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Assessment support pack for:

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

SCQF Level 6

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

Introduction

This assessment support pack has been developed primarily for the purpose of the summative assessment of learners against the requirements of the related unit and assessment standards. It must not be used for formative assessment.

The pack may also be used:

- To help centres develop an appropriate assessment for the unit;
- As exemplification of the standard of performance expected of learners achieving the unit, ie as a benchmark;
- To give teachers/lecturers/assessors new ideas;
- As a staff development tool.

General information

Before using this assessment support pack, centres should read the relevant unit specification, which details the standard of performance expected of learners. It is important to ensure that this assessment support pack is used in a context appropriate to the unit.

This assessment support pack supplements the section *Guidance on approaches to assessment of this unit* found in the unit specification's support notes. It provides an example of assessment that is valid, reliable and practicable. The assessment tasks correspond to the guidance contained in the unit specification. Centres must ensure the integrity and confidentiality of the assessment.

Although the content of this assessment support pack has been verified as a suitable assessment, centres should note that using it does not automatically guarantee successful external verification. It is the centre's responsibility to make sure that all the appropriate internal quality assurance procedures are satisfactorily followed. A valid and effective internal verification system should be in place.

Guidance on content and context for this unit

This assessment support pack supports the assessment of the unit *Understanding SMART Homes from a Construction, Information and Communication Technology, and Health and Care perspective*, at SCQF level 6. Centres are required to develop the assessment in accordance with the related unit specification.

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

How to generate assessment evidence

Assessment must allow the learner to demonstrate competence at the level of the unit and provide an opportunity for evidence of each learner's performance to be generated and assessed. This evidence must then be judged against the standards set out in the unit specification. To achieve the unit, learners must generate the evidence required in relation to all outcomes, knowledge and/or skills. This information is found in the statement of standards in the relevant unit specification.

This assessment support pack is consistent with the statement of standards for the *Understanding SMART Homes from a Construction, Information and Communication Technology, and Health and Care perspective*, at SCQF level 6 and the following information applies when using it to generate evidence of learner achievement.

Assessment

Examples of suggested evidence to be retained will always include the assessment, marking information and learner assessment records or class assessment records, as appropriate.

Assessment	Outcome covered	Evidence to be retained
Assessment task 1 Research SMART housing and present findings	**Outcome 1** *Describe how construction relates to SMART homes* **Outcome 2** *Describe how Health and Social Care relates to SMART homes* **Outcome 3** *Describe how Information and communication technology relates to SMART homes*	Written and/or oral evidence
Assessment task 2 Design a SMART housing solution in response to a client brief	**Outcome 4** *Work collaboratively across disciplines to respond to a SMART home problem-based scenario*	Written and/or oral evidence

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Conditions of assessment

Outcomes could be assessed separately and sequentially, or via a single integrated project-based assessment.

Evidence for all outcomes should be generated under open-book conditions and through extensive group work.

Quality assurance

Centres should retain assessment evidence and internal verification records. Units are subject to external verification by the awarding centre.

How to generate assessment evidence

The assessment example(s) below can be used by centres, or alternatively centres can develop their own assessment.

Introduction to assessment – Outcomes 1 – 4

Understanding SMART Homes from a Construction, Information and Communication Technology, and Health and Care perspective is a unit designed to develop your awareness and understanding of SMART housing in the context of three distinct, but inter-related industry sectors. The unit has been designed to give you experience of working with people from different subject areas towards a common goal, and through doing so, offer some insight into situations that you may encounter in the workplace.

The unit will help you to develop skills in relation to research; communication; teamwork and collaboration; person-centred design and problem solving; while developing your knowledge and understanding of SMART housing as it relates to the Construction, Information and Communication Technology, and Health and Social care sectors.

In **Outcome 1** *Describe how construction relates to SMART homes*, **Outcome 2** *Describe how Health and Social Care relates to SMART* homes and **Outcome 3** *Describe how Information and communication technology relates to SMART homes,* you will work in groups to research the emerging technologies, socio-cultural drivers and logistical considerations relating each sector to the concept of SMART housing, identifying real world examples and case studies to support and illustrate your findings.

In **Outcome 4** *Work collaboratively across disciplines to respond to a SMART home problem-based scenario,* you will use the information gathered in previous assessment tasks and the collective skills of your inter-disciplinary work group to collaboratively respond to a brief. In this collaborative task, you will develop and plan a SMART housing solution in response to a set of user needs.

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Assessment Brief:

Throughout this assessment you will be expected to work in interdisciplinary groups to collaboratively deliver all relevant outputs. It is expected that all group members will contribute equally to the various outputs and that any member of the group will be able to respond to questioning in relation to the work that is produced.

Context / Scenario:

You are members of a cross-functional innovation team working within a national social housing association – Osprey Housing. The organisation provides housing and social care services to over 30,000 users across Scotland and is experiencing a growing demand for its services.

