

School improvement through digital technologies

**Using managed service/support in schools in
Northern Ireland with case studies of success**

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1. INTRODUCTION

Schools in Northern Ireland, like those in any country, face educational challenges, whilst they are, at the same time, supported with a range of resource provision. Facing and addressing educational challenges enables schools to improve, in a range of possible and different ways: at an individual pupil level; at a single class level; for pupils across the school; with teachers across the schools; or for parents across the school. Some of the resource provision that is available to schools in Northern Ireland consists of the centrally-provided digital technology managed services and support from C2k and Capita. These services provide fundamental connectivity and networking within and across schools, hardware that can be added to and integrated with a school's own devices, a communication platform (Office 365, Google, or Fronter), and a wide range of selected software curriculum resources. This latter digital technology provision offers a very wide range of tools that teachers can select to use in specific teaching and learning circumstances. Whilst the affordances offered from selected networking connectivity, hardware, a communication platform and software curriculum resources can be utilised to support specific subject or topic tasks, they can also be selected to explore and address educational challenges and consequently to support school improvement leading to better outcomes for the learner. The process and examples that some schools have taken in this respect – selecting digital resources to address educational challenges to lead to school improvement – are the focus of this document.

Subsequent sections of this document will describe the educational challenge processes adopted, and the outcomes of success related to school improvement. The processes and cases described will show the importance of careful selection of digital resource affordances, the match between these and the educational challenge that is identified, and the persistent monitoring and evaluation of success over appropriate periods of time.

Whilst the process described is one that might be used in any educational challenge situation, the case examples are not provided as 'off-the-shelf' answers. The risk to avoid, when considering 'dissemination of best practice' (a phrase that is often stated without deep consideration of how that practice fits into a school or learning context), is to think of 'best practice' as a packaged solution which, once discovered, can be passed on from teacher to teacher, from school to school, regardless of different and differing contexts and circumstances. It will be seen from the case examples given that teachers and schools adopted quite specific resources to address their particular educational challenges; in this regard, the process they adopted was initially important, which led them to selection and choice of appropriate digital technology resources.

2. A BACKGROUND TO SCHOOL IMPROVEMENT USING DIGITAL TECHNOLOGIES

How can schools use digital technologies and the C2k and Capita managed services and support in Northern Ireland to gain success in school improvement in a way which leads to better outcomes for the learner?

The idea of using digital technologies to support school improvement has long been considered possible, but it has not always been clear how to do this. For example, one researcher¹ stated that:

“What is immediately evident is that the use of [information and communication technologies] ICT in schools is not a simple panacea for solving problems of underachievement, nor is it a straightforward way of raising standards of student performance. The investment of ICT resources in schools, and the development of accompanying teacher and student skills, should enhance the overall effectiveness of a school and should also improve levels of academic performance, but there can be no guarantees that these things will happen.” (p. 1)

While this researcher suggested that ways forward are not necessarily simple, the research literature does increasingly offer examples of how schools have addressed some specific school improvement needs. For example, addressing:

- Difficulties with text comprehension when learning to read².
- Lack of understanding about learners on the autistic spectrum by parents and carers³.
- Greater inclusive understanding of handling aggressive behaviours in a class⁴.
- Greater pupil awareness of developing international collaboration⁵.
- School-wide inclusion of pupils from immigrant backgrounds⁶.

These examples, and indeed the wider research literature, suggest that using digital technologies to support school improvement is not a matter of selecting and using ‘off-the-shelf’ recipes, but should take a much more exploratory and bespoke approach; it requires ideas of how to take forward an approach that will match the needs of a specific school improvement challenge. As the case studies from schools in Northern Ireland presented later in this document show, principals and teachers have generally, in the specific context of their school and the needs of their pupils, adopted an exploratory process or approach, followed by

¹ Rudd, P. (2000). School Improvement through ICT: Limitations and Possibilities. Paper presented at European Conference on Educational Research (ECER) University of Edinburgh, 22nd September 2000.

² Potocki, A., Ecalle, J., & Magnan, A. (2013). Effects of computer-assisted comprehension training in less skilled comprehenders in second grade: A one-year follow-up study. *Computers & Education*, 63, 131–140.

³ Doyle, T., & Arnedillo-Sánchez, I. (2011). Using multimedia to reveal the hidden code of everyday behaviour to children with autistic spectrum disorders (ASDs). *Computers & Education*, 56, 357–369.

⁴ Blood, E., Johnson, J. W., Ridenour, L., Simmons, K., & Crouch, S. (2011). Using an iPod Touch to Teach Social and Self-Management Skills to an Elementary Student with Emotional/Behavioral Disorders. *Education and Treatment of Children*, 34 (3), 299-322.

⁵ Leppisaari, I., & Lee, O. (2012). Modeling Digital Natives’ International Collaboration: Finnish-Korean Experiences of Environmental Education. *Journal of Educational Technology and Society*, 15 (2), 244–256.

⁶ Fredrikson, M., & Tikkanen, R. (2010). Music Making as a Social Integrative Tool – Design Experiences with Children. In J. Engelen, J. Dekelver & W. Van den Bosch (Eds.), *Social Media for Social Inclusion of Youth at Risk: Proceedings of the INCLUSO 2010 Conference* (pp. 41-48). Leuven, Belgium: K.U. Leuven.

decision-making that is then monitored in terms of outcome and effectiveness. They have done this by considering a school improvement challenge through a number of key elements (not necessarily always in the order presented here, as some of these elements needed to be considered as an overlap or in parallel). Nevertheless, considering each key element was important to their ultimate success.

