Business Case

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Version History

Version	Date	Details
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0.2	08 6 23	First draft with comments for discussion added
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0.5	28 8 23	Up-date following the Transform Leadership Board and consultation feedback

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Executive Summary

This Business Case aims to help address the ICT infrastructure connectivity issues that have affected some ELC settings, Primary and Secondary Schools in Moray.

To date, the issues that have impacted on network performance include roaming profiles which download at each login and then uploaded at log out, the continued use of old devices -in particular windows 7- and broadband connections for some schools, primarily in rural areas.

The increased use of iPads, has grown from 28 devices in 2014 to 1524 devices in 2023 across Moray Schools has also undermined network performance.

In addressing these issues, ICT colleagues have made many improvements to the Learning Estates ICT Infrastructure. This includes the replacement programme for Windows 7 operating system based devices.

These actions have had a positive impact on improving logon times.

Consequently, the premise of the Business Case is to provide additionality in terms of offering further improvement actions that could be undertaken by this Authority. The Business Case also intends to ensure that the Council is in a position of readiness for any possible future investment in digital devices.

The basis of identifying these improvement actions was a workshop held with Council ICT, Primary and Secondary Head Teachers and Learning Estate colleagues. The workshop explored a range of potential investment options that were assessed against the selection criteria of 'Improving Connectivity', 'Supporting Learning Outcomes' and 'Affordability'.

Following the application of the selection criteria, the preferred option was to "Address connectivity issues and support iPads."

The rationale for this decision is that the unintended consequence of the extensive use of iPads across Moray Schools is the detrimental impact iPads have on the overall performance of the Education ICT network by constantly needing to download up-dates and thereby draining the education network of bandwidth. This is a major factor contributing to slow logon times and poor network performance as experienced by many ELC settings and Schools.

The solution as outlined in this Business Case is the procurement of a Mobile Device Management System (MDM) that is designed to support Apple products such as iPads.

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The Business Case notes that there are a range of different MDM options that would result in improved network performance. However, the identification of the optimum option for this Council would need to be based on the outcome of a procurement exercise.

Nevertheless, the indicative cost for this preferred Business Case option is £74,000-£80,000. Thereafter, there would be an annually recurring cost of £8,000-£9-000 to support 1500 iPads. This cost would depend on the outcome of the procurement exercise.

One of the risks identified in the Business Case is that enhanced infrastructure support for iPads could result in an increased up-take of these devices across Moray Schools. Annual costs could therefore escalate above the estimated cost of £8,000-£9,000 to support 1500 devices.

If the preferred option identified in this Business Case is endorsed, then a detailed Implementation Plan would be developed. The execution of the plan would be undertaken by senior officers within ICT, supported by the temporary ICT technician post and overseen by the Head of HR, ICT & Organisational Development.

It should be noted that workshop participants were clear that any future investment programme leading to the increased procurement of 1:1 devices by the Council would need to be based on an extensive engagement exercise with both learners and teachers. However, the increased up-take of iPads over the last 10 years requires an immediate solution due to the impact that the extensive use of Apple products is having on the overall performance of the Council's ICT Infrastructure Network.

Presently, Council policy is to provide minimal support for iPads and the procurement of Apple products is at the discretion of each individual school.

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1.0 Introduction

For this Business Case, digital learning is defined as "any instructional practice that uses technology to strengthen a learner's learning experience. It can be used to provide professional learning opportunities for teachers, to reduce teacher workload, improve marking and feedback to the learner, and to provide personalised learning for learners". (Achieving Excellence in Learning Play Your Part, Inspire Learning Programme Data Report - update to Scottish Borders Council, October 2021).

Digital learning can therefore refer to the digital tools used to enable or manage learning in education, including:
- Resources
- Hardware
- Software
- Storage
- Systems

While the previous Digital Inclusion Outline Business Case explored the relationship between the curriculum, the attainment gap, the learning estate and supporting inclusive economic development, this Business Case has a specific focus on making sure that the ICT infrastructure is in place to support digital learning for the immediate future.

A glossary of the terms used throughout the document can be found at the end of the Business Case (**Appendix 1**).

2.0 Background

In 2018, the Council has established an Improvement and Modernisation Programme (IMP) to deliver transformational change across the authority.

The IMP contains eight workstreams including the Raising Attainment: Curriculum Breadth and Digital Delivery. This workstream aims to provide and enable a digital learning environment to improve equity and access to the curriculum in order to deliver a range of outcomes.

These outcomes include:-

- Improvement in attainment;
- Improvement in employability skills and sustained, positive destinations;
- Reviewing and transforming the learning environment;
- Improved attainment at both the Broad General Education and Senior Phase;
- Young people are better prepared for life beyond school and for the workplace

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- Providing and enabling a digital learning environment to improve equity and access to curriculum;
- Developing staff skills to improve learning and teaching, including digital Quality focus on improving learning and teaching; and
- Releasing and enabling leadership capacity.

On the 14 December 2022, an Outline Business Case (OBC) was presented for consideration to the Education, Children's and Leisure Services Committee.

The Outline Business Case presented evidence to reaffirm and support the contribution that digital inclusion can make to realising the above outcomes aligned to the Raising Attainment: Curriculum Breadth and Digital workstream and outlined 3 investment options for consideration by Committee.

These options are based on a staged approach to the development of digital inclusion in Moray's schools which may allow for preparations to be made pending a future investment from this authority or from the Scottish Government.

Relating to an ascending order of investment for the Council each of the following stages correspondents to an option for investment and ranged from:-

- **Stage 1:** This stage is focused on preparing and developing the ICT infrastructure to ensure readiness for digital development and of the Education Digital strategy and approach. This would include ensuring that the school digital environment is ready for the increased use of devices and curriculum tools

- **Stage 2:** Prepare the workforce ensuring that they have the leadership, skills and digital confidence they need and that a culture is created to support enhanced use of digital in schools by preparing pupils and parents and ensuring support is available for the new approach; and

- **Stage 3:** The roll out of devices to staff and pupils at a scale and over a time period that is affordable and takes account of any external investment, in particular from the Scottish Government. This is likely to be over a number of years, for example Scottish Borders invested over a 7 year period;

This staged approach had been informed by a report commissioned from CGI Consultancy in order to provide a way forward to progress the development of digital education that would represent a more affordable approach given the council's financial position.

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Following consideration of the OBC and the accompanying report, Committee agreed to:-

- "continue with the development of the infrastructure and Education Digital Strategy development to ensure readiness for digital development only" (para 9 of the minute refers).

It was also agreed to:-

- "note that the next steps for the development of the Raising Attainment Breadth and Digital project would include stakeholder engagement and preparation of Full Business Case to inform the options and approach to the project" (para 9 of the minute refers).