Osprey housing has recently commissioned over 1,000 new build properties to help service this increasing demand but in the short to medium term needs to find more efficient and effective ways to support existing users to live in their existing accommodations.

The innovation director has asked your team to explore SMART housing trends, technologies and practical implications as one possibility to maximise the efficiency and effectiveness of the current housing stock.

Assessment task 1A – Researching SMART housing and presenting findings:

The innovation director has asked your work group to conduct some initial research into SMART housing and present your findings, to help her and other senior managers build their understanding of how the technology might add value to the business.

Presentation of findings can be via a spoken presentation, a written report, or VLOG/BLOG submission and must cover the following mandatory requirements:

1. **An overview of emergent technological trends relating to SMART housing from the perspective of** (a minimum 3 trends per sector):
   a. *The Construction sector;*
   b. *The Health and Social Care sector;*
   c. *The Information and Communication Technology sector (must include reference to data ethics and cybersecurity).*

2. **An overview of socio-cultural drivers, trends and legislation for SMART housing from the perspective of** *(a minimum 1 x driver, 1 x trend, 1 x legislation per sector):*
   a. *The Construction sector;*
   b. *The Health and Social Care sector;*
   c. *The Information and Communication Technology sector.*

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3. **Real world, case study examples of SMART housing solutions as they relate to** *(minimum two case studies per sector):*
    a. *The Construction sector;*
    b. *The Health and Social Care sector;*
    c. *The Information and Communication Technology sector.*

A proforma is provided (overleaf) to help you structure your response. If you would prefer to present your answer in a different format, you are welcome to do so.

FUTUREquipped – SMART housing – assessment proforma 1 – research task 1A

Question:	Response *(can be delivered as a presentation, report, blog or vlog):*	
Please provide an overview of emergent technological trends *(minimum 3 trends per sector)*	Construction sector	*(minimum 3 trends)*
	ICT sector *(including consideration of data analytics and cyber security)*	*(minimum 3 trends to include data analytics and cyber-security)*
	Health and Social care sector	*(minimum 3 trends)*
Please provide an overview of socio-cultural drivers/trends and legislation for SMART housing *(a minimum 2 x driver/trends, 1 x legislation per sector):*	Construction sector	*(a minimum 2 x driver/trend, 1 x legislation):*
	ICT sector	*(a minimum 2 x driver/trend, 1 x legislation):*
	Health and Social care sector	*(a minimum 2 x driver/trend, 1 x legislation):*
Please provide real-world case study examples of SMART housing solutions *(minimum 2 examples per sector)*	Construction sector	*(minimum 2 examples)*
	ICT sector	*(minimum 2 examples)*
	Health and Social care sector	*(minimum 2 examples)*

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Assessment task 1B - Designing a SMART housing solution in response to a client brief.

Thanks to your research in the previous task, the innovation director has gained agreement from senior management to trial some SMART technology solutions within the current stock of housing.

Working in your group you must now collaborate to research and develop a prototype design for a SMART housing solution which can be taken forward for testing. Again, you are required to present your outputs to the innovation director so that she can report back to senior management team on your progress.

Presentation of your outputs can be via any (or a mixture) of - spoken presentation; a written report; or VLOG/BLOG submission and must cover the following mandatory requirements:

1. Development of a user persona and their daily routine *(using the proforma provided).*
2. Consideration of how a health diagnosis will affect the person in their daily routine (a diagnosis will be supplied).
3. Consideration of 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).
4. An overview of the anticipated benefits of your proposed solution in terms of quality of life, autonomy, health and wellbeing.
5. Consideration of the logistical requirements relating to installation and use of the system (from the perspective of Health and Social care, Construction and ICT professionals).

In order to complete this task, the innovation director has worked with the Osprey Housing's health and social care team to produce 2 case studies that represent the two most common user groups the organisation provides services to.

User option 1 – Una Thompson

Una is 82 years old and is housed in a ground floor flat on the southside of Glasgow.

She receives a daily home help service to help her with general housework, as well as to shower once a week. Her son, Matthew, who lives in East Kilbride visits here once a week on a Sunday, and her friend Margaret lives close by and likes to pay here a visit on a Tuesday morning for a cup of tea.

Her current home is fitted for general use and has no modifications.

Una has very recently been diagnosed with Dementia.

User option 2 - Hamish Patterson

Hamish is 20 years old and lives alone in Brora – a small village in the Highlands of Scotland. He has recently left his parents' house (also in Brora) to live in a new Osprey housing development.

He has just started a college course in software design at North Highland college, which is a 60-minute bus journey from Brora. He attends college 2 days per week.

Hamish has a lot of friends in the village and they regularly visit him at this house, where they play computer games, watch tv and listen to music.

He and his friend John have just started a Vlog on new programming languages which they record and edit at Hamish's house.

Hamish has recently been diagnosed with a chronic visual impairment that will eventually lead to total blindness.

His home is fitted for general use and has no modifications.

A number of proformas have been provided (overleaf) to help you structure your responses. If you would prefer to present your answer(s) in a different format, you are welcome to do so.

