NEXTGEN: HNC COMPUTING
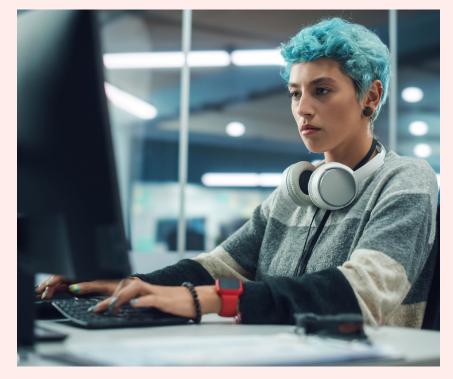

META-SKILLS IN PRACTICE

Practitioners' reflections and advice on incorporating meta-skills.

HIGHER NATIONAL   SQA

NEXTGEN: HNC COMPUTING — META-SKILLS IN PRACTICE

We asked subject-specialist writers with experience of delivering meta-skills in NextGen: HN to write a 'Meta-skills in practice' guide, giving us a sense of how they approach the integration of meta-skills within course delivery. In this way, practitioners could share real-life insights, practical advice, and examples to course teams coming new to NextGen Qualifications and meta-skills.

Neil, a lecturer in computing, explained in their words how the course team at their college contextualise, integrate, and assess engagement with meta-skills within NextGen: HNC Computing.

TOP TIPS

— Take an early and proactive approach to a shared understanding of meta-skills with all staff and students. Encourage learners to recognise the benefits of meta-skills, and to develop them naturally as they learn.

— Continually identify and cultivate opportunities for the development of meta-skills. Look out for places to embed this within lesson plans, classroom activities and assessments.

— Identify and utilise units from the HNC framework that lend themselves well to meta-skills. For example, those that include elements of planning, creativity and teamwork like Professional Practice in Computing, and Digital Skills.

— Keep meta-skills at the forefront throughout the year. Encourage learners to use digital tools to record and track their progress. Ensure educators note the different ways they are integrating meta-skills in their lessons.

— Listen to learners and seek to understand their individual needs. Continually review and highlight where they are developing meta-skills, addressing gaps as they arise.

— Recognise and celebrate meta-skills progress and success wherever it occurs.

META-SKILLS IN COMPUTING

Give us a general introduction to meta-skills within the context of your subject area.

Interdependent skills in self-management, social intelligence and innovation play a significant role in helping individuals to progress and succeed — not just in their everyday lives, but in their educational paths and careers. Meta-skills are particularly sought after by employers in the computing and tech fields. Many in this industry place as much value on skills such as adaptability, communication and problem solving as they do on the technical skills relevant to the subject domain.

> " Many in this industry place as much value on skills such as adaptability, communication and problem solving as they do on the technical skills...

How do you help learners to buy in to meta-skills and understand their relevance?

In this document, we use practical examples that we found useful during the pilot delivery of the NextGen HNC in Computing. These helped us with the opportunities and challenges in delivering a computing curriculum that supports learners in developing their meta-skills. It highlights how educators can introduce learners to and support them, and pursue buy-in from colleagues and the wider college community. It also identifies some areas of practice where meta-skills can be embedded within lesson design, coursework, and grading. Importantly, it seeks to highlight that meta-skills should not be seen as simply as an 'add-on' — but integrated into everyday teaching practice in ways that can enhance the delivery of dynamic and innovative learning experiences.

> " ...meta-skills should be integrated into everyday teaching practice

META-SKILLS CATEGORIES IN CONTEXT

Explain the three meta-skills categories as they relate to your subject.

In this section, we identify example scenarios where opportunities to develop meta-skills might naturally arise within HNC Computing NextGen. The scenarios given are in no particular order, but relate to meta-skills in self-management, social intelligence and innovation. They are presented within the context of units from the qualification framework — including Digital Skills, Professional Practice in Computing, Computing Science, Networking and Software Development.

SELF-MANAGEMENT

Examples of meta-skills in self-management:

— Setting realistic and measurable learning objectives at the start of term (self-motivation)
— Working with other learners to successfully overcome difficulties, such as a difference in opinion about the direction of a group project (adaptability and resilience)
— Identifying features for a new app based on a list of software requirements (sorting and filtering)
— Focusing on a particular individual classroom task for an extended time period (self-motivation)
— Making a positive contribution to a classroom discussion about a legal or ethical issue (professionalism and ethics)
— Providing an independent point of view or a critical perspective about a topical computing issue (independent thinking)
— Regularly checking an online class forum for updates from the lecturer (responsibility)
— Volunteering to be the minute taker in a team meeting (responsibility)
— Making measurable improvements to personal timekeeping and attendance (self-control and responsibility)

