From visioning to impact

A practice based research approach to innovation

Bodnant's Mission to Mars I

_____

Bodnant Community Primary,

Prestatyn, Denbighshire, Wales

September 2016

_____

Director: Dr Christina Preston,
Director of Innovation, MirandaNet and Associate Professor, De Montfort University
Senior Researcher: Dr Sarah Younie,
Director of Research, MirandaNet and Reader, De Montfort University
Senior Researcher: Bernard Dady,
MirandaNet Fellow and Head of Education Transformation, Gaia

Co-researchers
Tristan Hughes, Bodnant Community School
Caroline van Niekerk, Bodnant Community School
Joe Basketts, Gaia
Dominic Preston, MirandaNet

Summary

Through an established relationship between Gaia and Denbighshire County Council, Bodnant Community Primary, employed Gaia Technologies [1] as experienced education consultants in digital technology to support forward development. The aims of this partnership were to drive future procurement and deployment decisions and to develop a framework to inform planning of progressive educational technology (edtech) skills development and application use as pupils grow through the school.

A multi-project programme of support was delivered between April 2015 and July 2016. It had three components:
- development of an educational edtech vision and skills progression model to drive future decision-making re procurement, deployment and user training;
- boosted interactive use of interactive Whiteboards (IWBs), specifically Smart Notebook, across the school and curriculum;
- developing and deploying a virtual workspace using Google Apps for Education (GAFE) and integrated on-line software services.

The action-research component that was layered onto this programme was designed to capture learning about the process and assess the impact of the programme. The research was led by Dr Christina Preston (MirandaNet/De Montfort University) and relied on the observation and collection of evidence by the lead teachers and Gaia's consultant trainers.

Overall the research team was looking for evidence about **school policy** changes and **changes** in the partner company approach. The intention was also to provide advice to other schools and edtech installation route starting on a practice based research programme.

In those three areas the first impact on Bodnant **school policy** is that there is now an informed basis for moving forward and key steps have been taken in meeting early objectives i.e. increased use of interactive classroom presentation technology, demonstration of project-based learning enriched by informnation and communication technology (ICT) and establishment of the Google platform.

In the next eighteen months the school needs to formalise its vision statement for educational ICT and link this to a vision for pedagogy. The project has not yet succeeded in significantly improving an owned statement of the schools' overall vision for teaching and learning with ICT. Nor has it succeeded in embedding a model for the progression in ICT skills development that was originally envisaged. However, Gaia is able to provide the school with a framework for the computing curriculum that will help develop pupil knowledge, skills and understanding in a systematic way. This needs to be enhanced by thought as to how this is then applied across the curriculum so that digital literacy, as a core skill, is

---

[1] http://www.gaia-tech.com/

demonstrated on the same basis as literacy and numeracy through wider teaching and learning activity.

The partner company, Gaia, has learned that the management of a programme such as this is both reliant on the energies of the lead teachers and their own lead educationalists. Maintaining momentum over an eighteen-month period has been challenging. The learning from this project will inform subsequent procurement and installation decisions.

The advice that emerges for other learning establishments from the continuing professional development (CPD) leaders' is to assess the staff needs first and then tackle the challenge head on. "As a staff we need to be clear about what needs to be addressed. You need to start with an honest assessment".

For company suppliers of digital technology the advice is that such a programme should start with the visioning process and rapid progression to production of an educational ICT vision statement for the school. This process must involve all staff and be driven by the school leaders and governors. Training and project-based CPD needs to be carefully planned and driven at all levels to agreed timescales. Ultimately, the schools own project leaders sustain action week by week. They bring the content knowledge and curriculum expertise to the table. The ICT partner brings a vision of how ICT can be used and inputs skills development. It may, as in the case of the video editing, take part of the process out of the learning context to speed production and ease pressure on teachers and pupils.

Much has been learnt so far in this practice-based research project -a journey has been started.

Background

Bodnant Community School

Bodnant Community Primary School was formed in January 2012, through amalgamation of the former Bodnant Infant and Junior Schools. At the time of the project a new build was being completed to enable co-location of the infants school on the same site as the juniors. However, throughout this CPD programme with Gaia the school continued to operate on the two separate sites.

The school is in the seaside town of Prestatyn on the North Wales coast. There are just over 430 full-time pupils from four to 11 years of age in 17 mainstream classes. A further 60 part-time pupils attend the nursery either for a morning or an afternoon session. The majority of pupils come from homes that are neither significantly advantaged nor disadvantaged. Nearly all pupils speak English at home, but a very few speak Welsh as their first language.

Before 2104 the use of Information and Communications Technology (ICT) was not well organised. The school was well-resourced with Interactive White Boards (IWBs), laptops, and a computer suite, but the effectiveness and impact on education of this equipment depended on the background knowledge and confidence of the teacher using it. Pupil progress using ICT was varied and drew on their competence from home.

Then, in 2013, the Welsh Government implemented a new initiative: The Literacy and Numeracy Framework[2] . Suddenly, teachers were required to show evidence regularly of how the numeracy and literacy skills taught in Maths and Language lessons were being applied across all other subjects. The School Management Team (SMT) saw this as an opportunity to be more creative in the development of pupils' skills and the use of technology in particular.

Through an established relationship between Gaia and Denbighshire County Council, Bodnant Community Primary, employed Gaia Technologies [3] as experienced education consultants in digital technology to support forward development. The aims of this partnership were to drive future procurement and deployment decisions and to develop a framework to inform planning of progressive edtech skills development and application use as pupils grow through the school.

Since a new Bodnant Community Primary school was being built the governors and senior management team (SMT) decided to invest substantially in an effective IT infrastructure throughout the new school. This initiative was seen as an important element in ensuring that each student achieved full potential.

---

[2] http://learning.gov.wales/resources/browse-all/nlnf/?lang=en

[3] http://www.gaia-tech.com/

The associated Gaia professional development programme that ran from March 2015 to July 2016 had three components:

- development of an educational edtech vision and skills progression model to drive future decision-making re procurement, deployment and user training;
- boosted interactive use of IWBs (specifically Smart Notebook) across the school and curriculum;
- developing and deploying a virtual workspace using Google Apps and integrated on-line software services.

Additionally, Gaia was intending to involve its innovation specialists to support initial use of green screen technologies and video editing as a sponsored contribution from Gaia. The school agreed to identify ICT Champions who would lead and coordinate the projects above.

One of the reasons for choosing Gaia was that the company offered a developing programme of practice based professional learning and student engagement support that would ensure that the investment achieved results. Bodnant SMT wished to use the additional Gaia, *Innovate,* Continuing Professional Development (CPD) programme to work on very specific aspects related to their priorities.

An industry, education, research partnership

This CPD programme was supported by Gaia research associates, the MirandaNet Fellowship[4] based at De Montfort University. Professor Christina Preston led the parallel research project supported by Dr Sarah Younie, internal evaluator and Dominic Preston, Senior Researcher. These researchers would work alongside the educators and Gaia in the processes of learning that involved planning, training, coaching, mentoring and evaluation. The research was intended to help the participants evaluate what they had done and decide on the best way forward.

Established in 1992, MirandaNet is a professional organisation of educators who specialise in innovation in teaching and learning. Fellows work alongside teachers, students and technology innovators helping the participants to identify the successes and challenges as they modify their plans for the future. All the participants contribute to a practice based research report and they are also eligible for an award if they web-publish their final report and advice to guide other teachers. Pupils involved can also gain an award.

MirandaNet researchers would work with Bodnant and Gaia to implement a practice based research based evaluation of the specific projects looking for:

- impact of the vision statement and progression model upon curriculum planning, teaching and learning;
- improvement in use of interactive presentation technologies in classrooms;

---

[4] mirandanet.ac.uk

6

- impact of the developing virtual workspace upon teaching & learning and improvements in the process of engaging parents as co-educators.

The MirandaNet mentoring was intended to empower the teacher champions to drive the projects internally, thus reducing the need for Gaia management input, and to ensure that appropriate evaluation data was collected as the programme unfolded.

The education element of the partnership was composed of two members of the SMT, co-researchers Tristan Hughes and Caroline van Niekerk. Representing industry was the Gaia education lead Bernard Dady and account manager Martyn Wilks. They initiated the Innovate programme before handing over to Joe Basketts (Senior Education Technologist) who was the Gaia project leader. These three were also co-researchers in order to draw on company experience, as well as to provide the company with an opportunity for in-depth learning.