Principals and teachers clearly identified and understood the context of the educational challenge or interest: which might have been at one of a number of different levels – an individual pupil level; an individual class level; or at a school level (where either pupils, or teachers, or parents might have been the focus).

The focus of the challenge: detailing what the specific challenge was – what it was that needed to be addressed, and how digital technologies might be used to address that challenge.

Hardware used: considering the full range of digital technologies available, and identifying whether for this challenge to use mobile devices (either school- or home-owned), tablets, desktop machines, or some combination of these. The use of a communication platform was also carefully considered – whether to use Fronter, Google, Office 365, or no platform at all if, as will be seen in one case example, this would provide a barrier for parents.

Software curriculum resources used: exploring the width and range available, and deciding which affordances were important, and hence which software to use. Considering how the affordances would be used to address the challenge, and how they might work within the context of the challenge, was also critically important.

Teacher and learner interactions: considering carefully what the teachers needed to do in order to use the resources to address the challenge, how they would engage with the pupils, what the pupils would do with the resources, whether the teachers would monitor particular features, and provide feedback, and over what time periods, for example.

Educational success: identifying over a reasonable period of time how the interventions had addressed the challenge, and how the success could be monitored and judged.

Important features of these elements that principals and teachers have considered and worked through are highlighted also within the Northern Ireland Education Authority's *Transformation Levers for Better Outcomes for Children*⁷. In this model, the Education Authority highlight the importance of:

- Motivation and engagement – the positive motivation of pupils and teachers, and their engagement in exploring successful educational practices.
- Workforce skills and behaviours – the knowledge about the processes that can be used, the resources that are available and how these can be applied within specific situations.

⁷ Education Authority (2018). Transformation Programme Workstream Lead: Candidate Information Pack. Belfast: Education Authority. Retrieved on 11 June 2018 from: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwi-vliLqcvbAhWBdpoKHfWYANAQFggxMAA&url=http%3A%2F%2Fwww.eani.org.uk%2F_resources%2Fassets%2Fattachment%2Ffull%2F0%2F75232.pdf&usg=AOvVaw33d44UFiVfaGBdX09cy96H

- Transforming transactional services; ‘digital by default’ – thinking about how digital resources can be applied in pupil activities and in teacher interactions.
- Sound technological infrastructure – being able to rely upon and use the networking, connectivity, hardware and software resources provided and supported by the C2k and Capita managed services.
- Innovation – being willing to try out new or different approaches, but still matching specific needs and circumstances.
- Analytical intelligence – identifying the specific challenge, gathering data to inform how to approach the challenge, and knowing what data to gather to monitor progress and success.
- Risk identification – considering what the risks might be, and how these link to the analytical approach and data to be gathered as progress is monitored.
- Differentiated support – identifying the needs of a specific challenge, and ensuring that the uses of digital resources meets that challenge.
- Targeted intervention – identifying the specific individual, group or level that the intervention will focus on, and how the uses of the digital resources can support pupil activities and teacher interactions in this instance.
- Evaluating impact – monitoring carefully and regularly, knowing the form of evidence that needs to be collected, and when this should happen, so that ongoing success can be identified.
- Partnership – how interventions and interactions will digital resources will enable pupils, teachers, or parents to work in partnership on the educational challenge.
- Communication – ensuring that all those involved are aware of what is happening, how, and when particular parts of the process will be enacted and monitored.
- Advocacy – being willing to argue for the interactions and interventions, showing an understanding of the background, the focus, and what is envisaged and planned.
- Participation and engagement – enabling others (pupils, teachers, or parents) to become involved, so that they understand how they can be an important part of the process.
- Voice of children and young people – enabling pupils to have a voice in how they might be involved in activities, what they feel are important factors for success, and how they think progress might be happening (or not).
- From ‘giving’ to ‘equipping’ – enabling all involved (pupils, teachers or parents) to be involved in activities where they are ‘producers’ rather than ‘consumers’, where they are actively involved in ‘creating’ rather than only ‘taking’.

It will be clear in the case examples provided in this document that these elements and qualities have been fundamentally important and integrated within the approaches that principals and teachers have taken to considering and addressing educational challenges and school improvement in their own settings using digital technologies, using innovations to lead to ultimate successes.

3. IDENTIFYING SCHOOL IMPROVEMENT NEEDS

The *Inspection and Self-Evaluation Frameworks, Effective Practice and Self-Evaluation Questions for Primary*⁸ and *Effective Practice and Self-Evaluation Questions for Post-primary*⁹, provide a series of questions that schools use when considering school improvement in terms of ‘outcomes for learners’.

