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MIRANDANET 5.0
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Innovation for Education Futures

Education Futures Exchange

A national thinktank focusing on generating and collating advice and resources for professional development providers in edtech

Summary

MirandaNet 5.0, a partnership between MirandaNet Fellowship, ITTE and World eCitizens, has nearly 1,500 professional members globally, 80,000 web visitors per year and a long history in the research and practice in edtech professional development for teachers in all phases. As a professional organisation with thirty years history in this field, we have major concerns about lack of breadth in the edtech offering across the curriculum and the resultant problems in British industry many students are not presenting with the technology knowledge and skills that are needed in the workplace, particularly girls. Whilst cognisant of workload and funding issues, we believe that the edtech professional development for all teachers needs to be reassessed nationally.

This proposal has been prepared by the directors of the MirandaNet 5.0 as a response to the challenges raised through meetings with members of the DfE edtech Policy and Data Strategy unit in the seven challenges identified by the influencers who were invited to outline the issues over the summer holiday (Appendix One). We have now adjusted the proposal to include the results of our survey of members' views about edtech CPD in response to a series of questions issued in the DfE Edtech CPD Round Table (Appendix two). As a result, the proposal draws on our significant experience of edtech professional development since the early 1990s when computers were introduced into schools including judgements about what is possible and desirable at this point in time.

In particular, MirandaNet 5.0 has the research and practice evidence that suggests that existing communities of practice are a vital element in moving forward in national policy, strategy and practice. We have identified three categories of professionals who need to be engaged in a coherent drive to improve edtech CPD: edtech CPD experts in Universities and Teaching Alliances and companies involved in degree level programmes; CPD leaders in regions and clusters; and the

classroom innovators and staff trainers in the schools. We believe a shared approach to programme design at each level will improve the quality of edtech CPD which is in danger of becoming mostly skills training in schools. All the resources that are needed largely exist already but need to be disseminated and understood by professionals who can commit time to learning. The involvement of the edtech industry can be to the advantage of the whole education community as well as the companies in raising sophisticated use of digital tools.

In our proposed thinktank for those who teach the teacher educators, staff trainers and regional advisers we plan to involve relevant networks of teachers, leaders, teacher educators, advisors and training providers from industry in contemporary learning communities that combine physical and virtual spaces and make use of a range of social media and networking technologies. We will work with existing resources to develop a range of knowledge creation and dissemination activities over two years that result in deep thinking, collating existing resources and reinforcing the support that is widely available to these communities. We will also recommend a range of accreditation routes at different levels. We expect benefits for teachers and pupil achievement by building up national knowledge and resources about practice that works. Our aim is to create exciting and vibrant thinktank activities that engage academics, teacher educators, training providers, the edtech industry and specialists in related fields like cognition and learning theory in powerful collaborative thinking and collective knowledge building so that they have ownership of the outcomes.

We are already supported in this proposal by the leaders of key national networks and by our associate companies who fund some of our edtech research as a continuing professional development opportunity for teachers as co-researchers. As we were advised that the DfE sometimes funds projects in partnership with the UFI we have used their questions to frame our submission.

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Contents list

The submission

We are proposing a two-year project called the Education Futures Exchange (EFE) that aims to tackle the seven challenges identified by the influencers who were invited to outline the issues over the summer by the DfE edtech Policy and Data Strategy Unit:

1. Research evidence on edtech is not easily accessible, nor easily digestible for educators/teachers, or obtainable for industry;
2. Teachers are not sufficiently trained and confident in the use of digital technology for educational purposes;
3. Leaders and teachers are not confident in how technology can support teaching and learning and find it difficult to set their own vision for its use in their settings;
4. Education sector/delivery is risk averse;
5. There is a disparity between solutions being developed and actual educational requirements;
6. The system is not structured in a way that supports informed and effective purchasing of technology;
7. Developers struggle to gain access to educational establishments to test and develop products, or researchers to prove efficacy.

We have also tackled the questions asked by the DfE edtech CPD Round table which were:

- What are effective CPD models?
- How do we spread this good practice?
- What are the biggest barriers faced?
- What should government's role be?
- How do we make provision more joined up?
- Should we make provision more tool agnostic?
- Is there a role for regional digital leaders / innovation coaches?
- Would adopting set standards for teaching help? (e.g. ISTE standards)

(See Appendix two)

Our submission is organised to answer the funding questions posed by the UFI Charitable Trust (https://www.ufi.co.uk/apply) as we believe this might be a source of funding for our enterprise.

What is the problem or issue that your project will address?

MirandaNet 5.0 is a new professional association with over 1,500 members that has been set up to address edtech issues in innovative ways. The team of authors use the term 'Education Futures' to mean the building of capacity and capability for educational and pedagogical research in edtech in order to enhance professional development programmes and practice across relevant communities.

The new organisation builds on the achievements of the Association for Information Technology in Teacher Education (ITTE) and the MirandaNet Fellowship, based at the Institute for Education Futures at De Montfort University. This new professional grouping will be forward looking and inclusive, working with schools and industries that are tackling the challenges in ensuring that digital

technologies are used to their full potential and we resume our international lead in this area. We will also recommend accreditation routes at a range of levels and undertake publication of relevant projects The report has been written by the directors of Mirandanet 5.0 who have combined their expertise in this field (Appendix One).

In this alliance, we will also draw on the knowledge of our international members as we are part of the UNESCO ICT global strand, working in partnership with the UK Education Futures Collaboration Charity, also at the Institute for Education Futures.

Our aim is to create exciting and vibrant thinktank activities that engage academics, teacher educators, training providers, the edtech industry and specialists in related fields like cognition and learning theory in powerful collaborative thinking and collective knowledge building so that they have ownership of the outcomes.

Organisations who are keen to work with us so far are Naace, ResearchEd and the Chartered College of Teachers. Lord Jim Knight who is the ITTE patron, is also the Chief Education Advisor at the TES and can see a role for the TES Institute and related publicity.

BESA have also agreed to promote these principles of engagement with their edtech company members. MESHguides will oversee the communication of research evidence to teachers in digestible summaries. We have already spoken with key national communities of practice who want to work with our team.

Our evidence is drawn from thirty years research and practice of the MirandaNet 5.0 members as well as the recent survey we have conducted with members of ITTE and MirandaNet 5.0. The overall view from influencers is that English schools are not currently preparing pupils effectively for the workplace. This means pupils are not being fully prepared to deal with the impact of technologies across education, culture, industry, leisure, social and political communication. In addition, students will need to develop the capacity and flexibility to cope with technology accelerating the pace of change in the job market.

We are also concerned about the UK edtech industry that has been world leading. Many of us who have worked all over the world in the past are finding that the reputation of the UK is not as well-known as it was. Because there has been no consistency of support from Government, particularly Ofsted, about edtech in school there has been a serious falling decrease in funding and innovation. Schools especially need impartial advice and guidance with procurement that we can provide.

The background

Historically Britain was leading internationally in the edtech field until the financial crash in 2008, which resulted in a new era of austerity in schools and challenges in updating digital devices and providing CPD for teachers. In addition, teacher educators and training providers had a difficult task in keeping up with the impact of digital innovation on daily life; for example: social networking, big data, learning analytics, learning assessment, robotics development, the internet of things, developments of machine learning, artificial intelligence and other inventions that are changing the way we live. What research there has been has tended to focus on the value of specific digital products and on Computing in isolation rather than the wider themes relating to agreed views of what learning is and how digital tools should be deployed across the curriculum. As the DFE consultation meetings

agreed, what is needed are stronger and more explicit links between theory, research evidence and practice in order to better understand the big picture. And then these links need to become more openly accessible to all interested stakeholders as well as in a digestible form that teachers want to access.