SOCIAL INTELLIGENCE

Examples of meta-skills in **social intelligence:**

— Listening to an alternative opinion when discussing a requirements specification for a team-based project (collaboration and relationship building)
— Asking relevant questions to identify functional requirements when writing computer code (receiving information)
— Writing user stories from the customer's perspective when planning an Agile project (storytelling)
— Recognising and being aware of the impact of computing on sustainability (social awareness)
— Showing empathy to others and actively including their peers when collaborating in a class discussion (relationship building)
— Demonstrating leadership when navigating a difficult group-based task (influencing and motivating others)
— Helping people with disabilities use technology more easily by building apps and websites with accessibility features (social awareness)
— Adapting and effectively collaborating in hybrid working in a project where some of the work takes place both online and in-person (team-working, collaboration and adaptability)
— Being cognisant of computer security and ethics when designing a system that stores customer data (social awareness)
— Taking part in self and peer evaluation; for example, by listening to and reviewing a computing podcast produced by another learner (giving and receiving feedback)

INNOVATION

Examples of meta-skills in **innovation:**

— Developing new ideas, creating new things, taking leadership of one's own learning (visualisation and idea generation)

- Identifying an innovative and exciting computing project for their Professional Practice class (synthesis and maker mentality)
- Identifying an alternative approach to solving a difficult network problem (problem recognition)
- Installing the very latest version of an operating system to review its new features (analysis)
- Collaborating online and sharing resources using a virtual study group (synthesis and holistic thinking)
- Investigating and trying out new software tools to help manage a difficult coding project (problem solving)
- Keeping up to date with the latest developments in computing by reading tech news websites and attending conferences and webinars (information sourcing)
- Taking part in different tasks and activities with others during an all-day cyber security hackathon event (holistic thinking)
- Reducing e-waste and extending the life of older devices by taking part in a laptop recycling club (maker mentality)
- Hosting their own websites or web apps using cloud computing skills (computational thinking)

INTRODUCING AND UNDERSTANDING META-SKILLS

How do you help learners to buy in to meta-skills and understand their relevance?

TOOLS, A VISION AND STRATEGIES

Meta-skills are poorly understood. It can be difficult for learners to grasp what meta-skills are and why they are so important — and therefore difficult to get buy-in. Some learners may not fully appreciate the significance of meta-skills, while others — for a variety of reasons — may simply take the view that meta-skills 'aren't for them'. In addition, learners in computing fields tend to be focused on developing technical skills — rather than the interpersonal and organisational skills that can underpin and enhance so many other aspects of their lives and careers.

> " Some learners may take the view that meta-skills 'aren't for them'

BENEFITS OF INTRODUCING META-SKILLS EARLY

Meta-skills are interdependent — and therefore shouldn't simply be treated as an 'added extra' or worse 'something else we *need* to do'. During the pilot delivery, we found that although meta-skills could be introduced at any point, it was most beneficial to make students aware of their significance from the beginning. We talked about how they can impact upon life and work, and what meta-skills they can develop while studying the course, before taking steps to 'keep it visible' throughout the remainder of term.

We provided students with a working definition of meta-skills; giving practical examples and signposting them to where they might 'exist' within their day-to-day learning. We based our definitions around the Skills Development Scotland approach, which defines meta-skills as 'cognitive abilities that transcend specific tasks, roles, and industries that enable individuals to learn, adapt and apply new knowledge effectively'.

Significantly, we found that although teaching staff identified many opportunities for learners to develop new meta-skills, it was the learners who came up with some of the most innovative ideas on the types of meta-skills that were most valuable to them. Many of these ideas made their way into individual coursework and team projects.

> **"** ...learners came up with some of the most innovative ideas

Overall, we found that opportunities for meta-skills development can be integrated throughout the curriculum, and highlighted and enhanced wherever they occur. Meta-skills lend themselves well to the field of computing and tech, and naturally complement, thread and intertwine alongside knowledge and skills from the technical domain.

> **"** ...students responded very positively to the increased focus on interdependent skills

We found that students responded very positively to the increased focus on interdependent skills. During our course reviews and student feedback sessions, learners indicated that they understood the significance of meta-skills, were able to describe examples of how their skills had progressed, and recognised the positive impact this had on their learning experiences.

DEVELOPING META-SKILLS AND IDENTIFYING PROGRESS IN HNC COMPUTING

Tell us about your experiences, hindsight and future plans. Where do meta-skills fit most naturally in your course delivery?

There are many ways, activities and techniques to identify learner progress and achievement in meta-skills. They might range from informal discussions with learners about their engagement with meta-skills, through to more formal grading activities — possibly linked with combined assessment methods and integrated with various outcomes. All such activities can 'uncover' meta-skills development and can help ascertain the extent to which a student has engaged with meta-skills development. This section sets out some of our findings during the pilot delivery.