For primary schools, the questions are:

- Are the children actively engaged in their learning? What evidence is there that they are well-motivated, engaged and want to do well?
- What evidence is there that we have significantly improved standards of attainment or maintained them at a consistently high level?
- Are the children’s core skills in literacy, numeracy and ICT as high as possible or is there room for improvement?
- How do the children benefit from shared education?
- What evidence is there that the children apply their skills and knowledge across the curriculum?
- How good are the children’s standards compared locally and regionally?
- What evidence is there that all staff share high expectations for the children?
- What evidence is there that the children are developing intellectually, socially, emotionally, physically and morally/spiritually?
- Do the children learn at an appropriate pace? How do we know?
- How well developed are the children’s skills in carrying out self- and peer-assessment?
- What is the evidence that children make continuous progress, year-on-year and across key stages?
- How do we identify under- and low- achievers? What interventions are provided? Do we agree and discuss what interventions are successful or not? How are the outcomes for children tracked?
- Do we know the underlying reasons why children do not attend school and/or why their behaviour is not appropriate? What actions are being taken to support the children and their families?
- How actively and meaningfully are the children involved in setting their own personal goals? What evidence is there that the children know their own strengths, know what aspects of their work need to be improved and know how to make improvements?
- How do we know that the children are determined to succeed and achieve high standards?
- How do we, as a school community, encourage and acknowledge children’s achievements gained both in and out of school?
- Are children supported in a fair and equitable manner by all staff?
- How do we ensure consistency in the opportunities available to all the children?
- Do we know who our children at risk are? Does our self- evaluation process identify a particular group or individuals that may require pastoral or academic support?
- Is our induction process for children and staff effective? How do we know? Have we consulted with those involved?
- How do our working relationships with outside agencies impact on the children’s outcomes and well-being?

⁸ ETI (2017). *Inspection and Self-Evaluation Frameworks: Effective Practice and Self-Evaluation Questions for Primary*. Bangor: ETI.

⁹ ETI (2017). *Inspection and Self-Evaluation Frameworks: Effective Practice and Self-Evaluation Questions for Post-primary*. Bangor: ETI.

For post-primary schools, the questions are:

- To what extent do the standards achieved by pupils benchmark positively against similar schools over the past three years?
- How well does the performance of discernible groups of pupils, such as boys, girls or those with free school meal entitlement (FSME), compare with that of their peers?
- How do we know that the pupils with special educational needs in our school achieve the highest possible standards of work and learning?
- How do we know that more able pupils achieve to their fullest potential?
- How do the pupils benefit from shared education?
- How effectively do we monitor attendance rates and suspension and expulsions rates in order to identify and address the underlying reasons behind them?
- How appropriate are the destinations of all pupils in terms of relevant higher or further education programmes, work-based learning, apprenticeships or employment?
- How does tracking the destinations of pupils inform future curriculum and careers planning to meet the needs, interests and abilities of all the pupils?
- How do we know that the pupils are learning at an appropriate pace?
- How do we measure the pupils' progress over time and in particular at points of transition, including public examinations?
- How do we ensure that pupils are making the progress expected in their learning?
- How do we ensure that the interventions we implement for individual pupils impact positively on the progress in learning they make?
- To what extent do we ensure pupils acquire, develop and transfer their knowledge, skills and understanding across their learning?
- To what extent are pupils involved in setting and reviewing their own targets for improvement?
- How engaged are pupils in effective assessment for learning practices?
- How do we provide sufficient opportunities, across the curriculum, for the pupils to develop further their wider skills, capabilities and dispositions?
- How do we ensure that the confidence, self-esteem, self-awareness and sense of responsibility of pupils are developed sufficiently?
- How do we ensure that pupils have appropriate opportunities to experience different perspectives and to develop their ability to work in teams?
- How do we ensure that pupils are confident in learning in organisations beyond the school, such as other schools, further education and the workplace?
- How do we ensure that pupils have opportunities to make a positive contribution to local and wider community and/or global community?
- How do we ensure that pupils are developing intellectually, socially, emotionally, physically and morally/spiritually?
- How do we ensure that pupils have meaningful opportunities to contribute to the life of the school, including the school self-evaluation process?
- How do we ensure that the student council is valued and makes a discernible impact on school improvement?

Although these questions do not specifically ask schools to consider affordances and uses of digital technologies in bringing about school improvement, nevertheless, the case example schools have been exploring uses of digital technologies to do this. The following four case studies exemplify ways in which four different schools have explored specific educational challenges, the self-evaluative questions from the Education and Training Inspectorate (ETI) that they have needed to ask, and how they have attained success from using digital technologies and the C2k and Capita managed service and support available to them.

4. BACKGROUND TO THE CASE STUDIES

The four schools (two primary and two post-primary) were visited in Northern Ireland over a two-day period in March 2018. The purpose of the visits was to explore the ways that digital technologies, and specifically how the C2k and Capita managed service and support was being used in those schools, by teachers and learners. The visits yielded, in each case, examples of ways that specific school improvement challenges had been considered and undertaken, successfully using the C2k and Capita managed service and support to address an educational challenge or interest that had been identified at school, classroom or pupil level. To exemplify these successes, from each visit, a single success outcome was selected, and an outline case study showing the ways in which the uses of digital technologies and the C2k and Capita managed service and support was contributing to the success. For the four case studies presented here, a specific structure is used to frame the details; however, as stated earlier, this does not necessarily indicate a sequence of actions; rather, it indicates a range of elements and outcomes that were necessary building blocks.