3.0   Purpose

To this end, the parameters of this Business Case will be defined by what was agreed by the Education, Children's and Leisure Services Committee.
The Business Case will therefore relate to stage 1, as noted above, and will focus on the:-

- ➢ ICT infrastructure requirements thus aiming to ensure that this authority is in a position of readiness for any future investment in digital devices across its learning estate.

Also as agreed by Committee, the preparation of the Business Case has primarily been developed by conducting a workshop with Head Teachers from Primary and Secondary Schools, ICT Officers and Learning Estate Officers.

The approach adopted for this workshop is outlined in section 9 of this Business Case. The output of this workshop has then informed 4 options for consideration and will be subjected to the selection criteria based on the Critical Success Factors. The rationale for the selection criteria has been informed by consideration of The Strategic Case, The Economic Case and Finance Case as outlined in this Business Case.

Based on the application of the selection criteria, a proposal will be made for Committee to approve.

Finally, the approach to implementing the selected option will be outlined in The Management Case (Section 12) of this Business Case.

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4.0 The Benefits

There are 3 groups that are intended to be the main beneficiaries of the preferred option that is identified in this Business Case. These groups are:-

Moray Learners: Improving the digital infrastructure will support a quality learning experience that will contribute towards the following Improvement and Modernisation Programme outcomes.

> ➢ Improvement in attainment at both the BGE and Senior Phase;
>
> ➢ Improvement in employability skills and sustained positive destinations;
>
> ➢ Young people are better prepared for life beyond school and for the workplace;
>
> ➢ Providing and enabling a digital learning environment to improve equity and access to the curriculum; and
>
> ➢ Quality focus on improving learning and teaching.

Teaching Colleagues: Improving the digital infrastructure will support a quality teaching experience by:-

> ➢ Spending more time teaching and less time repeating time consuming, non-teaching activities;
> ➢ Giving each learner parity in the way they access learning;
> ➢ Innovating learning solutions; and
> ➢ Personalizing the learning style to suit each individual learner.

Administration (Non-Teaching Colleagues): To operate effectively, improving the digital infrastructure is also necessary for Business Support for ELC Settings, Primary and Secondary Schools in relation to:-

> ➢ Ensuring that schools can fully utilise digital platforms such as iPay, Parentsportal, Groupcall Xpressions and SEEMiS;
> ➢ Administration staff are enabled to work remotely; and
> ➢ Provide an efficient service.

The Business Case aims to support the realisation of these benefits.

5.0 The Strategic Case: Infrastructure Support for Digital Learning

Following consideration of this Business Case by Committee, it is the intention that the approved option will add value to the work already undertaken by ICT colleagues in supporting digital learning across the Council's 24 Early

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Learning and Childcare settings, 46 Primary Schools and 8 Secondary Schools **(See Appendix 2).**

To provide context, this section will provide a brief overview of the work undertaken to date by ICT colleagues to support digital inclusion across the Council's learning estate.

It will also identify the issues that have not been able to be fully addressed to date which were further explored by the Digital Inclusion workshop.

5.1 Hardware

ICT investigation and analysis indicates that there are a number of different elements that are likely to have an impact on connectivity within schools. This is reflected in that a significant number of the helpdesk calls received from schools relate to persistent slow logon times when teaching and non-teaching staff attempt to log into devices (desktops and laptops). This inevitably impacts on class lesson time and undermines the full curriculum offer.

A common misconception is that the sole reason for slow login in times and poor connectivity is due to insufficient bandwidth supplied to schools.

While bandwidth can be a factor, in practice, it is one of a range of factors that affects logon times. Other factors include use of legacy devices (e.g. Windows 7 devices), use of staff profiles used (now all adjusted), impact of large Microsoft updates, roaming profiles which downloaded at each login (and then uploaded at log out) and the increased adoption of iPads.

As from the end of April 2023, all remaining W7 devices in schools have been switched off from the Education network and a planned programme of removal is in place.

5.2 Mobile Device Management (MDM)

Another factor that ICT colleagues have identified as impacting on performance is the multiple use of different types of devices on the overall performance of the ICT Education Network.

Some teachers for example consider that iPads are the optimum learning device for some learners, and a number of schools would prefer to spend their budget on technology such as iPads, which are not supported by ICT, beyond initial connection to the network as agreed by Education. This would complement the provision of Windows desktops and laptops within schools.

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However, without a proper MDM (Mobile Device Management) these additional devices add to network issues and contribute to the detrimental impact on overall performance and logon times.

With the number of multiple devices being used within schools such as iPads having increased in recent years, there has also been a corresponding impact on network performance.

The following table illustrates the year on year increase in the number of iPads purchased across Moray Schools.
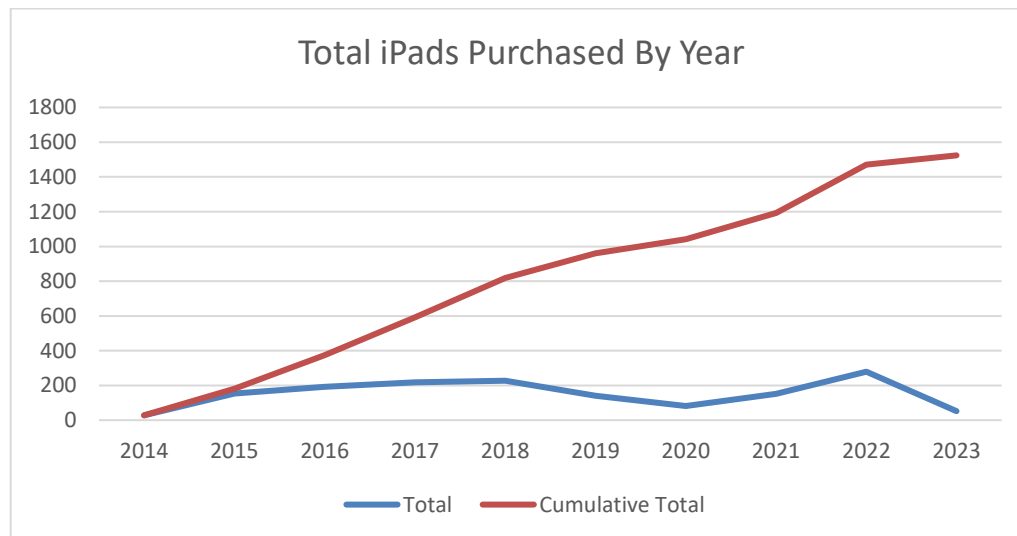
In 2014 there were a total of 28 iPads purchased. By 2023, the year on year cumulative total had increased to 1524 devices. This represents an increase of 5343% in less than 10 years.

It could therefore be expected that if the upward trend in using iPads continues, then further pressure will be added to the ICT Education Network.

The reason why iPads in particular are having a disproportionate detrimental impact on the overall education ICT network performance is that when connected the frequency of their up-dates is comparatively higher than other devices. Moreover, the bandwidth required for these up-dates is significantly bigger than other devices.