The notion of the education, research, industry partnership is based on Rose Luckin's Golden Triangle of Evidence-Based Produce Design (Luckin, 2016) (Figure 1):
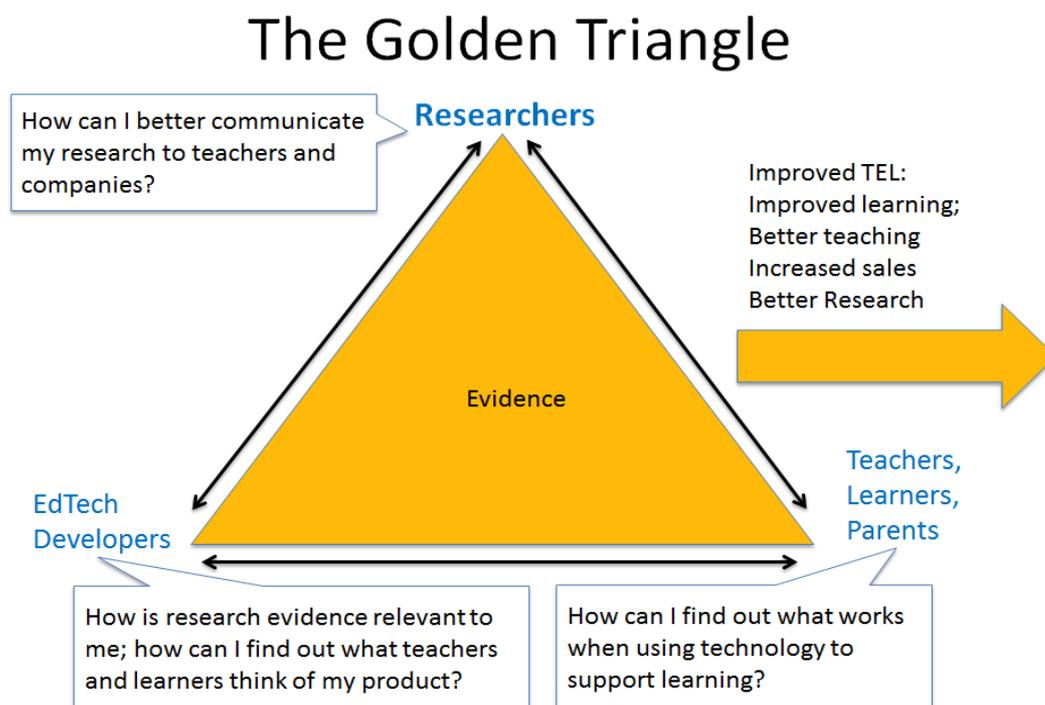

Figure 1: The Golden Triangle of Collaborative Evidence-based Product Design (Luckin, 2016).

The involvement of the teachers in the three schools as co-researchers meant that they have all been invited to comment on the data as means of increasing knowledge sharing.

Management of change

Unlike many of the companies who specialize in installing digital systems, Gaia's approach always starts with teaching and learning. They are committed to providing teachers with access to reliable and intuitive technology which will help them deliver exciting and relevant learning experiences and lessons. They pragmatically support use of technology to better deliver that which is proven to work in improving progress and raising standards. However, Gaia will also help innovate so that young people experience learning activities which will best prepare them for life and work digital world. Finally, Gaia staff are working at the interface of pedagogy and technology to help educators transform learning and teaching.

The Gaia team want to help students learn more effectively in, around and beyond school:

- through access to experts and as critical users of digital information;
- by working together and learning collaboratively;

- by creating and being creative with digital media;
- through enquiry, research and exploration;
- by practising and applying in interesting contexts;
- by receiving feedback through purposeful assessment.

At the heart of this approach lies commitment to **developmental partnership** that accords well with the Luckin Golden Triangle. As education technologists they seek to help teachers blend their pedagogic and subject knowledge with insight into how ICT can enhance and improve learning. The process is seen as a development journey - identifying when and how ICT adds value and makes a difference. At the core of this professional development offer is commitment to improving the digital literacy of staff and students, not only to improve teaching and learning but also to ensure that young people are prepared for life in the knowledge and digital economies.

This involves doing some things better through effective use of ICT. It also involves doing things differently - innovating with advanced technologies and recognising that ICT is driving change in the way that people learn and work.

In this spirit the Gaia Technologies, Head of Education Transformation, Bernard Dady and the Senior Management Team (SMT) of Bodnant intended this project design to inform future decisions about how to develop innovative practices in the school, to assist in raising the skills of teachers and to promote student achievement.

The practice based model of CPD that had been proposed was expected to help the school to demonstrate:
- professional learning for teachers;
- ICT enriched teaching & learning;
- return on investment in technology;

Learning by doing

Using their knowledge about effective CPD from the literature review and the experience of the team, Gaia discussed with the senior team the kinds of projects that would fulfil their aims during the time that the new build infant extension was being erected. This process was supported by the initial project, *Visioning and Strategy,* that was intended to align the technology offering with the needs of the school. The second project, *Developing innovative teaching and learning using Interactive WhiteBoards (IWBs)* was designed to ensure that these boards that had been supplied before the Gaia project were used more often and to better purpose. The third project in this ambitious initiative was the opportunity that Gaia offered to sponsor a green screen video project. This was an opportunity to bring learning to life through a multi-disciplinary topic on *Mars exploration.* Gaia offered the services of its lead video making professionals to support the storyboarding, video shoot and editing process.

The lead teachers were invited to present their achievements at a MirandaNet workshop in May where they shared their findings with practitioners from all over the country. For this contribution they received a MirandaNet Fellowship award. There was also an opportunity to engage in MirandaLink debates over the year.

Gaia Technologies education leaders, Bernard Dady, Martyn Wilks and Joe Basketts facilitated the meetings, workshops and undertook development tasks to support the programme.

Vision and strategy: project one

The Gaia team agreed with the Senior Leader Team (SLT) that right at the start of the initiative they should assess current practice and barriers to use of edtech as well as desirable solutions through on-line survey as well as interviews with teaching and support staff.

After examining this baseline the next task to identify priorities in the education vision and translate these into an education vision for the school that was underpinned by appropriate technology options.

At this point a strategy was agreed describing and mapping use of edtech across the curriculum to ensure progression and impact on standards. The Gaia team agreed in this context to provide a briefing to inform staff and foster inclusivity.

All the parties agreed that change would not be effected without full staff agreement. The first step was a Visioning workshop run by Gaia for the Bodnant staff that had twofold aims:

- to introduce the teachers of both infants and junior departments to the new two year CPD programme;
- to more fully understand some of the perceptions and issues that staff have, with regards to access and use of technology in the classroom.

This workshop was to be followed up with the audits: firstly providing information about individual teacher's edtech skills and secondly, their use of

edtech in the classroom. The outcomes were expected to inform the school's overall edtech vision statement.

The first step was to get feedback based on the six elements of the *Self-review Framework (SRF)*[5]. The questions covered four main topics and the feedback provided plenty of detail to work on.

The next stage was a visioning session planned as an interactive session where staff were divided in to groups of three (Appendix Three). Each group was asked to create a prioritisation matrix built on their perspective of edtech as a tool for teaching and learning. For convenience the results were captured as photographs and changed to a table by the researchers.

Discussion was focused on their subjective and perspective about topics. For example, they defined 'video' variously as YouTube, BBC iPlayer. Subscription services they defined as BrainPOP.

Interactive Classrooms: project two

Gaia's associate trainer and Smartboard specialist, Steve Crowther, provided two days training input to upgrade staff skills and develop two advance users who could then peer mentor colleagues. The staff were keen to improve their use of the IWBs and Smart Notebook as a tool for interactive presentation and learner engagement.

The aims of this programme focused on:
- understanding why some global governments funded IWBs for all classrooms in the 1990s and early 2000s;
- exploring how professionals were using IWBs in classrooms;
- developing a professional development programme that makes full use of IWB in school;
- stimulating a debate in the staff room about innovation in education linked to the opportunities of the new build.

Although the staff intended to learn more over the term about the history and pedagogy associated with IWBs they first wanted to explore operating issues like appropriate connections to classroom devices so that they could enable presentations from tablets from the classroom floor or manage localised access to Smart Notebook on student devices.

The extended programme developed to include: a whole staff training day; more intensive training for the lead teachers; establishing a mechanism for internal sharing of practice and techniques; preparing the two lead teachers, Tristan and Caroline, to mentor their colleagues and provide in-house support. In addition they established a series of short teacher led workshops to showcase further ideas and strategies for making good use of the Smartboards and Smart Notebook.

