current chaos in government, Damian Hinds, the Secretary of State for Education, looks like our best chance in improving the focus of politicians. He boasts of starting his career at IBM - he may be our best chance currently - if the government lasts.

In the first section of this journal called Reflections, the opening article is from the EDUCATE team at UCL about the political landscape in education. They believe that industry, academia and schools need to work together and collaborate on developing high quality technology that will positively impact its users. The team reflects on how successive governments have given educational technologists much to think about and will keep them engaged for many years. The UK education system, an historical battleground for political ideologies, has provided many challenges and conundrums for innovators to tackle, ranging from supporting children with learning difficulties, to solving the burden of teacher workload and improving social mobility among sections of the population. In this context, Hinds has announced plans for a £10 million EdTech strategy for education. In January at BETT19, he began to pave the way for a new approach to technology use in schools.

The initiative, which is expected to be launched in the Spring, is doubly significant. Firstly, he is sending out a message that entrepreneurs and technologists developing EdTech need to up their game and that their products and services should be valid, robust and fit for purpose.

In addition, and probably for the first time ever, he indicated an expectation that the teaching profession and schools would engage with this process and have a role in shaping what this new educational landscape should look like.

I hope this will also include education researchers who have a plethora of findings about what has worked in the past and what has not. You will find some examples here[1] and here[2] and here[3].

[1] https://mirandanet.ac.uk/knowledge-hub/becta-reassembled/

[2] https://mirandanet.ac.uk/about-associates/associates-research/

[3] https://mirandanet.ac.uk/external-publications/

Next, Bob Harrison, retired from Toshiba, a long standing friend of our community, reflects on his many visits over 20 years to BETT where Naace always have a stand. HIs key point is that BETT is actually a trade show, not an educational conference. This has always been a conundrum for us all. He records some anecdotes about the politicians' opening speeches. "Yes," he says, "most ministerial speeches and announcements pass me by, not only because they said so little, but also because these politicians appeared to have little idea about the meaning of the weasel words from their speechwriters.

Always the comedian Bob writes, "Someone once said that listening to a Ministerial BETT speech "was like listening to a three year old reciting Shakespeare". Such is the standing of politicians at BETT. There was a time when a BETT ministerial address was not to be missed. No longer. You wouldn't cross the road for one, never mind brave the crowded Tube or DLR to get to ExCeL".

I thought it would be appropriate here to swing from politicians' utterances to what teachers are reflecting on at the grassroots. I interviewed a teacher who has trained as a Computing teacher in his forties after a career in industry. We were investigating the different training roots, so this teacher's observations are pertinent and his suggestions valuable if we want to fill the 8,000 teacher shortage in this area.

"I did consider applying for the BCS Scholarship but the coding question put me off, as they were clearly prepared for candidates with Computer Science degrees. I felt that it was unlikely that would have qualified for the scholarship. For someone who wanted to teach computing, and had experience in the business the BCS route was clearly aimed at subject specialists, (a logical step). For someone who did not have a coding background, it was pretty intimidating. More KS5 than KS3, that's for sure.

I actually think that this approach should be re-considered as there is plenty of anecdotal evidence that coders don't necessarily make great teachers. My view is that what's more important is teachers who have the aptitude to teach and who are willing to learn. The subject knowledge comes second to this, against all the research".

In the next section of this journal, Issues, two practitioners argue about current deficiencies in the system. Firstly, Rob Ellis offers some sensible advice about e-safety. "Where", he asks, "do we get our safety messages from? Largely they are built up from interactions with previous generations but if those generations have no background in the new technology, (and how can they), the resource bank of good advice is not there. Additionally, if an older generation sees young people operating with confidence, even if that confidence is misplaced, they will be reluctant to challenge." In this piece, he argues for general advice about the technologies rather than specific advice about the products - a media studies approach as opposed to product training.

John Galloway's article follows, asking whether new technologies are raising issues of mental health in children and young people. As recently as January 2019 Matt Hancock, the Health Secretary, was warning social media companies that he would use legislation to act against them if they didn't do more to remove inappropriate content and protect children and young people from harm. In his speech Hancock comments: "It is appalling how easy it still is to access this content online and I am in no doubt about the harm this material can cause, especially for young people. It is time for internet and social media providers to step up and purge this content once and for all." (The Guardian, 26th January 2019[4],

Such concerns are not new, as Galloway points out, and, at times, can seem to be over-stated, perhaps over-simplified, by the press in order to enhance the story. Someone's online activity may be thought of as a reflection of their mental health, as an indicator of their state of mind, rather than a cause of their anxiety, although it could be difficult to disentangle the relationship. Certainly there are academics who suggest that new technologies are contributing to an increase in teenage suicides, now the number one cause of death world-wide for that age group. Our profession needs to be able to suggest some strategies for teachers in what is now a life and death situation. I doubt if teachers expected their observations of pupil behaviour would be so important.

In the final section, called Curriculum, two practitioners wrestle with elements of the curriculum.

In Revisiting computational thinking, Miles Berry, an authority in this area argues that given, then, the centrality of computational thinking to computing curricula and assessment, it would be reasonable to expect some clarity about what this is, and perhaps even some consensus around how it might best be taught in schools. "Unfortunately," Miles comments, " I fear there remains confusion over what computational thinking is, and thus

[4] https://www.theguardian.com/politics/2019/jan/26/matt-hancock-facebook-social-media-suicide-self-harm-young-people

ongoing issues over how it should be taught. He addresses these issues in his well argued piece that concludes the article sections.

In an age of voice recognition, she asks, why are we still interested in touch typing? These days anyone with a smartphone, she observes, can dictate their thoughts and notes and produce reams of text at super speed. Even more importantly, phones don't come with a stonking great keyboard, so why are people still talking about touch typing?

In her article she warns us that, on the other hand, voice to text has its limitations. Most people find it hard to dictate notes from scratch so voice recognition works best if they are dictating hand-written notes onto their phone. You need good wi-fi and a quiet environment which is why it is not widely used in offices and classrooms and, even if you use it every day, it is not necessarily especially accurate. True, none of the words will be misspelt but like most technology it lacks common sense, so some sentences will be ludicrous. Her arguments, that include putting the blame on 'posh people' for the lack of touch typing training, should make us think deeply about what aspects of technological advance may also interfere with traditional modes of communication.

At the end of this journal I have noted two books about practical pedagogy by Mike Sharples that Naace members may find interesting and two conferences where Naace members can meet up face to face. Hope to see you there.

Enjoy your Easter break. I hope this journal provides some stimulating reading. Sal Mckeown brings us back to an age old conundrum that is not life-threatening in any way.

Professor Christina Preston

BETT - Then & Now. Image Credits - left; T Kuechel, CC BY - right; Danny Nicholson CC BY ND

Reflections

Working with the edtech industry

The EDUCATE team UCL

When Damian Hinds, the Secretary of State for Education, announced plans for a £10 million EdTech strategy for education in January he began to pave the way for a new approach to technology use in schools.

The initiative, which is expected to be launched in the Spring, is doubly significant. Firstly, he is sending out a message that entrepreneurs and technologists developing EdTech need to up their game and that their products and services should be valid, robust and fit for purpose.

In addition, and probably for the first time ever, he indicated an expectation that the teaching profession and schools would engage with this process and have a role in shaping what this new educational landscape should look like.

Successive governments have given educational technologists much to think about and will keep them engaged for many years. The UK education system, an historical battleground for political ideologies, has provided many challenges and conundrums for innovators to tackle, ranging from supporting children with learning difficulties, to solving the burden of teacher workload and improving social mobility among sections of the population.

This has been evident in our work at UCL EDUCATE. Since our launch in 2017 we have worked with more than 170 educational technology companies, ranging from built-in artificial intelligence chatbots able to provide real-time support to learners, to assessment tools that can evaluate progress over time and software that can address teaching and learning problems in virtually every subject in the curriculum, covering every age. We believe that industry, academia and schools need to work together and collaborate on developing high quality technology that will positively impact its users.

In January, a day after Damian Hinds' announcement at the Bett Show, UCL EDUCATE launched its EDUCATE for Schools scheme, a step-by-step guide to helping dispel some of the myths and fears about using EdTech in the classroom, while pointing schools in the direction of what is effective and purposeful.

At the outset, EDUCATE's principal aim was to bring together technologists and educationalists, with the appropriate research base so that the EdTech the companies developed was robust, effective and fit for purpose. As our cohorts have progressed through the programme it has become apparent that what was needed was the input of schools into the EdTech creation and development process – a view now clearly also embraced by the government.