4.1 Case Study 1 - addressing low parental engagement and support

St Mary's Primary School, Divis Street, Belfast



Number of pupils in the school: 130

Educational challenge or interest identified: the majority of pupils came from low income backgrounds, with 91% of pupils entitled to free schools meals (FSM); the majority of pupils attending are from the Traveller and Roma communities, the majority of pupils are now from Newcomer families with the proportion of Newcomer pupils having grown rapidly (from 0.5% in 2011 to 65% in 2017); parental engagement with the school and with educational concerns was extremely low, many parents had little experience of going to school themselves, and many parents were not able to read or write; pupil attendance some years' ago was very low

The focus of the challenge: parental engagement and attitude towards school needed to be positively changed

School improvement ETI questions:

- Are the children actively engaged in their learning? What evidence is there that they are well-motivated, engaged and want to do well?
- How good are the children's standards compared locally and regionally?
- What evidence is there that the children are developing intellectually, socially, emotionally, physically and morally/spiritually?
- Do we know the underlying reasons why children do not attend school and/or why their behaviour is not appropriate? What actions are being taken to support the children and their families?
- How do we, as a school community, encourage and acknowledge children's achievements gained both in and out of school?
- How do our working relationships with outside agencies impact on the children's outcomes and well-being?

Hardware used: iPads purchased by the school were supported by the C2k and Capita managed service; tablets or smartphones that parents had at home

Software curriculum resources used: audio, image or video creation software (3 resources were used that were web-based), and a QR code creator

Teacher and learner interactions: teachers supported children in creating images, videos or audio of their work in class, which was then saved and specifically coded with a quick response (QR) code; the code was taken home (sometimes attached to a colourful leaf or other item), the child at home used the parent’s device with a QR code reader to access the file, so that the audio, image or video could be shown but also discussed and, if needed, it was created by the child and discussed in the native (home) language of the parent

Educational success: use of QR codes to support home communication has encouraged parents to develop closer links with the school, parental engagement has shifted over time; now parents visit the school, with pupil attendance at a level of only 20% some years ago to 90% currently (March 2018), parents want their children to attend, and are seeing the value of their children working towards taking the test for grammar school entry

Additional notes: a text-based communication platform would not have supported this outcome; the underlying connectivity and networking needed to allow image, audio or video to be saved and then made accessible on demand via a wider internet-based network beyond the school, accessible on the parents’ devices

In summary, the case is shown in Figure 1.

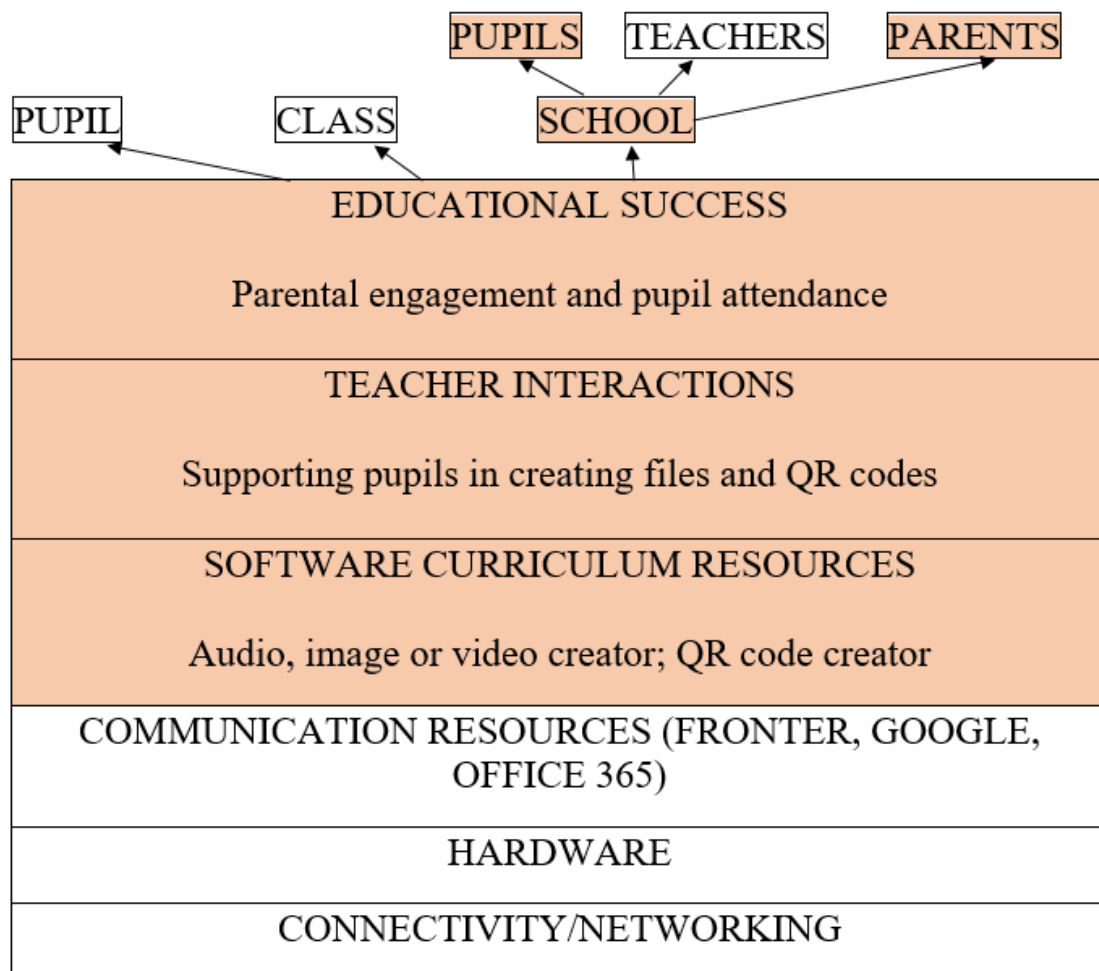


Figure 1: Overview of Case Study 1

4.2 Case Study 2 - addressing a pupil's lack of writing confidence and school disinterest

St. Macartan's Primary School, Downpatrick BT30 8PX



Number of pupils in the school: 190

Educational challenge or interest identified: pupils in a class lacked confidence in writing, and one pupil particularly lacked self-confidence to the extent of not wanting to attend school