ICT colleagues have also reported that there are concerns over how the updates are applied. In most cases the iOS (iPhone Operating System) updates must be downloaded and be applied on a home network as they will not download on the Moray education network, due to slow network speeds and Smoothwall sign in timeouts.

Moreover, the need to regularly sign-in to SmoothWall on the iPads during lessons is also a major issue for teachers. The iPads need re-logged into

SmoothWall part-way through lessons and queues form with learners unable to complete or save work.

To-date, ICT have supported schools by increasing the sign-in times for SmoothWall and have taken a similar position to the use of W7 devices by advising School SLTs of the detrimental impact on overall network performance by procurement devices that are not supported by the ICT Education Network.

The decision to procure an MDM to support other devices (e.g. iPad) would require a significant investment and is further explored in the workshop section of this Business Case.

5.3 Bandwidth

The final major factor that impacts on logon times and overall network performance is bandwidth.

In 2021, School Technicians undertook an exercise to visit every Moray School to gauge how effectively IT Education Network was working within the school learning environment.

Their report identified:-

"that some, but not all, of the schools have acceptable capacity to sustain multiple logons, but there is evidence to suggest an increase in bandwidth would be required should the roll numbers grow even slightly, or if usage is increased. Bandwidth requirements seem to be calculated based on school roll numbers and thus the number of educators and learners accessing the network. Physical location, available broadband technology in the area and overall distances will have a bearing on what link speed a school has been allocated.

As specified in the Network Testing Plan, the speed tests used are not definitive as the results will vary depending on the type of connection that a school has, but they do provide data which allows similarly specified sites to be compared.

During testing it was observed that schools with low roll numbers usually have 10Mb/s connections, whereas at the opposite end of the spectrum up to 160Mb/s was available to some slightly larger schools. Several of the 10Mb/s linked schools often showed results that only a small portion of that bandwidth was left available, even at low usage times. During the day (over a minimum testing period of 4.5 hours) only 0.45 Mb/s was recorded as being available, several times at a few of the schools, and this reduced network efficiency drastically, causing long logon times and issues with saving and even

renaming files. The exact values generated by the test software may not be entirely accurate in comparison to ICT's internal monitoring; however, they are representative of what was observed by the ICT Technicians during their time, no less than 4.5 hours, in each school" (*School Health Check Observation Report, Moray Council, 28 10 21*).

As noted above, there are broadband connectivity factors which are outwith the control of this authority. This includes the physical location of the school, available broadband technology in the area and overall distances which will influence the link speed.

Wherever possible, ICT colleagues aim to address bandwidth connectivity related issues logged by the School via the Helpdesk. Nevertheless, as highlighted during the Workshop (Section 8), bandwidth connectivity is still a major issue.

5.4 Conclusion

The Moray Council Learning Estate continues to experience significant connectivity issues in many schools. This is despite the actions noted above in relation to removing obsolete W7 devices, advising schools on the detrimental impact of procuring multiple devices on network speed such as iPads and addressing logged school help desk calls as they arise.

A pre-requisite for any of the improvement options arising from this Business Case is to make a positive impact on these issues.

6.0 The Economic Case

The OBC provided an overview of the impact that digital technologies will have on the global economy and on the Moray economy and the implications in terms of skills development.

For Moray, with a heavy reliance on traditional manufacturing jobs, this challenge is more acute than in other parts of the UK.

Previously included in the OBC, the following table published by the World Economic Forum (2020) highlights the challenge for Moray when considering the expected future transition from traditional occupants to new jobs based on digital and STEM based skills.

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	Decreasing Demand	**Increasing Demand**
1.	Data Entry Clerks	Data Analysts and Scientists
2.	Accounting, bookkeeping and Payroll Clerks	AI and Machine Learning Specialists
3.	Administrative and Executive Secretaries	Big Data Specialists
4.	Accountants and Auditors	Internet of things Specialists
5.	General and Operations Managers	Digital Transformation Specialists
6.	Client Information and Customer Services Workers	Process Automation Specialists
7.	Assembly and Factory Workers	Information Security Analysts
8.	Business Services and Administration Managers	FinTech Engineers
9.	Statistical, Finance and Insurance Clerks	Database and Network Professionals
10.	Bank Tellers and Related Clerks	Business Development Professionals

This shift in the skills base presents a particular challenge to the education system which is reflected in the Curriculum for Excellence and the Council's own Digital Innovation Strategy for Education and STEM.

Furthermore, the widely publicised exponential growth in AI, including Chat GPT, and the development of Immersive Technology adds to the challenge of developing a digital learning infrastructure within our schools that will support the learning needs of children and young people as we enter an era where jobs of the future will be overwhelmingly digital and STEM based.

6.1 Conclusion

While The Strategic Case within this Business Case identified what could be described as the minimum requirement in terms of supporting the digital infrastructure within Schools, The Economic Case highlights that developing

digital technologies will impact on future jobs and the skills that schools will need to develop in the present day.

Since digital technology, such as AI, is developing at an exponential rate it is difficult to accurately predict what these skills will be. A balance between continuing to use Windows products –which reflect the overwhelming use in the majority of workplaces- as a means to equip learners with a rounded experience of the world of work will continue to be the basis of School ICT provision. However, the Council will need to monitor developments in digital technology and respond appropriately.

The associated risks with striking the right balance is outlined in the risk section of this report.

7.0 The Financial Case

An important assumption is that there will be sufficient finances to support infrastructure development for all identified scenarios. Funding would be available from a range of sources.
The following potential investment sources have been identified.

- ➢ The Devolved School Management (DSM) Budget for Schools;

- ➢ The Council Transformation Reserve Budget; and

- ➢ On 26th January 2022, Council agreed that up to £50,000 could be used for external consultancy engagement in terms of strategy development. To-date £14,151 has been committed. The remaining £35,849 could also be allocated to appropriate elements of this initiative. The Source of this funding was Transformation Reserves; an

There is therefore funding available to enhance the Council's learning estate digital infrastructure.

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7.1 Conclusion

As noted above, a number of different sources of internal Council funding are potentially available to support digital infrastructure.

These sources include the remaining £35, 849 of the award made by the Education, Children's and Leisure Services Committee on 26 January 2022 from Transformation Reserves and, if appropriate from the Devolved School Management (DSM) for individual schools.

8.0 Critical Success Factors

Based on The Strategic Case, The Economic Case and The Financial Case, the following critical success factors can be identified.

Improving Connectivity: as outlined in The Strategic Case, options would need to be considered in relation to their potential to improve performance and connectivity within ELC Settings and Schools.

Supporting Learning Outcomes: as outlined in The Economic Case, the preferred option would be assessed against their potential to support future digital learning developments.

