careNET: Building ICT competences in the long-term care sector to enhance quality if life for older people and those at risk of exclusion

D3.4 Learning Architecture Working Document

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Abstract	

This working document describes the learning architecture embodied by the CareNet curriculum that comprises three learning pathways for digital competence acquisition in care workers and care recipients. The document also elaborates six example learning domains embedded within the curriculum. It also describes the proposed methodology for learning content production and an instructional design model for presenting the pathways and micro/macro tasks to the learners.

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Document History

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1. Summary

The CareNet learning architecture is a working document for the design and implementation of the CareNet curriculum and proposed learning pathways that stem from the identification of digital competence domains carried out under WP2. The architecture identifies a matrix of developmental activities and interventions to help care workers and care recipients acquire a set of digital competences relevant to their contextual setting.

The learning architecture document answers these questions:

- Who is to be developed? The target groups identified are represented by care workers and care recipients.

- What do they need to know, do and be able to accomplish? In other words, detail of the knowledge, skills and attitudes that define a particular digital competence area. These are detailed under three learning pathways: Foundation; Day to Day; and Vocational.

- How will it be accomplished? What kinds of interventions are planned and the expectations in terms of proficiency. What are the underlying principles that are being adopted in the learning design approach?

2. Background: digital and information literacy and principles for digital competence development

The terminology and discourse used that frames discussions around digital competence are widespread and vary according to which sources are consulted. This document acknowledges the following definitions and elaborations. First, digital competence can be identified in a broad manner, for example following the lead of the European Union and the JISC-funded LLiDA project where digital literacy is summarised as:

> The functional access, skills and practices necessary to become a confident, agile adopter of a range of technologies for personal, academic and professional use.
>
> http://jiscdesignstudio.pbworks.com/w/page/40474566/JISC-Digital-Literacy-Workshop-materials

Second, digital competences also define those capabilities which make an individual fit for living, learning and working in a digital society and therefore we also highlight an expanded definition (Ferrari, A., 2012) below:

Digital Competence is the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socialising, consuming, and empowerment.

Within the report highlighted above Ferrari (2012) argues that the need for Digital Competence covers much more that technical skills. Ferrari therefore proposes that the seven areas below should be taken into account as this approach is more adapted to current needs.

1. Information management
2. Collaboration
3. Communication and sharing
4. Creation of content and knowledge
5. Ethics and responsibility
6. Evaluation and problem solving
7. Technical operations

These in turn indicate can be linked to a set of elements that combine to form what we would understand as digital literacy (JISC, 2012):

- ICT/computer literacy: the ability to adopt and use digital devices, applications and services in pursuit of goals, especially scholarly and educational goals.

- Information literacy: the ability to find, interpret, evaluate, manipulate, share and record information, especially scholarly and educational information. For example, dealing with issues of authority, reliability, provenance, citation and relevance in digitised scholarly resources.

- Media literacy, including for example visual literacy and multimedia literacy: the ability to critically read and creatively produce academic and professional communications in a range of media.

- Communication and collaboration: the ability to participate in digital networks of knowledge, scholarship, research and learning, and in working groups supported by digital forms of communication.

- Digital scholarship: the ability to participate in emerging academic, professional and research practices that depend on digital systems. For example, use of digital content (including digitised collections of primary and secondary material as well as open content) in teaching, learning and research, use of virtual learning and research environments, use of emergent technologies in research contexts, open publication and the awareness of issues around content discovery, authority, reliability, provenance, licence restrictions, adaption/repurposing and assessment of sources.

- Learning skills: the ability to study and learn effectively in technology-rich environments, formal and informal, including: use of digital tools to support critical thinking, academic writing, note taking, reference management, time and task management; being assessed and attending to feedback in digital formats; independent study using digital/digitised resources and learning materials.