Yet a study published by the British Educational Suppliers' Association, (Besa), two years ago revealed that only 44 per cent of primary and 31 percent of secondary schools in England reported that the educational technology they'd implemented helped them to achieve what they set out to do. There is clearly a need, therefore, to support schools to meet their intended goal by providing advice and guidance so they can evaluate their own technology needs or conduct their own pilot study.

The Besa survey findings suggest that much of the technology being used in schools either doesn't perform the way the designers claim or was not the right choice for the schools' needs. The EDUCATE for Schools scheme addresses these problems.

As a research-based programme at a research institution, a solid base in evidence forms the foundation of what UCL EDUCATE does. When we work with EdTech companies, one of the first things we do is to teach them to identify the different types of evidence that might influence how and why they develop their product or service. In the same way, it is important for teachers to understand the available evidence and to make informed decisions about what might be suitable for their needs.

This might include anecdotal evidence, which is often delivered by word of mouth among colleagues or another school and can be subjective. Descriptive evidence, on the other hand, can be qualitative or quantitative and is useful in providing data about the characteristics of users of a product or the environment in which it is being used. This could help schools to identify products that have worked in school with similar student populations or context.

Correlational evidence establishes that two measurable variables are related but one does not necessarily cause the other. This type of research is common in social science research in which causality can be difficult to substantiate. But it is very difficult to establish causality in research not conducted in a laboratory, in which an intervention can be

isolated as the only variable that could have caused an outcome.

Given there are so many different types of research, it is possible that more than one type will be needed to make an informed decision, and this is true of EdTech use in schools. Firstly we advise schools' to conduct a needs assessment, which would identify whether it is, indeed, technology that would solve their needs or challenge, set alongside the school's development plan. Technology might not be the solution. Such an exercise should include all relevant staff and not just senior leaders, and the technology leads. This exercise is more about the school's objective than the technology itself.

After deciding the school's needs, it's useful for them to carry out an inventory of what technology is already in use, or is lying idle in a cupboard somewhere, long forgotten. This particular exercise should include an inventory of human resources, and schools might want to survey their staff to find out what capacity they have, and how willing they are to adapt to new technology. This information will determine how much professional development might be needed before piloting and adapting to EdTech.

Once this has been established, how do they find the best product for their needs? It is important to try to find out whether the product does what it claims to do; what the required conditions are for it to be effective; to establish if the findings are consistent with the data that was collected; and whether the school where the pilot was carried out is comparable to their own. Trying to determine whether the findings presented in a company's marketing materials are both reliable and relevant is not easy. Some EdTech companies allow schools to test out their product before committing to buying, and this requires schools to put an effective pilot in place, with a sample of participating teachers and students.

There is an expectation that the companies we work with carry out their own research on the efficacy of their products. Little Bridge for example, a global peer to peer learning community, now holds millions of data points and documented feedback from users around the world, which allows it to demonstrate that children who are more "social" on its platform achieve significantly better learning outcomes. Emma Rogers, its chief executive, said: "This has reinforced our confidence and integrity when speaking to any teacher considering purchasing our product. That's pretty fundamental for any business".

Image used with kind permission of UCL

Another company, Across Cultures, which works with EAL learners, used internal and external assessment data to track pupil progress, and can now demonstrate that learners made progress of over 2 years in reading comprehension and decoding age in as little as 4 months. Meanwhile, LitFilmFest, which encourages the use of film to improve literacy in primary-aged children, teamed up with another company to show that its product could accelerate the rate of academic progress by 3.75 times the average level. All of these findings give the companies leverage in attracting interest from teachers and schools and set them apart from the "snake oil salesmen" they are often warned about.

In devising EDUCATE for Schools our research team worked with the Hammersmith Academy in West London to pilot it before its unveiling it at the BETT Show. Gary Kynaston, the headteacher, said the loss of the British Educational Communications and Technology Agency (Becta) in 2010 had left a vacuum in schools who needed help and support in making decisions around technology use. He said that EdTech was "a minefield and a whole different language" to what schools were used to, so teachers needed a tool that would help them to ask the right questions about what technology to use.

"A lot of schools have technology but it's just sitting there and we're not getting the best out of it," Mr Kynaston said. At the same time, he warned against over-reliance on EdTech or seeing it as a "panacea, a silver bullet that just doesn't exist." "It is important to take a step back and consider carefully what technology to use and what to spend money on," he said.

We look forward to Damian Hinds' EdTech initiative making this process easier. For more information on the UCL EDUCATE programme go to, educate london

My 20th BETT

Some reflections

Bob Harrison

For 20 years I have made the January pilgrimage to the BETT educational technology show - now in London's Docklands - and have always had to remind myself that this is a trade show and not an educational conference. That has always been a conundrum.

There have been some memorable moments. I was there when Charles Clark announced the introduction of Interactive WhiteBoard funding (minus cash for associated teacher training). I saw the launch and demise of the Government's educational ICT agency BECTA. I jumped for joy when the Laptop for Teachers and the Home Access to Technology projects were launched (I was working for Toshiba). I enjoyed the heady days of the Building Schools for the Future programme and I remember when Michael Gove announced the 'reform' of the ICT National curriculum.

But the rest of the ministerial speeches and announcements have passed me by, not only because they said so little, but also that these politicians appeared to have little idea about the meaning of the weasel words from their speechwriters. Someone once said that listening to a Ministerial BETT speech "was like listening to a three year old reciting Shakespeare". Such is the standing of politicians at BETT. There was a time when a BETT ministerial address was not to be missed. No longer. You wouldn't cross the road for one, never mind brave the crowded Tube or DLR to get to ExCeL"

I have fond memories of the cramped and crumbling environment at Olympia, the growing international audience, the move to ExCeL with its exorbitant hotel prices, the crappy wifi in the early days, the BETT awards and the growth of the parallel Education World Forum and influx of education Ministers from around the world.

There was a time when England was seen as THE world leader in the use of educational technology for teaching, learning and assessment and other countries were anxious to visit, look, listen and learn. We had a national "Harnessing Technology" strategy, a National Agency, BECTA, ring fenced funding for ICT and a regional network of support within local authorities, broadband consortia, as well as several membership communities of practice.

Sadly those days have gone and will not be coming back. Credit to the owners (several in my 20 years) and organisers of BETT who, throughout all those years and changes have tried to maintain a commitment to learning and the sharing of knowledge and experience of teachers and learners at the heart of BETT.

But it has been a challenge to balance the profit and pedagogical tightrope of this glitzy extravaganza. There was some concern in the last few years that most of the big presentation slots were going to sponsors who had the biggest budgets and slickest PR set-ups. There was also concern that the cost of the stands was becoming prohibitive, especially to the small start-ups, one-person bands, membership and voluntary organisations and education charities.

The emergence of the BETT Futures zone and projects like EDUCATE has been refreshing. However, the big boys still dominate and one EdTech name is reported to have paid £250K for its presence this year - and they do not sell anything. I suppose it's not surprising in these days of venture capitalists that BETT organisers keep their financial accounts in the Cayman Islands.

Another trend, which has been worrying, is the cavernous spaces taken by education ministries of oil-rich Middle Eastern countries. These are big empty spaces not designed to share knowledge of Edtech, but purely to recruit teachers from UK and Europe. This year new stands from China and Russia also made an appearance.

This is undoubtedly profitable for BETT but surely something of a mission drift from the original aim and purpose of the show?

One thing that has evolved over the years has been the quality and diversity of the freebies. Gone are the days when a pen and a dip into a box of Quality Street would attract the attention of crowds. Companies have also learned to be a bit more sophisticated in their engagement strategies, but it is always amusing to walk around the show in the half hour before it opens to see the organised warm-up sessions to energise the T-shirted troubadours employed to smile and establish eye contact and suck you on to their stands. And it is always funny to see them compete for who is going to have the biggest brightest stand and loudest PA system.

Some things never change.

One of the consistent themes of the last 20 years has been the passion of teachers and their desire to learn from each other as well as the companies selling stuff. They are hungry to hear about how they could improve teaching, learning and assessment using technology. And to their credit the

organisers have realised that this is the pumping heart of the show and the seminar sessions in the Schools, SEND and Post 16 Theatres, which I was privileged to host, were as rich and lively as they have ever been. The days were full of back-to-back sessions where teachers from across the globe shared what had worked for them and were willing to share that with others - for free, even though some of their efforts were then sponsored!

In Olympia the seminars always felt like a bit of a side show, an add-on and a platform for politicians to sound like they were not only interested in what was going on but that they were going to do something about it. Some did but most didn't, especially now!

Although this year Damian Hinds did announce a very modest £10m investment innovation fund (modest in comparison to the overall BETT spend,) some EdTech roadshows by BESA and a LendEd scheme where schools can trial technology products before they buy. That may be being a tad optimistic given schools are struggling to cope with budget cuts which limit their ability to keep things going, let alone invest in new kit or workforce skills. Still all journeys start with small steps.