Affordability: as outlined in The Financial Case, there is a budget of £236,000. The preferred option will need to cost no more than this amount. The above critical success factors will be adopted as the selection criteria and applied to the scenarios generated from the Backcasting Workshop.

9.0 The Backcasting Workshop

In accordance with the committee recommendation, a staff workshop was held to develop possible investment scenarios that could then be translated as investment options for this Business Case. This would form the basis for identifying the preferred option in line with the purpose (section 3.0) and benefits outlined in this report (section 4.0).

9.1 The Backcasting Workshop Objectives

Held on 19 April 2023, the staff workshop adopted the following objectives:-

- To first of all determine what the ICT infrastructure requirements are in the short term to envision a range of possible digital inclusion futures for Moray learners;

- To then consider the device infrastructure, connectivity infrastructure and social (workforce) infrastructure that will require to be put in place to realise these possible future digital inclusion options for the Moray learning estate; and

- To use the input, output and outcome insights from this exercise as the basis of the Business Case that outlines a range of costed options and which will then inform an implementation plan.

To help ensure an informed discussion took place, invited participants aimed to strike a balance between Head Teachers (Primary and Secondary), ICT colleagues, Learning Technologists and colleagues from the Learning Estate. A list of colleagues is listed (**See Appendix 3**).

The 3 hour workshop was chaired by Martyn Wallace, Chief Digital Officer, Scottish Local Government.

9.2 Scenarios Generated

Working backwards, workshop participants were first of all asked to brainstorm and consider what the digital inclusion futures for Moray learners would look like.

The premise of the workshop is that the investment in the infrastructure would ideally need to be aligned and able to support each of these possible digital future scenario, albeit within the parameters of the available financial resource available (see section 7 of this report).

The following scenarios were agreed. These scenarios range from minimal investment (scenario 1) to scenarios which would necessitate more significant investments.

Scenario 1: While there is no transformative investment in terms of the provision of 1:1 devices (i.e. a significant investment in devices), there will nevertheless be a focus on further improving broadband connectivity across the learning estate.

Scenario 2: While there is no transformative investment in the provision of 1:1 devices, broadband width is increased to not only enhance current school connectivity (scenario 1) but also to support teachers to utilize emerging innovations such as virtual reality and immersive technology within the classroom.

Scenario 3: A phased investment programme is initiated for 1:1 devices that is focused on the rollout of **google products (e.g. chromebook)**. This investment is in addition to enhancing broadband connectivity (scenario 1) and increasing broadband connectivity to support the use of virtual reality and immersive technology (scenario 2).

Scenario 4: A phased investment programme is initiated for 1:1 devices that is focused on the rollout of **Apple products** (e.g. **iPads)**. This investment is in addition to enhancing broadband connectivity (scenario 1) and increasing broadband connectivity to support the use of virtual reality and immersive technology (scenario 2).

Scenario 5: A phased investment programme is initiated for 1:1 devices that is focused on the rollout of **Windows products**. This investment is in addition to enhancing broadband connectivity (scenario 1) and increasing broadband connectivity to support the use of virtual reality and immersive technology (scenario 2).

Scenario 6: A phased investment programme is initiated that is focused on the adoption of a **hybrid approach to the provision of 1:1 devices (e.g. google, windows and/or apple products)**. This investment is in addition to enhancing broadband connectivity (scenario 1) and increasing broadband connectivity to support the use of virtual reality and immersive technology within the classroom (scenario 2).

Scenario 7: The infrastructure is developed to support Moray learners to bring their own device to school.

9.3 A Logic Modelling Approach

The workshop was based on undertaking a logic modelling approach to identify the outputs and the inputs which are aligned to each of the above 7 possible future digital inclusion scenarios. The format of this approach is outlined in the diagram below (**Diagram1**).

Diagram 1: Logic Model Format for each of the Identified Scenarios

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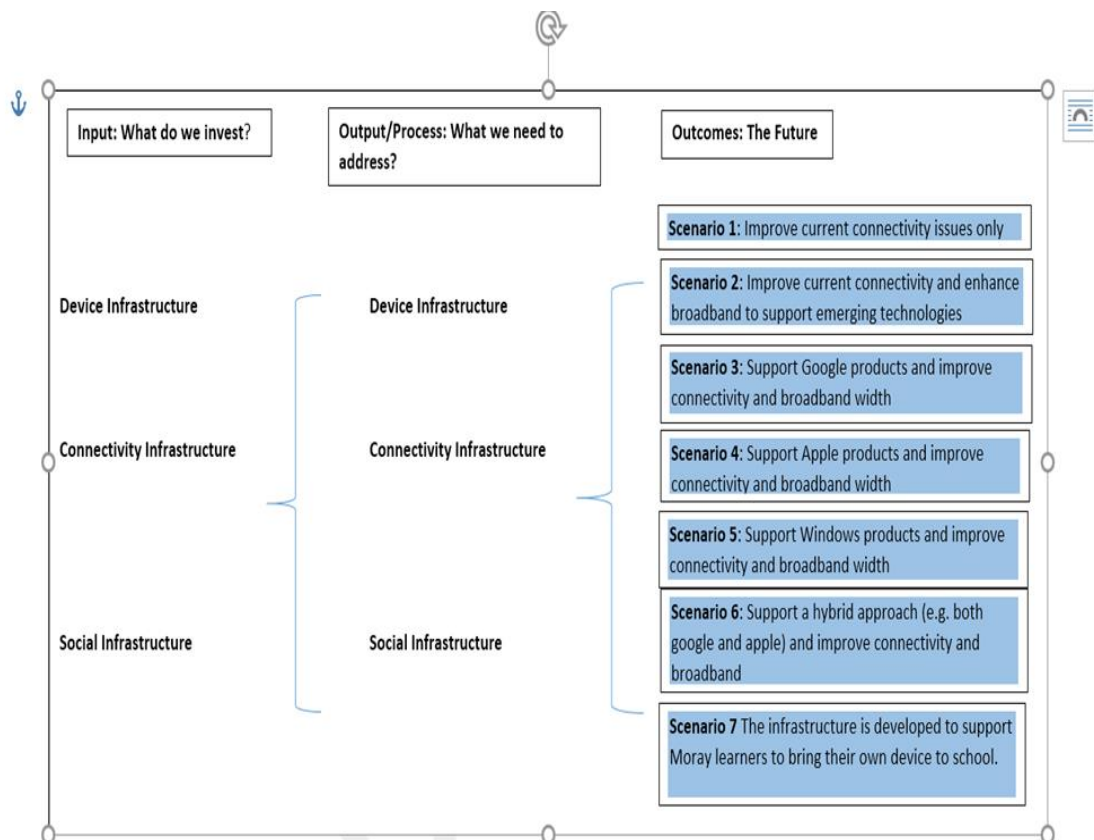
Following the identification of possible future scenarios and then working backwards, workshop participants explored issues relating the themes of device infrastructure, connectivity infrastructure and social infrastructure under in both the "output/process: what we need to address?" and the 'input: what do we invest columns" which is required to enable these future scenarios to be realised.