---

[5] Follow the link: https://www.naace.co.uk/publications/srf-overview-six-questions/

This programme of planning, coaching, mentoring and evaluation in which all the teachers would explore the impact of use of IWBs in their classrooms was facilitated internally by the two identified 'lead teachers' with trainer/consultant support from Gaia and MirandaNet.

Green Screen Video: project three

In Wales, the National Literacy and Numeracy Framework (LNF) is designed to help teachers embed literacy and numeracy into all subjects for learners aged 5 to 14. The new National Curriculum will add digital literacy to this expectation.

The LNF sets the skills that the school expects learners to develop:

- oracy across the curriculum;
- reading across the curriculum;
- writing across the curriculum.

Within numeracy learners are expected to become accomplished in:

- developing numerical reasoning;
- using number skills;
- using measuring skills;
- using data skills.

Bodnant developed with Gaia support the idea of a practical, cross curricular project where the pupils would learn through a flexible multi-disciplinary topic entitled 'a Mission to Mars'. At the heart of this would lie a project-based learning approach, leading to production of a digital product. The staff knew that this "new" initiative would mean an increased workload but they were keen to tap into the pupils' creativity as an effective way of developing their skills.

Gaia offered, at no cost, to support the initial use of green screen video technology which would take the two lead teachers and their Y5 classes on an exciting journey into uncharted waters. To do this the team planned a detailed programme that included monitoring and progress reporting on use of video technologies to support the topic with two year 5 classes. Gaia and the lead teachers agreed a method for evaluating the impact of the project. The lead teacher was expected to deliver a presentation to indicate what had been achieved.

The teachers embarked on a project focused on promoting a tourist Mission to Mars. They were expected to work in small teams to investigate items like the practicality and cost of getting to Mars, the science of the planet and the issues confronting visitors to the Red Planet and how they would promote a trip to Mars to visit.

Gaia equipped the teachers with guidance on how to set about making a video, the digital product, which would showcase the learning. For the teachers this involved first use of the newly purchased green screen video equipment. Gaia implemented an Improvement through Creative Teaching and Current Technologies (IMPACT) projects is a methodology by which Gaia deploys specialist professional from its

studio team to work alongside teachers and students. In this case Gaia deployed its lead video professional, Paris Wharton, and sound engineer Carl Richardson. Working with Joe Basketts and the two teachers. They focused on helping the teachers and students with the process:

- storyboarding & scripting;
- filming against the green screen;
- editing.

Expanding the classroom: project four

From Expanding the Classroom the strategy that emerged was to developing a 'cherry picking' approach to Cloud services. The team were focusing primarily on Google Apps for Education (GAFE) as the main delivery method of the digital workspace but still incorporating additional tools from *Hwb+*, the SharePoint based VLE developed by the Welsh government and currently on offer without charge to Welsh schools. They also looked at other offerings.

This project was about supporting the development of the use of a parental facing website, designed to disseminate digital resources to support home/school links and to facilitate effective storage, access and retrieval of digital materials in the support of teaching, learning, management and administration, including promotion of home-school links.

The school wishes, ultimately to develop an integrated approach to Cloud services, including assessment, monitoring and tracking using the management information system (MIS), the monitoring and tracking software INCERTS [6], student E-Portfolios and other assessment tools like quiz and test building software.

Before they could set out on this journey decisions needed to be reached as to the core platform upon which a range of service could be built. Bodnant did not have a VLE but did have access to Hwb+, the VLE solution promoted by the Welsh Government. This product is a SharePoint based product and is currently available to schools in Wales without charge

The Gaia team were provided consultancy and support for developing Cloud services and as part of the discussion reviewed with the school the options: develop Hwb+; adopt Google Apps for Education (GAFE) or purchase a commercial VLE.

Questions

The focus of this topic was the value to the school overall of introducing innovative technologies, alongside a CPD programme for the teachers. In each project the leaders decided on the questions they wanted answered that were specific to the topic. However, the MirandaNet team was exploring answers to some questions

---

[6] https://www.incerts.org/

that relate to the success of the intervention across the school including if possible the impact on the parents, the students, the teachers and school policy.

How have these interventions impacted on the practice and policies of:

- students;
- staff ;
- senior leaders ;
- parents;
- partner company.

The questions that were devised to show evidence of management of change in the first year were:

- How has pupil engagement and achievement changed?
- At what stage is staff engagement, skill improvement and curriculum adjustment?
- How has school policy changed?
- What is the partner company now doing differently?
- What advice emerges for other learning establishments and company suppliers of digital technology?

(Davis, Preston and Sahin 2009 a & b)

The questions that this project aimed to answer in this first year would be built into further projects in the next two years and refined. The answers to these questions will provide options for the school in the next year of the project.

Methodology

Evaluating CPD initiatives
This is a practice based study in which teachers, researchers and developers work together in reflecting on the introduction of innovation.

In this report an overall picture of the success of the CPD has been built up using a well-tested model, Guskey's five levels (2002). The Guskey framework has been successfully used in the past to evaluate and measure the impact of CPD programmes in a variety of contexts but the theory depends on the principle that the teachers will be fully involved in the process of evaluation rather than the model where the researchers simply observe the teachers and report on them. The latter approach does not give the teachers ownership and, therefore, limited change in practice and policy is achieved.

Guskey showed that the quality of professional development is influenced by a range of factors: content characteristics, process variables, and context characteristics.

- **Content Characteristics Variables** include the new knowledge, skills, and understanding that are the foundation of any professional development experience or activity.
- **Process Variables** include the types and forms of professional development activities and the way those activities are planned, organised, carried out, and followed up.
- **Context Characteristics Variables** include the organisation system, or culture in which professional development takes place and where the new understandings will be implemented.

The results of CPD programmes can be analysed from the perspective of Guskey's multilevel framework to evaluate teacher professional development. He laid out five critical levels for the evaluation of professional development programmes in general: (1) participants' reactions, (2) participants' learning, (3) organisational support and change, (4) participants' use of new knowledge and skills and (5) students' learning outcomes.

This approach to analysing the impact of innovation has been built up in several studies about the role of digital technologies in the change process that MirandaNet Fellows have published. Their focus on professional development in digital technologies began with the government-funded programme in England and Wales intended to engage teachers in innovation and pedagogy that lasted from 1998-2003 (Preston 2004). This report was based on the evidence from two large commercial companies who were training providers and Davis, Preston, and Sahin (2009a, 2009b) re-examined the statistics from the perspective of the small local trainers. The method has also been used, again successfully, to analyse the impact of three CPD programmes designed to help teachers introduce tablets into schools (Preston and Younie 2016). However, Guskey findings suggest that embedded change would be expected to emerge over about three years so this study can only record emergent trends at Bodnant.

In this case, the staff were survey to find out what their basic level of skills and knowledge was. Martin Wilks provided the outcomes of the Visioning workshop.

Findings

The findings are recorded from several different perspectives on the overall project: the results of the base line survey, information from the visioning workshop, interviews from the key school leaders and the results from discussions with leaders in other schools about how innovative pedagogy could best be implemented in the classroom.

Since there has been a new build at the school during this year of staff development, the investment was made in Innovate in order that ultimately attainment at the school would be improved. It was, therefore, vital to have the teachers as the first stage of training to ensure that teaching became interactive so that increased pupil engagement and attainment would follow. This first stage of Innovate ensured that a developing a high-level vision at the school was in

progress, that procurement was relevant and relevant skills in the school were increasing.

Visioning and Strategy: project one

Base line survey results
The survey carried out in Autumn 2015 looked at two things:
- staff self-assessment of their own ICT skills and competencies
- application of technology in the context of their work

The skills survey had 30 responses. It was completed by teachers and teaching assistants. The survey scored 0 – no use or skill to 3 – confident and can help others. Key findings were:

- over a quarter of the staff perceived that they had no insight into copyright and intellectual property rights, whilst just under a quarter felt confident in this area;
- generally staff felt confident about working safely on-line;
- around 84% of the staff felt reasonably or very confident that they could take digital photographs and upload them to Cloud storage; this relatively high level of confidence translated into using images in PowerPoint;
- levels of confidence were generally much lower once activity involved image processing (13% very confident) or use of scanners (20% very confident);
- about 80% responded that they had no skill or lower levels of confidence in using visualisers;
- there were no very confident users of video and animation technology with only 37% stating that they had a little confidence and over half having not used the technology;
- levels of confidence were much higher in respect of capturing media using cameras and recorders;
- levels of confidence in handling different file formats and editing were very low, with 60% stating they had no skill video editing;
- very few staff stated that they were confident of very confident in inserting videos into presentational software (just under 10%);
- social networking skills amongst staff are high with all staff stating some confidence and over three quarters being very confident;
- the pattern was less consistent when it came to using blogs, forums and chat technologies;
- general skills with Office applications were more secure but staff knowledge of connection with web based platforms was more diverse;
- there is very little skill amongst the staff on using a VLE with only one member of staff stating that they were very confident and 57% self-assessing as having no skill in that area;

- capacity to make presentations is also very varied and overall the survey revealed that most staff were unconfident or had limited confidence that they could do this,
- nearly everyone felt able to research on the internet but only six members of staff used software to capture and collate that information;
- just over a half of the staff are confident or very confident in using spreadsheets and producing graphs and charts but skills fall away quickly when it comes to searching and sorting data to answer questions;
- over half the staff had no experience of data logging and only two people judged themselves very confident;
- confidence and competence in areas of programming are generally quite low but staff were more confident about using a programmable toy;
- less than 20% of staff were confident or very confident about sharing files with pupils at home (reflecting absent history of VLE use); and
- confidence was generally low regarding extending learning with ICT although the school has two staff that feel very confident in this area.

