**Primary Early Years (3-7 phase) Initial Teacher Education: Curriculum Plan**

**Subject Computing**

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| **Curriculum Vision:**  Through our Initial Teacher Education Curriculum, it is our intention that trainees:   * Develop a practical subject knowledge to be able to teach EYFS and KS1 National Curriculum Computing three strands of Computer Science, Information Technology, Digital Literacy and to form the basis for additional subject knowledge development and enhancement (LH3.1). * Develop understanding of the importance in providing opportunity for children to learn about Computing from Nursery through to Year 2. * Apply their subject knowledge to adaptive planning, teaching, learning and assessment for classroom practice to ensure appropriate progression. * Develop knowledge, understanding and critical reflection of pedagogical approaches for adaptively teaching Computing in Early Years and KS1 | | | | | | | | |
| **Phase 1** | | | | | | | | |
| **University Based Learning** | | | | **School/Practical Based Learning** | | | | |
| **Learn That** | | **Learn How** | | **Learn That** | | **Learn How** | | |
| **Component Knowledge** | Computing is important in society and provides a range of opportunities to children. Their role as teachers is to open these opportunities for all children. Computing is integrated into society and there are significant opportunities for those who can work in this field. Computing requires a more diverse workforce | Computational thinking can be taught through a range of pedagogical approaches, including unplugged pedagogies, and should become embedded in practice as children design and program their own systems **(LH3.5, LH3.6, LH3.7)** | | Learning experiences should build upon prior learning by using components which lead to composite knowledge | | Plan a computing lesson using the school’s medium-term plan.  Either:   * Teach and reflect on the computing lesson taught; or * Discuss the planned lesson and its effectiveness with a member of school staff (mentor, class teacher or subject lead) | Intent |
| The fundamentals of what a computer is, how it works, how it stores, processes and sends information | Read code and predict what it will do using logical reasoning. **(LH4.2, LH4.4, LH4.5, LH4.12, LH4.14)** | | Regular formative assessment as a lesson progresses is important for the develop for children’s knowledge and understanding, application of practical skills and to promptly address misconceptions in the subject. Making use of appropriate hinge questions and adapting teaching to address this **(LT6.4, 6.5; LH6.1, 6.7, 6.10, 6.1, 6.13, 6.14, 6.15, 6.16, 6.1)** | | Observe a Computing lesson noting scaffolding & fading, direct & explicit instruction, use of groups/ pairs, formative assessment and adaptive teaching approaches.**( LT4.3, 4.4, LT4.7, 4.9; LH4.2, 4.10; LH5.12, LH4.12, 4.13 LH4.3; LT5.1, 5.3, 5.7 LH5.1, 5.5)** |
| Computer science is a way to make it easier to solve problems, think through solutions and create systems. Computational thinking underpins computer science: problem solving, design and implementation of computer systems (virtual and physical devices). This includes algorithms, sequences and pattern recognition. | Evaluate a Computing lesson sequence and/or scheme of work which demonstrates progression for all learners. **(LH2.3, LH2.4, LH2.7, LH3.20, LH4.2, LH4.4, LH4.5, LH4.12, LH4.14)** | | Cross-Curricular, after-school clubs and extra-curricular activities are linked to subject enrichment (not necessarily in Computing). Reflect on how extra-curricular clubs could enhance learning for Computing. **(LT8.3; LH8.13)** | | Discuss with the Computing subject lead the curriculum plan for Computing and how this sequences content to avoid overloading working memory; and the different expectations for different ages. **(LT1.3, LH1.1, LH2.3; LT4.2)** |
| The programming concepts develop sequencing and repetition. | Use software beyond typical office applications which can be used for Early Years creative computing, for example: animation, sound editing, collaborative tools (2Simple, Audacity, TTS, Google docs, OneDrive). | |  | |  |
| Common input/ output devices. | Lesson Planning takes into consideration children’s current knowledge, understanding and skills of the subject,  as well as their emotional and cognitive development, and be adapted accordingly **(LT1.3, LT2.2, LT5.1, LT6.6)** | |  | |  |
| That computers store information in various places, process and send data in different ways e.g. streaming, hard disks, cd/dvd disks | to plan a lesson breaking down the national curriculum end point to component knowledge which is appropriate to the age phase of the children, using appropriate pedagogical strategies. | |  | |  |