These terms have been adopted from the Scottish Government's Digital Learning Discovery Research Report. The scope of these terms are as follows:-

Device Infrastructure: This refers to mobile device management systems (MDM) and the digital technologies currently deployed or which could potentially be procured in the future.

Connectivity Infrastructure: This refers to ensuring that each school has sufficient broadband width to meet current and future digital supported learning needs. Presently, as a rough rule of thumb, secondary schools should be able to access 1GB and primary schools 100 MBS. However, caution is advised in terms of establishing a standard since other factors such as the size of the school roll should also be taken into account.

Furthermore, it may be the case that bandwidth would need to further increased if future scenarios such as virtual reality or the universal roll out of 1:1 devices is to be realised.

Social Infrastructure: This refers to the workforce and would cover the possible need to appointment members of staff with relevant skills set to support the possible future digital inclusion scenarios.
It is proposed that using the same standardised terminology as the Scottish Government report will be a consistent approach to national discussions on progressing digital inclusion.

9.4 Scenario Summary

Following the logic modelling approach, the scenarios were completed by participants at the workshop. It should be noted that scenarios 3 to 6 were merged together since the same issues were apparent regardless if Google, Apple or Windows products are adopted. These scenarios are included at the end of this Business Case **(See Appendix 4)**.

A separate template will be used for backcasting outputs and inputs in relation to each future outcome scenario.

A summary of the cross cutting themes that emerged from the backcasting exercise are as follows:-

- Connectivity to and in the school (intra and inter) e.g. connectivity to the door and service within the school estate (Wi-Fi/hot spots). It was noted that what is fit for one school building (infrastructure), may not be for another;
- It was commented that the level of digital capability and connection across the school estate is massively variable;
- All are aware of the mobile connectivity limitations across Moray due to for example rurality and SWAN limitations;
- Private sector investments will have an impact on the devices which are 'best suited' but we should not focus on one particular kind of device for 'future proofing digital infrastructure for schools' as sector focus can fluctuate based on demands;
- It was highlighted that iPads require a separate network connection and the connection issues surrounding this operating systems (OS);
- Multiple MDMs require additional manual work/resources to maintain and manage the network, software, licences and devices;
- Overall connectively covers a wide range of devices, it is not just laptops and Windows OS;
- Seamless ways of working, for example, Glow – currently cannot work between online and App versions; this syncing is disabled and causes frustrations with staff and learners;
- Staff using multiple devices to access various software;
- We need to get to the root cause of the problems across the school estate and address where possible;

- Not all schools will have the same concerns/issues;
- There is not one thing or one solution to manage; there is many strands and work is underway in various areas; and
- The educational benefits and return on investment of immersive technology (e.g. immersion rooms and VR) are questionable at this stage and should not represent an immediate investment priority for this authority while connectivity issues need to be addressed.

The shortlisted options outlined in the following section have been informed by this scenario setting exercise.

9.5 Options and Appraisal

The scenarios generated from the backcasting workshop can be translated into the following 4 options. Selection criteria have been applied to each option and assessed on a scale of 1 to 5 (with 3 being the highest and 1 being the lowest score).

Option 1	Address connectivity issues and support Ipads (scenario 1)
Outcome	While there is no transformative investment in terms of the provision of 1:1 devices, there will nevertheless be a focus on further improving broadband connectivity across the learning estate.
Description	This could be described as the minimum investment option. The immediate focus is improving ELC and School logon times and connectivity. The inclusion of supporting iPad devices -through an MDM- is not only a reflection of the significant uptake of Apple devices in recent years but also the detrimental impact that iPads have on the ICT Education Network performance if not supported. In addition, the network connectivity for Moray Council Schools is currently delivered via the Scottish Wide Area Network (SWAN); a managed service. The use of ICT has grown dramatically leading to higher demands for network connectivity than previously anticipated. The Council is focused on providing Schools with the connectivity that they need to deliver high quality learning and teaching whatever the future brings. A temporary Senior ICT Officer post is currently in place to specifically focus on improving schools connectivity and it is proposed that an extension to this resource would enable further work to be carried out that builds on current progress and to support the installation of the MDM. The salary costs for a 12 month extension to this post would be £56,000.

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Selection Criteria		
Improving Connectivity	Addressing connectivity and slow logon times is the focus of this option.	3
Supporting Learning Outcomes	This criteria will be addressed by improving logon times thus improving the teaching and learning experience. Other options have a stronger focus on learning outcomes.	2
Affordability	As the minimum investment option, this is the most affordable. This cost estimate includes an annual licence fee (i.e £8,000 based on 1500 devices). **Estimated Cost**: £74,000-£80,000	3
Comment	Improving connectivity was identified as the top priority by participants who took part in backcasting workshop. While an agnostic position should be taken on the merits of 1:1 device compared to another until a teacher and learner engagement exercise is undertaken, the significant increase in the number of iPads in use over the last 10 years, should be supported by the ICT Education Network if connectivity is to be further improved.	
	Total Score	8

Option 2	Address connectivity issues and support a 5G Classroom within each of the 8 ASG areas (scenario 2)	
Outcome	While there is no transformative investment in the provision of 1:1 devices, broadband width is increased to not only enhance current school connectivity (option 1) but also to support teachers to utilize emerging innovations such as virtual reality and immersive technology within the classroom.	
Description	Although other sources of funding would be available through the Learning Estate Build Programme, this option adds to option 1 by also including Virtual Reality and Immersive technology support.	
Selection Criteria		
Improving Connectivity	As per option 1, addressing connectivity and slow logon times is an integral part of this option.	3
Supporting Learning Outcomes	This option also aims to utilise emerging innovations such as immersive technology. A 5G classroom was identified as a possible investment option although such a development would be part of the Learning Estates Investment Programme. Workshop participants were however of the view that it was too early to judge if emerging technologies represent	2

	best value in terms of making a positive impact on learning outcomes.	
Affordable	While it is not possible to provide an accurate cost estimate, providing infrastructure support for 5G classrooms within each ASG area and other forms of immersive technology would be outwith the indicated budget. This is based on a conservative estimate of £200k allocated to each of the ASG areas for a 5G classroom in addition to the option 1 costs. **Estimated Cost:** £1.7m	1
Comment	Until consistent logon times are established across ELC settings and Schools, the investment in virtual reality and immersive technology was considered by workshop participants as a lower priority and	
	Total Score	6

Option 3	Support the use of multiple 1:1 devices (scenarios 3 to 6)
Outcome	Support a hybrid approach -Google, Apple and Windows products- and improve connectivity and broadband.
Description	This option would require investment in multiple MDMS to support a range of different 1:1 devices.