Proforma 2A – Persona mapping sheet
Proforma 2B – Daily routine and support needs map
Proforma 2C – SMART home technology solutions (including user benefits)
Proforma 2D – Logistical/Practical implications of the proposed solution

Proforma 2A – Persona mapping

Use this template to develop your understanding of your persona – while you have been supplied with some initial content – you are encouraged to use your imaginations to fill in the blanks and add as much detail as possible to bring your persona to life.

Who am I?

Likes?

My family, friends?

Work, hobbies?

Where do I live?

Dislikes?

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Proforma 2B – Persona daily routine and support needs

Time	Activity (map out in as much detail as you can, a typical day in the life of your persona / case study)	Type of assistance needed (consider the types of assistance needed by your persona to help them carry out the activity in light of their health diagnosis)	Impact of the physical environment? (how does your persona's physical environment (home) impact on their routine in light of their condition and assistance needs?)
12-5am	e.g. Sleeping…		
6am	e.g. Getting up	e.g. help with getting dressed up…	
7am			
8am			
9am			
10am			
11am			
12am			
1pm			
2pm			
3pm			
4pm			
5pm			
6pm			
7pm			
8pm			
9pm			
10-12pm			

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Proforma 2C - SMART technologies and user benefits

Use the proforma below to capture information on SMART technologies you could use in the development of a solution for the user you have selected.

SMART Technology	Overview of functionality *What can the technology do?*	Potential benefits to your persona *e.g. to quality of life, wellbeing, autonomy*

Proforma 2D - Logistical/Practical implications of the proposed solution

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Use this proforma to map out the logistical and practical implications that need to be considered in order to develop and install a prototype of your solution.

Summary of proposed solution
(Please provide a brief overview of your proposed solution, the technology it involves and the way(s) in which it will benefit the user)

Response:

Technology	**Practical implications** *What challenges / opportunities / interdependencies will you have to consider to make use of this technology in your selected context?*	**Related tasks** *What are the key tasks than need to be completed in order to install / operationalise the technology in your selected context.*	
1.		Construction specialist	
		ICT specialist	
		Health and Social care specialist	
2.		Construction specialist	
		ICT specialist	
		Health and Social care specialist	
3.		Construction specialist	
		ICT specialist	
		Health and Social care specialist	

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Guidance for making assessment decisions

Assessment task 1A

Task 1 covers the requirements for the first 3 outcomes in the unit:

- **Outcome 1:** *Describe how construction relates to SMART homes.*
- **Outcome 2:** *Describe how Health and Social Care relates to SMART homes.*
- **Outcome 3:** *Describe how Information and communication technology relates to SMART homes.*

Assessors should ensure that learner submissions are representative of current and/or emerging trends in relation to SMART technologies, sociocultural drivers and relevant legislation. Additional case study information should be provided to illustrate the practical application of SMART technology across each of the three sectors. The supplied proforma 1A offers clear guidance on the required content, as well as sufficiency of responses and could be used as a guide to support assessment decision making.

Example responses have been provided (overleaf) to illustrate the levels of depth and sufficiency expected in an acceptable response. Assessors should use questioning to clarify any areas of ambiguity in the submitted evidence.

An optional assessor checklist has been provided to support centres verify the sufficiency of evidence across all 3 of the outcomes being assessed.

Assessment proforma 1 – research task 1A (Exemplar responses)

Question:	Response *(can be delivered as a presentation, report, blog or vlog):*	
Please provide an overview of emergent technological trends *(minimum 3 trends per sector)*	Construction sector	*(minimum 3 trends)* **An acceptable response for <u>1 of the 3</u> trends under consideration may be:** " T1 –BIM technology is a developing trend within the construction sector. BIM uses software together various aspects of a construction project in digital form and across the entire life cycle of the building. This enables greater collaboration and visibility of a project between stakeholders and in doing so increases efficiency through optimised design, planning and reduced errors / discrepancies. "
	ICT sector *(including consideration of data analytics and cyber security)*	*(minimum 3 trends to include data analytics and cyber-security)* **An acceptable response for <u>1 of the 3</u> trends under consideration may be:** " T1 – The emergence of data analytics and data science has created a vast quantity of potential SMART housing applications. For example, data analytics can be used to learn from the data generated through sensor and wearable technologies, identifying themes and patterns in user behaviour that can help the medical profession to make more accurate diagnosis' and increase the efficiency of health and social care provision. "
	Health and Social care sector	*(minimum 3 trends)* **An acceptable response for <u>1 of the 3</u> trends under consideration may be:** " T1 – SMART technology is already having a profound effect on the Health and Social care sector. For example, sensor technologies that can capture data relating to motion, pressure, temperature and a host of other variables, offer care providers, family members and other stakeholders the opportunity to track the movements and behaviours of a care user while maximising the levels of independence and autonomy they have. "
Please provide an overview of socio-cultural drivers/trends and legislation for SMART housing *(a minimum 2 x driver/trends, 1 x legislation per sector):*	Construction sector	*(a minimum 2 x driver/trend, 1 x legislation):* **An acceptable response for <u>1 of the 3</u> factors under consideration may be:** " D1 – Productivity in the construction sector is lower than the national average, by some 21% - according to figures from the UK government (UK Gov – Construction Sector Deal). SMART related technologies such as data analytics, artificial intelligence and robotics are considered critical in helping to tackle this gap and redefine the construction sector in the digital age. For example, the use of robots for laying bricks can help to increase the speed of task completion, while reducing the potential health and safety risks attached to this. "