The ICT use survey was completed by 18 persons: 18 teachers and 3 teaching assistants.

Overall the SMT gained a clear picture of staff competence and could plan professional development in accord with the programme. In detail the survey showed that:
- use of ICT to support curriculum development and planning is not secure. Only one teacher did this frequently and the rest concluded that they did this rarely;
- despite the investment in IWBs, over three quarters judged that they rarely or never used ICT to explain, model, instruct and demonstrate using interactive technologies;
- only two members of staff used ICT to support assessment frequently or often;
- six members of staff never used ICT to record achievement and a further 8 did this rarely;
- despite investment in the Incerts[7] assessment software only half of the respondents stated that they made frequent use of ICT to track pupils' progress;
- the use of technology to create projects in writing and number is not frequent overall;
- The use of technology to research information is used more widely, although still a low level activity compared with some other schools;
- any other form of production using technology is likely to be an infrequent activity and probably is restricted to experiences with a specialist ICT teacher;

---

[7] An assessment tool https://www.incerts.org/

- 44% of the staff stated that they thought that the time cost of using ICT was never worth it compared to the benefits to learners and a further 50% judged it to have impact infrequently;
- Staff were more positive about ICT producing learning gains for pupils with 44% suggesting this happened often or frequently, nevertheless over half though never or infrequently.

Generally, the baseline surveys show that staff at Bodnant are low level users of ICT and there is a mismatch between the investment in presentational classroom technology, teacher confidence and skills and current levels of use. There is clearly a long journey to be undertaken. Targetted long term professional development would be a solution.

Visioning workshop perceptions
Given that vision has to be lead from the top, it was encouraging that the head also attended this workshop and took ownership and showed commitment to the developing plans. However the group answers to the visioning exercise indicated how much CPD was required at this early stage.

In the first exercise these were the comments agreed up by the whole staff.
Leadership & Management
- *Feedback*: There was evidence of departmental support between colleagues, albeit on a small scale. There was also recognition that Caroline (ICT lead teacher) was considered to be the first port of call for any in-class support. There was however, very little evidence of the sharing of good practice or exchange of ideas with regards to what does/does not work.

Planning
- *Feedback*: Some staff were using the Incerts[8] programme in order to provide guidance on the teaching of ICT skills as well as dedicated lessons to teach the relevant skills in order to achieve the target. But there was no systematic mapping of ICT across the curriculum.

Learning
- *Feedback:* There was a unanimous acknowledgement that the use of edtech can help students become more effective and confident learners, partly because they are more inclined when using computers, to want to research and take the initiative with their learning. It was felt, however, that students were not given enough opportunity to use technology, generally due to device access.

Assessment
- *Feedback*: Assessment was seen to lead on from the 'Planning' feedback in as much as is used to assess students, as well as inform planning.

Professional Development

---

[8] Incerts is an assessment tool for teachers: https://www.incerts.org/

- *Feedback*: There was a clear understanding and desire to want to sign into professional development starting with basic classroom technology support. In particular they wanted to make more effective use of the interactive whiteboards that currently were mostly in cupboards.

  Resources
- *Feedback*: There is relatively good provision of technology in the junior department, but this is concentrated in the two IT suites. The staff found this arrangement restrictive because planning and forethought are required. Staff cannot respond to need for spontaneous use. Use of technology was also impacted on occasions because of the lack of continuity of software on laptops that were brought in to the classroom.

An analysis of the results of the second exercise is taken from the table of responses for the five groups of staff (Data in Appendix Three). These collaborative replies indicate how varied the staff skills are represented across five columns that are explained here:

- Column One, DO NOW, indicating what skills they had at that moment;
- Column Two, DO NEXT, shows an overall enthusiasm to take on new tasks;
- Column Three, DO LAST, indicates the skills that the staff will need longer to learn but feel that they are willing to take these on;
- Column Four, NEVER, shows the levels of perceived competence across the staff in some areas because they are asked what they will never do in class.

This final column, NEVER, indicates lack of confidence to engage in some of these tasks, reluctance or actual distaste that would need further discussion:
- Group Two is willing to take on any task eventually believing that they have the capacity so there are no entries in NEVER.
- Group Five only has one NEVER entry: deploy, collect and mark assignments in digital form
- Group One also agrees that they will never 'Deploy, collect and mark assignments in digital form' which means that they will not support the submission of any work in digital form.
- Group Three will never: provide information for parents; facilitate learning at home; capture and provide access to lesson content; or, display video on demand. Like Group Four they will also not respond to quizzes, tests and surveys
- In addition, Group Four will not: write blogs and make web sites; use productivity software such as a Word, Publisher, Excel or Powerpoint; play educational games; measure, record and evidence progress and achievement; take, organise, edit and present photographs; make digital presentations for their class to view.
- Like Group Three, Group Four will also not 'provide information for parents'.

The results suggest some strong opinions amongst the staff about the value of edtech and raise a number of questions about the different levels of CPD that the staff will need at this early stage.

Looking more closely at the NEVER entries, for example, in some cases suppositions could be made that this task might offend against a member of staff's beliefs about what professional teachers should be asked to do. However, some of the NEVER replies indicate a lack of understanding about what the task is because they have had little experience of computers and may not have the vocabulary.

Another particular conclusion that could be drawn is that many teachers do not understand the potential of digital technologies in promoting independent learning and collaborative learning, or that these are pedagogies they do not employ in teaching and learning.

In the light of the group exercise, it is clear that Bodnant staff have disparate views about what teachers should be doing in innovation as well as possibly some lack of knowledge or misunderstandings about what these tasks meant. Group dynamics will also account for the negativity of some of the groups. Not only was more whole staff visioning required but also clear guidance on what should be available for pupils in a digitally rich environment and an agreed professional development programme.

Senior leaders' observations
Evaluation interviews were conducted with the two school leaders of the project: the strategic leader, Tristan, and the operational leader, Caroline. The two leaders explained that overall the new build and ICT upgrade provide a good opportunity to enable parents and pupils to better understand what the school was aiming to do. The school had been in partnership with Gaia from the outset of the project and had worked with them on a proposal together for this two-year programme.

Parents and pupils were not involved in these initial stages. However, the leaders spoke to the School Council where they discovered that some of the pupils were 'amused' by the teachers' poor usage of the technology. Pupils found the teachers' basic errors comical but were also keen to help.

In detail the leaders had set out to:
- develop a clearer direction on purchasing hardware in order that money was saved and spent more wisely.
- make a bigger impact on learning side by tapping into a massive resource to aid learning
- use technology to interact more with home and maintain contact.

Tristan Hughes was the strategic leader, who had undertaken the task of acting on behalf of the school to improve edtech provision for teaching and learning particularly to increase focus and attention. In the past the use of technology had been ad hoc and his plan was to develop a more strategic approach with the support of Gaia. Together they had focused purchasing around the needs of the school with intentions to look particularly at IWBs and green screen moving onto

Google Apps. In particular, he wanted to maximise the investments in these technologies as they were in the school but were having limited impact.

Caroline van Niekerk who joined Tristan intended to have more direct contact with the teachers and teacher assistants. Her job was gathering feedback, asking questions, and helping and making suggestions based on training. She aimed through mentoring to develop staff confidence and resources at the operational end of the project.

Interactive classrooms: project two

In terms of background Tristan Hughes had only used interactive white boards (IWB) in a basic way mainly as a digital writing screen. He was keen to enhance his own skills as well as the staff.