One of the benefits of the move to ExCel is that the learning is in the heart of the show. In fact the main BETT arena is the epicentre of the hall and the heart of the show. The other constants and heartbeats of BETT are the friendships, networks, communities and personal contacts that have grown over the years despite the domination of the money people.

The disconnect between UK policy makers and those educators and industry people who understand that technology alone can never change learning and teaching – that pedagogy is the key – has grown. So much so that some business leaders have a far better grasp of what is required than our own education ministers. That would have been unthinkable 10 years ago.

Yes BETT IS a trade show where companies want to sell you stuff - but to think it is only that is to miss the point. It is the people who make BETT, not the salespeople necessarily, but the educators from across the globe who want to learn and share their understanding of what needs to change and how technology can help.

It is for that reason I have already got 22nd-25th January in my diary for my 21st BETT. Will I see you there?

Bob Harrison

Bob has extensive experience in schools and colleges as a teacher, lecturer, senior manager, Principal and Governor. He has worked with Head teachers and senior leaders in developing leadership skills for the National College of Teaching and Leadership, advised DfES on the FE Principals Qualification and was lead on Digital Futures for the Building Schools for the Future Leadership programme. Bob is also Chair of Governors at Northern College and Vice Chair of Governors at a Trafford school.

Bob is an Honorary Life member of CGLI for services to Vocational Education advisor and a Fellow of the RSA. He was Toshiba's Education and was also a member of the British Computer Society/Royal Academy of Engineering working group which redrafted the ICT National Curriculum.

Bob serves on many boards and advisory groups including the Ufl Trust, YMCA Training and Awards, the BIS FE and Skills Area based review advisory group. He is a Fellow of the Royal Society of Arts and is a judge for the BETT Awards and TES FE Awards. www.setuk.co.uk twitter @bobharrisonset

Becoming a ComputingTeacher

Christina Preston

Christina Preston, MirandaNet Fellowship

We interviewed a Computing teacher who took up this subject in a secondary school in middle age following the SCITT route.

I decided to try teaching after 20 years in the EdTech industry when research into the use of digital technologies in schools gave me an opportunity as an adult to observe how schools worked. I was intrigued.

I did consider applying for the BCS Scholarship but the coding question put me off, as they were clearly prepared for candidates with Computer Science degrees. I felt that it was unlikely that I would have qualified for the scholarship. For someone who wanted to teach computing and had experience in the business, the BCS route was clearly aimed at subject specialists, (a logical step.) For someone who did not have a coding background, it was pretty intimidating. More KS5 than KS3, that's for sure.

I actually think that this approach should be re-considered as there is plenty of anecdotal evidence that coders don't necessarily make great teachers. My view is that what's more important is teachers who have the aptitude to teach and who are willing to learn. The subject knowledge comes second to this, against all the research. The subject knowledge has to come secondary where there is a drought in the subject area. Perhaps a more guided pathway through KS3 to KS4 to KS5 might yield better results. Indeed subject specialists can find the drop to KS3 frustrating; they are used to operating at a much higher level with like minded people with a passion for the subject. If you are teaching thirty kids who just don't care, can you actually teach them anything if you do not have excellent teaching skills?

In this context I have no regrets in choosing the SCITT route. I already had a first degree and a Masters and so the School Centred Initial Teacher Training (SCITT) salaried route made sense.

With my experience in companies my technical skills and understanding of design and application were good. But, of course, I started in school with no practice in teaching and no knowledge of the computing syllabus or coding.

The first year was nearly too much with so much observation, reporting and paperwork. I found the pressure very intense. The combination of the administration, cognitive load and the relentless nature of the work was tough. Never in my professional life had I had so much to learn and was under so much observation - at one third of my previous salary! On reflection, it has put me in great shape for the subsequent years.

But the constant observation is difficult, the sense of vulnerability takes time to get used to. As a forty something guy from a corporate background it can be hard not to start getting a bit defensive when you are being given feedback. Especially when you know you are, at this stage, a bit rubbish!

The documentation for the SCITT year can also be overwhelming. You have to provide evidence for every standard and sub standard. Alongside preparing lessons you are focusing on all the different elements and techniques. If you have never taught before you do not realise how much is involved in managing a classroom, Assessment for Learning, Behaviour for Learning, Special Needs requirements, gifted students, differentiation, task management, scaffolding, pace, challenge, accessibility and so on. The timetable is reduced but soon ramps up.

Nevertheless, the endless paperwork in the first year helped with the transition to the NQT year. The Newly Qualified Teacher (NQT) year has proved easier. Those who are struggling through their first year might like to look forward to the improvements. Teaching Computing gets easier in the second year as there is familiarity with the subject, the routines and the school environment. I was lucky enough to stay at the school I trained with. I knew a lot of the students' names, my way around the school and the systems.

In the NQT year there is also less cognitive load, as you have done this before. The syllabus gets more manageable because, unless there are any significant changes, you have taught the units before and you can adapt and change from experience.

I've also reduced the variables by staying at the same school where I trained which has probably made the transition easier. I was pleased, however, to have had experience in my first year in another very different school.

During these training years mentoring has been a valuable source of reference throughout by my own Department Head and an external mentor from other school.

Image Credit: Abington Free Library and Roslyn Branch CC BY NC

Now that I am trained I can see the challenges that our school has to deal with in making Computing attractive to enough pupils. In our computing department there are only two dedicated teachers and four teachers who teach other subjects as well to cover all 2,000 learners. To put it in perspective the English and Maths departments have about 15- 20 teachers. Teaching has most impact when you know the children well. However, frustratingly, at KS3 we only see the students once a week. This does mean that I teach a very high volume of KS3 students, about 250, and it can take time to get to know the students and for them to build up their skills in the subject.

This short interface with children slows a learning relationship, less so at KS4. Although, ironically, I will have taught a large number of students in the school and know some of them very well. I'm very glad I have had a tutor group from year 7 in my NQT year. This helps with the pastoral side of teaching and helps with the more general challenges of school life.

One source of support has been Computers at Schools (CAS). I have attended a couple of events and training sessions. Sometimes I access CAS emails and use the resources occasionally. Of course, I would like to be involved more but I am so very time poor and it is difficult to get released from teaching commitment. Evenings also tend to be school related, catch ups, school groups, faculty time, all school meetings, year group meetings, parents evenings, marking and simply preparing for lessons. Finding time to squeeze events elsewhere is virtually impossible.

Although I love the teaching, having come from the business world, the technology in schools can be very dated. This is exacerbated by the general lack of money available in schools to keep pace with the ever changing technological landscape.

We find that the Computing syllabus is too big (OCR) and results in lessons being very delivery focused. There is simply not enough time to give students the freedom to experiment. Indeed, calendar limitations mean that the lesson time becomes very pinched and you can find you have to rush and cram to cover all the elements in the syllabus. This is compounded by the need to spend 20 hours on a personal project that contributes nothing to the final exam. It did, but came with too many challenges to be controlled - the power of the internet and information being a major factor.

We now start the curriculum as early as Year 9 so that there is less pressure at Year 10 and 11. We have to use an element of Streaming at Year 9 as a broad brush. However, any pupil who wants to study GCSE Computer Science is moved into the computing classes. They would be at a disadvantage at KS4 without the base learning in KS3.

Non-exam Assessment (NEA) has been scrapped due to issues with internet, cheating and fair teaching. It is now a programming project, which we are using to help teach some of the core subjects for the exam. We start year 10 with the project and this has been really useful and helped teaching the theory later down the line as preparation for Paper 2: programming. But in reality it's a tough sell – 20 hours of work impacts on teaching the curriculum and has zero impact on the exam. We took a day off timetable to simply save us 2 weeks of time. One day is 5 periods, we see the students 5 times over two weeks.

There is pressure on results and it is hard for this not to impact on teaching, there is only so much time at KS4 and easy to default into teaching to the exam as the answers required are quite specific. KS5 offers more scope for discussion and investigation. As is the irony, the students tend to remember the tangents and off topic conversations that get used in answers in the exam but yield no marks,

If the authorities are worried about the NEA, it is pretty obvious if a student has copied code and produced work that is not theirs. They cannot interpret or correct the code. Why not give them code and ask them to adapt, fix and annotate the code and their changes? They all have a baseline to work from and it is their commentary that shows knowledge. This should flush out plagiarism pretty quickly.

It is a concern that very few girls want to undertake CS GCSE cohort Y10 out of the 60 pupils we have. Similar to competitive sport, computing is not cool. Girls tend towards the more creative subjects.