Actions was taken by government to redress the edtech skills shortage after the election in 2010 by disapplying the existing Information and Communications Technology (ICT) curriculum in favour of Computing which has a greater focus on Computer Science. The subsequent initiatives which aimed to convert existing ICT teachers to this curriculum have had localised success but these have not been as widespread as originally intended, nor have attempts to recruit more Computer Science specialists.

Nevertheless, the MirandaNet 5.0 directors welcome the increased emphasis on computational thinking, creativity, digital making and computer science in the revised national curriculum and recognise that these crucial skills enable pupils to develop a deeper understanding of how technology works; for example, how to design the products and how to use them. It has opened up opportunities for teachers to implement a digital maker philosophy that puts children in the role of hands-on inventors, thinkers and problem solvers, providing that we can support them and find ways to get sufficient critical mass of innovative teachers to adopt the approach. In addition to this, our view is that teams of people in education, the media and business are required to use digital technologies effectively and wisely, and develop multimodal and collaborative ways of working. Technology has impacted on language and literacy practices, and we are excited by the rich choice of authoring technologies available for the production of multimodal texts. Contemporary literacy is a much broader field than just encoding and decoding written text, and the process of making, reading and learning from multimodal texts is much more complex. A key distinction is the degree to which this process is social and participatory. Meaning-making in today's society typically combines several communication modes and often involves the remixing of content.

Moving forward

To implement these exciting ideas, we need stronger and more explicit links between theory, research evidence and practice. In addition, these links need to become more openly accessible to all interested stakeholders (Younie and Preston 2017 a&b). This will ensure that teachers feel more confident in this field, even enjoy the challenge. This more holistic approach is now required in research about theory and pedagogy to better inform practice- based professional development in schools. For example, explicit references to media literacy, a life crucial skill in today's workplace, have been removed from in primary subjects whereas it used to have a presence in the previous national curriculum. Our workshop approach would also seek clarity about the relationship and differences between STEM skills, edtech skills and computing skills (as defined by the national curriculum) and try to define what we as a nation mean by edtech and consider the role of the Arts in STEM.

Our contention is that if influencers in professional development increase our shared understanding of digital technologies at home, at school and in the work place we can confidently increase pupil achievement and help them refine their judgement about the value of these new tools. Only if the edtech training providers have a wider and more sophisticated understanding of the implications for social communication can we help our students to make the most of the opportunities and avoid the dangers. If we can collect and share credible evidence, schools will function better and industry will have a firm research and practice base to promote their products and services in England and abroad.

The Education Futures Exchange (EFE)

MirandaNet 5.0 has evidence that suggesting that existing communities of practice are a vital element in moving forward in national policy, strategy and practice. We plan to involve teachers, leaders, teacher educators, advisors and training providers from industry (Appendix one) in contemporary learning communities that combine physical and virtual spaces and make use of a range of social media and networking technologies. Such communities interact in many modes, for example, virtual meetings mixed with physical meetings, synchronous interactions mixed with asynchronous interactions, text-based posts mixed with multimedia posts. In our experience, the increased connectivity afforded by online communities of practice can act as the glue pulling together this varied activity and will enable us to continue to collect, share and build upon ideas emerging from our unconferences and MESHguides.

By working in these contemporary ways, **edtech will be more accessible and digestible for educators/teachers and obtainable by industry representatives who will also be engaged in this project (Challenge one)**. MirandaNet 5.0 has evidence that suggests that existing communities of practice are a vital element in moving forward in national policy, strategy and practice. We plan to involve teachers, leaders, teacher educators and training and providers from industry in contemporary learning communities that combine physical and virtual spaces and make use of a range of social media and networking technologies. Such communities interact in many modes, for example virtual meetings mixed with physical meetings, synchronous interactions mixed with asynchronous interactions, text-based posts mixed with multimedia posts. In our experience, the increased connectivity afforded by online communities of practice can act as the glue pulling together this varied activity and will enable us to continue to collect, share and build upon ideas emerging from our unconferences and MESHguides.

We feel that we can develop a series of engaging workshops over two years and invite the right influencers because we have been active researchers in the evaluation and design of professional development over many years (Davis 2017: Davis, Preston & Sahin 2009 2009 a&b: Pachler, Preston, Cuthell, Allen and Torres 2011: Younie and Leask 2013: Boulton and Hramiak 2014: Bradshaw and Younie 2017 in press: Porayska-Pomsta K, C. Preston, C. Laerke Weitze, S. Younie: 2017 in press).

In particular, we have worked for fifteen years in designing the Arena community of practice model for professional development (Figure one). This Arena diagram indicates how many influencers must be considered if edtech professional development is to be truly effective nationally, regionally or in one school. All these agents need to work together on balancing the best of traditional pedagogies with the need for innovation. Our plan is to engage these communities in our activities.

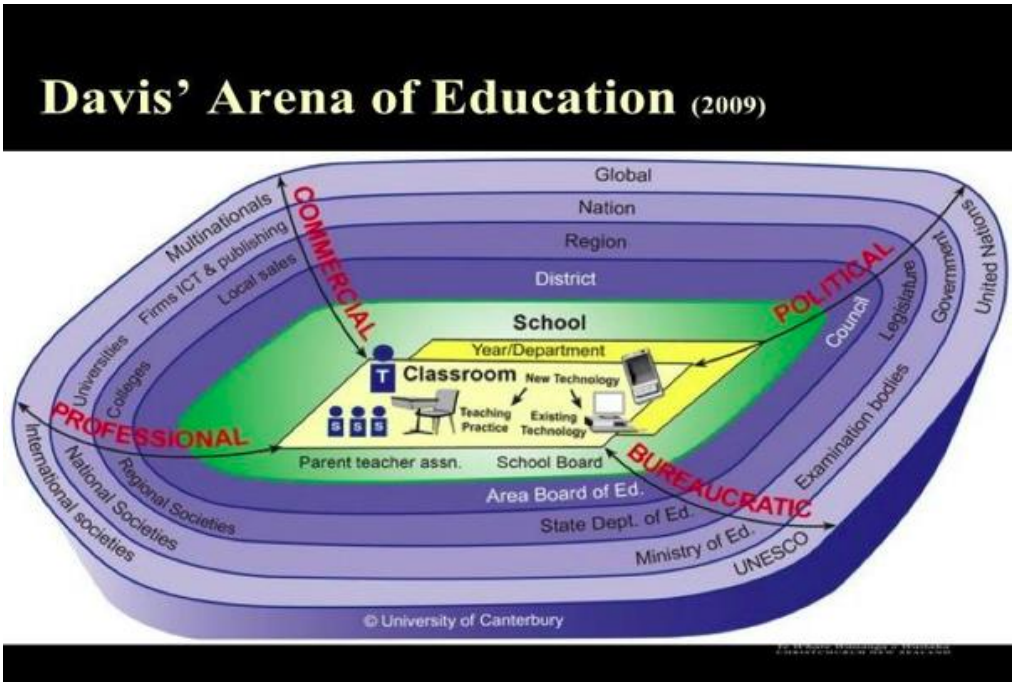

Figure one. Digital technologies and change in education: The Arena.