3. Learning Design: Curriculum development

The design approach is based on the following levels of participant activity that are drawn together under the overarching curriculum objectives (see Section 4):

a) Common learning modules: these cover day to activities. The expectation here is that care workers and care recipients will engage in cooperative learning in order to address common digital competence development;

b) Specific modules: these are targeted for individual learning that will address in particular self-development competences for care workers and where applicable

The curriculum outlines three key learning pathways:

1. Foundational
2. Day to Day
3. Vocational

These three learning pathways are sub-divided into identified competence domains that are drawn from the work carried out under WP2, that are supported by micro and macro tasks that utilise a task orientated and problem solving learning approach (see Sections below for more detailed information). Purposeful activity within each of the learning pathways will be captured via a portfolio type system to demonstrate evidence of achievement.

Entry into the learning pathways is gated by a baseline skills test activity to check the prior learning and skills of the participant.

4. Curriculum aims and objectives

The aim of CareNet curriculum is to provide a balanced learning experience that will develop and enhance the digital competences of participants such that they are confident and able to progress their life and professional goals through the safe, responsible and productive use of ICTs and digital media.

We want all participants to be:

- Successful learners: who enjoy learning and make excellent progress to achieve their full potential.

- Responsible citizens: who make a positive contribution to society and use their talents and abilities for the benefit of others as well as themselves. Able to lead safe, healthy and fulfilling lives and who are capable of leading others.

- Independent, confident individuals: who and develop the capacity for lifelong learning, professional advancement and able to enhance their quality of life in a positive, owned and purposeful manner.

Within the CareNet curriculum the three identified learning pathways have the following objectives

1. Foundation: the objective is to build a set of foundational set of digital competences that provide a range of reusable skills, knowledge and attitudes for basic ICT use.
2. Day to Day: the objective is to use authentic joint learning scenarios to build on the foundational skills and focus on particular elements of digital competence that promote active engagement with online and digital activity.
3. Vocational: the objective is to enable care workers to manage and advance their professional life though the use of acquired digital skills and knowledge.