The focus of the challenge: to enhance self-confidence of pupils, and one pupil in particular

School improvement ETI questions to consider:

- Are the children actively engaged in their learning? What evidence is there that they are well-motivated, engaged and want to do well?
- How well developed are the children's skills in carrying out self- and peer-assessment?
- How do we identify under- and low- achievers? What interventions are provided? Do we agree and discuss what interventions are successful or not? How are the outcomes for children tracked?
- Do we know the underlying reasons why children do not attend school and/or why their behaviour is not appropriate? What actions are being taken to support the children and their families?
- How actively and meaningfully are the children involved in setting their own personal goals? What evidence is there that the children know their own strengths, know what aspects of their work need to be improved and know how to make improvements?
- How do we know that the children are determined to succeed and achieve high standards?
- How do we, as a school community, encourage and acknowledge children's achievements gained both in and out of school?
- Do we know who our children at risk are? Does our self- evaluation process identify a particular group or individuals that may require pastoral or academic support?

Hardware used: a managed personal computer (PC) in a central area with a suite of 12 PCs

Software curriculum resources used: News Desk

Teacher and learner interactions: the teacher supported all children in the class to write a story to be submitted to News Desk, so that one or more stories might be selected and shown to a much wider audience of pupils, teachers and parents across schools in Northern Ireland; the story chosen for the front page of the website was the story written by the boy with low confidence in writing

Educational success: all pupils were engaged, they all had a wide audience for their work, but the boy whose story was on the front page was very strongly affected by the experience, to the extent that he now enjoys attending and working in school

Additional notes: the underpinning networking and connectivity across Northern Ireland, and the provision of the News Desk facility, were instrumental in this success

In summary, the case is shown in Figure 2.

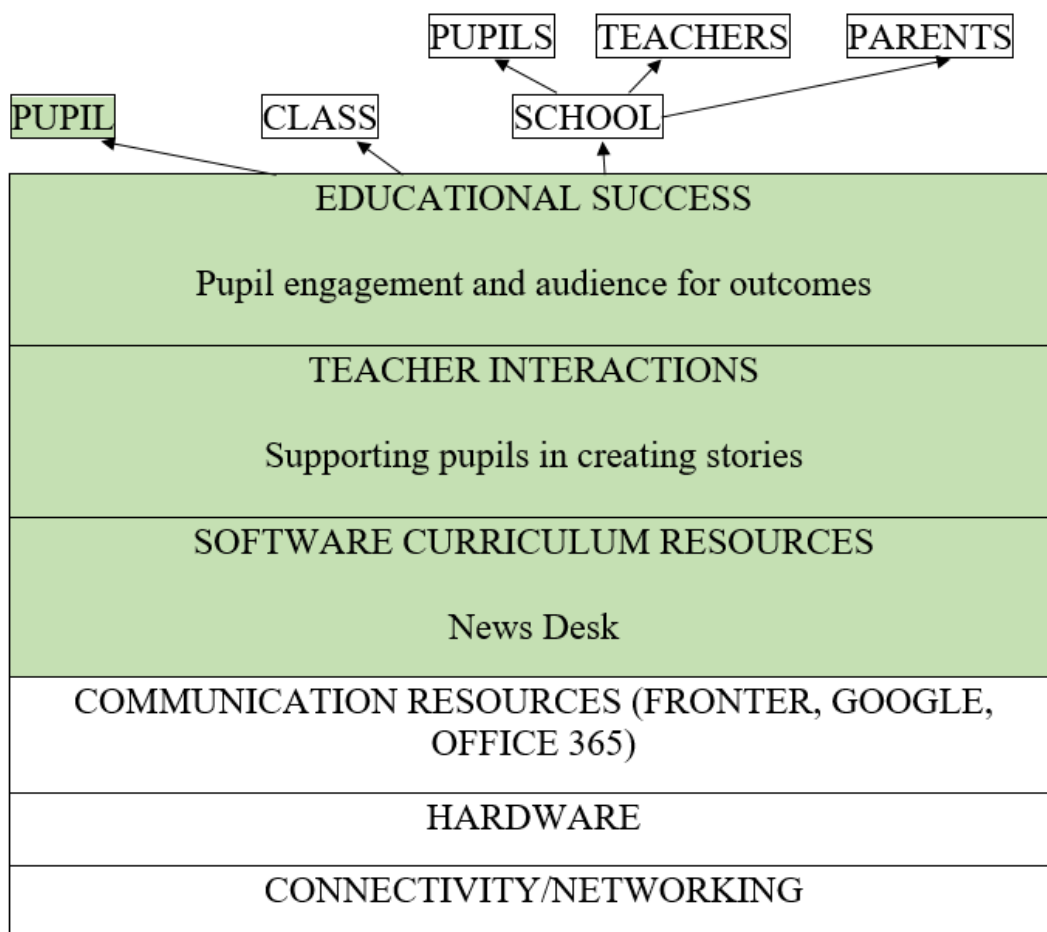


Figure 2: Overview of Case Study 2

4.3 Case Study 3 - addressing boys' low engagement with musical composition

St. Mary's Grammar School, Magherafelt



Number of pupils in the school: 1,100

Educational challenge or interest identified: to further engage and motivate boys in their learning in music lessons through the use of technology