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	ICT sector	*(a minimum 2 x driver/trend, 1 x legislation):* **An acceptable response for 1 of the 3 factors under consideration may be:** *" D1 – A trend that will impact the levels of adoption of SMART technologies now and in the future are differing views around data ownership, sharing and privacy. Some members of the public have a concern or mistrust around data sharing, ownership and security.* *Given that many SMART solutions depend on access to data e.g. predictive data analysis of large data sets to identify trends / themes, working with the public as owners of their personal data will be essential to manage the risks of large scale data capture and sharing across agencies / services "*
	Health and Social care sector	*(a minimum 2 x driver/trend, 1 x legislation)* **An acceptable response for 1 of the 3 factors under consideration may be:** *" D1 – there is an aging population in Scotland, which means that more people are going to require care services than ever before. This will put a strain on the national health service and other private care providers so the potential for SMART technology to make health and care more provision more efficient and effective is a major driver for the adoption of SMART tech in the sector. "*
Please provide real-world case study examples of SMART housing solutions *(minimum 2 examples per sector)*	Construction sector	*(minimum 2 examples)* **An acceptable response for 1 of the 2 case studies under consideration may be:** *" CS1 – The Smart Home Lab, is a key feature of BRE's (Building Research Establishment) new Centre for Smart Homes & Buildings.* *Currently being put to the test in the Smart Home Lab are a range of devices covering heating, energy use, safety and security, lighting and air quality. Scientists at BRE are also working with RNIB (The Royal National Institute of Blind People) and others to look at how SMART homes and buildings can best support independent living, helping older people and those with disability or chronic illness to live more independent lives both at home and work.* *Dr. Martin Ganley, Director of Smart Homes and Buildings at BRE, comments, "Within the rapidly-growing smart home and building technology sector, the CSHB (Centre for SMART homes and buildings) will play a vital role in providing clarity on the performance of devices and systems, ensuring that technology meets the needs of the end user, and in helping address emerging risks and common challenges."*
	ICT sector	*(minimum 2 examples)* **An acceptable response for 1 of the 2 case studies under consideration may be:** *" CS1 - The ALBYN housing fit homes development is an example of where construction, ICT and health and care professionals have come together to deliver a SMART housing solution for health and social care users. The*

		project uses smart home technology to enable people to live safe, well and independent lives in the community for longer by using sensors to gather different types of data as well as Artificial Intelligence to help detect episodes of ill health and falls. *An example of the project in action is the Fit sense initiative. Harnessing data to predict and prevent dangerous falls. Data is collected from the fit home's sensors and analysed using state-of-the-art data science algorithms to identify behaviours that are linked to an increased risk of falling. The Data Lab, which is the Scottish Innovation Centre responsible for generating value from big data, has funded the project.* *A video with more information on the project can be found here:* *https://www.youtube.com/watch?edufilter=NULL&frags=wn&v=cwDqjmSmtMQ*
	Health and Social care sector	*(minimum 2 examples)* ***An acceptable response for <u>1 of the 2</u> case studies under consideration may be:*** *" CS1 – 'Clevecogs' (https://www.blackwoodgroup.org.uk/clevercogs) is a digital care service launched by the Blackwood housing group. The company have taken a user-centric approach to the design of the system, involving their end users, along with various other stakeholders from within the health and social care sector e.g. government, families, staff and software designers.* *Based around a touch screen hub, the clever cogs system allows users to communicate with their carers and family, as well as receive reminders when medication is due to be taken . "*

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Outcomes 1 – 3 – Assessor Checklist

Knowledge/Skills Requirements *Has the candidate evidenced their ability to:*	Complete (Y/N)
Describe how construction relates to SMART homes.	
3 emergent technological trends	
2 socio-cultural drivers + 1 piece of legislation	
2 real world / case study examples	
Describe how health and social care relates to SMART homes.	
3 emergent technological trends	
2 socio-cultural drivers + 1 piece of legislation	
2 real world / case study examples	
Describe how Information and communication technology relates to SMART homes.	
3 emergent technological trends	
2 socio-cultural drivers + 1 piece of legislation	
2 real world / case study examples	
Assessor Comments:	
Assessor Signature:	
Date:	

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Assessment task 1B

Task 1B focusses on producing evidence for the 4th and final outcome in the unit:

- **Outcome 4** *Work collaboratively across disciplines to respond to a SMART home problem-based scenario*

To support the completion of this task, learners have been provided with a series of proforma's to help structure their responses:

- Proforma 2A – Persona mapping sheet
- Proforma 2B – Daily routine and support needs map
- Proforma 2C – SMART home technology solutions (including user benefits)
- Proforma 2D – Logistical/Practical implications of the proposed solution

Should learners wish to organise and present their responses in a different format, they are welcome to do so, provided the evidence requirements in the unit descriptor are sufficiently met.