Davis N.E (2017)

In our experience, winning over hearts and minds through informed face to face communication is an important human capacity that now can be further strengthened using social media. Our aim is to develop a national vision for edtech CPD that can be adapted for any cohort by **working with key leaders, teachers and other training providers who are not currently confident in knowing where technology can support delivery, and who are finding it difficult to set their own vision for its use in their schools and colleges (Challenge three**). Developing confidence in the profession and engaging with the edtech industry in learning together will, we intend, **reduce the education sector's tendency to be risk averse in the field of Computing** (**Challenge four**)**.**

The proposed national Education Futures Exchange will provide the resources to work up to Masters level in practice based for a CPD programme for training providers that will include face to face and online elements across several levels. All the multimodal contributions by participants will be web-published for other teachers to investigate. Accreditation will be voluntary and can be achieved through participation in the activities at certificate, diploma or masters level.

Three 24 hour events on Fridays and Saturdays are suggested for each year that will be run as knowledge mobilisation unconferences, a style of communication in which all the participants offer a four to five minute presentation. This is different from typical conferences because there is no audience - everyone there participates. One iteration of the unconference movement is a TeachMeet (https://todaysmeet.com/) that is popular amongst teachers. However, MirandaNet 5.0 have developed an extended version called a MirandaMod (http://www.mirandanet.org.uk/mirandamods/) In this iteration after the initial short presentations all the participants engage in establishing new methods and practices for immediate translation to the classroom based on what they have learnt from each other (Preston and Cuthell 2012).

Companies will be invited to join the project as practice-based students as well to improve their edtech training skills. Policy makers in the DfE will also welcomed, as well as journalists who are interested in communicating good practice through the education press and other media channels.

Throughout the two-year period the participants will be expected to spread their knowledge in workshops and conferences for other potential trainers in conferences and workshops across the nation. MirandaNet 5.0 expect to work with the many professional organisations in this field with which they have relationships. MirandaNet 5.0 will also taking advice from other organisations that will benefit from this initiative.

What is new and innovative about your project approach?

There is nothing new about building national capacity by supporting communities of practice (CoPs). This motivational strategy has been proven time and again since the medieval trade guilds were established. However, in the world of edtech we plan to draw on the many expert CoPs that have emerged in the last thirty years and help them to become stronger. However, we take a fresh approach including technology-enabled and online communities of practice strategies. What is innovative is that the project has been designed on sound principles about building communities of practice and about professional development that have emerged from MirandaNet 5.0 iCatalyst programme (large-scale funded research and practice as well as CPD evaluations across the world including Brazil, China, Czech Republic, India, Mexico and South Africa (http://mirandanet.ac.uk/icatalyst/examples-of-icatalyst/**).**

We are well placed to tackle **the perceived disparity between the solutions being developed and actual educational requirements (Challenge Five)**. The longstanding partnership in research and development between MirandaNet and industry associates in the iCatalyst programme means that some companies are already well versed in practice-based research techniques and keen to engage with others. The MirandaNet website already publishes pilot projects and practice-based research working with teachers and industry representatives as co-researchers. This research and development has been funded by BrainPOP (learning games and quizzes), LightSpeed (sound equipment), Gaia Technologies (digital media and 3-D), Groupcall, Innovate my School (knowledge sharing between teachers), IRIS Connect (web based video), Just2Easy (a primary web platform), Oracle (courses on Computing), SAM Learning (student achievement) and Tablet Academy (teacher training). Inviting the MirandaNet associates to talk about their practice-based research to the Education Futures Exchange workshops will be an innovative way of helping to up-skill other company representatives, encouraging them to learn more about the field in which their product or service sits, and providing broader training than has been previously possible at cost (http://mirandanet.ac.uk/research-findings/ http://mirandanet.ac.uk/research-in-progress/.)

In iCatalyst, the practice-based MirandaNet CPD programme, the Fellows make use of the knowledge-creation events, called a MirandaMod, in which groups of professionals compare their knowledge and experience. In this way, teachers create new knowledge for practice with edtech.

In our six themed unconferences over two years we will be working with the EFE community, a broad spread of training providers nominated from a range of existing communities, to consider questions about edtech tools, pedagogy and learning theory as well as social and political conundrums that have not been central to the national agenda for some time like:

- what are the key learning theories educators should know about?
- what are the key edtech developments educators should know about?
- is computer assessment of learning impacting on our traditional systems?
- does computer assessment allow us to test new kinds of knowledge and skills?
- which are the existing theories about the value of edtech?
- where do theories conflict?
- how does theory relate to political systems?
- where is theory relevant in the use of digital tools across the curriculum?
- what is the role of MirandaNet 5.0 in the edtech landscape?
- what is the evidence, both qualitative and quantitative, about the impact of edtech?
- where are the best edtech resources and how should they be judged?
- what will attract more girls to computing?
- how can a school run practice-based professional development at low cost as well as taking account of workload issues?
- how can our leading training providers in edtech keep up to date about key issues in such a fast changing landscape?

We expect that participants from a range of networks of advisers and training providers will share in workshops and conferences, and publish grassroots expertise to their colleagues about what works in the classroom and how best to implement change in the use of innovative technologies. We aim to create a buzz around these matters that stimulates the profession and industry to think about and articulate the potential and the achievements of edtech.

The results from the unconferences will be collected and reported using up to date media channels. These include MESHguides, the Mapping Educational Specialist knowHow initiative with a community of educators from 178 countries, designed to provide evidence-based summaries for educators. The result is a collection of research digests supporting teachers' access to research by bringing together theory and practices. MESHguides techniques will also be employed to ensure that the research is stored so that busy teachers can absorb the principles quickly from the web. These methods will be central to the way that the findings are collected and published.

In this way, we also hope to help our industry by meeting **Challenges Six** and **Seven** which are:

- **to improve the structure of the system in such a way that supports informed and effective purchasing of technology;**

- **and, to help developers in their struggle to gain access to educational establishments to test and develop products, or researchers to prove efficacy.**

Involving the DfE and other government stakeholders in the process would also be a means of giving the civil servants professional development in the edtech field.

This initiative is intended overall to ensure that there is a national team of confident teacher educators and training providers who can tackle the current challenge two, at the core of the national concern, **that teachers are not sufficiently trained and confident in the use of digital technology for educational purposes (Challenge Two).**

In pursuit of confidence, we will also be promoting active accreditation that is focused on rewarding the school as edtech strategies improve, as already happens through the Naace Self review framework. We also aim to increase the profession's capacity to develop strategies to evaluate innovation and align this with the schools' vision, as in the MirandaNet 5.0 action research qualifications. All this accreditation will be predicated on publishing for the wider community (in detail in Appendix one)

Who would be the customers for your eventual product?

We have identified three groups who would benefit from our proposal: experts in edtech CPD whose recommendation of resources and programme would help the regional and school cluster CPD leaders and in the schools, the staff trainers and classroom innovators (in detail in Appendix one).

Based on our established background in professional development that promotes change, we would want edtech training experts to develop a range of communities of practice based on the Arena model, drawing on the key professionals from the subject association leaders, academy training schools and communities managed by companies like Oracle, IRIS Connect, Microsoft and TES. Low cost methods of motivating these leaders to learn more about edtech professional development would include an expenses budget funded by companies who stand to gain from being educated themselves as leaders with more to offer than product training.

We intend that from the EFE community will emerge a network of teacher educators and training providers who will want to use the EFE resources on the web over time and/or plan an iCatalyst intervention. MirandaNet 5.0 Fellows will be able to train and mentor the new trainers and advisors as they take the accredited programme themselves. We suggest that FutureLearn might be the right vehicle for which there will be a fee for access and mentoring and another for accreditation. This will give employment to the many school teachers and independent consultants who would like to do more in the CPD field.

What are your budget suggestions?

We have used the UFI submission headings in this draft proposal as we are told that the DfE might partner with this charity in funding this kind of project. As a working total, we suggest as a starter figure £100,000 each year for two years.