The focus of the challenge: to engage boys in composition to greater extents

School improvement ETI questions to consider:

- How well does the performance of discernible groups of pupils, such as boys, girls or those with free school meal entitlement (FSME), compare with that of their peers?
- How do we know that more able pupils achieve to their fullest potential?
- How do we know that the pupils are learning at an appropriate pace?
- How do we ensure that pupils are making the progress expected in their learning?
- How do we ensure that the interventions we implement for individual pupils impact positively on the progress in learning they make?
- To what extent are pupils involved in setting and reviewing their own targets for improvement?
- How do we ensure that pupils have appropriate opportunities to experience different perspectives and to develop their ability to work in teams?

Hardware used: a suite of 12 Macs, purchased by the school and supported by the C2K and Capita managed service, located in a music room, each with a midi keyboard attached; an interactive whiteboard was linked to a teacher computer used to display success criteria of the task

Software curriculum resources used: GarageBand

Teacher and learner interactions: the teacher identified criteria for the learning activity in the lesson, supported pupils with use of the software to create a short composition to meet

these criteria, and monitored their work by examining their progress through the on-screen graphical interface on the Macs

Educational success: boys were seen to be as engaged in their learning as girls in the lesson

Additional notes: underlying connectivity and networking enabled the work to be saved as the lesson progressed, and for the work to be accessed at a later time, so that it could be refined and reviewed

In summary, the case is shown in Figure 3.

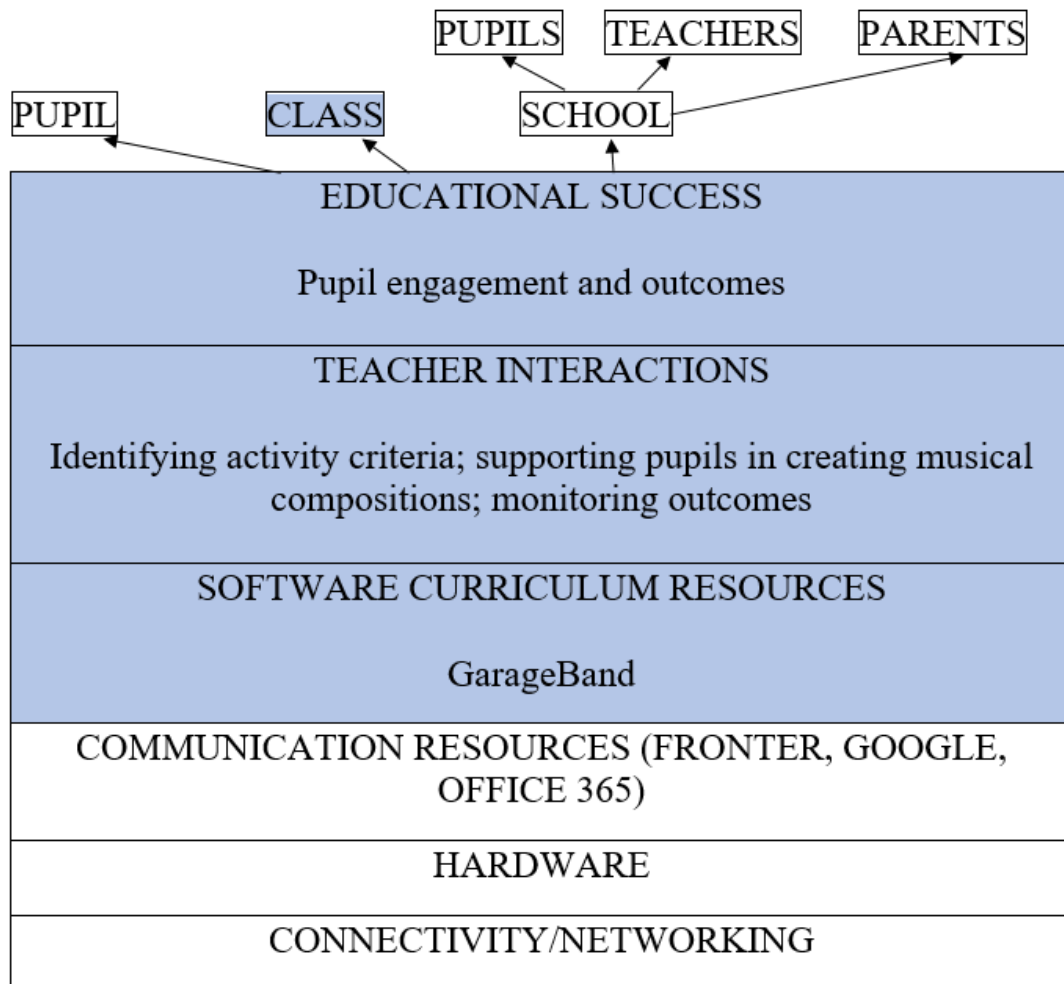


Figure 3: Overview of Case Study 3

4.4 Case Study 4 - addressing low engagement of pupils with higher-order mathematics tasks

Edmund Rice College, Newtownabbey



Edmund Rice College

Number of pupils in the school: 650

Educational challenge or interest identified: to create more possibilities for teachers to work on higher-order mathematics tasks involving reasoning and problem-solving and in doing so improve General Certificate of Secondary Education (GCSE) outcomes