| Programming Bee Bots and virtual on-screen programs, require resilience, perseverance, risk-taking, innovative-thinking, collaboration, trial and error; debugging and testing are essential parts of the process. **(LT4.5, LT7.4)** | to operate and develop sequences with programmable toys/devices | |  | |  |
| Information Technology should be selected on the basis of the task which is to be performed and different tools (hardware/ software) are suitable for different tasks. Information Technology use (including Internet searching) should be appropriate and efficient. | to make use of appropriate computing in a variety of subjects that are appropriate and where possible, child-led or initiated scaffolded by the early years practitioner. | |  | |  |
| Information is created, saved and retrievable | To deliver content digitally for others to access | |  | |  |
|  | Selecting appropriate pedagogical strategies can aid  cognitive load, retrieval and long-term memory, including  purposeful practice, spaced learning and scaffolding and  fading **(LT2.1, LT2.4, LT2.7, LT2.8)** |  | |  | |  |  |
| **Assessment** | **Assessment** | | | **Assessment** | | |  |
| * Modify or debug a given algorithm (tutor observation); * Create an IT provision document appropriate for EYFS (tutor observation). * Participate in group/ class discussions and Q&A | | | Assessed throughout Professional Practice through lesson observations, weekly development summaries and weekly tasks. Feedback provided by mentor, class teacher, link tutors and blue book reflections. | | | Impact |
| **Composite Knowledge** | **Composite knowledge/understanding/skills** | | | | | |
| *By the end of this phase trainees will* ***know:*** | | *By the end of this phase trainees will* ***understand:*** | | *By the end of this phase trainees will* ***be able to:*** | |
| * how to create basic algorithms * how to design and write and debug programs; and * - pedagogical strategies for teaching computer science to Early Years and KS1 | | * Computing is discrete at times and cross curricular particularly in Nursery and EYFS * Computer science and problem solving within computing is foundational for developing computing skills * Testing, debugging and collaboration are fundamental aspects of computing. Computing teaches children an experimental and developmental approach (through play where appropriate) as well as resilience, perseverance, creativity and a willingness to collaborate with others. (LH1.3) * how schools plan and teaching Early Years computing in practical and manageable ways taking account of how they support other curriculum areas | | * plan appropriately to teach computing adapting it for pre-national curriculum delivery and throughout curriculum areas * identify and reflect on appropriate strategies for teaching computing effectively in Nursery, EYFS and KS1 | |
| **Research** | **KEY RESEARCH****That Trainees will know that informs teaching and learning in Computing** | | | | | | |
| Bagge, P., 2022. Code-IT [online]. Available from: <http://code-it.co.uk/>  Computing at School, 2022. Barefoot Computing [online]. Available from: <https://www.barefootcomputing.org/>  Department for Education, 2013. National Curriculum for Computing. London: HMSO. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study>  National Centre for Computing Education, 2022. Teach Computing [online]. Available from: <https://teachcomputing.org/>  Ofsted, 2022. Research review series: Computing. Ofsted Available at: <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing>  Raspberry Pi Foundation, 2022. Hello World [online]. Available from: <https://helloworld.raspberrypi.org/> | | | | | | |
| **Phase 2** | | | | | | | | |
| **University Based Learning** | | | | **School/Practical Based Learning** | | | | |
| **Learn That** | | **Learn How** | | **Learn That** | | **Learn How** | | |
| **Component Knowledge** | Information Technology should be selected on the basis of it being purposeful (including Internet searching) and should be appropriate to the age of the child and efficient. | Researching and writing an effective cross-curriculum project for teaching Computing which will enable all children to make National Curriculum progress across a sequence of lessons. **((LT1.3, LT2.2, LT2.6, LT4.4, LT4.6, LT4.7, LT4.8, LT4.9, LT4.10, LT5.1, LT6.6)** | | Learning episodes in KS1 are spaced across the curriculum as an effective way to develop schema and embed learning through revisiting concepts.  Nursery and EYFS teaching will be more child led/initiated depending on the setting | | Either:   * Plan, teach and assess a sequence of lessons for Computing based on the school’s medium-term plans; or * Annotate a medium-term plan from school and discuss with a member of staff how you might use this to plan a sequence of lessons for Computing. | Intent |