This £300,000 (£150,000 DfE and £150,000 UFI) will be used for the MirandaNet 5.0 Education Futures team who will be engaging networks of actual or potential edtech trainers in building new theory, knowledge and practice across the curriculum. This team will:

- manage the budget
- oversee team members' expenses
- manage the associated website
- decide on a platform with the DFE
- organise the workshops
- market the unconference workshops to agreed communities
- select thinktank members who will win a small bursary
- analyse the evidence collated
- evaluate the resources to be posted
- populate the platform
- write and disseminate the course suggestions based on the evidence

All workshops will be run at cost in the most cost-effective places, most likely in universities and schools. ResearchEd have good experience in this field. The employers of all the participants will be expected to fund expenses and time to be involved as an investment in affordable CPD that they can then deploy in their own contexts. We have contacted the Chartered College of Teachers who may also be interested in supporting the funding of the workshops.

We also hope that the programme and the unconferences will attract funding from companies who want to be involved in the learning process. BESA will be consulted on this point.

There is no budget allowed for an online platform and the management of that platform. This will have to be negotiated separately with the DfE edtech Policy and Data Strategy Unit. FutureLearn, which is government owned, would seem to be a possible contender.

To ensure sustainability, we strongly suggest that means are found of ensuring that this valuable data will be constantly updated because of the pace of change in the edtech field.

We hope the DFE will join us as they have in the past at Winchester University on 7th & 8th June for the 2018 ITTE and Mirandanet unconference: *Raising aspirations for digital education.*

This unconference addresses two key themes that provides an example of the kind of debate we envisage:

- What are the digital skills that teachers and pupils need and how can you support all to achieve this?

- How can we improve computing education, prepare children to become digital citizens and make full use of digital tools across the curriculum?

This unconference will be open to teachers, teacher educators, advisors and researchers and will provide opportunities to develop professional knowledge and skills through presentations and workshops with leading practitioners and researchers. CPD certificates will be available.

Funding will be used to develop more regular unconferences of this kind that attempt to develop understanding of the wider reasons for developing edtech knowledge in our schools.

APPENDICES

1.MirandaNet 5.0 directors and partners

This submission about continuing professional development in edtech under the new professional organisation called the MirandaNet 5.0 has been authored by three professional organisations: the MirandaNet Fellowship, the Association for Information Technology in Teacher Education (ITTE) and World eCitizens. These three organisations have several joint members at Board of Management level and work together to develop effective Continuing Professional Development programmes (CPD) in edtech. They are keen to work with the DFE EdTech Policy and Data Strategy Unit on their timely consultation and the organisations have also recognised workload issues in this proposal draft.

Our aim is to harness DFE/UFI funding to catalyse change across the UK so that significant scale can be achieved in digital vocational learning for the teachers of teachers in universities, regional consultancies, academy chains and teacher training schools.

Each organisation specialises in a different slant on teacher education and training:

- professional development, training and knowledge mobilisation in edtech through ITTE at initial teaching training and CPD levels;
- ITTE also owns an internationally rated academic journal, Technology, Pedagogy and Education, published by Routledge;
- MirandaNet Fellowship iCatalyst practice-based research CPD programme in which teachers work as co-researchers with industry representatives. The British Education Suppliers Association (BESA) (http://www.besa.org.uk/) and MirandaNet partners (mirandanet.ac.uk) support these research programmes
- World ECitizens, the charity, publishes edtech projects developed by global students

Together this partnership represents more than 1,500 educators who are committed to innovation and well placed to influence policy and practice in universities, further education and the schools at national, regional and local level.

What is unique about these organisations is that policy and practice are underpinned by nearly thirty years of research into professional development in edtech funded by bodies like government, charities, EU and industry. Board members represent these organisations on a range of professional bodies. This existing research evidence and the experience of practice in schools offers a strong baseline to base new research upon, and to provide suggestions quickly about what to do next to build and share edtech knowledge and expertise within networks of professional development leaders. The fragmentation of the schools' market means that new approaches have to be considered so that government, education and industry can work together profitably in edtech professional development projects.

We also have produced significant related research in the building of 'communities of practice', face to face and online, that includes experience over many years of developing and sustaining professional

organisations, international networks and communities specifically designed to improve professional development practice (Davis 2017: Davis, Preston & Sahin 2009 2009 a&b: Pachler, Preston, Cuthell, Allen and Torres 2011: Younie and Leask 2013: Boulton and Hramiak 2014: Bradshaw and Younie 2017).

As a result of the reputation for British excellence in edtech CPD that engenders change, the team have run professional development projects in regional and national communities of practice across the world, for example: Argentina, Brazil, Mexico, Chile, Czech Republic, China, Hong Kong, India, Pakistan and South Africa. Much of our expertise has been developed in these projects as well as several projects developing a delivering Massive Open Online Courses (MOOCS). Helen Caldwell has been the lead developer and project lead in: Let's Teach Computing 2015 (in collaboration with Oxford Brookes University, funded by Department for Education); Teaching with Tablets 2016 (Funded by the University of Northampton Innovation Fund); Technology Outdoors 2017 (Funded by Erasmus+) and STEM to STEAM 2018 pending. (Funded by Erasmus+). Sarah Younie and Christina Preston have led the HandsOn ICT MOOC with colleagues in Catalonia, Greece, Slovenia and The Netherlands that gained an EU excellence award. This was rolled out to participants in the pilot period and continues as a free course for European educators to use.

We also have the support of Dame Alison Peacock at the Chartered College of Teachers and Tom Bennett, ResearchEd. In terms of industry, MirandaNet already has strong links through the British Education Suppliers Association (BESA). Through the MirandaNet iCatalyst programme MirandaNet associate companies like BrainPOP, Gaia Technologies, IRIS Connect , Just2Easy, Oracle, SAM Learning, are keen to support the research initiative we propose. Each company has invested in a user network is undertaking practice-based research. Lord Jim Knight, the patron of ITTE, is offering support from the TES network and resources as they do for ResearchEd. Routledge publish the ITTE, Journal, Technology, Pedagogy and Education.

The theoretical framework underpinning successful CPD has been refined by international teams in MirandaNet workshops at the Institute of Education, University of London, at a working party of UNESCO and recently at a symposium at the World Conference for Computing Education, Dublin, July 2107. A book is about to be published covering this stage of our work (Davis 2017). We plan to refer to this model as it relates to the English context.

Our work centre is at the Institute for Education Futures at De Montfort University. We will be working closely with two charities where members of the team are Trustees. The first is the Education Futures Collaboration that includes knowledge mobilisation for the whole profession through the MESHGuides website and activities: The Education Futures Collaboration Charity, was established in 2014, and provides governance to the MESH (Mapping Education Specialist knowHow) project (www.meshguides.org.uk). MESH is a low-cost, international, knowledge management system providing teachers with easy access to research summaries to develop evidence-informed practice. This project is addressing the UN's SDG 4 (United Nation's Sustainable Development Goal) for "generating inclusive and equitable quality education and promoting lifelong learning opportunities for all in education", by creating a model for a dynamic, quality-assured knowledge base for educators, offering research summaries and connectivity. The second partner will be World Ecitizens where pupils can be accredited for publishing their work.

In our research and the recent survey amongst ITTE, Naace and MirandaNet 5.0 members we identify three groups of professionals who need the opportunity to develop their skills, knowledge and

understanding of education technologies in the schools context at different levels and for different purposes:

- Edtech CPD experts: we suggest a national thinktank of group of teacher educators and trainers of trainers selected from Universities, Teaching Alliances, and company trainers who will help England to develop the vision for what needs to be taught in the curriculum drawing on what exists and working on future proofing. The criteria for serving on this Thinktank should be carefully decided to include those who work within the community rather than those outstanding 'thought leaders' who are not wishing to collaborate. A percentage of the thinktank should have Masters and Ph.Ds in edtech CPD and/or key publications to ensure that their views are based on knowledge, experience and reflection.