Example responses have been provided on the pages overleaf to offer centres guidance around the levels of depth and sufficiency in learner's responses.

Proforma 2A – Persona mapping sheet

In their groups, learners will have provided evidence that shows some development of the skeleton persona that was provided in the assessment brief. Use of imagination and creativity to expand on this by contributing ideas around the person's likes, dislikes, hobbies, home environment and family members should be evident.

Assessors should ensure that there are at least 2 – 3 entries per characteristic to ensure that the persona has been developed sufficiently beyond the original brief provided.

Proforma 2B – Daily routine and support needs map

Learners should provide an overview of their persona's daily routine, broken down into 1-3hour chunks of time (as per the proforma supplied for the task). This should provide at least one entry per period (chunk) and provide a coherent picture of their persona's day from start to finish.

Against these entries, learners should provide evidence that they have considered the potential support needs that will result from the health diagnosis provided as part of the assignment brief e.g. Una has been diagnosed with dementia.

While it is expected that consideration will be given to all aspects of the persona's daily routine – it may be that not all the activities in the routine will have a related support need. Assessors are encouraged to use own discretion to assess that support needs have been adequately identified and should expect as a minimum that 50% of the daily activities will have had a support need identified.

A similar approach can be taken in terms of consideration of the persona's living environment with ca 50% of activities showing some matched consideration of the living environment and its affects.

Proforma 2C – SMART home technology solutions (including user benefits)

Learners should provide a description of a minimum of 3 SMART housing technologies, referring to the core functionality and the potential benefits to their persona brought about through application of the technology.

Responses should demonstrate awareness of the diagnosed health condition and the technologies reviewed should have a clear application in the context of the health condition being used as context for the assessment task.

Proforma 2D – Logistical/Practical implications of the proposed solution

In responding to the questions in proforma 2D, learners are first required to provide a brief overview of their proposed SMART solution. This should follow on from and show coherency with the technologies identified and described in 2C.

Learners are then expected to provide some narrative around any practical implications, considerations or challenges that they are able to forecast as part of bringing the solution to life and installing it in their selected Persona's home. Responses should demonstrate broad understanding of common issues that might be encountered for example; interoperability, installation and retrofit, socio cultural perceptions and barriers to technology adoption could all be referenced.

Learners should then identify the key tasks they would anticipate being carried out in order to install and operationalise the solution. It is not expected that every technology will have a linked task or requirement for each of the three subject areas and assessors are encouraged to use their discretion and own specialist knowledge to determine the completeness of responses.

Where there is ambiguity around any responses, assessors may wish to engage with colleagues from the relevant subject areas to verify assessment decisions. Question of learners could also be employed to clarify any areas of ambiguity.

Example responses for each of the Proforma's 2A - D have been provided overleaf.

Proforma 2A – Persona mapping (example response)

Who am I?

- *Una Thompson – an 82 year old woman*

Likes?

- *Watching countdown; the antiques road show; and time team.*
- *Listening to Frank Sinatra, Glen Miller and the Proclaimers.*
- *Fresh flowers*
- *Baking*

My family / friends?

- *Son: Matthew – lives in East Kilbride and visits once per week on a Sunday*
  - *Matthew has just had a baby with his partner Alice. The baby's name is Alan.*
- *Margaret – lives close by – visits on a Tuesday morning for tea.*
- *Sister – who lives in Florida (USA) and who Una catches up with over the phone every now and then*
- *Home help(s) – Jennifer – visits Una once a week to help with housework – they often have a cup of tea and a chat during these visits.*

Work / hobbies?

- *UNA used to work as a doctor in Glasgow but she has now retired*
- *UNA used to volunteer for the Citizens advice bureau in Govan, providing support for people to access benefits relating to health and wellbeing. She misses this as it provided an opportunity to meet new people and help them.*
- *Playing scrabble with her friend Margaret*
- *Doing crosswords in the local paper*

Where do I live?

- *In a ground floor tenement flat on the Southside of Glasgow.*
- *The flat was built in the late 1800's and has 3 bedrooms, a lounge, 2*

Dislikes?