We try to counteract this trend. We show videos of successful women in the coding and tech business, demonstrating women in tech is a cultural norm. We do need more role models. That said, the subject is increasing in popularity and girls are better represented.

To further increase the popularity of the subject we have dropped coding into Year 7, Python Turtle, using simple commands to draw shapes and colour them. The code can become very complex very quickly and the students almost don't realise they are coding. The students do love the instant gratification running the code and seeing shapes appear. We can get to the students early enough to remove the geek factor of coding. However, once a week at KS3 is hardly embedding learning.

There is now tangible evidence that in Humanities and Science at university they will need to have some basic coding skills. Python is commonplace for data analysis, creating hypothetical models and is prevalent in the workplace.

The issue is the perception of the subject. Computing is still seen as a subject where the students 'play' on computers. We see them once a week, less than Design and Technology, and the same as library session. The students just see the lesson as a 'bit of a doss' subject. Because this is a lesson where they are at the computer, it is often used for addition tests, reading tests or low ability students are taken out for 1 of the 2 lessons over the 2-week timetable. This has a huge impact on learning. You miss one week and it sets you back and can impact on the plan for the year. It takes us 7 weeks to cover a topic that could take English a week and a half. If you knock out 1 lesson we then have to move to a new term.

Changing attitudes to computing

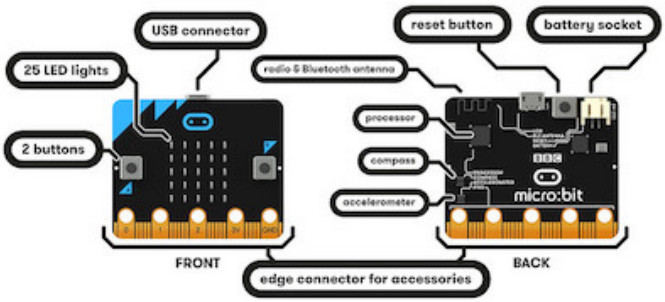
On a strategic note, being honest, I do not think there will be change in schools about the importance of Computing unless it carries the same weight as Maths or English. In a recent YouGov survey, parents saw computer science a

Image Credit: Abington Free Library and Roslyn Branch CC BY NC

the third most important subject after Maths and English, as it used to be under the Labour government curriculum before 2010.

Schools are simply not environments where technology or the use of it is on the agenda generally or can be afforded. Upgrading equipment, networks and keeping on top of the network requires money, skills and expertise. Can schools be expected to afford the equipment and the people at the right level? Schools are relatively cocooned from the way technology is moving and the speed of the movement. A generally out-dated perception of Information and Communications Technology (ICT) sees the subject as a means of teaching Microsoft Office applications, but Computing is now a science including theory and practical.

But this news has been slow to spread. That said, the subject does seem to be growing in popularity, perhaps the pressure will increase from the bottom up?



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Issues

New technologies are raising issues of mental health in children and young people. Do they also offer solutions?

John Galloway

The internet is having an effect on the mental health of children and young people in this country. As recently as January 2019 Matt Hancock, Health Secretary, was warning social media companies that he would use legislation to act against them if they didn't do more to remove inappropriate content and protect children and young people from harm.

"It is appalling how easy it still is to access this content online and I am in no doubt about the harm this material can cause, especially for young people. It is time for internet and social media providers to step up and purge this content once and for all." (The Guardian, 26th January 2019, https://www.theguardian.com/politics/2019/jan/26/matt-hancock-facebook-social-media-suicide-self-harm-young-people) .

Such concerns are not new, as a quick Google search reveals, and, at times, can seem to be over-stated, perhaps over-simplified, by the press in order to enhance the story. Someone's online activity may be thought of as a reflection of their mental health, as an indicator of their state of mind, rather than a cause of their anxiety, although it could be difficult to disentangle the relationship. Certainly there are academics who suggest that new technologies are contributing to an increase in teenage suicides, now the number one cause of death world-wide for that age group.

Jean Twenge, Professor of Psychology at San Diego State University, writing in the Guardian last year, says that between 2010 and 2015 teenage suicides in the US increased by 31%, and that during the same period smartphone ownership in this age group grew to more than 50% in 2012 and 73% in 2015.

Not only did smartphone use and depression increase in tandem, but time spent online was linked to mental health issues across two different data sets. We found that teens who spent five or more hours a day online were 71% more likely than those who spent less than an hour a day to have at least one suicide risk factor (depression, thinking about suicide, making a suicide plan or attempting suicide).

Overall, suicide risk factors rose significantly after two or more hours a day of time online.[5]

Other concerns about young people's mental health and the internet include cyberbullying and easy access to websites detrimental to well-being, such as those encouraging self-harm and eating disorders. However, as we all know, the internet can also be a powerful force for good, providing routes to find people and resources that can offer support.

A Wikipedia article on 'Social Media and Suicide' quotes research that found, "Although, the public opinion is that message boards are harmful, the following studies show how they point to suicide prevention and have positive influences." It goes on to quote studies showing that the vast majority of messages on social forums are supportive and opposed to suicide, and that "the users of such forums experience a great deal of social support and only a small amount of social strain." (https://en.wikipedia.org/wiki/Social_media_and_suicide accessed 24th February 2019)

Beyond forums there are other ways in which the internet can provide support for those experiencing a range of mental health issues, which in many ways are welcome, given how difficult it can be for children and young people to get the services they need. In November 2018 The Guardian reported that nearly 40% of referrals to Child and Adolescent Mental Health Services (CAMHS) in England in 2017 were turned down. Given that making a referral in the first place requires the subject to already have met a pretty high threshold of concern, this is very worrying. There will be many more who will not have been referred also in need of help. (https://www.theguardian.com/society/2018/nov/21/uk-teenagers-turn-to-mobile-apps-to-help-with-mental-ill-health November 22nd 2018)

One response has been to create web spaces and apps that can be used directly to address concerns. Amongst the latter are Calm Harm (www.stem4.org.uk), and Clear Fear (https://www.clearfear.co.uk), both of which are designed to work in similar ways. Installed on a smartphone (including iPhones) these offer practical approaches to immediately cope with the issue – for instance, in the case of self-harming, to apply a plaster to the body part they are thinking of hurting, a means to contact a personal support network, and the capacity to log when these behaviours arise, along with notes about potential triggers.

[5] (https://www.theguardian.com/society/2018/may/24/smartphone-teen-suicide-mental-health-depression May 24th 2018)

There are also websites set up to connect with other people, including counsellors and therapists. Both www.kooth.com and www.meetwo.co.uk are designed as places where young people can post their concerns and get responses, not only from peers, but also, when necessary, from trained counsellors. Messages are moderated so only positive responses are ever posted.

Another approach is to help young internet users to understand the issues presented when online and to take charge of dealing with them, themselves. The BBC have created www.bbc.co.uk/ownit providing advice through text and videos from a mix of experts, but perhaps more importantly, from children and young people themselves, including regulars from television shows, or with an established Youtube presence. Under sub-headings that include 'Take Control,' 'It's Personal,' and 'Don't Panic,' topics including cyber-bullying, getting messages from strangers, and reaching out to others when you are worried, and all covered in an easily digestible format.

A further step technology might be able to take is to actually provide the therapist. Since the early days of artificial intelligence computers have been trying to imitate counsellors. One of earliest attempts to meet the Turing Test - the challenge to create a program whose responses are indistinguishable from a human (https://en.wikipedia.org/wiki/Turing_test) – was Eliza, which was based on Carl Roger's approach to counselling. Here the therapist summarises and reflects back to the client the concerns they raise. An algorithm analyses the respondent's dialogue and gives replies based upon them.

There have been several iterations of Eliza (such as https://www.masswerk.at/elizabot) which can be amusing to try out but are somewhat wanting as therapeutic tools. More useful is Ellie from the University of Southern California Institute of Creative Technologies (http://ict.usc.edu/prototypes/simsensei with a good overview here https://www.youtube.com/watch?v=ejczMs6b1Q4&t=130s) who could be seen as a relative of Eliza in that she works off an algorithm determined by the human subject's responses. However, here it is not just language that is analysed, but also facial expressions and body language. In some instances, talking to Ellie has been preferred by 'clients' to an actual therapist, for instance amongst US servicemen suffering from PTSD, who were wary of being open with medical staff in case issues revealed were passed on because of military protocols. Ellie, herself, is an avatar, who responds with body language as well as words, for instance echo postures, or leaning in to improve engagement.

Similar AI systems drive Woebot (https://woebot.io), an app which uses the principles of cognitive behavioural therapy (CBT) to not only offer support when issues arrive, but to proactively prompt discussion, with daily checks on how users are getting on, and short video clips offering coping strategies even when all is well.