MINI CASE STUDY 1 — EMBEDDING META-SKILLS IN PROFESSIONAL PRACTICE IN COMPUTING

The unit Professional Practice in Computing has many opportunities for developing meta-skills, as it involves the completion of a team project. In addition to the core work of the group project, learners maintained individual diaries, recording the development of skills such as goal setting, decision making, self-management, and generally how they collaborated and communicated with others and as part a team. Learners were encouraged to continually reflect on their experiences and discuss their next steps with their lecturers. Alongside the group project, learners submitted their individual reflective diaries for review by the teaching team. Staff took a collaborative approach in marking and grading the students' work. Teaching staff agreed that the reflective content was a useful tool to gauge how well learners had engaged with meta-skills.

MINI CASE STUDY 2 — A GROUP OF LEARNERS DESIGN A HEALTH AND FITNESS APP

The Professional Practice in Computing unit also offers opportunities for learners to develop meta-skills in their choice of team project. One team developed a mobile app to promote health and fitness. In addition to practical skills in software design and coding, and meta-skills, the group also developed their knowledge of healthy eating and exercise in ways that can enhance physical and mental health.

MINI CASE STUDY 3 — LEARNERS MAKE A PODCAST ABOUT COMPUTING SCIENCE

The Digital Skills unit also offers opportunities for combined assessment and meta-skills development. This unit can be assessed alongside a number of other units from the qualification framework and offers up opportunities for interesting and innovative assessments that can include a wide variety of interdependent skills. As part of an assessment relating to Digital Skills and Computing Science, students researched a variety of computing topics and presented their findings in the form of a podcast. They then shared and wrote short reviews of each other's podcasts leading to peer evaluation. This exercise facilitated a wide range of meta-skills including, sorting, filtering and presenting information; listening and reflecting; and receiving and giving feedback.

> "...the Digital Skills unit offers opportunities for innovative assessments

PRACTICAL TIPS FOR EDUCATORS WHEN HELPING STUDENTS TO DEVELOP META-SKILLS

— Inspire learners to develop a vision of where they want to go in life and identify strategies to work towards their goals. This could involve workshops in planning and goal setting. Tools like the SQA Meta-skills development log can help students create their own personal plan.

— Help students recognise the meta-skills they are developing. Encourage them to regularly take note of new skills. Highlight and celebrate even small achievements.

— Encourage students to reflect on their skills. Highlight how meta-skills link with other areas of life and encourage them to think about the positive impact.

— Assist students when recording their meta-skills experiences. Show them different tools and techniques that can be used to record and track progress.

— Keep meta-skills at the forefront; for example, by scheduling a fortnightly meta-skills check-in.

— Encourage students to discuss skills such as critical thinking, problem solving, collaboration and communication. Highlight how these skills link with requirements of working in different areas of computing. Reinforce these using additional resources; for example the Skills Framework for the Information Age (SFIA).

GENERATING ASSESSMENT EVIDENCE

We've produced guidance around the assessment of meta-skills. There's quite a lot of flexibility around assessment evidence. Can you give us a sense of what you've been doing in this space?

Learners were introduced to the **baseline assessment** in early September. An early indication was given on how study of the Professional Practice unit in particular offers opportunities to develop social, self-management and innovation skills. We displayed the baseline to the class on the big-screen or projector and explained the steps involved in completing the baseline assessment. It's important to highlight and encourage class discussion about the significance of the baseline assessment as a reference point and how it will be used to measure distance travelled later in the course.

Learners developed a personal plan of their meta-skills development before the end of September. This encouraged them to link their development goals with the different knowledge and skills elements of the course units. For example, they could develop skills in 'collaborating' through the groupwork aspect of the Professional Practice unit.

> "...link their development goals with the different knowledge and skills elements of the course units

Likewise, they could develop skills in sense-making in the Software Development unit when analysing the requirements brief. Some found it useful to use the digital note-taking and progress-tracking tools, where possible using their college-based accounts. It's helpful to explain how to access the different features of the digital tools and how they can be used in conjunction with other tools, such as the Meta-skills development log.

Learners took time to monitor their goals and record their reflections regularly throughout the academic year — at least every two to four weeks. Some time for reflective practice was allocated during the delivery of the Professional Practice unit. It tended

> "...explain how digital tools can be used with other tools, such as the Meta-skills Development Log...

to work best with short but regular spells of reflection; for example, a 30-minute session twice a month. The sessions were informal and relaxed.

Evidence of meta-skills could also be obtained through successful completion of all sections of the Meta-skills Development Log and supplemented with screenshots or a 'print-to-pdf' of any digital artefacts and notes.

CAPTURING EVIDENCE OF PROGRESS WITH DIGITAL TOOLS

Students can find electronic note-taking and progress-tracking tools particularly helpful for recording and reviewing their meta-skills. For example, a student working on their social intelligence skills could create a note entitled 'communication skills' and then add a checklist of examples like 'actively listening to others during a class discussion' and 'giving information to my team about a requirements specification'.

SUMMARY OF RECOMMENDED RESOURCES AND APPROACHES

— Connect meta-skills to life, work and study
— Meta-skills Development Log
— Class discussion — significance of baseline self-assessment
— Digital note-taking and progress-tracking tools