- *Politics*
- *Rudeness*

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Proforma 2B – Persona daily routine and support needs (example response)

Time	Activity (map out in as much detail as you can, a typical day in the life of your persona / case study)	Type of assistance needed (consider the types of assistance needed by your persona to help them carry out the activity in light of their health diagnosis)	Impact of the physical environment? (how does your persona's physical environment (home) impact on their routine in light of their condition and assistance needs?)
12-7am	Sleeping	Dementia friendly clock to help Una know if it is night or day and when it is time to get up.	There is a risk of dementia sufferers wandering and becoming disorientated during the night – minimising hazards / risk of harm is advisable.
7am	Wake up and make breakfast	Memory aids and signage around the home to help with orientation.	Potential requirement to adapt (retrofit) existing home with glass fronted cupboards and memory aids / signage to reduce the impact o
8am	Get dressed and read the paper	Glass fronted wardrobe to remember where clothes are stored	Dementia sufferers can suffer mobility and balance issues so the physical environment may need to be adapted with mobility aides (e.g.wall handles) to support Una move safely around the home.
9am	Watching TV	May require a specialised remote and/or audio description to help with understanding programmes.	Dementia can affect the patient's eyesight so Una's living space may need to be adjusted to allow her to sit closer to the television.
10am	Home help visits	Various types of assistance – mainly support with washing / hygiene and cleaning the house.	To support assisted and/or safe bathing, Una may require a wet room to be built into her existing bathroom.
11am	Hobby time – baking, playing scrabble with Margaret	Glass fronted cupboards to make it easier to remember where ingredients are. Assistance to ensure cooker / oven are not forgotten about	
12am	Hobby time – baking, playing scrabble with Margaret		Potentially fitting safety cut offs on appliances to minimise the risk of them being left on due to forgetfulness.
1pm	Preparing and eating lunch	Dementia sufferers can experience difficulty with their motor skills / co-ordination, so Una may need assistance with cooking / feeding herself.	Appliances that are dementia friendly e.g safety cut offs where they have been on for too long.
2 - 4pm	Afternoon nap	Alarm so Una doesn't oversleep and isn't able to sleep in the evening.	
4pm	Watching countdown	As per 9 am entry.	As per 9am entry
5pm	Making dinner	Reminder about when dinner time is Safety measures to ensure that cooker/oven are not forgotten about	As per 1pm entry
6pm	Dinner and washing up		
7pm	Doing the crossword in the local paper	Dementia impacts sufferers vision, so Una may require special glasses / visual aides to help her.	n/a
8pm	Watching TV	As per 9am entry	As per 9am entry
9pm	Watching TV	As per 9am entry	As per 9am entry
10pm	Goes to bed	Reminder to ensure that doors are locked and the house is secure Memory aides and signage to help with orientation	

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Proforma 2C - SMART technologies and user benefits <mark>(example response)</mark>

SMART Technology	Overview of functionality *What can the technology do?*	Potential benefits to your persona *e.g. to quality of life, wellbeing, autonomy*
Motion sensor	*Motion sensors have a variety of applications as part of a wider Internet of Things (IoT) enabled SMART home solutions. For example:* ● **Security** - *can trigger alarm if unauthorised motion is detected* ● **Lighting** - *can be used to turn lights on and off automatically when user enters or leaves a room* ● **Safety** - *can trigger warnings when a pet or child is near a hazardous area e.g. cooker in use, fire, hot taps etc.*	*Can alert care providers / family members if Una's regular behavior falls outwith a set norm – this will allow for a remote check up e.g via phone or video call to make sure that everything is ok.* *When linked to the lighting in the home this could allow for automatic switching on or off of Una's lights which will help her optimise her energy usage.*
Pressure sensor	*Can be used to capture relating to a number of activities in a users home:* ● **Movement/gait** - *a pressure sensor in the floor can be used to track a user's location in the home, while also monitoring how they are walking. Information in the case of the latter can then be used to determine if there are any significant deviations in the users walking that might signal an issue, triggering a preventative response (check up / call) from the care provider.* ● **Posture -** *Pressure sensors in the legs of a chair can be used to capture information on a users posture and via complementary technologies, make recommendations for how this might be adjusted to improve.*	*In conjunction with motion sensors, pressure sensors can also be used to create a picture of Una's movement in the home – monitoring where she is, her patterns of behavior and the way(s) in which she is walking.* *Alerts could be set up to alert her care provider or family of any non-standard behavior that might require an intervention.*
Temperature sensors	*Can be used as part of an Internet of Things (IoT) solution to help monitor and manage conditions within a users lived environment* ● **Comfort** - *can be used to monitor temperature within a dwelling and through complementary technologies, make automated adjustments to maintain an ideal temperature. - This contributes to optimal / efficient energy usage.* ● **Safety** - *can be installed in or near household appliances e.g. cookers /taps to monitor heat levels and enable automated responses e.g. hob shut down if a user forgets they have been cooking.*	*Due to Una's Dementia, there is a high risk that she might forget about a cooker that has been turned on for cooking, or she might run a bath that is dangerously hot.* *The use of temperature sensors can help to minimise this risk by managing the length of time a cooker can be on for, or by limiting the temperature of a bath of shower to a safe level. This will help to keep Una safe and well in the absence of her carer or family members.*