  These thinktank members will provide advice and support to government and the regional leaders helping in the design of programmes, selection of resources and in appropriate accreditation. These consultants who will be running workshops and conference will need financial support from the government. It is recommended that this group also design training programmes for OFSTED inspectors and edtech companies;

- Regional and school cluster leaders: designated leaders in schools and company training providers who will have access to regional hubs, courses and resources. Employer will be motivated fund these activities if the government provides a clear direction on education technologies in the curriculum. Undertaking Masters level studies and Naace accreditation would be valuable for this group;

- Classroom innovators and staff trainers: teachers in the classroom who will be supported by leaders in the school to experiment with innovation and report the results. The CPD of this group will be funded by the school if performance indicators are recommended and if OfSTED reports effectively on their expectations of education technologies in schools. This group should be encouraged to web-publish their practice based results and rewarded for this contribution to professional knowledge with an accreditation that has value for their cv.

All the research indicates that edtech CPD needs to be supported at all levels in order to upskill the profession and engage them intellectually. What emerged clearly from members' responses is that a CPD system of practice-based research is most effective where the innovations take place in the school and the leaders are rewarded for collecting and analysing the data and sharing the results. These accreditation systems exist and are well validated. They are designed to be adapted to changing circumstances which is always the case in edtech.

We have outlined two key accredited programmes we recommend here:

Naace programmes

Naace has a programme for school leaders called the Self Review Framework (SRF) in which the school analyses its progress with a Naace Assessor. The Naace Self Review Framework (SRF) provides a structure for schools to review their use of technology and its impact on school improvement. The purpose of the SRF is to support school improvement through a reflective practice that allows schools to measure and improve their provision against a well-researched and evidenced

set of criteria such that pupils become digitally literate and are, ‘able to use and express themselves and develop their ideas through information and communications technology’. Schools who engage with the Framework on a regular basis benefit greatly from the process and many are judged excellent or good on inspection. The Framework has 6 crucial elements, one of these is 'Professional development' and supports schools to identify and address the ICT training needs of the school and individual staff, provide quality support and training activities for all staff in the use of ICT sharing effective practice and review, and monitor and evaluate professional development as an integral part of the development of the school.

Schools engaging with the SRF can request support and when they feel they have reached national benchmarks or beyond, can go on to request assessment for the ICT Mark Award by a registered Assessor, involving examination of evidence, a visit to the school and report.

The aim of the 3rd Millennium Learning Award is to enable schools to demonstrate how they are providing an education fit for the 21st century. It celebrates schools’ achievements in creating an environment and curriculum that stimulate more and better learning, making full use of the opportunities presented by technology. This is a peer-referenced Award, with no set criteria, as schools enable their pupils to experience 3rd Millennium Learning in very diverse ways.

Judgement of the submissions by schools for the Award is made by a ‘college’ of schools that have already gained the Award and the Award Steering Group comprised of 3rd Millennium Learning Guides. The 'college' offers unique peer-mentored professional development. The Guides are Naace members who have demonstrated understanding of 3rd millennium learning approaches, by review of a range of both primary and secondary schools that have gained the Award.

MirandaNet 5.0 accreditation

MirandaNet 5.0 Fellows engage in both quantitative and qualitative research often working with groups of teachers and school leaders as co-researchers. This practice-based research programme (sometimes called action research), called iCatalyst, is available at a 30-point Masters research module but can also be undertaken by members of the same group at certificate and diploma level. Groups of teachers can be in one school, in a chain or schools, regional or national. School leaders can gain particularly from this model.

The process is designed to help school work towards effective change by developing and refining their own strategies. The teachers decide on the research questions they would like to ask, develop the data collection strategies, and with the support of a MirandaNet Fellow turn that data into a case study and be awarded a Fellowship for web publication in the form of an article, blog or a talking head.

The process takes about six weeks following the process of guided data collection in the classroom. Here are the steps that a teacher will take as part of a team:

- Receive template for research write-up;
- Spend half a day preparing a 2,000-word practice-based blog or talking head;
- Spend half an hour meeting with a MirandaNet professional (via Skype) discussing research and receiving feedback;
- Submit draft version of research piece;
- Receive suggestions and comments to refine final submission.

Apart from being informative and enjoyable the project provides evidence to Ofsted that the school is research active. The resulting articles can be used by the school to inform policy and practice and for marketing purposes. Teachers/leaders can be accredited for further analysis of all the groups data in a 30 point De Montfort University module.

What is distinctive about this model is that MirandaNet associates have worked in partnership with MirandaNet on this model as well as funding the professional involved. This creates an alliance in which both parties learn. This could be offered as an opportunity for the delegates through the Education Futures Exchange project. Because these awards are group based some profound, collaborative thinking about Edtech in schools would result.

MirandaNet 5.0 can also offer for leaders a Masters in Digital Literacy. This would be effective for a smaller group of staff trainers in all their guises as advisers, mentors, teacher educators and company trainers.

Potential associate communities of practice

We plan to suggest MOUs with Professional communities who want to engage in this Education Futures Exchange initiative. This is our starter list where we already have good contacts and joint memberships:

BERA https://www.bera.ac.uk/

British Computer Society http://www.bcs.org/

Chartered College of Teachers https://chartered.college/

Computers at School (CAS) https://www.computingatschool.org.uk/

Innovate My School (IMS) http://www.innovatemyschool.com/

ITTE https://www.itte.org.uk/

Association for Learning Technology (ALT) https://www.alt.ac.uk/

MESH guides http://www.meshguides.org/

Microsoft Educator Community https://education.microsoft.com/

MirandaNet Fellowship https://mirandanet.ac.uk

Naace https://www.naace.org.uk/

ResearchEd http://www.workingoutwhatworks.com/

The Council for Subject Associations (CfSA) http://www.subjectassociations.org.uk/

Times Education Supplement (TES) online community https://community.tes.com/

MirandaNet 5.0 directors' profiles

Jon Audain

Jon is currently a Senior Lecturer in Primary ICT and Music at the University of Winchester. His area of expertise is working with and mentoring teaching students with a focus on ICT, Educational Technology and music. He has worked as a VLE/Learning Platform Consultant within Hampshire and is a former county-based Advanced Skills Teacher (AST) specialising in Primary ICT, where he supported primary schools across Hampshire.

As an experienced primary teacher Jon and regularly spends time in schools, teaching and supporting staff and children. He frequently works as an ICT consultant, freelance writer and Promethean trainer across the UK.

Within music, Jon works as a freelance musician and conductor. He performs in a range of different ensembles from saxophone ensembles, rocks bands through to a flute, oboe and piano trio. Jon previously worked for Hampshire Music Service as a Listen2Me instrumental teacher and still teaches for Portsmouth Music Service as a woodwind teacher.

Helen Boulton

Dr Helen Boulton is an Associate Professor at Nottingham Trent University. Helen has 10 years teaching experience as Head of ICT and Computing in secondary education. Helen is a National Teaching Fellow. Her research is focused on using new technologies in learning and teaching and she has co-authored several books focussing on learning and teaching in secondary education. Chair of the Association for Information Technology and Teacher Education, Regional Co-ordinator for Computing at School, she is also a member of several national committees. Helen has been involved in the use of digital technologies in education with UK government agencies, including the Training and Development Agency HEA and JISC. Helen's work is published nationally and internationally.