Selection Criteria		
Improving Connectivity	As per options 1 and 2, addressing connectivity and slow logon times is an integral part of this option.	3
Supporting Learning Outcomes	As well as improving logon times this option aims to develop an infrastructure to support any future investment in 1:1 devices.	2
Affordability	Multiple MDMs to support a range of different 1:1 devices will be more expensive than procuring a MDM to support only Ipads. There would also be increased training costs due to the need to support multiple digital solutions. This cost estimate is based on an additional licence fee per £8,000-£9,000 representing the purchase of a further MDM to the costs noted in option 1 and a	1

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	further £10,000 to £15,000 for professional support and training **Estimated Cost: £81,000-£89,000**	
Comment	In light of the anticipated infrastructure costs, workshop participants considered that an extensive engagement exercise should first of all be undertaken before investing in MDMs and the network infrastructure to support range of 1:1 devices.	
	Total Score	6

Option 4	Support Learners to Bring their own device (scenario 7)	
Outcome	The infrastructure is developed to support Moray learners to bring their own device to school.	
Description	This option is based on the premise that asking learners to use their own devices will reduce costs to this Authority.	
Selection Criteria		
Improving Connectivity	Multiple MDMs would require to be installed to support a range of different devices.	2
Supporting Learning Outcomes	If this is a viable option from a technical perspective, it would have the same impact on learning outcomes as the other options.	2
Affordability	While this option would mean that there would no need to invest in the universal provision of 1:1 devices, multiple MDMs would need to be established and high level security risk (e.g. proliferation of viruses) would need to be addressed. Since more than one MDM would be required, the cost estimate below is the same as option 3. **Estimated Cost**: £81,000 - £89,000	2
Comment	Since the device would be owned by the learner, the Council would have very limited control over how the device	

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	would be used. This would present a wide range of risk to the Council. These risks would range from viruses infecting the Education Network to reputational damage due to inappropriate use.		
	Total Score		6

9.6 The Preferred Option

The following is a summary of the scoring for each of the 4 options as outlined in the above (section 9.5).

Option	Improving Connectivity	Supporting Learning Outcomes	Affordability	Total
1.Address connectivity issues and support iPads	3	2	3	8
2. Address connectivity issues and support a 5G Classroom within each of the 8 ASG areas	3	2	1	6
3. Support the use of multiple 1:1 devices	3	2	2	7
4. Support Learners to Bring their own device	2	2	2	

Based on the application of the selection criteria, the preferred option is option 1: Address connectivity issues and support iPads.

When exploring the options for procuring an MDM, ICT colleagues sought specialist expert advice. The Council have been advised that there are number of different approaches and products that could meet the requirements of the preferred option. Most options would be based on annual licence fee arrangement for each individual iPad. These options include In-tune (OS Tool provided by Microsoft), Manage Engine and JAMF (both cloud based products).

In the context of this options appraisal, determining the optimum option for Moray Council will require to be based on a procurement exercise. Affordability would also be a key element of the procurement brief and selection criteria.

The high level procurement tasks are outlined in the Implementation Plan section (See Section 12.2).

9.7 Cost Profile

As noted above, an accurate cost estimate can only be secured as a result of undertaking a procurement exercise that weighs up the merits of a range of different MDM options against an agreed specification.

Initial estimates show a significant range in cost and for indicative purposes, the cost profile below (line 3) relates to one possible option. Due to commercial sensitivity, these potential providers are note named in this Business Case.

The £8, 531 noted is an annual cost based on £5.69 per device on just over 1500 devices.

	Item		Value
1.	Senior ICT Officer support Salary costs for a 12 month post at grade 9.		£56,000
2.	Professional services for implementation and training		£10,000-£15,000
3.	MDM to support iPads through an appropriate MDM solution. Cost per annum based on the number of devices		£8,000-£9,000
		Total	£74,000-£80,000

It should be noted that reference to training (row 3) relates to ICT and not teaching staff.

The Council funding source to meet these costs is noted in section 7.

10.0 Main Risks

The following are some of the high level risks that were either considered by workshop participants or were subsequently identified.

MDM: A different mobile device management system (mdm) will be required for Google and Apple products. While providing both products may represent the optimum option for education colleagues, a hybrid approach requiring multiple mdms may be difficult and costly to manage. The example has been given where if we are moving from 6,000 devices to 15,000 to 18,000 devices there may be an exponential increase if a hybrid approach is taken. Multiple MDMs would therefore result in increased running costs;

Devices: Without undertaking a consultation exercise with learners, parents and teachers, it is not possible to identify the optimum type of device to be

deployed across Moray. An investment in an MDM to support Apple products may influence or determine the outcome of any future engagement exercise.

Capacity: External consultancy support may be required to implement the infrastructure support identified;

Expectations: There is a risk that enhancing the ICT infrastructure for schools may raise expectations of an imminent significant investment in digital devices; and

Security: While requesting that learners bringing in their own home device to school, there is a heightened risk of viruses. Moreover, the Council may have limited control of the appropriate nature of materials being accessed via their own device.

Benefits of iPad: An MDM to support Ipads does not reflect this documents benefits statement (section 4.0) in relation to making learners ready for the workplace, since iPads are thought to represent only a 24% share of the device marketplace. As described in this Business Case, an MDM to support Ipads is nevertheless necessary for an improvement of the overall network performance.

Payment based on the number devices: There is risk that enhanced infrastructure support for iPads could result in an increased up-take of these devices across Moray Schools. Annual costs could therefore escalate above the current estimated cost of £8,535 to support 1500 devices.

11.0 Constraints and Dependencies

There are 2 major constraints associated with this project.

- **Staff Capacity**: The implementation of the preferred option will need to contend with the constraints in releasing ICT staff who are otherwise committed to other priorities. As well as funding backfill to release ICT colleagues to undertake Implementation Plan tasks, it may also be necessary to undertake an options appraisal leading the possibility of tendering and outsourcing work to a specialist consultancy firm.

- **Funding:** As outlined in Section 7 of this Business Case, there is a finite budget to support this service improvement.

In terms of dependencies, the delivery of the curriculum for excellence is predicated on a reliable ICT infrastructure. Similarly, for Administration Business Support Staff a reliable ICT infrastructure is essential for utilising a range of different digital platforms.

These dependencies are part of the Councils Improvement and Modernisation Programme (IMP) and relate to the outcomes listed in section 4 of this Business Case.

12.0 The Management Case

The preferred option will be progressed in accordance with the arrangements set out in 12.1.

12.1 Project Reporting Structure

If the preferred option identified in this Business Case is endorsed, then a detailed Implementation Plan would be developed. The execution of the plan would be undertaken by senior officers within ICT, supported by the temporary ICT technician post and overseen by the Head of HR, ICT & Organisational Development.

12.2 The Implementation Plan

Relating to the preferred option, an outline of the key tasks that will form the basis of the implementation plan is highlighted below.