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Wearables *(SMART watches, wearable air sensors, cameras)*	*Can be used to generate real time data in relation to the physiological health, environmental conditions (air quality, temperature) and location of a patient or care user. This can allow for self and/or remote monitoring of key personal health information.* *Via the use of complementary app technologies, care providers (and family members) can access this information via SMART device apps to maintain awareness of the persons*	A wearable would benefit Una in a number of ways e.g. by recording her health stats and communicating these to both her and her care provider in real time – helping to monitor and prevent any health issues before they become serious. The data captured over time could also be used to develop a better understanding of Una's overall health and track any deterioration in her condition over time.
Health apps *(The are currently over 160,000 health related apps on the apple store)*	*There are a multitude of applications for health apps in the context of SMART living environments. For example:* ***Personal Monitoring*** *- through data generated from across a SMART home (e.g. via wearables and sensors) APP's can help keep a care user informed about and in control of their own health e.g. through medicine reminder alarms.* ***Remote monitoring*** *- care services / health providers can use organisation wide health apps to monitor their users conditions and make more effective / efficient use of their resources e.g. by minimising the need for non-essential visits and so providing the right patients with the right care, at the right time.* ***Physical environment monitoring*** *- through Internet of Things (IoT) enabled hubs within a living environment, a network of sensors can be used to capture data and manage the conditions within the home be this from a security, comfort, air quality, temperature or safety perspective.*	The above suggestions will depend on apps and SAS (software as a service) applications to handle, process and respond to the data being generated by sensors and wearable tech.

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Proforma 2D - Logistical/Practical implications of the proposed solution <mark>(example response)</mark>

Use this proforma to map out the logistical and practical implications that need to be considered in order to develop and install a prototype of your solution.

Summary of proposed solution
(Please provide a brief overview of your proposed solution, the technology it involves and the way(s) in which it will benefit the user)
Response: *The proposed solution will employ a selection of sensor technologies to make a number of improvements within Una's existing home:* 1. *The use of motion and pressure sensors to give care providers and family members greater awareness of Una's behaviour. By allowing this to occur remotely, Una's independence can be being retained, but with an increased level of support and peace of mind for the care provider(s) and family.* 2. *Temperature sensors will be installed with kitchen appliances (the cooker, taps) and in the bathroom (taps and shower controls) to monitor various hazards and ensure safety cut offs / temperature management is in place to minimise the risk of harm due to forgetfulness and/or vision problems.* 3. *These sensor technologies will be accompanied by a wearable (e.g. SMART watch) to issue alerts and reminders to Una in response to various pre-programmed things.* 4. *Underpinning all of these technologies will be a suite of SMART apps and a SMART hub which will process and respond to the various data being generate.*

Technology	Practical implications *What challenges / opportunities / interdependencies will you have to consider to make use of this technology in your selected context?*	Related tasks *What are the key tasks than need to be completed in order to install / operationalise the technology in your selected context.*	
1. Wearable(s)	*1. The wearable needs to be part of a wider solution where the data captured is delivered back to the user in a meaningful way e.g. via an app or similar health platform. Requires a joined up approach between service users, health care providers, app designers and computing specialists.* *2. Societal resistance to monitoring and use of personal data e.g. concerns around privacy and the security of data.*	Construction specialist	n/a
		ICT specialist	*Identifying technologies that are interoperable i.e. they can "talk" to each other and work as part of a wider system.* *Ensuring that the relevant security and data protection protocols are in place.*
		Health and Social care specialist	*Supporting Una to familarise with the device(s) – through regularly checking up with her on its use. Dementia patients can struggle to*

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				retain new information so this may take some time. *Working with Una and her family / power of attorney to agree who (e.g. care company, family members) can access what data and for what purpose.*
2.	**Motion sensor(s)**	*1. Requires complementary IoT enabled technologies e.g. a SMART hub, to relay data into a wider platform from which data can be captured, shared and responded to e.g. via automated responses such as alarms, or changes in lighting.* *2. Installation considerations, in order to be unobtrusive the technology would need to be factored in as part of the design stage in new builds.*	Construction specialist	*Installation and fixing of the sensors in appropriate positions throughout UNA's home.*
			ICT specialist	*Identification and/or development of complementary app or SAP technologies to interface with the sensors, capture data and make an appropriate response.*
			Health and Social care specialist	*Work with construction and ICT specialists to identify sensor positioning, data requirements and relevant ownership considerations.*
3.	**Pressure sensor(s)**	*1. Installation - for sensors to be integrated into the floor / obscured form view, this will require consideration at the design and build stage. Otherwise, retrofit (but visible) options are available e.g. side of bed pressure mats to record when a patient gets in and out of bed each day.* *2. As with all SMART home data capture devices, value can only be created when the technology in employed as part of a wider, connected solution. Complementary technologies for connectivity, automated responses (alarms, warnings to care providers) will require the integration of other technologies and disciplines to build a workable solution.*	Construction specialist	*Installation and fixing of the sensors in appropriate positions throughout UNA's home.*
			ICT specialist	*Identification and/or development of complementary app or SAP technologies to interface with the sensors, capture data and make an appropriate response.*
			Health and Social care specialist	*Work with construction and ICT specialists to identify sensor positioning, data requirements and relevant ownership considerations.*
4.	**Temperature sensor(s)**	*1. For energy purposes, will require the necessary SMART hubs to manage and respond to data created by the sensor(s)* *2. From a safety perspective, appliances with the technology pre-installed may be required. If not, then a workaround is likely to require collaboration across multiple disciplines (e.g. electrical,*	Construction specialist	*Installation and fixing of the sensors in appropriate positions throughout UNA's home e.g. in the kitchen and bathroom.*
			ICT specialist	*Identification and/or development of complementary app or SAP technologies to interface with the*