| Cross-curriculum teaching with technology (TEL) does not meet the National Curriculum for Computing, unless there are specific learning objectives for Computing curriculum included; teachers should exploit cross-curriculum opportunities by planning learning for both subjects. | Use software beyond typical office applications which can be used for creative computing, for example: animation, sound editing, digital art, data handling (2simple, Purple Mash, Audacity), collaborative tools (Google docs, OneDrive, school server spaces), and their use in the classroom. | | through conversations with school colleagues (mentor, class teacher or subject lead), that schools use varied approaches to assessing children | | Examine the school curriculum plans for computing to identify how learning is transferred or linked across different subjects, e.g., use Beebots on a grid to develop geographical skills, and discuss these with a member of staff (mentor, class teacher or subject lead) |
| Data Handling software exists relevant to this age group and generally relates to pictographs and graphing applications | Use and evaluate software appropriate for data handling projects in EYFS and KS1 | |  | |  |
| Data handling enables storage, organisation, search, sort, filter and reporting capabilities of large-scale data | To make effective use of specific Early Years software to support learning | |  | |  |
| A range of pre-made resources and guidance are available from NAACE, Barefoot Computing, Computing at School. **(LT8.2; LH8.3, 8.7)** |  | |  | |  |
| **Assessment** | **Assessment** | | | **Assessment** | | | Impact |
| * Apply programming (retrieval activity) to on-screen or toy programming (tutor observation) * Create an IT provision document for Nursery or EYFS (tutor observation). * Plan a sequence of lessons for KS1 (tutor observation) * Participate in group/ class discussions and Q&A | | | Assessed throughout Professional Practice through lesson observations, weekly development summaries and weekly tasks. Feedback provided by mentor, class teacher, link tutors and blue book reflections. | | |
| **Composite Knowledge** | **Composite knowledge/understanding/skills** | | | | | |
| *By the end of this phase trainees will* ***know:*** | | *By the end of this phase trainees will* ***understand:*** | | *By the end of this phase trainees will* ***be able to:*** | |
| * Information displayed by computers in relation to data can store, sort, filter, search and report the data in the form of various graphs. * That there are a range of tools and published schemes to monitor progression in computing | | * That contexts from other subjects provide opportunities for planning effectively in Computing * progression through the school’s curriculum should be monitored at National Curriculum level after preparation | | * Identify age-appropriate technologies for data handling and appropriate contexts for teaching data handling across KS1 * plan for progression across a sequence of lessons using appropriate contexts | |
| **Research** | **KEY RESEARCH****That Trainees will know that informs teaching and learning in Computing** | | | | | | |
| Bagge, P., 2022. Code-IT [online]. Available from: <http://code-it.co.uk/>  Computing at School, 2022. Barefoot Computing [online]. Available from: <https://www.barefootcomputing.org/>  Department for Education, 2013. National Curriculum for Computing. London: HMSO. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study>  Grover, S, 2020. Computer science in K-12: An A-Z handbook on teaching programming. Edfinity: USA  National Centre for Computing Education, 2022. Teach Computing [online]. Available from: <https://teachcomputing.org/>  Ofsted, 2022. Research review series: Computing. Ofsted Available at: <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing>  Raspberry Pi Foundation, 2022. Hello World [online]. Available from: <https://helloworld.raspberrypi.org/>  Sentance, S., Barendsen, E. & Schulte, C., 2018. Computer science education: perspectives on teaching and  learning in school. Bloomsbury: London | | | | | | |
| **Phase 3** | | | | | | | | |
| **University Based Learning** | | | | **School/Practical Based Learning** | | | | |
| **Learn That** | | **Learn How** | | **Learn That** | | **Learn How** | | |