Ref	Activity	Duration (weeks)	Elapsed Time (weeks)
1	Specification of Requirements	4	4
2	Options Appraisal	4	8
3	Procurement	8	16
4	Implementation (Core)	2	18
5	Testing	2	20
6	Training	1	21
7	Implementation (Devices)	6	27

In addition, the approach to evaluating the impact of implementing the preferred option will need to be developed and implemented. This is part of the Benefits Realisation approach noted in Section 12.4.

Following the approval of this Business Case, the Implementation Plan will be up-dated and revised with further detail. This will include the responsible officers –including the Senior ICT Officer temporary post- for progressing specific milestones and tasks. Dependencies between milestones and task and start and finish dates will also be detailed.

12.3 Arrangements for Risks and Issues Management

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As part of the project governance arrangements, risks and issues will be monitored by the project management group and mitigating actions taken.

12.4 Arrangements for Benefits Realisation

The Project Management Group will also be responsible for implementing an appropriate approach to determining the benefits resulting from this project. This will include the establishment of baselines and the use of both quantitative and qualitative measures.

Appendix 1: Glossary of Terms

AI	Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.
Backcasting	A planning method that starts with defining a desirable future and then works backwards to identify policies and programs that will connect that specified future to the present.
Business Case (Outline and Full)	Moray Council adopts a 5 case model as the basis of its Business Plans (Treasury Green Book). The 5 cases are the Strategic Case, Economic Case, Financial Case, Commercial Case and Management Case. The difference between the Outline Business Case (OBC) and Full Business Case (FBC) is the degree of detail provided.
Chat GPT	As example of AI which has recently gained significant media attention since it allows the user to have human like conversations. It can answer questions and assist with tasks such as composing emails, essays and writing reports.
Cloud	Cloud computing is a general term for anything that involves delivering hosted services over the internet.
Commissioning	Strategic commissioning is the term used for all the activities involved in assessing and forecasting needs, links investment to agreed desired outcomes, considering options, planning the nature, range and quality of future services and working in partnership to put these in place.

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Connectivity Infrastructure	This refers to ensuring that every school has sufficient broadband width to meet current and future digital support learning needs
Device Infrastructure	This refers to mobile device management systems (MDM) and the digital technologies currently deployed or which could potentially be procured in the future.
Digital Learning	Defined as "any instructional practice that uses technology to strengthen a learner's learning experience. It can be used to provide professional learning opportunities for teachers…and personalised learning for learners."
Immersive Technology	Immersive technologies create distinct experiences by merging the physical world with a digital or simulated reality. Augmented reality (AR) and virtual reality (VR) are two principal types of immersive technologies.
Inputs	The resources required to make something happen.
Issue	When a risk does materialises and becomes a fact.
MDM	Mobile Device Management System. Optimize the functionality and security of devices. A different set up is required depending on what product is adopted.
Outcomes	This refers to the impact and change resulting from inputs, process and outputs.
Outputs	The immediate result of inputs and processes.
Risk	A possible eventuality. In other words, something that hasn't happened. When evaluating a risk we consider probability and severity. Linked to the concept of issue
SLT	This is an abbreviation for School Leadership Team.
Smoothwall	This is a web content filtering, safeguarding and internet security system.
Social Infrastructure	This relates to the workforce and covers teaching, non-teaching and ICT colleagues.
Transformational Change	Refers to a radical or significant change in the way that services are delivered (i.e. non-linear)
W7	This is an abbreviation for Microsoft Windows 7. This is an operating system that is now obsolete.
W10	This is an abbreviation for Microsoft Windows 10. This is the current operating system used by the Moray ICT Education Network.

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Appendix 2: Learning Estate Profile

	Primary Schools	Number
1	Number of Primary schools	46
2	Number of pupils	6889
3	Number of teachers	475.39 FTE
	Secondary Schools	
4	Number of Secondary schools	8
5	Number of pupils	5328
6	Number of teachers	454.88 FTE
	Early Learning and Childcare	
7	Number of ELC settings	24 Council 38 PVIs 38 childminders
8	Number of children	1600 approx
9	Number of ELC Practitioners	515

Appendix 3: Digital Backcasting Workshop Participants

	Name	Job Title
1	Martyn Wallace (Chair)	Chief Digital Officer, Scottish Local Government
2	Frances Garrow	Head of HR, ICT & OD
3	Graham Cooper	Infrastructure Manager
4	David McKay	Information Systems Manager
5	Stewart McLauchlan	Quality Improvement Manager
6	Claire Johnson	HT, St Gerardines Primary School
7	Robin Paterson	Project Manager (Education)
8	Grahame Davidson	ICT Team Leaders (Support)
9	Andrew Hall	Snr Project Manager (Learning Estate)
10	Shona Leese	Snr Project Officer (Learning Estate)
11	Neil Johnson	HT, Buckie Community High School
12	Louise Davidson	HT, Tomintoul Primary School

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13	Jan Sinclair	HT, Forres Academy
14	Alison McCook	Learning Technologist
15	Euan Morrison	Learning Technologist

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Appendix 4: Backcasting Scenarios

Scenario 1

Inputs		Output/Process		Outcomes
What do we invest?		**What we need to address?**		The Future
Device Infrastructure • MDM provision to support a range of different devices currently in use. • It was highlighted that IPads require a separate network connection.		**Device Infrastructure** • The increasing use of iPads means that support for these devices needs to be improved.		**Scenario 1:** While there is no transformative investment in terms of the provision of 1:1 devices, there will nevertheless be a focus on further improving broadband connectivity across the learning estate.
Connectivity Infrastructure • Connectivity to and in the school e.g. connectivity to the door and service within the school estate (Wi-Fi/hot spots). It was noted that what is fit for one school building (infrastructure), may not be for another. • It was acknowledged that the level of digital capability and connection		**Connectivity Infrastructure** • Minimum requirements for schools (e.g. 1GB for secondary schools and 100 MBS for Primary Schools was discussed). We need SG / SFT etc to provide guidance on the minimum standard e.g.11GB per secondary schools.		

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Inputs		Output/Process		Outcomes
across the school estate is massively variable. • It was highlighted that IPads require a separate network connection.		• Wi-Fi within schools e.g. Wi-Fi hubs required within each school • A minimum expectation is that in general coverage should be 'quite good'. If not then need to identify what the issues are for each campus – it isn't just one thing that is causing the current connection issues. Clear if it is technical issues or provision of access points that are causing current connectivity issues;		
Social Infrastructure • Additional resource to support ICT to undertake an assessment of each ELC setting and School. • Additional manual work/resources to maintain and manage the network, software, licences and devices.		**Social Infrastructure** • Health Check Assessment of ELC Settings and Schools so that hot spot / black spots are (inc poor coverage) are identified. Understanding particular issues for each school and identifying solutions resources where possible. • Access to connectivity out with the school and how to support this. • MDM support and latest products and connectivity support.		

