Unit descriptor for:

Understanding SMART Homes from a Construction, Information and Communication Technology, and Health and Care perspective.

SCQF Level 6

Unit Title:
Understanding SMART Homes from a Construction, Information and Communication Technology, and Health and Care perspective.

Unit Purpose:

The purpose of this unit is to introduce learners to the concept of SMART homes, from the perspectives of three distinct industry sectors - Construction; Information and Communication Technology; and Health and Care. Learners will be introduced to emergent themes and innovations relating to SMART homes, from three sectoral perspectives, to develop an understanding of how cross-sectoral interactions can enhance the positive economic and societal benefits associated with SMART homes. In the final outcome of this unit, learners will undertake a cross-disciplinary project in response to a SMART home related case study.

Recommended prior knowledge and skills:

While entry is at the discretion of the centre, candidates will normally be working towards a related group award at SCQF level 6. For example:

- NC Built Environment GJ4F 46
- NC Health and Social Care G8K3 46
- NC Computing: Technical Support GE48 46

Credit points and level:

4 SCQF credit points at SCQF level 6

Equality and Inclusion:

This unit has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods, or considering alternative evidence.

Statement of standards:

This statement of standards section is mandatory and covers learning outcomes; knowledge and skills; and evidence requirements.

Learning Outcomes:

On completion of this unit, learners will be able to:

1. Describe how construction relates to SMART homes.
2. Describe how Health and Social Care relates to SMART homes.
3. Describe how Information and Communication Technologies relates to SMART homes.
4. Collaborate across disciplines to respond to a SMART home problem-based scenario.

Knowledge and Understanding:

1. **Describe how construction relates to SMART homes:**
   a. Overview of emergent technological trends relating to SMART homes within a construction context.
   b. Drivers for SMART homes within a construction context.
   c. Real world examples of SMART homes within a construction context.

2. **Describe how health and social care relates to SMART homes:**
   a. Overview of key health and social care issues and drivers for SMART homes.
   b. Overview of emergent technological trends relating to SMART homes within a health and social care context.
   c. Real world examples of SMART homes within a health and social care context.

3. **Describe how Information and communication technologies relates to SMART homes:**
   a. Understanding of current hardware and software infrastructures for SMART homes.
   b. Overview of emergent technological trends relating to SMART homes within an ICT context.
   c. Data ethics and security for SMART homes
   d. Real world examples of SMART homes within an ICT context.

4. **Collaborate across disciplines to respond to a SMART home problem-based scenario:**
   a. Emergent social, policy and legislation trends relating to SMART Homes.
   b. Skills and capabilities for cross-disciplinary working.

Evidence Requirements:

1. **Describe how Construction relates to SMART homes.**
   a. Written and/or Oral evidence (blog/vlog posting OR presentation)
      i. Minimum of 3 technological trends
      ii. Minimum 2 socio-cultural driver
      iii. Minimum 1 piece of legislation
      iv. Minimum 2 case study examples
2. **Describe how health and social care related to SMART homes.**
   a. Written and/or Oral evidence (blog/vlog posting OR presentation)
      i. Minimum of 3 technological trends
      ii. Minimum 2 socio-cultural driver
      iii. Minimum 1 piece of legislation
      iv. Minimum 2 case study examples
3. **Describe how information and communication technology relates to SMART homes**
   a. Written and/or Oral evidence (blog/vlog posting OR presentation)
      i. Minimum of 3 technological trends
      ii. Minimum 2 socio-cultural driver
      iii. Minimum 1 piece of legislation
      iv. Minimum 2 case study examples
4. **Work collaboratively across disciplines to respond to a SMART home problem-based scenario**.
   a. Performance evidence / observational evidence / written and/or oral evidence:
      i. Develop a user persona and their daily routine.
      ii. Identify how a health diagnosis could affect the person in their daily routine.
      iii. Describe potential SMART housing technologies that could support the person to live with optimal independence in their home (a minimum of 3 technologies to be considered).
      iv. Propose a SMART solution and describe its potential user benefits.
      v. Identify the logistical requirements relating to installation and use of the solution.

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Evidence may be gathered at appropriate points throughout the unit, in open-book conditions. Outcomes could be delivered sequentially, or via an integrated assessment covering some or all outcomes.

Evidence will be internally marked and verified by centre staff in line with their own quality assurance policies and those of the awarding centre. All assessments are subject to the awarding centre's quality assurance requirements and external verification.