5. Proposed framework for the learning architecture

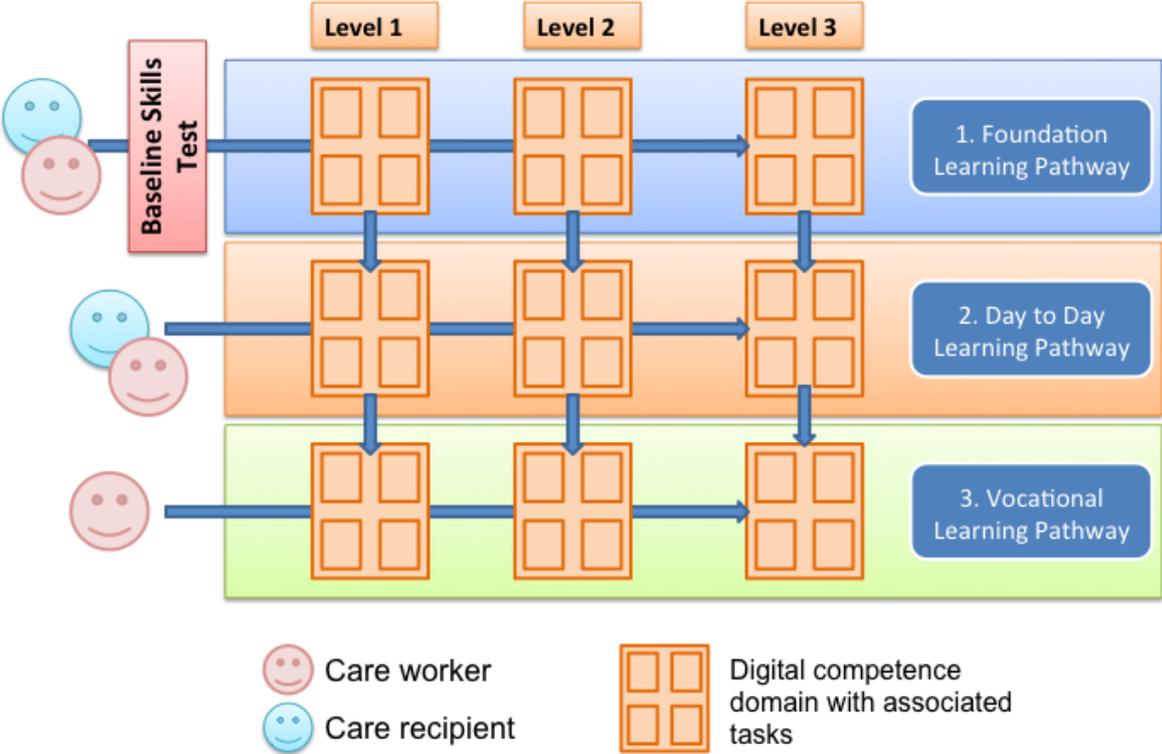**Figure 1:** Overview of the interrelation between learning pathways and levels. The interconnections are shown as a matrix as it is expected that some flexibility will exist in terms of ability of learners to switch between tasks and levels. The care workers and care recipients are anticipated to be working on tasks together though the vocational pathway is specifically targeted at the care worker alone.
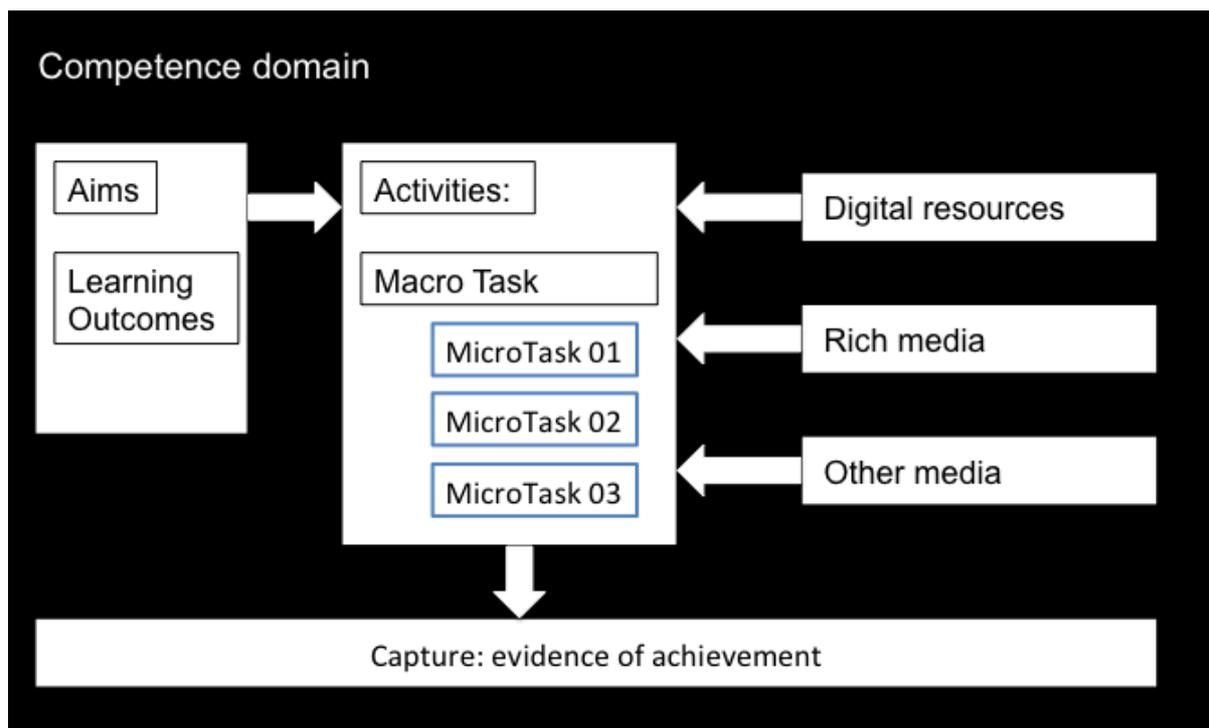
Figure 2: Detail of the link between the elements within the competence domain, showing the activities, in the form of macro-tasks and micro-tasks, driving the choice of and association between the learning materials. Evidence of achievement is captured by an ePortfolio type system.