Whilst technology is beginning to offer resources to address fundamental mental health issues, it is not yet in a position to replace human therapists, according to some of those who would be under threat. In a report entitled, 'Why Therapists Aren't Worried Robots Will Come For Their Jobs,' Vice News asked several to review a transcript of a session with Woebot (https://youtu.be/AE966uR09es). They felt that aspects such as 'unconditional positive regard,' and 'empathy,' along with the essential rapport of a 'human-human connection' could not be replicated electronically. Whilst this may true, if new technologies are leading to the development of mental health issues in children and young people, then it is unsurprising if we also look to them to provide answers.

John Galloway

I am a specialist in the use of technology to support the inclusion of children and young people with special educational needs and disabilities (SEND) in the curriculum. My work covers all phases of schools and learners with a very broad range of SEND. Along with providing advice and assessment for children with SEND, both groups and individuals, I also provide and run projects in classrooms. I work part-time for Tower Hamlets, as well as consulting and writing more widely.

What's the problem with online safety?

Rob Ellis

When I first started doing online safety work more than 10 years ago, it was clear that new technologies bring problems for the very reason that they are new. Before users can interact safely with them they have to understand the nature of the technology. Much of what I write here is about parents but the principle applies to most groups of people, including teachers and young people themselves.

The first issue I encountered was that people didn't know what they didn't know. This would manifest itself, and still does to a degree, in empty meetings. Parents whose children were all well drilled in the rule of not talking to strangers would not take part not, I believe, because they didn't care but because the issue did not resonate with them or their experience. One father who did attend told me he didn't anticipate problems because his family lived miles from anywhere, unaware that physical distance was no longer something that enhanced safety. It is interesting to hear parents talk about how, in the physical world, they will always ask their children where they are going and with whom and set time limits for coming home but never ask the same questions when their children go online.

Where do we get our safety messages from? Largely they are built up from interactions with previous generations, but if those generations have no background in the new technology, (and how can they), the resource bank of good advice is not there. Additionally, if an older generation sees young people operating with confidence, even if that confidence is misplaced, they will be reluctant to challenge.

Much of what is reported happens to the young, perhaps because of the quite justified emphasis on grooming, but that is not to say that they are more likely to do something risky out of any lack of understanding. I have a wonderful slide I use that says, "The best part about being over 40 is we did most of our stupid stuff before the internet!"

I have had parents recount to me, stories of purchases of non-existent items, for instance a car. This latter was an advert on a reputable website but with a link to a criminal one. This example reminds me that with all the attention quite rightly paid to person to person interactions considerable harm, physical, mental and financial can come from an inability to assess the validity of internet content. This skill set is not much in evidence in schools.

In trying to get to grips with the new phenomenon that is the world wide web we are left to use the vocabulary that we had before but to apply it to something that is very different. Perhaps the best example is 'friend'. Where once we had two or three, we might now have hundreds but what happens if we try to behave in the same old way with them over distance, having never met physically, (or matured the relationship). There are many other examples. This sort of scale also gives rise to risk when, say, sharing comments or images, that might once have been the property of a small circle, with all those online 'friends'.

There are times when a specific application or website has created specific problems that need solving, but given the speed at which these things come and go, perhaps more focus should be on safe behaviours in a general sense rather than on the features of say, Facebook, Instagram or Snapchat for example.

Finally, if negotiating a safe route through the hazards of online wasn't enough, we now have to cope with the fear created by spoofs (like a certain all too well publicised incident). Current advice received from the Safer Internet Centre says that schools are best advised not to refer specifically to alleged threats lest this enhances their reputation but rather to remind people that if they have fears about anything to go to a responsible person to talk about it.

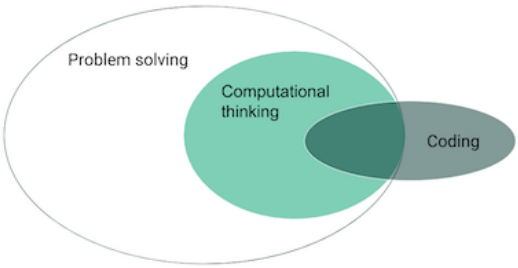
Rob Ellis

Rob has wide experience in education having been a teacher for 30 years leading mathematics, history, computing, data management as well as pastoral care for 100 children. At one point these responsibilities were simultaneous. While teaching and working for his LA as Educational Transformation Project Manager and advisory teacher for mathematics, he worked on a number of national research projects before working independently with schools, local authorities and private companies in the education sector.

Curriculum

Revisiting computational thinking

Miles Berry



'Computational thinking' is seen as the golden thread running through England's computing curriculum and its development provides a key argument for the (re)introduction of programming into education systems across the world. In England, the computing programmes of study open with the ambitious view that,

> *'A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world.' (DfE 2013)*

Other jurisdictions emphasise the importance of problem solving in computing education, recognising that, whilst not every student will end up as a software engineer or computer scientist, teaching everyone to program will help them to develop as computational thinkers, and that this is something that will be useful for everyone. As Jeanette Wing argued back in 2006:

> *'Computational thinking is a fundamental skill for everyone, not just for computer scientists. To reading, writing, and arithmetic, we should add computational thinking to every child's analytical ability' (Wing 2006).*

More recently, the OECD's Andreas Schleicher has cast doubt on the global movement to teach 'coding', but nevertheless argued that he would be much more inclined to teach data science or computational thinking than to teach a very specific technique of today (Turner 2019). This emphasis on 'computational thinking' is even reflected in current arrangements for assessing computing at GCSE, where actual coding, although a formal requirement of the specification, carries no marks, although 50% of the grade is given for 'computational thinking, algorithms and programming' (OCR 2018).

Given, then, the centrality of computational thinking to computing curricula and assessment, it would be reasonable to expect some clarity about what this is, and perhaps even some consensus around how it might best be taught in schools. Unfortunately, I fear there remains confusion over what computational thinking is, and thus there are ongoing issues over how it should be taught. I'd like to use this short article to address these issues. Back in 2006, Wing gave a definition of computational thinking:

> *'Computational thinking involves solving problems, designing systems, and understanding human behaviour, by drawing on the concepts fundamental to computer science. Computational thinking includes a range of mental tools that reflect the breadth of the field of computer science ' (Wing 2006).*

Unfortunately, this idea of taking the ideas of computer science and applying them to other domains is rather too vague to be of much practical use: we end up with little more than 'problem solving skills' with some connections to the concepts of computer science. Regrettably, this sort of vague interpretation of computational thinking was the one picked up by the Royal Society in the Shutdown or Restart report:

> *'Computational thinking is the process of recognising aspects of computation in the world that surrounds us, and applying tools and techniques from Computer Science to understand and reason about both natural and artificial systems and processes.' (The Royal Society 2012, p29)*

An understanding of the principles of computer science gives us a better understanding of, well, computer science. It doesn't, on its own, make us any better at music, history, or physics, or generic problem solving. To get better at music, history or physics, study music, history or physics respectively. As Tedre and Denning argue,

> *"Computational thinking […] offers very powerful mental tools for people who design computations. There is no need to make exaggerated claims—notably automatic transfer of CT skill across domains or about superiority of CT over other ways of thinking and practising".*

Mark Guzdial goes further:

> *'The challenge to computational thinking is the problem of knowledge transfer. Applying computing ideas to facilitate computing work in other disciplines is clearly achievable. Applying computing ideas in daily life is less likely. There has not been a study since Wing's 2006 paper that has successfully demonstrated that students in a CS class transferred knowledge from that class into their daily lives.' (Guzdial 2016)*

That's not to say that computer science doesn't offer particular insights into other domains: of course it does, as witnessed by advances such as generative art, the digital humanities and computational science. But these advances haven't come about merely through the application of the principles of computer science to these domains, they've come about by actually using computer programming to solve problems in these domains. It's this, I think, that's key to a proper, and useful, understanding of computational thinking. In short, computational thinking without computation is just thinking.

More recently, Wing has adopted a rather more helpful definition of computational thinking, which sites computational thinking within the broader territory of problem solving, and recognises that computational thinking is distinguished from other approaches through its solutions being ones which computers can carry out:

> *'Computational thinking is the thought processes involved in formulating a problem and expressing its solution(s) in such a way that a computer—human or machine—can effectively carry out.' (Wing 2017)*

The key then in computational thinking is looking for solutions to problems that are automatable: that could be carried out by a machine, or perhaps by people acting as machines. To take one common example, it's not computational thinking to come up with a recipe for jam sandwiches, but it is computational thinking to come up with a way of making jam sandwiches which can be implemented by a production line, whether that's staffed by robots or people.