The focus of the challenge: to develop pedagogic and learning practices that would enable reasoning and problem-solving activities to be undertaken more regularly

School improvement ETI questions to consider:

- To what extent do the standards achieved by pupils benchmark positively against similar schools over the past three years?
- How do we know that the pupils are learning at an appropriate pace?
- How do we measure the pupils' progress over time and in particular at points of transition, including public examinations?
- How do we ensure that pupils are making the progress expected in their learning?
- How do we ensure that the interventions we implement for individual pupils impact positively on the progress in learning they make?
- To what extent are pupils involved in setting and reviewing their own targets for improvement?
- How engaged are pupils in effective assessment for learning practices?

Hardware used: tablets were used by individual pupils or by pairs of pupils in mathematics lessons

Software curriculum resources used: Learning by Questions

Teacher and learner interactions: the teacher selected a suitable topic batch of questions for pupils to answer, the software provided immediate responses and feedback when pupils completed answers, not only for the individual pupil level but also networked onto a dashboard so that the teacher could monitor quickly and easily each individual pupil's responses, either on a separate teacher's tablet or on the interactive whiteboard; consequently, the teacher could identify those pupils not engaging or those having difficulty, so that intervention could be undertaken quickly within the lesson, to support specific pupils; using the software, pupils continued to engage and to move through the background tasks quickly enough for them to progress to tackling reasoning and problem-solving questions within a subsequent lesson

Educational success: pupils moved more quickly through the basic tasks, even those who would normally on paper only answer one or two questions (rather than the thirteen or fourteen that were completed in the lesson using this software); this meant that the focus of a subsequent next lesson could be devoted to follow-on questions on reasoning and problem-solving

Additional notes: the reliability and speed of the underpinning networking and connectivity was vital; immediate feedback to pupils' responses was required by both the pupils (to gauge their success and comparative achievements) and the teachers (to monitor where pupils needed support)

In summary, the case is shown in Figure 4.

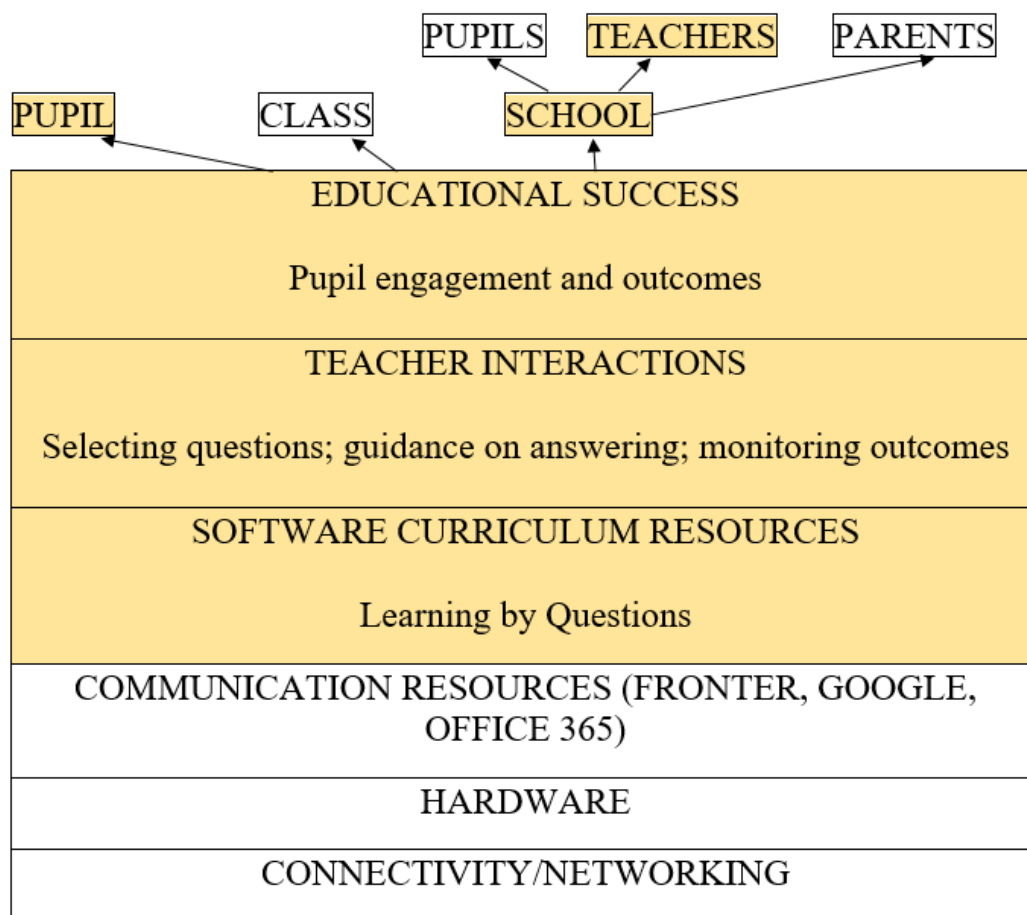


Figure 4: Overview of Case Study 4

5. GOING FORWARD

As stated in the ‘Introduction’ section, when it comes to sharing ‘best’ practice, the risk to avoid, when considering ‘dissemination of best practice’ (a phrase that can too often be stated without deep consideration of how that practice fits into a school or learning context), is to think of ‘best practice’ as a packaged solution which, once discovered, can be passed on from teacher to teacher, from school to school, regardless of different and differing contexts and circumstances¹⁰.