In the same way Caroline was learning on the job after the formal whole staff training that had galvanised the staff. It was evident that many staff were sympathetic to innovation in the visioning workshop but that quite a high proportion had few skills and very little understanding of what computers could bring to teaching and learning. Also the school's vision of pedagogy was not clearly defined.

Caroline and Tristan planned the resultant CPD initiative with Gaia, based on the data from the survey and the visioning workshop which made it clear that more training was wanted and needed.

After the visioning process all the staff felt there was a lack of direction in the school's use of technology and a clear strategy. Until Gaia offered their support, decisions about using the technology they had was based on 'what other schools' were doing. They were particularly pleased with the results of the Mission to Mars project that they could not have undertaken without the sponsorship of Gaia staff. This had allowed the staff to experiment with innovation in teaching and learning.

The first step was to investigate the hardware and software themselves and work out how to use it. Importantly the head was keen to go ahead and introduced the project to the staff emphasising his support for this. There followed the whole day training on IWBs, run by Steve Crowther from Gaia, for the teachers, teaching assistants and pupils. In order to help them get the most come the boards, Steve went into some detail about how the board worked, introduced basic functions and then introduced more complex uses. One teacher commented that this was "the best training we have ever had".

However, this first training, of necessity, was very basic focusing on turning the kit on, connecting and making use of basic tools in Smart Notebook. All teachers were given the opportunity to rehearse the taught skills on the training day. There was only time to do a bare minimum on device connectivity and mirroring. Overall, the initial training had very positive feedback via the evaluations. After the advanced user training for Tristan and Caroline, the school committed to a series of short 'how to' sessions in which new techniques with Smart Notebook were drip-fed to staff.

Green Screen Video: project three

Tristan had also planned the Mission to Mars (Appendix four) project with Gaia staff in which the pupils had taken a range of roles in real time. In setting up the mission they had:

- created the role of the space scientists;
- set up the astronaught training programme;
- established research teams.

They had also had to practice vital work routines like:

- being answerable to the mission leader and the world leaders who were asking for information;
- working to deadlines;
- creating the first ever tourist guide to Mars.

The benefits of this project were:

- they were using IT creatively using state of the art technologies;
- working closely with Gaia staff in a professional context;
- the end product, the guide, was a digital web publication that reflected the pupils' engagement and involvement.

The project leaders were particularly enthusiastic about the engagement of some pupils who could be difficult to teach or had learning difficulties. Collaboration in group work was effective in the learning process.

So that the teachers could concentrate on the teaching and learner support, Gaia facilitated the film-making process and the pupils' output was taken back to the Gaia studio where the two videos were edited. Bodnant's Mission to Mars 1[9] and Bodnant's Mission to Mars 2[10] were presented to audience at the end of the school term:

> *Just wanted to let you know that Paris has sent over the films this evening! Both Caroline and myself are absolutely blown away by the quality! The work that Paris, Carl, you and everyone else have put in is very much appreciated. We could not have wished for a better result! The thought of the reaction of the children tomorrow night when they see it for the first time is really exciting. I don't think I've ever been more excited about the prospect of a day at school!!*

The videos were posted to Gaia's You Tube Channel so that children and their families could view the product of the Mars project and they now feature on the school website.

The project demonstrated the power of project-based learning and the teacher researchers reported:

---

[9] https://www.youtube.com/watch?v=XTUBqV64dFo

[10] https://www.youtube.com/watch?v=0HNtcqe9R9k

- high levels of enthusiasm of the students;
- application of literacy and numeracy skills;
- problem-solving;
- team work;
- creative application.

Tristan shot video of some of the pupils working in order to capture evidence of some of the learning processes and gains made by the students. He, and Caroline, presented this to participants at the MirandaNet conference in June 2016, where he described the progress that his pupils had made in applying both literacy and numeracy skills as well as demonstrating quite sophisticated learning in science.

A key experiential learning activity was the staged visit to the school of aliens. The school was set up as a 'crime scene' with evidence of the alien visitors planted around the school. This engaged the pupils and stimulated a powerful response that drew on the children's imagination and skill at assimilating evidence.

Pupils used laptop computers to investigate Mars, and apply mathematics. They worked in teams of three or four to build a picture of Mars and the logistics of visiting the planet. They were then charged with creating a promotional video that would explain to potential visitors what their trip would be like, including analysis of some pros and cons of such a vacation. All the pupils were involved in shooting the video clips and presenting to camera.

The videos demonstrate that the pupils made strong progress in developing, knowledge, understanding and skills. The presentations are thoughtful and entertaining with evidence of creative writing, good presentation skills and thought about the content. They clearly applied their literacy and numeracy skills through the project and learned a significant amount of science as they investigated another planet. Motivation levels were high and behaviour good throughout. Staff and pupils are very proud of the videos that they made with Gaia's help.

Overall the project had been fun for teachers and pupils, which in the teachers' view had contributed value to the learning.

Expanding the classroom: project four
The school were clear almost from the outset that their preference was to move down a Google route. Due to the focus on the green screen and IWB work the development of this project was deferred to the end of the year. Thus at time of writing the school is in an early stage of adoption. Gaia has helped set up the Google Apps for Education (GAFE) account and has provided basic training in use of Google Apps.

One of the key factors in making the decision to go down the Google route was the intuitive interface. Compared with working in a SharePoint VLE both the school and Gaia concluded that GAFE is much more suited to use by primary teachers and pupils. The school is moving its e-mail accounts from Exchange to G-Mail.

The input to support development of Google Apps to provide VLE functionality was delayed until late in the summer term. Some technical issues had to be resolved before roll out could be achieved. However, these were resolved and the school has proceeded to adoption of Google Apps for Education. The programme concluded with a GAFE training session held at the school. This Cloud based platform was new to most teachers. However, the training was well received with very positive evaluation.

Identify three key skills you have achieved today	How can you apply these key skills with pupils?	How will these key skills improve pupil / student learning outcomes?	How would you rate the clarity of the presentation	How would you rate the pace of the presentation	How would you rate the presenter's response to questions?	How would you rate the quality of the support materials (printed or online)?
Understanding cloud. Create documents using google. Shared documents.	Lesson introductions, useful for setting homework and collaborative work.	Improve engagement.	Excellent	Excellent	Excellent	Excellent
creating a document transferring word in to google drive how to share a document	Not yet as working in foundation phase but will do in future	engagement of learning	Excellent	Excellent	Excellent	Excellent
Setting up a group. Creating a folder. Creating a document.	Children can add research to the files that I have created. With the right technology there is a good opportunity for live QandA with the children.	Teaching them more advanced ICT competencies.	Excellent	Excellent	Excellent	Excellent
How to use Google Drive. How to share documents. How to edit shared documents.	Not sure yet.	Digital literacy competencies will be easier to achieve.	Excellent	Excellent	Excellent	Good
Create a document, insert a picture, create a powerpoint	During lessons to share information	Able to share information instantly, edit work.	Excellent	Excellent	Excellent	Excellent
How to log on and access Google drive, How to share documents, how to make a shared document and edit.	Making powerpoints initially, working together on one piece	Peer assessing and learning	Excellent	Excellent	Excellent	Excellent

How to open and use documents How to share documents How to use programmes within the cloud	Not at the moment, that's something for the future!	Eventually, brilliant!	Excellent	Excellent	Excellent	Excellent

Further development of the environment will take place during academic year 2016-17.

Discussion

In considering what had taken place over the year the CPD leaders answered the questions related to Guskey's essential measures of success. They could explain, for example, what **basic preconditions had been essential to the success of the project**. The first was the pre-project survey of staff ability that alerted the senior leaders and whole staff to their personal profile in edtech knowledge and skills. Gaia's advice for to the school was to assess the staff needs first and then tackle the challenge head on. This was recognised by the two school project leads, "As a staff we need to be clear about what needs to be addressed. You need to start with an honest assessment".

The second **basic precondition** was to ensure that the all the staff including the teaching assistants and the senior team were supporting the project. Being engaged in the visioning process was the best example where the staff charted what the school had already done, what should be considered next and what could be left to the future. They also had the right to identify elements of edtech practice that they did not want to be involved in. They suggested that notice needs to be taken of the reasons why some teachers hold back on some tasks. Research indicates that frequently they had good reasons to be reluctant to forge ahead with digital technologies (Pachler, Preston, Cuthell, Allen and Pinhero 2011).