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	sensor specialists, care providers) to develop and retrofit an effective solution.		*sensors, capture data and make an appropriate response.*
		Health and Social care specialist	Liase with Una and the construction / ICT specialists to plan the installation with minimal disruption to Una's daily routine. Provide Una and her family with clear explanations of the purpose of the sensors and the ways in which they work. This may need to be revisited with Una on a regular basis.
5. Health app(s)	*1. Adoption of technologies amongst certain target groups e.g. the elderly can be a challenge due to digital literacy / the ability to make use of the technology or the SMART device. How will the user be trained/ upskilled so they can use the technology.* *2. Interoperability (the ability for different devices and systems to communicate and exchange information) between various SMART devices and a relevant app needs to be investigated and managed ensure that all parts of the solution work well together.*	Construction specialist	n/a
		ICT specialist	*Identifying technologies that are interoperable i.e. they can "talk" to each other and work as part of a wider system.* *Ensuring that the relevant security and data protection protocols are in place.*
		Health and Social care specialist	*Working with Una, her family and other stakeholders to identify key requirements / needs from the system and communicate these to the ICT specialists to allow for collaboration in identifying the most suitable / optimal technologies to develop the solution.*

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Outcome 4 – assessor checklist

Knowledge/Skills Requirements *Has the candidate evidenced their ability to:*	Complete (Y/N)
Work collaboratively across disciplines to respond to a SMART home problem-based scenario, by:	
Developing a user persona and describe their daily routine (Proforma's 2A and 2B)	
Considering how a health diagnosis will affect a person in their daily routine (Proforma 2B)	
Describing SMART technologies that could support a person to live with optimal independence in their home – a minimum of 3 technologies to be covered (Proforma 2C)	
Describing a potential SMART solution and its user benefits (Proforma 2D)	
Identifying the logistical and practical considerations relating to the installation and use of the system - from the perspective of Health and Social care, Construction and ICT professionals (Proforma 2D).	
Assessor Comments:	
Assessor Signature: **Date:**	

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LEVEL 6

The following descriptions are for guidance only –
it is not expected that every point will necessarily be covered.

CHARACTERISTIC 1: KNOWLEDGE AND UNDERSTANDING

- Demonstrate and/or work with:
  - An appreciation of the body of knowledge that constitutes a subject/discipline/sector.
  - A range of knowledge, facts, theories, ideas, properties, materials, terminology, practices and techniques about, and associated with, a subject/discipline/sector.
  - Relating the subject/discipline/sector to a range of practical and/or commonplace applications.

CHARACTERISTIC 2: PRACTICE: APPLIED KNOWLEDGE, SKILLS AND UNDERSTANDING

- Apply knowledge, skills and understanding:
  - In known, practical contexts.
  - In using some of the basic, routine practices, techniques and/or materials associated with the subject/discipline/sector.
  - In exercising these in routine contexts that may have non-routine elements.
  - In planning how skills will be used to address set situations and/or problems and adapt these as necessary.

CHARACTERISTIC 3: GENERIC COGNITIVE SKILLS

- Obtain, organise and use factual, theoretical and/or hypothetical information in problem solving.
- Make generalisations and predictions.
- Draw conclusions and suggest solutions.

CHARACTERISTIC 4: COMMUNICATION, ICT AND NUMERACY SKILLS

- Use a wide range of skills, for example:
  - Produce and respond to detailed and relatively complex written and oral communication in both familiar and unfamiliar contexts.
  - Select and use standard ICT applications to process, obtain and combine information.
  - Use a wide range of numerical and graphical data in routine contexts which may have non-routine elements.

CHARACTERISTIC 5: AUTONOMY, ACCOUNTABILITY AND WORKING WITH OTHERS

- Take responsibility for carrying out a range of activities where the overall goal is clear, under non-directive supervision.
- Exercise some supervisory responsibility for the work of others and lead established teams in the implementation of routine work within a defined and supervised structure.
- Manage limited resources within defined and supervised areas of work.
- Take account of roles and responsibilities related to the tasks being carried out and take a significant role in the evaluation of work and the improvement of practices and processes.

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