Dr Boulton is currently managing the Regional Centre for Computing at School(CAS), providing support and training for primary and secondary teachers in developing Computing. Helen has been course leader for the Post-Graduate Certificate in ICT, and is currently Course Leader for the Doctorate in Education. Helen is also a co-investigator for two European Horizon 2020 bids: No-one Left Behind, and Managing Affective-learning Through Intelligent Atoms and Smart Interactions. Helen is also a co-investigator for an Erasmus + research project: Mobile Pedagogical Assistant to develop meaningful pathways to personalised learning.

Helen Caldwell

A Senior Lecturer in Education (ITE - ICT) at Northampton University, Helen has over 15 years teaching experience and held an ICT Co-ordinator role for nine years, working across a group of schools to develop their capability with ICT. She was an assistive technology advisor for Milton Keynes Council and a regional and web portal manager for the Open University Vital CPD programme.

Helen's university teaching and CPD work covers the use of technology across primary school subjects, implementing the computing curriculum and assistive technologies for SEND. She is a member of the Primary National Curriculum for Computing in ITT Expert Group supporting tutors and trainees in ITT in preparing for the new curriculum and a Fellow of the Higher Education Academy (FHEA). Her research interests include eLearning and social networking in Higher Education, and computing and digital literacy in Primary Education. She currently co-leads the Erasmus+ project: Digital Learning across Boundaries.

Andrew Connell

Head of Initial Teacher Education at University of Chester, Andrew is passionate about improving the education of our children and students. He is a highly experienced and successful teacher, lecturer and trainer of teachers, trainee teachers and undergraduates, a widely recognised expert in Initial Teacher Education and particularly in Computing Education, with a national and international profile.

Andrew is chair of the Council of Subject Associations and holds positions on the Executive Committee of the Association for IT in Teacher Education (ITTE), is a Senior Fellow of the Higher Education Academy, a consultant on Computing Education and Quality Teaching, was a member of the national Subject Expert Group for Computing and was on the Steering Group for the Royal Society's UK Forum on Computing Education (UKForCE). He has authored and co-authored publications on teaching Computing and management of teacher training.

Andrew Csizmadia

Andrew is Senior Lecturer in Computer Science Education at Newman University Birmingham, where he teaches new computing teachers. He has supported in-service teachers in the transition from ICT to Computer Science through coordinating regional and national computing projects. Andrew was a member of the CAS Computational Thinking Working Group and a co-author of Computational Thinking: A guide for teachers, and is a member of the CAS Assessment Group. Currently, Andrew is the Secretary for ITTE and is the Academic Lead and Senior Assessor for the British Computer Society's Certificate in Computer Science Teaching, which is an accreditation scheme for in-service computing teachers.

Christina Preston

Professor Christina has been at the forefront of education and technology for over 25 years. She is associate Professor of Education at De Montfort University in the new Institute for Education Futures. The MirandaNet Fellowship that she founded in 1992 has become a global thought leader in edtech with over 1,000 members in 80 countries and an outreach of more than 80,000 website visitors a year who read up to 10 screens. At the core of the members'' philosophy is the sharing of knowledge and change management based on grassroots evidence. The members research into the impact of technology and learning in classrooms and report on their findings for the global community. They also run practice-based research professional development programmes in schools when the practitioners become co-researchers.

Christina has won 5 international awards for her contribution to education innovation and community of practice development. She is also the Chair of Trustees of World Ecitizens charity established by the MirandaNet Fellows in 2002 after the events of 9/11 in New York. This charity provides a web space where learners across the world can publish for an international audience.

Chris Shelton

Dr Chris Shelton is Head of the Primary Postgraduate Certificate of Education (PGCE) at the University of Chichester and jointly coordinates the undergraduate and postgraduate ICT and Computing modules. He teaches on BA, PGCE and MA programmes on modules related to ICT, Computing and Professional Studies and has been an External Examiner for a number of undergraduate and postgraduate teacher education programmes. Chris is a member of the National Executive Committee of ITTE (the Association for IT in Teacher Education) and was a member of the Primary National Curriculum for Computing in ITT Expert Group supporting tutors and trainees in ITT in preparing for the new curriculum. He is a Fellow of the Higher Education Academy and a member of NAACE and BERA. Previously he worked in primary schools across Key Stages One and Two and was a school ICT Co-ordinator. Chris is a school governor and regularly runs in-service training events for primary school teachers at the University and in local schools.

Chris has a range of research interests relating to technology, computing and digital literacy in schools and universities. His PhD focused on teacher's thinking about technology in Higher Education and his recent work has explored the pedagogy of teaching computing and teacher beliefs and knowledge about technology.

Chris was UK project director for the CIRT (Consortium for Intercultural Reflective Teachers) project - an EU funded project (€200,000) in collaboration with Pennsylvania State University in the USA and Jönköping University in Sweden. The project aimed to encourage international collaboration through a five year programme of staff and student exchanges between the three partner universities (2008-2012). He was awarded a £5,000 grant from the Teaching Agency as part of the Leading Partners Programme: ICT. This was used to explore and develop links with partnership schools to improve teacher training in ICT (2012).

Sarah Younie

Professor Younie has been involved in international and national teaching and research on educational technologies for over twenty-five years. She has been involved in the use of digital technologies in educational settings for UNESCO, EU and UK government agencies, including the Training and Development Agency (TDA, DfE), Becta, BBC, HEA and JISC. She has worked as a teacher and researcher in secondary schools, universities and as the UK Chair of the National Subject Association of IT in Teacher Education (ITTE) and she has conducted national research, including evidence for the Parliamentary Select Committee Inquiry into Education.

Dr Younie is a Professor in Education, Innovation and Technology at De Montfort University and is Editor-in-Chief for the Journal of Technology, Pedagogy and Education and sits on the journal's Editorial Board. Professor Younie is a founder member of 'Education Futures Collaboration' (EFC) charity, she is a Trustee and sits on the Strategic Leadership Steering group for EFC. Professor Younie has collaborated with Prof Leask from the beginning to set up MESHGuides and has helped to drive this vision forward, through establishing its structures and processes; she sits on the MESH Chief Editorial Board & is Editor-in-Chief of MESH ICT Editorial Board.

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2.Replies to recent DFE CPD Round table questions by ITTE and MirandaNet members

1.What are effective CPD models?

2. How do we spread this good practice?

3. What are the biggest barriers faced?

4. What should government's role be?

6. How do we make provision more joined up?

7. Should we make provision more tool agnostic?

8. Is there a role for regional digital leaders / innovation coaches?

9.Would adopting set standards for teaching help? (e.g. ISTE standards)

Below is a summary of the replies we received from our members that match well with the research into edtech CPD effectiveness that our members have undertaken over the years. The organisations have nearly 1,500 members between them and a history in edtech teacher education, professional development and research that stretches back over 30 years.

1.What are effective CPD models?

The potential for change in the classroom described by one of our respondents, a primary teacher educator who is engaged in a Ph.D on this topic:

The most effective models as recommended by schools appeared to be digital champions in schools with teams of pupils as digital leaders (with a lead teacher for digital learning co-ordinating their support) and project-based CPD often called practice-based research. The staff noted that having extended time to experiment with a device/software and trial it in multiple scenarios helped with their integration.

Face to face training is essential for some of the time with valued resources available online but the school leaders must be totally supportive of the change process. Working with a group of staff in the school can be effective if they share their experience but motivation needs to be strengthened by the setting of performance targets and other career building like awards for publishing in the networks. This can be talking heads and videos as much as written essays.