It is encouraging for the future of edtech at Bodnant that Caroline and Tristan had learnt so much about teacher education and change by undertaking the responsibility thoughtfully. In running this CPD programme said that they had had to adapt to the pace of their colleagues and their motivational triggers. For example, had found that, in the initial stages, technical success needed to be speedy because if the equipment did not work immediately, initial enthusiasm would die. Because technical skills were mastered quickly the momentum from the training seemed to carry through and staff attitudes were very positive. Some practical and technical issues had arisen but had not posed real risks to the programme.

The leaders realised that they needed to make sure the initial enthusiasm did not disappear because of a cascade of the information from them. One large session was a good starting point but small steps also needed to be drip-fed. So they improved staff ownership of practice by encouraging the teachers themselves sharing information in staff meetings regularly. Every month they shared a skill on the IWB for ten minutes. The teachers were then encouraged to try it out and feedback on their discoveries in the next meeting. In addition, Tristan was

including technical information to staff on a drip feed basis to promote use of Smart Notebooks. This ensured a regular flow of information lead by the teachers. As a result of this concentration on transfer of knowledge, in the last term teachers began to explore the lessons they were learning from the 3-D Mars exploration project.

By engaging teachers in sharing their learning in this way, the leaders were able to track changes in staff practice although they were careful not to make these observations feel like surveillance. By encouraging feedback from staff the conversations were 2-way rather than instructional. Mutual discovery of information was effective as people like their discoveries to be heard as well as raising the issues. In general, the staff gained the leaders respect by being honest about their skills and capabilities.

Through this process there has been observed and demonstrable improvement in use of the interactive classroom presentation technology. Staff who now use all the features and have built them into their interactive lessons.

An incidental result was that the staff realised that the training had improved their credibility with pupils. In addition, they had been more relaxed about asking pupils to help them. In fact, help from pupils was formalised because with selected student digital leaders advising on the Mars green screen project. This exercise was then used as a spur to recruit more pupil digital leaders to support the teachers.

Overall the evidence from this first year suggests that there are staff achievements to be built on: practice has changed substantially in the school with all using the staff using the IWBs that had previously been neglected. The leaders felt that the training project had progressed as expected with no unexpected surprises. "It is the norm now", Caroline commented, "to see the whiteboard being used".

The staff were pleased to report that the improved use of interactive and visual technologies has had a positive effect on pupil engagement in lessons, particularly for boys. Notably this was observed to have had a positive impact on writing within the Mars Exploration topic.

However, this anecdotal evidence aside, there has been no discussion as yet about how using the white boards is actually helping students to learn. Theorising and understanding this should be the next step in the second year. A challenge that needs to be overcome is that the software is only on staff machines.

The leaders thought that the training model employed to promote IWB use could be used for other areas of ICT use. The original input had been evaluated very positively and the lead teachers felt well supported with the advanced training input. They would continue to follow the model to see how it develops in the second year. What had contributed to the success was that all the parties, staff and pupils, had agreed the end goal because they had been bought into the process and were comfortable with it.

The solution and initial training has been established and it is through the next development phase the school can start working towards its aim of using the virtual workspace as a bridge between home and school.

Gaia colleagues and Bodnant staff have won their Fellowship awards for their submission to the MirandaNet website[11] (Appendix 5). This presentation shows how well the pupils adapted to green screen technology for which they can receive a World Ecitizens award.

According to the research into the value of CPD programmes in edtech the real benefits emerge after three years because in the first year the teachers are learning how to use the kit, in the second year they adapt their practice to embrace the edtech opportunity and in the third year they gain mastery in practice that becomes embedded and they change policies to match (Preston 2004, 2009).

However, the initial impact of the 18 month initial CPD programme has been pleasing and projects have overall offered observable and demonstrable improvements especially in the use of IWBs.

In terms of the Guskey evaluation levels the conclusions cover the impact on pupils, staff, policy and the associate company partner.

Positive outcomes for the pupils are:

- The Bodnant CPD leaders have managed to change **pupil** engagement and achievement in ICT by involving them in the teachers' learning process.
- The school has initiated development of student digital leaders. Those students who are now digital leaders are so because of their prior learning in this field, which is mainly developed at home. The students have valued being part of this process with some significant engagement from pupils who are usually difficult in class.
- Through the green screen project there is evidence that collaborative project-based learning can produce high standards, as well as introducing pupils to use of new technologies, whilst modelling demands in the workplace to deliver product to schedule. Pupils produced a good quality digital product which showcased their learning. They applied literacy, numeracy and other soft skills and demonstrated improved subject knowledge at the conclusion.

Positive outcomes for the staff are:
- evaluation of Gaia's training input on both IWB software and Google Apps was judged to be excellent overall;
- many of the Bodant **staff** have increased their use of ICT in pedagogy and acquired some new skills, particularly in use of IWBs;

---

[11] http://mirandanet.ac.uk/education-innovation-pupil-achievement-practice-based-research/abstracts/

- levels of use of the Smartboards has demonstrably increased.

Positive outcomes for school policy are:
- the school project leaders have learned a lot about the process of professional development and leading staff forward with use of educational technology;
- the visioning workshop and baseline surveys produced an accurate assessment of the school's starting place;
- the staff and the head have been fully engaged in promoting change.
- the foundation for the Cloud collaboration and communication environment (Google Apps) has been laid.
- curriculum adjustments are now being considered for 2016/2017.

Conclusions

Overall the research team was looking for evidence about **school policy** changes and **changes** in the partner company approach. The intention was also to provide advice to other schools and edtech installation route starting on a practice based research programme.

In those three areas the first impact on Bodnant **school policy** is that there is now an informed basis for moving forward and key steps have been taken in meeting early objectives i.e. increased use of interactive classroom presentation technology, demonstration of project-based learning enriched by ICT and establishment of the Google platform.

In the next eighteen months the school needs to formalise its vision statement for educational ICT and link this to a vision for pedagogy. The project has not yet succeeded in significantly improving an owned statement of the schools' overall vision for teaching and learning with ICT. Nor has it succeeded in embedding a model for the progression in ICT skills development that was originally envisaged. However, Gaia is able to provide the school with a Framework for the computing curriculum that will help develop pupil knowledge, skills and understanding in a systematic way. This needs to be enhanced by thought as to how this is then applied across the curriculum so that digital literacy, as a core skill, is demonstrated on the same basis as literacy and numeracy through wider teaching and learning activity.

The partner company, Gaia, has learned that the management of a programme such as this is both reliant on the energies of the lead teachers and their own lead educationalists. Maintaining momentum over an eighteen-month period has been challenging. The learning from this project will inform subsequent procurement and installation decisions.

The advice that emerges for other learning establishments from the CPD leaders' is to assess the staff needs first and then tackle the challenge head on. "As a staff we need to be clear about what needs to be addressed. You need to start with an honest assessment".

For company suppliers of digital technology the advice is that such a programme should start with the visioning process and rapid progression to production of an

educational ICT vision statement for the school. This process must involve all staff and be driven by the school leaders and governors. Training and project-based CPD needs to be carefully planned and driven at all levels to agreed timescales. Ultimately, the schools own project leaders sustain action week by week. They bring the content knowledge and curriculum expertise to the table. The ICT partner brings a vision of how ICT can be used and inputs skills development. It may, as in the case of the video editing, take part of the process out of the learning context to speed production and ease pressure on teachers and pupils.

Much has been learnt so far in this practice-based research project - a journey has been started.

The future

The next stage is to develop Bodnant's vision for education technology going forward and to build upon the three key components of this programmes work:

- encouraging the teachers to use edtech more frequently and to develop their skills and confidence;
- developing vision and skills through project-based professional learning set in the context of innovative teaching and learning;
- securing a progressive model for developing pupil skills in ICT and computing;
- delivering on the vision for Google Apps.

A key question is whether the expenditure on programmes like this are sustainable. Gaia has subsidised the process to a high degree out of commitment to developing the process and to Bodnant Community Primary as a valued customer of its wider services. The school needs to reflect on whether it could have come this far without Gaia's input and whether it needs a level of continued input to make the next step. This is a value for money judgement.

The next practical stage for moving forward was going to be a production of edtech resources with access via a shared folder on the network. Additionally, the school had indicated that it will continue the process of sharing of practice in the second year. To support this process, the main request from the school's project leads is for additional training so that they can become a sustained resource for promoting change. Given that one of these leads has been promoted away from the school at the end of the project, there is a need to identify how this gap can be filled. This situation poses a high risk that momentum could be lost in 2016-17.

In addition, the lead teachers think that more technical training for the teaching assistants would spread the load and widen the knowledge base. Furthermore, identifying a leader from the teaching assistants would be another way of developing internal leadership. By selecting one teaching assistant as a digital leader the school might drive discussion of edtech practice with the rest of the teaching assistants.