Finding solutions to problems that can be automated is a rather more modest vision for what we should be teaching, but it's still really quite important - there's hardly any domain of study or employment where computers aren't already helping us to get previously hard things done more easily and providing new insights and creative opportunities. Computational thinking of this sort really does help here. Furthermore, it gives teachers something they can practically teach and assess: teaching computational thinking becomes less about making sandwiches and more about thinking how to write a program to solve a problem; assessing it becomes less about parroting definitions, non-verbal reasoning puzzles or spotting patterns and more about writing programs that solve problems.

I think the relationship between problem solving, computational thinking and coding looks a little like this:

Not every time we try to solve a problem are we looking for a solution that can be automated (indeed, automating solutions to problems seems to be frowned on in much school mathematics these days), but sometimes we are, and it's on those occasions that the processes of computational thinking come into their own. When we actually do implement those solutions on a computer, typically we're writing code, i.e. instructions that both the machine and the programmer can both understand. I deliberately use the word 'coding' here, rather than 'programming', as the latter should be seen as including the computational thinking necessary to work out how to solve the problem: i.e. programming is algorithm plus code. Not all coding is inside the computational thinking hoop here. Too much of the time in school I fear we try to teach coding without the computational thinking that should come before it. Children simply follow the steps they're given, or just tinker aimlessly with blocks. In those circumstances it's no surprise that just learning to 'code' has little, if any, impact on what might be assessed as computational thinking (Pea 1983, Straw 2017).

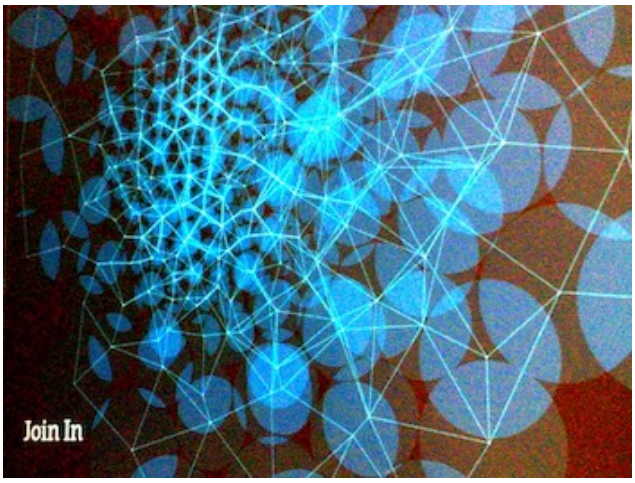


Image credit: Garnet, CC BY NC

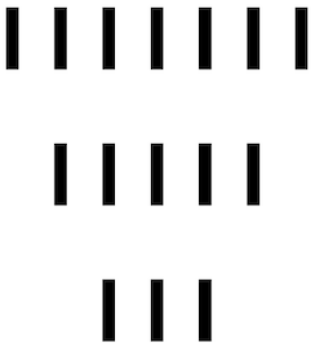
Barefoot Computing and others have attempted to break down computational thinking into a number of concepts, approaches or processes. Typically, these lists include decomposition, algorithms, patterns and abstraction. All of these are of direct importance in computer programming, and thus the computational thinking necessary to find an automatable way of solving a given problem. They also occur in other contexts too, away from computer programming. Perhaps in keeping with Wing's earlier notion of applying the fundamental concepts of CS to other domains, or perhaps because teachers want their pupils to understand these aspects of computational thinking, these

often get taught in isolation. Thus, for example, pupils might learn about decomposition as the different parts of a plant, algorithms as the sequence of steps they follow to make toast, patterns in nursery rhymes and abstraction as the storyboard for a film. These are all well and good as ways of giving pupils some grasp of these individual ideas, but they're really quite unsatisfactory as examples of computational thinking, as none of them result in the solutions to problems which could be carried out by computers, and finding these sorts of solutions is what computational thinking means!

The point of teaching concepts such as decomposition, algorithms, patterns and abstraction is not that these can be applied to solve problems in other domains or in everyday life, but that they help us to write programs, and it's those programs that can (and should) be applied to solving problems in other domains or in everyday life. Consider a simple turtle graphics problem such as drawing this:

To write a program for the turtle (or someone acting as the turtle), you need to break down this complex shape into component parts (12 squares, or perhaps three window frame like structures), recognise that each component can be drawn using the same pattern of instructions, identify the algorithm for drawing each, and work at an appropriate level of abstraction (programming the turtle, rather than worrying about colour values for each pixel on the display).

Or writing a program to play the game of Nim (players take turns to remove 1 or more matches from a chosen line, aiming to take the last match themselves).



Again, the concepts of computational thinking can be applied directly here: we might decompose our approach to create a model of the game and its rules, a way to display the board at any point in the game, and a way for the human player to selecting their moves. We'd might explore the patterns in winning moves, using these to establish the algorithm the computer should follow to play these moves.

We'd use abstraction to recognise that the position of pieces within a row is irrelevant, as is the order of the rows. It's hard to see how you could program the computer to play Nim without drawing on these ideas.

This approach to teaching the elements of computational thinking: holistically, to solve a problem, and with a program as the outcome, seems much more practical than attempting to teach each in isolation, and, I suspect, is also likely to result in pupils who become that little bit more competent at programming. Will teaching computational thinking this way make pupils any better at music, history or physics? Well, probably not, but I don't really think the other way would either. At least this way, they might stand a good chance of taking some problems from music, history and physics, and then writing decent code to find solutions to them.

References

DfE. 2013. The national curriculum in England. July. London: DfE.

Guzdial, Mark. 2016. Learner-centered design of computing education: research on computing for everyone. Williston, VT: Morgan and Claypool.

OCR. 2018. GCSE (9-1) Computer Science J276. Coventry

Pea, RD. 1983. Logo programming and problem solving. In American Educational Research Association, Chameleon in the Classroom: Developing Roles for Computers. Montreal, Canada.

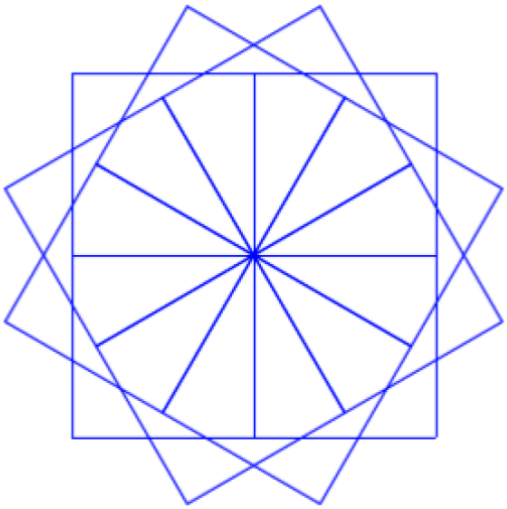
Straw, Suzanne, Susie Bamford, and Ben Styles. 2017. Randomised Controlled Trial of Code Clubs. Slough: NFER.

The Royal Society. 2012. "Shut down or restart?" January. London: The Royal Society.

Turner, Camilla. 2019. Teaching children coding is a waste of time, OECD chief says. https://www.telegraph.co.uk/education/2019/02/21/teaching-children-coding-waste-time-oecd-chief-says/

Wing, Jeannette M. 2006. "Computational Thinking." Communications of the ACM 49 (3):33–35. https://doi.org/10.1145/1118178.1118215

Wing, Jeannette M. 2017. Computational thinking's influence on research and education for all. Italian Journal of Educational Technology 25 (2):7–14. https://doi.org/10.17471/2499-4324/922



Miles Berry

Miles is principal lecturer in Computing Education at the University of Roehampton. Prior to joining Roehampton, he spent 18 years in four schools, much of the time as an ICT coordinator and most recently as a head teacher. He is a board member of Computing At School, the BCS Academy of Computing and the CSTA. He is a fellow of the BCS, RSA, HEA and Chartered College of Teaching, and a member of the Raspberry Pi Foundation. He served on Naace's Board of Management, including asChair in 2012-13.

Over the years he has contributed to a number of computing related projects including the National Curriculum Computing Programmes of Study, Switched on Computing, Barefoot Computing, QuickStart Computing, CAS TV, Project Quantum, Hello World and the National Centre for Computing Education.

He gives regular keynotes and CPD workshops on computing and education technology in the UK and abroad and has worked on a number of international consultancy projects involving technology-enhanced learning, curriculum development and CPD.

Why don’t schools put touch-typing on the curriculum?

Sal Mckeown

In an age of voice recognition why are we still interested in touch-typing? These days anyone with a smart phone can dictate their thoughts and notes and produce reams of text at super speed. Even more importantly, phones don't come with a stonking great keyboard, so why are people still talking about touch-typing?