Schools shown in this paper all adopted a common **process** of school improvement through the use of digital technologies, but specific to their context and needs, rather than taking ‘off-the-shelf’ solutions. It is the process of school improvement using digital technologies as illustrated in this paper that can be considered more universal, rather than the practice itself. The process adopted, which other schools can similarly explore, involved a number of key elements (not necessarily in this sequence, as some may be overlapping or in parallel):

- Identifying and clearly understanding the context of the educational challenge or interest, whether at an individual pupil, class or school (pupil, teacher or parent) level.
- Detailing what the specific challenge is, what needs to be addressed, and how digital technologies might be used to do this.
- Considering the range of digital technologies available, and which to select, from the communication platforms available (Fronter, Office 365, or Google), from hardware available (mobile devices whether school- or home-owned, tablets, or desktop machines), and knowing the reasons for which not to use as well as those to use.
- Exploring and selecting from the width and range of software resources available, deciding which affordances are important, and how they might work within the context of the challenge (from, for example, SeeSaw, Accelerated Reading, GarageBand, Learning by Questions, NewsDesk, QR codes).
- Considering carefully specific teacher and learner interactions that will be involved, what teachers will need to do, what support they will provide for pupils, what pupils will do, and what monitoring and feedback will be involved.
- Identifying educational success, over a feasible time period to match the needs of the challenge, and which features to evaluate in this specific context.

It is worth noting that the successes reported here depend upon the understanding and ability of teachers to make informed decisions about the values and potential (the ‘affordances’) of the software curriculum resources used to support effective pedagogical practice in their own

¹⁰ Department of Education (2016). *Dissemination of Best Practice in Teaching and Learning Research*. Bangor: Department of Education. “...**advocates the need for dissemination to be pre-planned, focused, coordinated and developed in a strategic manner to ensure that effective solutions are identified, disseminated and taken up more widely**” (p. iii). “**Best practice should be identified and endorsed by a credible source and validated before widespread dissemination can be justified**” (p. iv). Retrieved on 17 June 2018 from: <https://www.education-ni.gov.uk/sites/default/files/publications/education/Dissemination-of-Best-Practice-in-Teaching-and-Learning-Research.pdf>

context. Researchers working in the *E-Learning Action Plan of the European Commission*¹¹ defined ‘pedagogic quality’ in the context of using technology-based resources to underpin the quality of the learning experience. They stated that:

“*The quality of the tools and the resources ...**afford** rather than determine the quality of learning. Quality is ultimately dependent on the decisions and behaviours of learning and teaching practitioners and participants themselves.*” (p. 1)

The methodical approach to improvement in the best interest of the learner which is illustrated by the examples in this paper and summarised in the model presented here is a timely example of one of the key ways of thinking about teacher professional learning set out in the Department of Education’s radical *Learning Leaders Strategy*¹² which calls for the development and dissemination of good practice – “supporting the identification and harnessing of innovative practice in professional learning already in the system in order to effect improvement and develop ‘next’ practice” (p. 4); “supporting closer collaboration between practitioners, schools and school clusters and professional learning providers” (p. 4); with “planned opportunities for teachers to work collaboratively to share best practice through learning networks” (p. 9).

It will be advantageous for schools to share examples, not just of the technology-enhanced solutions they have successfully adopted to address specific barriers to learning faced by their learners, but more specifically the problem-solving, improvement processes in which they have engaged.

At the time of writing, C2k is managing a wide consultation on the uses of digital technologies in teaching and learning to inform the specification for a ‘digital by default’ service in Northern Ireland from the year 2020 and beyond. A part of this consultation is gathering evidence about educational successes of uses of digital technologies for school improvement, matching the Department of Education’s call for identification of innovative practice in professional learning.

Finally, the ICT Excellence Awards¹³ provide opportunities for schools across Northern Ireland to showcase and share their innovative practices using digital technologies. Outcomes from previous years are accessible on the Capita Managed IT Solutions website¹⁴.

¹¹ Anderson, J. and McCormick, R. (2006). Pedagogic quality – supporting the next UK generation of e-learning. In U-D. Ehlers and J.M. Pawlowski (Eds.) *Handbook on Quality and Standardisation in E-Learning*. Berlin, Germany: Springer. pp. 407-421.

¹² Department of Education (2016). *Learning Leaders: A Strategy for Teacher Professional Learning*. Bangor: Department of Education. Retrieved on 15 June 2018 from: <https://www.education-ni.gov.uk/publications/teaching-professional-learning-strategy>

¹³ Education Authority (n.d.). ICT Excellence Awards invite NI schools to showcase their innovative use of technology. Retrieved on 15 June 2018 from: <http://www.eani.org.uk/about-us/latest-news/ict-excellence-awards-invite-ni-schools-to-showcase-their-innovative-use-of-technology/>

¹⁴ Capita Managed IT Solutions (2017). Winners of the 2017 ‘ICT Excellence’ awards for Northern Ireland schools announced. Retrieved on 15 June 2018 from: <https://education.capita-mits.co.uk/newsroom/news/winners-of-the-2017-ict-excellence-awards-for-northern-ireland-schools-announced>

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