Guidance on the content and context for this unit:

The nature of work now and into the future will increasingly require practitioners from different disciplines to be able to come together, collaborate and jointly address the challenges and opportunities brought about by a world where change has become the status quo.

Largely driven by technological advance and mega trends such as industry 4.0, or the 4th industrial revolution, increasing levels of automation, artificial intelligence and data drive innovation will change the nature of work across many industries. An example of this in action is the area of SMART housing.

A SMART home/house is one in which a network of sensors and interconnected devices are employed to monitor and respond to various environmental conditions. Initially conceived from the desire for convenience, security and energy efficiency, SMART home concepts are now being applied in the context of supported living, enabling those in need of care to lead more autonomous and fulfilling lives.

It is this context that provides the focus of this unit, one in which the built environment, computing and information and technology sectors intersect in the development of user centric, technology empowered solutions.

Guidance on approaches to delivery of this unit:

Outcomes could be delivered sequentially, or as a single integrated project activity. Centre's could deliver to mixed cohorts of learners from construction, computing and health and social care specialisms in order to maximise the potential for inter-disciplinary learning and collaboration.

This unit has been developed with the concept of inter-disciplinary learning at its foundation, placing emphasis on development through practical and collaborative working; research and problem-solving activities. A supporting library of FUTUREquipped

micro learning content is available as a central information source, but the use of additional sources and lines of enquiry is encouraged.

In outcomes 1 to 3, centres could signpost and make use of the FUTUREquipped micro learning library which offers content relevant to the knowledge and skills requirements of each outcome and its related sector. Centres could make extensive use of case studies to example real-world applications of SMART home technology and solutions, with visits from or to industry encouraged as a way to provide context and support learner's understanding. Encouraging learners to conduct secondary research and engage in peer to peer presentation and/or discussion could maximise opportunities for the development of complementary skills i.e. communication, curiosity, collaboration and creativity. The FUTUREquipped micro learning library contains supporting content around these skills which could be used to facilitate learning and discussion in relation to these, as well as providing opportunities for formative assessment.

A practical approach could be taken to the delivery of outcome 4. Centres could engage learners in activities that provide an opportunity to engage in and reflect on the benefits and challenges relating to inter-disciplinary learning. Visits to and/or from SMART housing facilities, employers and/or related SFC innovation centres could help to contextualise learner's understanding of the ways in which three distinct industry sectors intersect in the development of SMART solutions. An introduction to the concept of user-centric design could help to provide learners with the tools to carry out collaborative project work and assessment. Centre staff could take a faciliatory role, encouraging and supporting extensive peer to peer discussion and collaboration to help develop the requisite skills and knowledge.

Guidance on approaches to assessment of this unit:

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Where learners experience a range of assessment methods, this helps them to develop different skills that could be transferable to work or further and higher education.

Outcomes could be delivered and assessed sequentially. However, there is scope to combine delivery and assessment of all outcomes via a single integrated project-based assessment.

Outcomes 1, 2 and 3 could be evidenced using a combination of collaboratively produced report, blog, vlog or oral presentation. Evidence could be generated under open-book conditions at appropriate points across the unit.

Outcome 4 could be assessed through a practical, group-based, task requiring learners to work in cross-disciplinary groups to respond to a mini project / challenge. This could be based around a user-centric design exercise i.e. to redesign an individual's living environment in response to a recent health diagnosis. Learners could be supplied with a case study/scenario and asked to work together to design a SMART housing solution that attends to a changing care need through technologically enhanced adjustments.

Alternatively, it could be possible to present the assessment of all four outcomes as a single project exercise. For example, learners could be presented with a scenario where a local housing association / local authority are looking to explore options for the integration of SMART housing technology into their existing stock of accommodation. The first challenge could be to conduct some research into the topic e.g. emerging technological trends; practical considerations when designing and installing a SMART homes solution and some case study information to support findings (covering LO1-3). The outputs of this exercise could be a project report / presentation / blog / vlog which details the benefits, drivers, ethical considerations that the clients should be aware of when considering SMART technologies. This task could then be followed with a challenge to make recommendations for a SMART home solution in the client's existing housing stock. The solution should demonstrate awareness of care users with one (or more) of a range of support needs e.g. sensory impairment, dementia, mobility issues, old age etc. The output of this exercise could be a series of recommendations for how the space could be adapted (most likely via retrofit of SMART technology) to support a more effective and efficient care provision. These recommendations could be supported with a project plan, or floor plan that outlines the tasks, timelines and other practical considerations relating to the solution.

END

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