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Inputs		Output/Process		Outcomes

Risks
Technology and device -at which point do we decide which device has impact on attainment (proving outcome and achievements) across the school years – this would assist in identifying which devices are the best option.

Further Notes
- Connectivity to the school within the school and the infrastructure of the building (Wales example)   - Quality of service at the school – Perth & Kinross School. Help support new ways and styles of teaching and Scottish Borders. Examples of learning/good standards are: "to the school": Welsh digital education strategy model for the minimum standards for Primary Schools. within the school": Perth & Kinross Council Bertha Park school – fully enabled for digital education systems.   - Each school building will need to be considered ad hoc as dependent   - How are YP connecting at home. Mobile device connection are utilised and shared ad hoc.   - Connectivity across LES is massive variable – most common theme is the Lag, but has gotten better but still lags. Some areas wireless connectivity is good but some have numerous blackspots.   - Connectivity wireless blind spots is okay in most areas but can only be access via a MC device.   - IPad connectivity is on a separate network and requires additional resources/work to manage and keep the system is updated.   - Overall connectivity is for a wide range of devices not just laptop.   - Glow – issues via desktop and App/Cloud – issues with connectivity and syncing.   - Capacity of the system – variable across the LES.   - Work has been undertaken by Learning Techs and ICT across the LES – many of which recommendations have been completed. It might be worthwhile considering an updated scope.   - Hayward Report – snr phase a third of learning/accreditation will be generated out with the school building – which means devices will need to be mobile and able to be utilised within schools and out with. Tenancy and seamless learning.   - In a school what is critical is that it is reliable, it works quickly enough that allows for 45 minutes of learning in a 50 minute class rather than joining delays and unreliability of devices.

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- Reminder that the majority of legacy devices have already been removed from the school estates (phased programme).
- Core provision will be refreshed on a reasonable period/ongoing basis by ICT.

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Scenario 2

Inputs		Output/Process		Outcomes
What do we invest?		**What we need to address?**		**The Future**
Device Infrastructure • One suggestion was the establishment of a 5G classroom within each ASG area. This would be a shared resource was all ELC settings and Schools within each ASG cluster		**Device Infrastructure** • Establishment of a 5G classroom in each ASG area. This could be accessed by more than 1 school within each ASG. Not focusing on the 'new' as it won't necessarily be the best option e.g. VR/simulation/immersion		**Scenario 2**: While there is no transformative investment in the provision of 1:1 devices, broadband width is increased to not only enhance current school connectivity (scenario 1) but also to support teachers to utilize emerging innovations such as virtual reality and immersive technology within the classroom.
Connectivity Infrastructure • Enhanced broadband to support VR headsets and other forms of immersive technology. Bluetooth technology may require to be invested in to support VR and immersive technology.		**Connectivity Infrastructure** • Bluetooth connectivity would potentially have a significant impact on the network and security.		
Social Infrastructure • Potential linkage to Early Years STEM Moray Growth Deal and the Learning Estate Programme.		**Social Infrastructure** Questions asked were- • What are the learning outcomes we are trying to achieve? • What's the attainment levels?		

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Inputs		Output/Process		Outcomes
		- What's the pathway plans from schools to work - What are we trying to ensure YP skill sets are when leaving school - What industry requirements are important that will feed into the skills YP need ; - Yet to see VR/simulation used within a school environment in an effective way.		

Risks
Since this is emerging technology it is considered unclear how immersive and VR technology will support learning outcomes. The possible return on investment was considered to be debatable at this early stage in the development of these technologies
Alignment of learning outcomes and technology investments.

Affordability in terms of available IMP budget is a risk.

Further Notes
Have to be careful that immersion investment does not have the same impact as actual activities
The digital devices have to improve the skills for the majority and not the minority within certain career/industry

Good school connectivity does allow for expansive digital/online learning platforms that will expand curriculum but does require a cost benefits analysis and digital upskilling.

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Scenarios 3 to 6 (Multiple devices)

Inputs		Output/Process		Outcomes
What do we invest?		**What we need to address?**		**The Future**
Device Infrastructure • Multiple MDMs will be required to support the use of multiple devices. • It was highlighted that additional devices require a separate network connection.		**Device Infrastructure** • Need to be clear SQA requirements and what their expectations are for future school based learning. • Assess what capacity is there in secondary schools to support multiple device use. • Need to look at good practice for staff e.g. one device that covers all needs/solutions.		**Scenario 3-6:** Support a hybrid approach -Google, Apple and Windows products- and improve connectivity and broadband.
Connectivity Infrastructure • Multiple MDMs will need to be established		**Connectivity Infrastructure** • As per scenario 1, a pre-requisite for this scenario is consistent wi-fi connectivity. • Tenancy agreement options would need to be explored.		

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Inputs	Output/Process		Outcomes
Social Infrastructure • Device choice will have an impact on ICT support. E.g. Google Chrome via glow, tenancy. • Multiple MDMs require additional manual work/resources to maintain and manage the network, software, licences and devices. • Device Digital training for staff and learners.	**Social Infrastructure** • Through training, ensure that teachers have the skills and confidence to support learners.		

Risks

There is a risk that the provision of multiple devices at different stages of the journey through school will undermine the learning experience.

Multiple MDMs will entail an increased cost. There is a risk that this scenario is not affordable.

A teacher/learner engagement exercise would need to be undertaken to select the optimum type of devices to use.

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Scenario 7

Inputs		Output/Process		Outcomes
What do we invest?		**What we need to address?**		**The Future**
Device Infrastructure • Multiple MDMs will be required to support the use of multiple devices brought into school by learners		**Device Infrastructure** • Schools would need to support a range of different devices. This would not only include charging point provision. • The ICT network would need to be protected from any viruses that could be introduced from a learners' device.		
Connectivity Infrastructure • Multiple MDMs will need to be established •		**Connectivity Infrastructure** • Would not be able to rely on Apps, and various OS. Would need to be browser based. • There would be issues that would need to be addressed about revising the Council's Network Policy in terms of security and acceptable and appropriate use		**Scenario 7:** The infrastructure is developed to support Moray learners to bring their own device to school.

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Inputs		Output/Process		Outcomes
Social Infrastructure • Device Digital training for staff and learners.		**Social Infrastructure** • Significant staff training would be required to cover a range of different types of devices.		

Risks

There is a risk that minimal filtering will result of inappropriate use of devices on school premises. This will lead to reputational damage to the Council.

While a policy of bringing your own device to school would aim to achieve equity, there is risk that inequity would persist in terms of children and young people who have a device and those who don't. Some brands may also be perceived as having a higher status over others.

There is a risk of demarcating when the Council has responsibility for the device and when responsibility lies with the child/young person. For example, damage to device when on school property or virus review and up-dating.