Voice to text has its limitations. Most people find it hard to dictate notes from scratch, so voice recognition works best if they are dictating hand-written notes onto their phone. You need good wi-fi and a quiet environment, which is why it is not widely used in offices and classrooms and, even if you use it every day, it is not necessarily especially accurate.

True, none of the words will be misspelt but like most technology it lacks common sense so some sentences will be ludicrous. Recent examples from my own notes include, 'She seems to have a bouncing Asda' – (a bounce in her step), 'She played windy in Peter Pan' (I don't know if I was trying out accents then) and I am still trying to work out why some notes on the BETT awards contain the sentence, 'Hello I'm all in puce'.

I use both voice recognition and touch-typing and have an extensive collection of some 500 shortcuts on AutoCorrrect in Office because I don't want to type physical disabilities if I can get away with PD and why write out in full the title of my book How to Help Your Dyslexic and Dyspraxic Child when H8 will do the trick?

At the recent ERA awards someone mentioned Mavis Beacon. This is so retro it is now a free download and gets mentioned in nostalgic blog posts about games children used to play. This led to a debate about touch typing which in turn led to this article.

I first became sold on touch-typing as a tool in education when I taught in adult education and worked with people who were blind or had very limited sight. It was so effective that we employed a typing teacher to teach basic keyboard skills to students who had dyslexia, physical disabilities or severe learning difficulties and not only were they delighted to be learning a new skill but their spelling improved too.

I noticed that away from the keyboard they would often be moving their fingers in patterns on the desk as they worked out spellings. Who knew that 'was' is a triangle and 'were' is three steps forward and one step back? They started to develop that muscle memory which most of us reserve for handwriting - that sense that you have made a mistake before you even look at what you have written.

Why do touch-typing when you can find your way round a keyboard?

People who do learn to type often say it's one of the best investments they have ever made. They can copy type, build impressive speeds, take notes while watching a video or listening to a lecture. Those who can't touch-type tend to be slower. Research by Pitman Training shows that people who type with two fingers manage between 27 and 37 words a minute, while someone trained to touch-type can reach between 50 and 70 words a minute. This matters when essays of 2,000 words are commonplace at university, as are dissertations upwards of 10,000 - and all have to be typed.

Over a lifetime, hunt and peck will damage the body because the writer is hunched over the keyboard rather than sitting back and looking at the screen. Occupational therapists reckon that touch-typing is one of the best ways to combat repetitive strain injury in later life.

Why don't we teach touch typing at school?

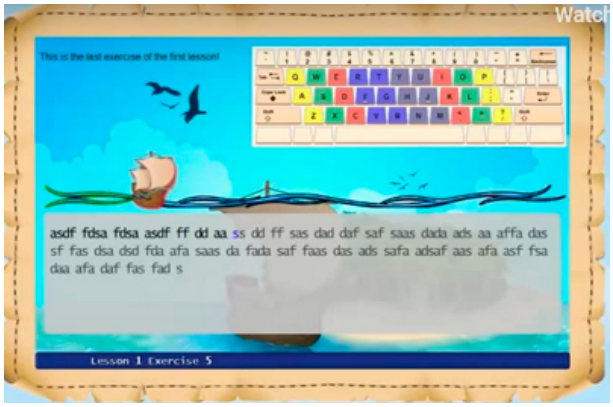
The short answer is because it is not on the National Curriculum. Typing is already on the curriculum in the US and several European countries, where it's seen as a basic skill and a few years ago the TUC campaigned for touch-typing to be introduced into British state schools but it didn't happen.

I wonder if this is because most of the people who make educational policy in the UK went to posh schools? It used to be that such people had secretaries and administrators and so would not need to use a keyboard. Doctors used to dictate patient notes for someone else to type up but these days every GP has a computer on the desk and is the person responsible for accurately recording patient information, symptoms and prescriptions.

Times have changed and, according to the Daily Mail Eton, is one of a number of elite schools bringing in touch-typing and Brighton College introduced typing lessons for pupils,

'after middle-class parents demanded it be put on the timetable[6].' Leah Hamblett, deputy head, told the Mail: "It's like teaching them to write without showing them how to hold a pen. The vast majority of our pupils will go onto university and then to a job that will require them to type. 'Why not give them the skill so that it is second nature, meaning that they can put all their mental effort into the actual task they are working on and simultaneously save an awful lot of time, not having to search around for keys?'

What can you use?



There are many programs out there and all have their fans so I will just mention a few. Some believe children should learn touch-typing as early as possible to help with literacy and these have primary appeal: Typekids[7] is an online touch-typing course designed specifically for young children. It has a pirate theme and rewards and incentives to keep young children on task;Ten Thumbs[8] for the Mac features Vikings, while Nessy fingers[9] teaches letters in alphabetical order and children practise new skills via games, with popular themes such as dragons, soccer and boats. It promises that children will learn all the keys in just five lessons.

English type sees vocabulary content from the National Literacy Strategy word lists and follows key stages 1-3 of the national curriculum. It is dyslexia-friendly and 'uses real words from Lesson 1, and does not use nonsense words or gibberish that can be very confusing, and even damaging, to literacy skills.'

Touch-type Read and Spell[10] is an online-access typing course recommended by the British Dyslexia Association based on the word lists of 'Alpha to Omega'. Users can customise fonts and colour schemes.

Winner of the Education Resources Award - Special Education Resource 2017, TTRS has 24 levels, each with 31 modules. Every 5th module is a 'dictation module' that helps combat short-term memory problems. The judges said: 'A simple idea that is very well executed. Having a strong theoretical background, with a clean interface and lots of flexibility in its presentation that can be configured to individual needs. A welcome update to a tried and tested resource.'

Kaz[11] was shortlisted for the Bett Special Needs Award 2019. The judges liked the idea of their Accelerated Learning Course that teaches the A to Z keys in just 90 minutes. Kaz uses both sides of the brain, a multisensory approach using sight, sound and touch and builds up muscle memory. Unlike other touch-typing products which are marketed for young children or for users with dyslexia, Kaz has embraced neurodiversity big time. With advice and guidance from the Dyslexia Research Trust (Reading Clinic and Oxford University) they have tailored their product to meet the needs of students with poor working memory, dyspraxia, autistic spectrum disorder and ADHD.

Impact on ICT

So much of the research around touch-typing has been about literacy - composition, transcription and learning spelling patterns - but it is becoming apparent that for those who want to work in the technology industries of tomorrow touch-typing has benefits.

Mark Dorling, former primary and secondary school teacher and founder of the Digital Schoolhouse project, knows that children love to learn how to code, as evidenced by the excitement they show on seeing "hello world" displayed on the screen. Children often first learn to code in block-based

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6 https://www.dailymail.co.uk/news/article-4550892/Leading-schools-touch-typing-timetable.html

7 https://www.typekids.com/

8 https://ten-thumbs-typing-tutor.en.softonic.com/

9 https://www.nessy.com/uk/product/nessy-fingers/

10 https://www.readandspell.com/

11 https://kaz-type.com/

languages like Scratch and Google Blockly, but can struggle to make the transition to a text based language like Python.

He acknowledges that there are many factors which can influence this but would like to see schools focus on teaching touch-typing as part of general studies or in a cross-curricular way, perhaps in English or Computing lessons. 'Many children I have taught over the years in primary said to me that proper [text] programming is hard and slow. We can't ignore the fact that students' typing speed could impact their motivation and need to take steps to remedy this.'

Prof. Marc Eisenstadt, Chief Scientist at the Knowledge Media Institute at The Open University agrees. He has seen at first hand the increase in productivity that touch-typing can bring to computer programming :

"I had observed students on Open University courses, and to my amazement I found that when it came to some difficult computer programming exercises in a Social Science course we had developed, OU students with a secretarial background progressed much better than those with technical/scientific/programming backgrounds! The reason was that those in the latter group were wasting phenomenal amounts of time hunting and pecking at their keyboards."

He introduced Kaz to the OU, where it is now embedded in many of their courses and encouraged a local primary school in Milton Keynes, where he is a governor, to adopt it: 'I challenge any teacher to walk around two groups of 10-year-olds, one of which can touch-type and one of which cannot, and note the difference: the former is busy building web sites and writing web-newspaper articles and blogs, while the second is hunting around the keyboard in frustration to get to the next step in some chore.'

How could you introduce it?

'Keyboard skills used as starters for ICT lessons can be fun and allow pupils to record their improvement in time taken and/or accuracy very easily,' says Jane Finch, teacher adviser ICT, at Worcestershire County Council, but if you cannot fit it into lessons, think about the beginning and end of days.