However, all our research indicates that those who need a deeper understanding of the issues as well as skills training are teacher educators who should be designing and leading regional and national programmes for the training leaders in schools, company representatives, academy chains, consultancy and advisory companies and local authorities as well as the representatives of the key subject associations, the Chartered Council for Teachers and BESA.

These people who may be directing several programmes are need to be well versed in techniques that promote change in schools. In the UK National Opportunities Fund(NOF) ICT training programme from 1999-2004, (Preston 2004) government making payments to companies to do the training did not work. One reason was that there was no formal training for the company trainers working at the management of change level. Another reason was the underestimate of how much training in skills the teachers needed before they could tackle the pedagogical issues. In addition, as always, the pressure on teachers' time was significant already. However, the schools were willing to support this programme because of the government directive.

In the 1980s, before NOF ICT training was introduced, local authority leaders were released for 20 days to pursue a specialism at a university. Although this may now not be affordable, a reasonable amount of time must be allotted to some carefully identified professionals in the system in order that they can up-skill the teacher educators, advisers and school trainers who are training teachers. Practice-based research studies means more time can be spent by the specialists in the workplace supervising the posing of questions, the analysis of data and publication as part of their own learning. However, time for sharing ideas with a tutor and a community as well as publishing the results is crucial.

The organisations and companies who select these professionals as specialists may be more willing to release these staff and to offer expenses for training if the programmes were government endorsed as part of a clear strategy for enhancing our students' preparedness for work. A clear vision needs to be articulated by government and some seed funding offered. Making the actual workshops/conferences free might work but the participants would. They would have to be selected and prepared to devote time to study and team building. The enterprise would have to be led by paid edtech programme designers and tutors.

2. How do we spread this good practice?

Our members who have joined these professional organisations all suggested that a specialist network should be set up of trusted professionals dedicated to edtech CPD in order to centre energy on this topic.

These individuals need to make the best use of an exploding canopy of online resources from all over the world: large datasets, blogs, YouTube channels and simulations, together with an understanding of the implications of fixed and mobile devices in the classroom. But these must be accredited by the professionals first and in line with an established programme.

One respondent advised on what the specialist network would provide for the training providers:

Given the time pressure that staff face from their daily workload, new information needs to be succinct, with the options for further reading where appropriate. Weekly or Monthly digests with short case studies would be an effective way to share the setting, procedure and impact of a new approach with teachers. This could then be shared on a blog and linked to via social media or email. Schools could then choose to share via email or in print form in staff rooms.

Another member said:

In our region, before all the cuts, we had a network of leading ICT teachers who met once a term to share good practice and learn together. They then supported schools locally in a range of ways - e.g. cluster support meetings. This created a real buzz and helped raise the profile of ICT. I see the CAS Master teachers as reflecting this model to some extent. I do like this model but suspect you need more teachers involved and a broader curriculum

A member who wanted to see a broader approach to edtech said:

I think digital lead teachers of some kind could make an impact but not those who are evangelists for computer science. They tend to put the generalist teacher off.

One professional with significant leadership experience nationally said:

Teachers should be encouraged to use digital technologies as much as possible. The approved 5-star resources and leadership guidance should be signposted by effective CPD professional organisations. Leaders should be encouraged to promote their own successes at trainers' conferences.

Companies should be welcome to train with other professionals but not to promote programmes that focus on their own products - programmes should be product agnostic although highlighting the overall themes and issues.

3. What are the biggest barriers faced?

The general concern was that government is not providing any guidance in this area and Ofsted do not inspect adequately. Most of them are not trained in this area and need support.

Our respondents complained that there is a massive focus on OFSTED Maths and English in schools. Other things are low priority in many schools. One primary school I went in didn't have a Science Coordinator.

Another observation was that school leaders need significant support with procurement. This is an area where professionals need to step in and provide some guidance because companies obviously have their own products in mind. The professional organisations, ITTE, MirandaNet and Naace could be offering workshops and support in this area in partnership with companies but not lead by them. Indeed, the professionals could also be working with the companies on education issues including pedagogy and e-safety. Of course, the financial cost of equipping a school properly means that procurement principles are even more important.

Another challenge is the pressure on teachers' time that is greater than ever. It is understandable that some teachers just cannot cope with learning how to use digital technologies effectively on top of all their other commitments. The Unions also have to be considered when new tasks are suggested by government. There needs to be career advantage and some form of award which does not have to be money but time made free to take on edtech seriously.

One respondent explained this well:

Teachers need time to adequately integrate a new technology into their practice. There is a lack of national support that is exacerbated by the vastness of the internet, not knowing where to find trustworthy support and generic ICT CPD. Teachers want to understand how a piece of technology can be used in their subject or specialism. Generic, decontextualised CPD doesn't appeal.

Several valuable points were made here about the need for our own clarity that have been raised in other sections:

I'd hypothesise that there are several barriers to edtech use, training, workload, the maths/English league table pressure, morale in a world where financial reward is lacking… It might also be that evidence of its value is thin on the ground. It might also be that modern ways of working are inconsistent with curricula and assessment systems.

I think we need to be clearer about what we mean and what, in different circumstances, edtech brings. Is the technology transformative? Is it replacement? This latter is not necessarily a bad thing, for instance in the way paper replaced slate.

Who are the users? There are teachers and students. Teachers' tech might be for teaching, record keeping, reporting… Students' might be for learning, there're a number of subsets here, research (I promise not to mention digital literacy), demonstrating learning…

Some differences between primary and secondary were noted:

In primary, there is still certainly an issue around staff competence and confidence. Also, within the early years there are questions around the appropriateness of technology so some teachers do not buy in because of philosophical viewpoints.

In addition, there were comments about the low level of training because none of the trainers, school leaders and teacher advisors had access to CPD at a high enough level to provide them with the concepts to lead.

4. What should government's role be?

All the respondents wanted promotion and endorsement from the government departments about the value of education technologies across the curriculum. The BETT18 speech was seen as a good focus for a new direction. At the edtech CPD Round Table an underspend was mentioned that could be accessed quickly?

Another request was for government agencies to improve on listening to a wide range of professionals in this area, not just the advocates of Computer Science. The latest Royal Society report that values Learned Societies gives a hint.

Here were some of the suggestions:

I think government should support, but not control, a national thinktank that shares best practice, engages with the latest research to support teachers in also doing so, offers guidance on specific technologies and approaches, etc. DFE and others plus companies could be learning also from their involvement.

and

More funding for teachers to attend professional development opportunities and to work together. Currently school budgets are so tight that many teachers get less professional development than they should. Ideally, I think schools should be given ring-fenced money for staff development.

One reply was very comprehensive:

- *Make Computing compulsory for all schools, i.e. No curriculum opt-out'*
- *Incentivise schools with ring-fenced infrastructure budgets;*
- *Establish an edtech monitoring service within the College of Teaching;*
- *Create career recognition for teachers with aptitude for edtech;*

- *Ensure that all school leaders are at least as competent as their best staff - for those in post, high impact retraining; for those seeking promotion a new CV requirement;*

- *Develop a specific CPD module aimed at school leaders which aims to demonstrate how the model of computational thinking can be applied to school management processes .*

A word of caution:

Too many government invitations for advice or to lead think tanks recently have been given to well-known gurus in the field who, in fact, have not researched or reported within recent times and are trading on reputation. Often, they are not networked with other professionals and tend to think they know the answers to complex questions without listening to others and collaborating. The qualities of those who are selected to be in a Government thinktank or to lead it need careful consideration as well as the balance of a group. The choice should not be left to one individual to invite their admirers.