We would advise that there will be value in continuing to develop pupils as digital leaders and continue recognising that teachers and pupils can learn together when it comes to applied use of edtech.

In terms of securing more quantitative evidence of impact it is commended that:

- The staff skills audit be repeated later in 2016 to look for evidence of improved general confidence and use of ICT and identify continued needs for professional development;
- An interactive visual learning questionnaire be used to formalise insight, beyond perception, into adoption of technology as a tool for teaching and learning.

References

Davis, N., C. Preston, and I. Sahin (2009a) ICT teacher training: evidence for multilevel evaluation from a national initiative.British Journal of Educational Technology (BJET). Volume 40. Issue 1 (January 2009) Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8535.2007.00808.x/abstract Retrieved: April 2016.

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). Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8535.2008.00875.x/abstract

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

Luckin, R. (2016) Mainstreaming Innovation in Educational Technology. Scholarship of Teaching & Learning, 3, 1, 2016. Available at: http://tlc.unisim.edu.sg/research/advsotl-2016/luckin.html. Retrieved: April, 2016).

Pachler, N, C. Preston, J. Cuthell, A. Allen and Pinheiro Torres (2011) The ICT CPD Landscape in England Becta. Available at: http://mirandanet.ac.uk/wp-content/uploads/2016/04/ICT_CPD_Landscape_report.docx. Retrieved: April 2016. A section from this about good teachers who are reluctant to use digital technologies can be downloaded here http://mirandanet.ac.uk/knowledgehub/publications/

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). Available at: http://www.mirandanet.org.uk/tta/. Retrieved: April 2016.

Preston C. and S. Younie 2016 Taking the tablets: has the long predicted revolution in teaching and learning finally arrived? *Handbook for Digital Learning in K-12 Schools* Eds. A. Quinn and T. Hourigan, Springer Download draft here: http://mirandanet.ac.uk/knowledgehub/publications/

The authors

Dr Christina Preston, Professor of Education Innovation, has been at the forefront of education and technology for over 25 years. She founded MirandaNet in 1992 to research and advise clients in the impact of technology and learning. The professional organisation has become a global thought leader with over 1,000 members in 80 countries. Knowledge sharing and creation and managing the change process to ensure impact is at the core of MirandaNet's philosophy. Christina is an associate of the Research, Business and Innovation Directorate at De Montfort University. 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.

Dr Sarah Younie, MirandaNet Research and Innovation Director, has bought her significant experience to MirandaNet projects over twenty five years since she has been involved in international research on educational technologies and teaching. She has been involved in the use of digital technologies in educational settings for UNESCO, the EU, UK Government Agencies, Local Authorities, educational charities and other funders. She has worked as a teacher and researcher in secondary schools, universities and as UK Chair of the national subject association of IT in Teacher Education (ITTE) she has conducted research, including gathering evidence for the Parliamentary Select Committee Inquiry into Education.

Sarah is a Reader in the Research, Business and Innovation Directorate at De Montfort University, where she is Programme leader for the MA in Education Practice. She has published widely on educational technologies and is the Associate Editor-in-Chief for the international Journal of Technology, Pedagogy and Education. Dr Younie's latest book published by the Open University Press is entitled 'Teaching with Technology: the essential guide'. Dr Younie is a founder member of MESH (Mapping Education Specialist knowhow) and is the Editor-in-Chief of the MESH Guides for ICT.

Bernard Dady (Head of Education Transformation, Gaia)

Bernard is an educational strategy, design and technology professional who leads Gaia's training and professional development service and advises the Company on matters educational.

Bernard has extensive experience of developing initiatives and maintaining strategic partnerships between private sector organisations and forward-thinking educational providers. He is a published author and editor with strong ICT skills brought to bear in the generation of a wide range of published material. He has several years of experience in client and bid side advisory work in the design of new schools and

integration of their ICT systems. Bernard has worked in education for over 30 years as teacher (Sheffield), adviser/inspector (Kirklees), education action zone director (South Bradford) and local authority strategic manager (Bradford). Until early 2010 he was the BSF Programme Director for Tribal Group PLC where he worked as a consultant adviser to several major contractors on the design of new schools.In previous roles he has managed implementation of local authority key skills initiatives; acted as environmental education and humanities adviser; led Ofsted inspection of secondary schools; authored ten multi-media CDs; written six school text books and was formerly editor of Wideworld Magazine for Phillip Allan Updates.

Bernard has specialist knowledge in education, especially of: learning & teaching; curriculum development, learning space design and the application of ICT. He leads a team of educational professionals to offer quality assured support for ICT implementation and effective use in all phases. He has broad knowledge and experience of a wide range of hardware and software solutions commonly used in the education sector and is a member, and accredited tutor, of Naace (The ICT Association).

MEd, BSc(Hons), PGCE (Sheffield)

Member of NAACE and Fellow of MirandaNet

Tristan Hughes: Deputy Head Teacher at Bodnant Community Primary School in Prestatyn, North Wales. Working alongside Caroline van Niekerk, Tristan has co-led the school in a complete overhaul of the use of ICT to enhance the quality of teaching and learning, allowing pupils and staff to build and develop a skill set which will see them be at the forefront of the use of ICT in education.

Caroline van Niekerk*: ICT leader at Bodnant Community Primary School in Prestatynorth Wales. Working alongside Tristan Hughes, Caroline has co-led the school in a project to develop the use ICT at the school in ensuring that it is at the forefront of all lessons in achieving high quality teaching and learning. Caroline is constantly developing her own knowledge of ICT in education and is the 'go-to' person in school for training and advice. Caroline has set up a programme of regular training and demonstration for staff in the use of Smartboard to aid teaching.

Appendices

Appendix One: Gaia history and technical information

Gaia Technologies was established in Bangor (North Wales) in 1992 to supply computer systems, parts and peripherals throughout the UK. The company was established as a partnership between three former Bangor University students.

Gaia was initially set up to trade in hardware products and supplied computer systems, parts and peripherals throughout the UK. It was successful in winning its first significant order in the education sector in 1996. In the same year, and as the turnover reached £2.5m, a decision was made to give the company a public limited status to become Gaia Technologies PLC. The decision was made to reflect the Directors' deep belief in providing a strong and well-supported presence in the area and inspire confidence in terms of commitment and ability to serve.

After more progress, such as developing a wireless solution that interlinks schools in 1998 and developing a North Wales educational WAN covering 21 Schools & 800 sq. miles in 1999, as well as a project with Manchester to supply 4,500 homes, schools and community learning centres with broadband and computers in 2001, Gaia Technologies was selected by the Department for Education (DfE), formerly Becta, in 2001 as an Infrastructure Framework member. They were selected again in 2006, 2010 and again in 2015, one of only five ICT companies in the UK to do so. As a result, they were awarded the KS3 Testing Infrastructure Tender to supply PC's and Quad Core Servers to 24 schools across England.

Gaia entered the 3D Education market with a project for Bangor University in 2004, which enabled it to learn about and understand the technology and identify the potential of 3D at a school level. Since then the business has invested in excess of c. £2.4m over seven years to develop an exclusive 3-dimensional teaching support system. This includes 3D viewer software and a substantial library of immersive 3D content, which it started to roll out in earnest in 2011. This software is now being used in schools all over the world from the USA to China.

In 2007 The Directors took the strategic decision to focus exclusively on the education market. This drastically changed the company and since then, Gaia Technologies have gone from strength to strength, winning many tenders through the Becta & DfE Frameworks. They have grown their turnover a staggering 326%, from £3.8m in 2007 to £16m in 2014, and now employing over 100 people throughout many locations in the UK.

In 2011 Gaia Technologies completed the purchase of their current Head Office building, located on Parc Menai in Bangor. They previously occupied the building as tenants since its construction in 2007.

Gaia's approach to educational ICT

Gaia believes in a holistic approach to ICT, particularly for ICT for Education. We view the school as a whole and design our ICT solutions from the ground up. We understand that all learning spaces can be used for a wide range of different learning styles, and we believe that the use of ICT can maximize the educational experience. We pride ourselves on providing comprehensive ICT solutions incorporating robust technical solutions, support

and training, innovative design, reliable end-user devices and the provision of a range of options for ICT Managed Service.

We are resolute in our belief that technology has an essential role to play in enabling flexibility in learning spaces. ICT should be designed to remove barriers and enable a wide variety of teaching and learning to take place. Our vision is to drive the use of ICT across the curriculum and embed ICT into learning and teaching. We believe that technology should be used as a teaching tool, and when used properly can open up new possibilities for teachers and students.