Typing's Cool[12] runs typing courses in independent schools. So for example, they run clubs from 7.45 – 8.30 and aim to teach children aged 8-16 to type at 10-30 words per minute with 95% accuracy in 10 sessions. While EnglishType says that post SATs is a popular time to run a curriculum course and for covering PPA time. It could also be a holiday course, perhaps to run alongside coding or as a way of reinforcing literacy and avoiding the summer slide.

Gill Grant from Bournemouth and Poole Colleges says: ' I have used Kaz in an after school typing class for junior children. It was very successful. One year 8 girl used Kaz at home and at school for several weeks and now has a typing speed of 56 words per minute. Very impressive!'

Kaz now has been accredited by City and Guilds so that learners can sit an assessment and get a badge that they can put on social media or their CV. The assessment consists of a multiple choice paper consisting of 15 questions covering posture, Repetitive Strain Injury and typing technique plus a three minute typing test lasting where the candidate needs to type at 35 words/minute, with an accuracy of 80%. See https://www.dyslexic.com/blog/kaz-types-new-city-and-guilds-assured-edition/

There will always be diehards who resent the time that it takes to learn the basics of touch-typing but just consider how many hours, and even years, we spend teaching children handwriting. It has many benefits - although fewer now than in the past, since in the digital age signatures have been superseded by passwords, email addresses and date of birth as forms of identity.

Many people never use handwriting these days and in a few years even more will use it just for their own notes and for condolence cards. Is it time we took a serious look at the role of handwriting in education?

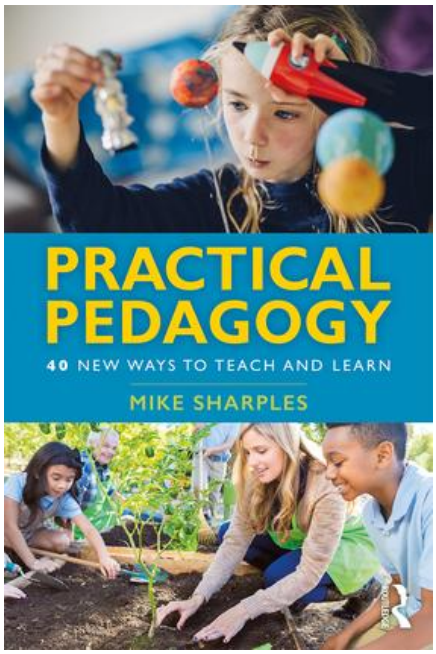
Sal Mckeown

Sal is a freelance journalist specialising in disability, education and technology. She writes regularly for Education Today, Practical Pre-school, Teach Secondary and Early Years Educator and is also a judge for the Bett and ERA awards

[12] https://www.typingscool.co.uk/]

Book Reviews

We do not hear enough about EdTech pedagogy so it is pleasing to announce two new books about pedagogy that Professor Mike Sharples has published.



Practical Pedagogy

The first is Practical Pedagogy that is based on the yearly publications Mike oversaw at the Open University. To be published in May by Routledge, the website explains that the book "aims to expand the universe of teaching and learning. It provides an accessible guide to new and emerging innovations in education, with insights into how to become more effective as a teacher and learner. New teachers will find a comprehensive introduction to innovative ways of teaching and learning. Experienced educators will be surprised by the range of useful pedagogies, such as translanguaging, crossover learning, teachback, bricolage and rhizomatic learning. Policy makers will gain evidence of how new teaching methods work in practice, with resources for curriculum design and course development.

Drawing on material from the hugely influential Innovating Pedagogy series of reports, this book is a compilation of the 40 most relevant pedagogies, covering:

innovative ways to teach and learn;

how pedagogies are adopted in new ways for a digital age;

evidence on how and why different methods of teaching work, including case studies set in classrooms, informal settings, and online learning spaces;

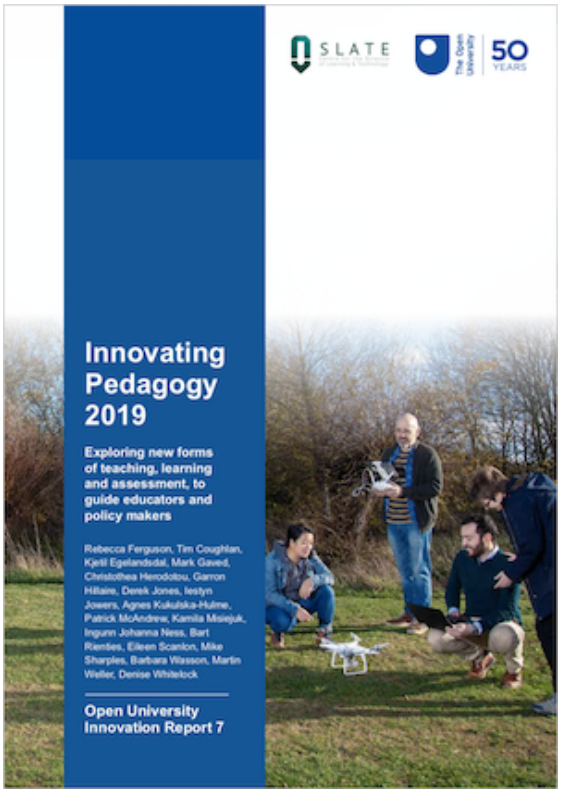
practical implications of the latest research into the science of learning, combining psychology, education, social sciences and neuroscience.

Organised around six themes – Personalisation, Connectivity, Reflection, Extension, Embodiment and Scale – Practical Pedagogy is a comprehensive source for teachers, policy makers, educational researchers and anyone interested in new ways to teach and learn.

Available here

Innovating Pedagogy 2016 Report

The second book we recommend is the latest edition of the Pedagogy Reports that are free:



Learning through design, analytics and failure: trends from Innovating Pedagogy 2016 report

The Innovating Pedagogy 2016 report from The Open University highlights ten trends to impact education over the next decade. These include Design Thinking, Productive Failure, Formative Analytics and Translanguaging.

The report also presents evidence to inform decisions about which pedagogies to adopt. The pedagogies range from ones already being tested in classrooms, such as learning through video games, to ideas for the future, like adapting blockchain technology for trading educational reputation.

This year, the report has been written in collaboration with the Learning Sciences Lab, National Institute of Education, Singapore.

The report is available here

The ten trends are:

- Learning through social media: Using social media to offer long-term learning opportunities
- Productive failure: Drawing on experience to gain deeper understanding
- Teachback: Learning by explaining what we have been taught
- Design thinking: Applying design methods in order to solve problems
- Learning from the crowd: Using the public as a source of knowledge and opinion
- Learning through video games: Making learning fun, interactive and stimulating
- Formative analytics: Developing analytics that help learners to reflect and improve
- Learning for the future: Preparing students for work and life in an unpredictable future
- Translanguaging: Enriching learning through the use of multiple languages
- Blockchain for learning: Storing, validating and trading educational reputation
- For further information, contact: mike.sharples@open.ac.uk

Mike Sharples

Mike Sharples is Emeritus Professor of Educational Technology in the Institute of Educational Technology at The Open University, UK and Honorary Visiting Professor at the Centre for Innovation in Higher Education, Anglia Ruskin University. He founded the influential Innovating Pedagogy Report series and is author of Practical Pedagogy: 20 New Ways to Teach and Learn.

His research involves human-centred design of new technologies and environments for learning. He inaugurated the mLearn conference series and was Founding President of the International Association for Mobile Learning. As Academic Lead for the FutureLearn company, he informed the design of its social learning approach. He leads the nQuire project with the BBC to develop a new platform for inquiry-led learning at scale. He is author of over 300 papers in the areas of educational technology, science education, human-centred design of personal technologies, artificial intelligence and cognitive science.

Conferences

TPEA Conference, 2019

The Pedagogy and Education Association warmly invite Naace colleagues to our 33rd conference at Winchester University on 11th and 12th July 2019. We will be pleased to offer a symposium and/or meeting space to Naace members. http://conference.itte.org.uk/

TPEA a new organisation intended to address the new landscape of EdTech policy, strategy and curriculum. The 1,500 members worldwide represent a merger between The Association for Teacher Educators in Information Technology (ITTE), founded 1986, and MirandaNet Fellowship founded in 1992.
You can read more about the merger here. https://www.tpea.org.uk/

ALT Conference, 2019

ALT's Annual Conference 2019 is seeking to confront and challenge established assumptions, approaches and accepted truths in relation to key dimensions of digital education, and to advancing our practice and thinking through critical dialogue and reflection, closer scrutiny of evidence and theory, and a stronger commitment to values including creativity, community, social good, openness and porosity, and more democratic access to knowledge and learning.
Read more about the conference here https://altc.alt.ac.uk/2019/