5. How do we raise awareness for what is already out there?

Points about content:

Living with the sheer quantity of content we have available to us is not a new problem. In its modern form it has a 400 year history from the 'push' perspective a research and development web service. Promoting existing resources can be automated in interesting ways, though it will require some staffing. Becta did this the old way (some online but also significant use of postal service), and long before them so did MEP/NCET (post service).

We still rely on the idea of 'portals' and 'repositories' but the problem of gathering, filtering, collating and disseminating content has become so immense that it probably cannot be done without automated means. Moreover, portals and repositories imply a form of organisational control and authority that is out of keeping with our contemporary democratic attitudes towards public and professional participation in the sharing of knowledge.

We should stop trying to gather resources into one location or portal, or to 'join up' these things. Instead concentrate on better methods of search and retrieval. Content is out there, it takes care of itself - we just have to find it.

Several members felt very strongly about government ownership of websites that hold research findings because the next government can take down these websites wholesale:

Professionals should not allow government agencies to hold any web resources because the Coalition in the first week of their election in 2010 took down the Becta websites with the resources and research that had been assembled since 1995. This was put in the National Archive but not categorised properly. Some of the Becta research has been reassembled here http://mirandanet.ac.uk/knowledgehub/becta-reassembled.

Problems also occur when companies own content and run training programmes as happened in the NOF programme 1999-2004. This content although government funded was not open to all.

Many members advocated the MirandaNet approach of researching with companies and sharing case studies. Furthermore, many professional organisations do offer peer reviewed content like the case studies assembled on the MirandaNet website as well as ITTE and Naace resources that are behind a paywall. These are tool agnostic as are CAS resources about Computer Science. The TES also has good resources that are also behind a paywall.

6. How do we make provision more joined up?

Re-establish DfE communications with all the national professional organisation in this field: ITTE, MirandaNet, Naace as well as CAS and BCS. This would enable different subject experts to work together in developing the whole Computing curriculum.

Making provision more joined up is essentially a design issue in so far as it assumes there are sources/places/resources that are there to be joined up. So what is it that we need to join up? Can we make a list? In what way are these not already joined up? We need again regional digital leaders like the old LEA representatives. An interactive map of professionals developing activities that make a difference would be very helpful. How do we peer review?

7. Should we make provision more tool agnostic?

Yes, all respondents thought that having companies taking charge of training and resources is at the heart of the challenges we now have, mirroring our research. It was suggested that support should be around digital literacy and approaches to education technology and not on specific devices. Technological development is too fast to focus on specific tools. This approach would only shorten the usefulness of resources and guidance that is created.

One comment explained how being fixated on the tool prevents understanding the bigger issues:

I get fed up with people moaning about how the school up the road is using this system or that system so children are not prepared for their alternative e.g. they are using Apple computers so don't understand a Windows environment. Technology changes but those with real competence and capability change and adapt with it because they have transferable skills. I believe that in education we should always focus upon types of tools to solve problems (rather than specific software or specific languages etc) where possible giving children opportunities to explore several examples of each discussing similarities and differences so they can make informed choices about the tools and approaches that they want to use.

The government could help by focusing on this strategy as an ‘opportunity’ area.

8. Is there a role for regional digital leaders / innovation coaches?

The provision of this kind of leader was considered to be vital. Relevance is of great importance to teachers and this is wider than subject content alone. Teachers want advice that appreciates the needs of their learners and regional guidance would be a good way to support this.

Yes, I certainly see some kind of network of practitioners as being a good way to spread good practice.

and

Yes, certainly as long as it is practical and easy for people to access (eg Facebook page).

However, it was pointed out that in our evaluation of national training projects all over the world an assumption is made that there are trained trainers of trainers already existing. We think that three groups of professionals need different kinds of training: the CPD experts, the regional leaders and the classroom innovators. But these programmes will depend on a clear vision to be effective across the nation.

9.Would adopting set standards for teaching help? (e.g. ISTE standards)

There were some informed comments on this point that overall a stronger support structure would need to be in place first before new standards were developed. In the meantime, it was felt that we have existing subject standards that could be developed quite easily.

It would be good to revise the old 'TDA characteristics' document that spelt out what IT ITT providers should promote without it being another set of standards to be ticked off. But we must avoid standards that are not allowed to change in quick time - "performance, feedback, revision" should be the motto.

Careful thought was advised and some very important points made about how standards should be developed:

- Who knows what such standards should be? ISTE is already dated. Needs review. The jury is out on what standards should really address (or indeed if they really help). Most are so general as to provide little guidance or clarity!

- A major reason for this uncertainty is that the digital environment changes so rapidly. The meaning of digital competence/digital literacy/computer literacy changes by the month. A vibrant network would share these ideas.

- An empirical approach to framing such standards is needed (a research project is needed here?). How do such standards manifest themselves in the course of real teaching? Do such statements represent reality about the digital fabric of effective teaching or learning? Such standards as ISTE are based less on reflected reality about what teachers do than on prescriptions about what they should do. This is backwards! The development of standards should be driven by research.

Selected research about the effectiveness of national CPD programmes

Boulton, H. and Hramiak, A., (2014) Cascading the use of Web 2.0 technology in secondary schools in the United Kingdom: identifying the barriers beyond pre-service training. Journal of Technology, Pedagogy and Education 23(2) 151-166

Davis, N., C. Preston, and I. Sahin (2009a). ICT teacher training: evidence for multilevel evaluation from a national initiative. British Journal of Education Technology (BJET). Volume 40. Issue 1 (January 2009) (Published Online: Feb 5 2008 12:00AM): 135–148.DOI: 10.1111/j.1467-8535.2007.00808.x

Davis, N. E., C. Preston and I. Sahin (2009b). Training teachers to use new technologies impacts multiple ecologies: Evidence from a national initiative. British Educational Research Journal (BJET). Volume 40. Issue 5 (September 2009).

Guskey, T. R. (2002). Does it make a difference? Evaluating professional development. Educational Leadership, 59(6), 45–51

Leask, M. and Younie, S. (2013) 'National Models for Continuing Professional Development: The Challenges of Twenty-First-Century Knowledge Management' Journal of Professional Development in Education, Vol. 39, No. 2, pp 273–287.

Pachler, N, Preston, C., Cuthell, J.P., Allen, A. and Torres, P. (2011) The ICT CPD Landscape in England Becta download here (http://dera.ioe.ac.uk/1769/). This report contains a section about teachers who are reluctant to use learning technologies in classrooms that you can download here http://39lu337z51l1zjr1i1ntpio4-wpengine.netdna-ssl.com/wp-content/uploads/2015/02/Paper-reluctant-teachers-copy.pdf.

Preston, C. (2004) Learning to use ICT in classrooms: teachers' and trainers' perspectives: an evaluation of the English NOF ICT teacher training programme 1999–2003. London: MirandaNet and the Teacher Training Agency www.mirandanet.org.uk

Sentance, S. and Csizmadia, A. (2016) 'Computing in the curriculum: Challenges and strategies from a teachers' perspective'. In: Brodnik, A. and Lewin, C. (eds.) Education and Information Technologies. Springer: New York, NY, pp. 1-27.

Sentance, S. and Csizmadia, A. (2015) Teachers' perspectives on successful strategies for teaching Computing in school. In: Brodnik, A. and Lewin, C. (eds.) IFIP TC3 Working Conference "A New Culture of Learning: Computing and next Generations". Vilnius, Vilnius University, pp. 201 – 2010

A longer list of relevant research and comment on Edtech CPD can be found here:

http://mirandanet.ac.uk/specialist-cpd-research/