Gaia believes in developing ICT solutions with schools through working together in real partnership. We operate under the philosophy that our relationships should be based on mutual understanding, respect and effective partnership. We recognise that in order to offer a truly educationally focussed ICT solution we must design specific ICT solutions that are tailored to the particular needs of each school. We must respond to and contribute towards the development of each student, offering support and innovation as well as providing challenge in the spirit of true partnership.

Appendix Two: data from the base line staff survey

The baseline surveys were completed on-line. The full results can be accessed via these links:

Bodnant ICT Skills Survey 2015 - https://www.surveymonkey.net/results/SM-L3QY7HVX/

Bodnant Staff Use Survey 2015 - https://www.surveymonkey.net/results/SM-WLYD9HVX/

Appendix Three: data from the visioning workshop

Table 1

DO NOW	Do next	Do last	Do never
Use curriculum software, apps, or an online educational service	Share teaching and Learning materials Between staff and With pupils	Get pupils to collate and organize their research in a digital scrapbook	Deploy, collect and mark assignments in digital form
Make digital presentations For my class to view	Provide something For parents	Control things, eg Lego models or robots	
Use a visualizer to aid Demonstration or show Pupils' work	Show work from a pupil's device on the screen	Make stop frame animation	

Display video on demand	Communicate with others: email, instant messaging, video conferencing	Measure, record, and Evidence progress and achievements	
Work anywhere, anytime & access your work every- where.	Research topics on the internet	Make and edit music	
Organise use of resources eg rooms & equipment	Use productivity software such as a Word, Publisher, Excel or Powerpoint	Produce digital books or comics	
Make interactive lesson Content to display to the class	Respond to quizzes, tests and surveys	Make, edit and present Video (Live action)	
Read digital books and magazines	Facilitate learning at home	Take, organize, edit and present photographs	
Let pupils use the screen and projector as a learning tool	Use software or an on-line educational service		
Play educational games	Write blogs, make web sites		
Capture and provide access To lesson content	Have your own class web pages and file sharing site		
	Let pupils use the screen and projector as a learning tool		

Table 2

DO NOW	DO NEXT	DO LAST	DO NEVER

Play educational games	Control things e.g. Lego models or robots	Provide information for parents	
Research topics on the internet	Make, edit and present video (live action)	Facilitate learning at home	
Display video on demand	Get pupils to collate and organise their research in a digital scrapbook	Capture and provide access to lesson content	
Make interactive lesson content to display to the class	Work anywhere, anytime and access your work everywhere	Make and edit music	
Measure, record and evidence progress and achievement		Write blogs, make web sites	
Measure, record and evidence progress and achievement		Respond to quizzes, tests and surveys	
Use software or an on-line educational service		Deploy, collect and mark assignments in digital form	
Organise use of resources e.g. rooms and equipment		Share teaching and learning materials between staff and with pupils	
Organise use of resources e.g. rooms and equipment		Show work from a pupil's device on the screen	
Use a visualiser to aid demonstration or show pupils work		Produce digital books or comics	
Read digital books and magazines			
Make stop frame animation			
Make digital presentations for my class to view			
Take, organise, edit and present photographs			
Use productivity software such as a Word, Publisher, Excel or Powerpoint			
Use software or an on-line educational service			
Communicate with others e.g. e-mail, instant messaging, video conferencing			

Have your own class web pages and file sharing site			

Table 3

DO NOW	DO NEXT	DO LAST	DO NEVER
Use a visualizer to aid demonstration or show pupils' work	Take, organize, edit and present photographs	Make and edit music	Provide information for parents
Use curriculum software, apps or an on-line educational service	Share teaching and learning materials between staff and with pupils	Get pupils to collate and organise their research in a digital scrapbook	Capture and provide access to lesson content
Use productivity software such as a Word, Publisher, Excel or Powerpoint	Write blogs, make web sites	Show work from a pupil's device on the screen	Facilitate learning at home
Make interactive lesson content to display to the class	Make digital presentations for my class to view	Deploy, collect and mark assignments in digital form	Respond to quizzes, tests and surveys
Research topics on the internet	Let pupils use the screen and projector as a learning tool	Read digital books and magazines	Display video on demand
Control things e.g. Lego models or robots	Make, edit and present video (live action)		
Measure, record and evidence progress and achievement	Produce digital books or comics		
Have your own class web pages and file sharing site	Make stop frame animation		
Play educational games	Communicate with others e.g. e-mail, instant messaging, video conferencing		
Work anywhere, anytime and access your work everywhere			
Use software or an on-line educational service			
Organise use of resources e.g. rooms and equipment			

Table 4

DO NOW	DO NEXT	DO LAST	DO NEVER

Get pupils to collate and organize their research in a digital scrapbook	Make, edit and present video (live action)	Make interactive lesson content to display to the class	Respond to quizzes, tests and surveys
Work anywhere, anytime access your work everywhere	Make and edit music	Make stop frame animation	Write blogs, make web sites
Use a visualizer to aid demonstration or show pupils work	Share teaching and learning materials between staff and with pupils	Facilitate learning at home	Use productivity software such as a Word, Publisher, Excel or Powerpoint
Control things, e.g. Lego models or robots	Have your own class web pages and file sharing site	Deploy, collect and mark assignments in digital form	Play educational games
Communicate with others e.g. e-mail, instant messaging, video conferencing	Capture and provide access to lesson content	Use curriculum software, apps or an on-line educational service	Provide information for parents
Show work from a pupil's device on the screen			Measure, record and evidence progress and achievement
Organise use of resources e.g. rooms and equipment			Take, organise, edit and present photographs
Use software or an online educational service			Make digital presentations for my class to view
Display video on demand			
Produce digital books or comics			
Read digital books and magazines			
Let pupils use the screen and projector as a learning tool			

Table 5

DO NOW	DO NEXT	DO LATER	DO NEVER
Capture and provide access to lesson content	Take, organise, edit and present photographs	Respond to quizzes, tests and surveys	Deploy, collect and mark assignments in digital form
Measure, record and evidence progress and achievement	Share teaching and learning materials between staff and with pupils		

Use a visualiser to aid demonstration or show pupils work	Provide information for parents		
Display video on demand	Get pupils to collate and organise their research in a digital scrapbook		
Make digital presentations for my class to view	Communicate with others e.g. e-mail, instant messaging, video conferencing		
Use software or an on-line educational service	Produce digital books or comics		
Make interactive lesson content to display to the class	Read digital books and magazines		
Research topics on the internet	Write blogs, make web sites		
Make and edit music	Facilitate learning at home		
Play educational games	Have your own class web pages and file sharing site		
Make, edit and present video (live action)	Control things e.g. Lego models or robots		
	Organise use of resources e.g. rooms and equipment		
	Make stop frame animation		
	Show work from a pupil's device on the screen		

Appendix Four: Fellowship publication

Tristan Hughes and Caroline Van de Clerk gained a MirandaNet Fellowship for their presentation at the CPD event at The Innovation Centre, De Montfort om May 21st 2016

Introduction

At Bodnant Community Primary School the use of ICT was ad-hoc! We had equipment: Smart boards, laptops, and a computer suite, but the effectiveness and impact on education of this equipment depended on the background knowledge and confidence of the person using it! Pupil progress using ICT was varied to say the least!

Then, in 2013, the Welsh Government implemented a new initiative: The Literacy and Numeracy Framework. Suddenly, teachers were required to show evidence regularly of how the numeracy and literacy skills taught in Maths and Language lessons were being applied across all other subjects. We

saw this as an opportunity to be more creative in the development of pupils' skills and the use of technology in particular.

With Gaia Technologies, we started with a blank canvas to create a vision of where we wanted to be in the effective use of technology in 5 years time. We reversed the usual pathway taken by a great many schools to first spend lots of money on the latest technology and then think about how to use it Talking to staff, pupils and parents, we worked out what we wanted to do and then bought the technology to suit our needs to fulfil the vision.

Setting up a clear process of regular training, technology use and review, we now have far more confidence and effectiveness in the use of technology in school. Project work with constant access to technology has given pupils the opportunities to use, apply build on a range of skills. This has resulted in the improved quality of teaching and learning, sustained pupil engagement and of course we can keep the Welsh Government happy!

You can download the presentation on the Mirandanet website under the Professional Development tab here: http:// mirandanet.ac.uk

or here

http://mirandanet.ac.uk/education-innovation-pupil-achievement-practice-based-research/abstracts/