| **Component Knowledge** | Online safety education should be tailored to meet the specific requirements of children at different stages of their development and technology use inside and outside of  school. | There are different pedagogical approaches for teaching computer science, allowing for child led/initiated activities and using physical computing resources to allow abstract concepts to become concrete. | | Progression should be planned from the outset, including small step progression to take account of pupils with SEND from the outset, and to set challenging learning goals. **(LT2.2, 2.6, 2.8; LH2.1, 2.4, 2.7 LT3.7, LH6.5)** | | Discuss with the subject leader for computing:   * progression across the year group in the three strands of computing (computer science, information technology and digital literacy) * planning small step progression in Computing takes account of pupils with SEND from the outset * how the policies for Computing are used * how they check the quality of education in computing   **(LT3.1; LH3.8; LH5.2, 5.5)** | Intent |
| Physical devices, such as robots or microprocessors can be programmed including the use of sensors (input), motors, LEDs, buzzers (outputs) (Scratch and Raspberry Pi in Y2) | The programming concepts for KS1 apply in both on-screen and physical programming contexts. | | The policies for computing are designed to safeguard children online, both at home and at school. | | Work with an experienced member of staff to monitor and assess progress in computing. This might be through a sequence of lessons being taught by the trainee, or by reviewing children’ work from previous computing lessons. |
| The programming concepts sequence, selection, repetition and variables and how they apply in a range of different programming contexts. | It is helpful to practice programming across a range of contexts to embed and deepen knowledge of programming concepts. Also making use of various Beebot templates to develop cross curricular subject enhancement – e.g. phonics, number and place **(LT2.7)** | | Subject leaders have a key role in monitoring the quality of education provision in their subject area. | |  |
| Long-term planning should build on prior knowledge gained from Nursery and EYFS and enable children to progress through the curriculum developing component and composite knowledge **(LT2.2, 2.6, 2.8, 3.6; LH2.1, 2.4, 2.7 LT3.7, LH6.5)** |  | |  | |  |
| **Assessment** | **Assessment** | | | **Assessment** | | | Impact |
| * Creation of a digital literacy toolkit for personal use in schools (tutor observation) * Evaluating e-safety resources (tutor observation). * Contributing to a long-term plan (tutor observation) * Participate in group/ class discussions and Q&A | | | Assessed throughout Professional Practice through lesson observations, weekly development summaries and weekly tasks. Feedback provided by mentor, class teacher, link tutors and blue book reflections. | | |
| **Composite Knowledge** | **Composite knowledge/understanding/skills** | | | | | |
| *By the end of this phase trainees will* ***know:*** | | *By the end of this phase trainees will* ***understand:*** | | *By the end of this phase trainees will* ***be able to:*** | |
| * Age-related expectations for progression in computing * A range of resources available for teaching e-safety/digital literacy appropriately to different age groups | | * Computing in Nursery and EYFS has to be part of continuous provision and/or child led in the activities done * that planning for progression across a series of lessons is key to children’s learning in Key Stage 1 | | * Assess children’s progress in computing against the school’s curriculum. * Evaluate long term plans and/or continuous provision in computing for progression | |
| **Research** | **KEY RESEARCH** | | | | | | |
| Bagge, P., 2022. Code-IT [online]. Available from: <http://code-it.co.uk/>  Computing at School, 2022. Barefoot Computing [online]. Available from: <https://www.barefootcomputing.org/>  Department for Education, 2013. National Curriculum for Computing. London: HMSO. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study>  Grover, S, 2020. Computer science in K-12: An A-Z handbook on teaching programming. Edfinity: USA  National Centre for Computing Education, 2022. Teach Computing [online]. Available from: <https://teachcomputing.org/>  Ofsted, 2022. Research review series: Computing. Ofsted Available at: <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing>  Raspberry Pi Foundation, 2022. Hello World [online]. Available from: <https://helloworld.raspberrypi.org/>  Royal Society, 2017. After the Reboot – Computing Education in UK Schools. Royal Society.  Sentance, S., Barendsen, E. & Schulte, C., 2018. Computer science education: perspectives on teaching and  learning in school. Bloomsbury: London  Waite, J. 2017 Pedagogy in teaching Computer Science in schools: A Literature Review. Royal Society | | | | | | |