6. Curriculum overview: learning pathways and competence domains

Learning Pathway	Target Group/s	Competence Domain	Descriptor/s *(draft statements where indicated)*	Reference/s and cross mapping
ID=1 **Foundation**	Care worker and care recipient	1.1 Orientation	Baseline skills in using a mobile Internet device. I am able to use the buttons and touch-screen to navigate the device and access the device settings to connect to the Internet. I can recharge the device	Digital Literacy referencing the ECDL (European Computer Driving Licence[1]). See also IC3[2]

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[1] http://www.ecdl.com/
[2] http://www.certiport.com/PORTAL/desktopdefault.aspx?tabid=669&roleid=101

			safely.	
		1.2 Communication, collaboration and participation	I am able to communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact and participate with communities and networks.	Mapped from DIGCOMP (Ferrari, 2013)
		1.3 Information seeking and management	I am able to identify access, retrieve, store, organise and analyse digital information, judging its relevance and purpose in a critical and effective way.	Mapped from DIGCOMP (Ferrari, 2013)
		1.4 Creation of content and Knowledge	I am able to create and edit new content (from text to images to video); integrate and re-elaborate previous knowledge and content and creative expression.	Mapped from DIGCOMP (Ferrari, 2013)
		1.5 Privacy and security	I am able to understand risk and security issues, particularly in relation to using the Internet and protect my personal data, apply security measures and exhibit a safe and responsible attitude.	Mapped from DIGCOMP (Ferrari, 2013)
		1.6 Informed decisions and problem solving	I know that several technologies are available and I can ask for support and assistance when technologies do not work.	Mapped from DIGCOMP (Ferrari, 2013)
ID=2 **Day to day**	Care worker and care recipient	2.1 Create and maintain bonds	I am able to manage electronic communications consistently over time and understand both asynchronous and	Draft from empirical data analysis WP2; cross map 2.5 and 2.6

			synchronous modes. *(Draft statement)*	
		2.2 Participate in online transactions	I am able to participate knowledgably and safely in online transactions from shopping, ordering goods and online banking. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 1.5
		2.3 Well-being	I feel a sense of and can maintain my well-being through online medical interactions and the skills and knowledge to access devices to raise alarms via telehealth services and/or relatives. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 2.5
		2.4 Hobbies and leisure	I am able to participate in online activities for my pleasure that include for example, studying a course that interests me, playing a game, keeping up to date with relevant news and articles. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 1.2, 1.4, 2.2.
		2.5 Self expression	I am able to articulate my feelings and emotions in a responsible and ethical manner in online interactions. *(Draft statement)*	Draft from empirical data analysis WP2 Cross map 1.2, 2.1, 2.2
		2.6 Community participation	I am able to join, engage with and if needed leave online communities. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 1.4, 1.5, 2.1 and 2.5
ID=3 **Vocational**	Care worker	3.1 Supporting the older person in using ICT	Transitional competency: understanding the basics of teaching, for example to gain interest of older persons in demonstrating tools and	Draft from empirical data analysis WP2; cross map 1.1

			techniques. *(Draft statement)*	
		3.2 Manage job related tasks	I am able to effectively manage my time using appropriate tools to plan and coordinate my work around the care-recipient that may include making appointments, setting up alerts and ordering goods. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 1.5, 2.2
		3.3 Peer learning	I am able to understand my own learning needs and act on them in a shared learning environment, as well as exchange issues with my peers that stem from my professional practice. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 1.2, 2.2, 2.5, 2.6
		3.4 Employability	I am able to follow locate and follow appropriate CPD pathways, build my professional profile to reflect my personal and professional achievements and engage in meaningful job search activity. *(Draft statement)*	Draft from empirical data analysis WP2; cross map 1.3, 3.3

7. Template for elaboration of learning elements within the identified learning pathways

7.1 Learning Pathway 01: Foundation pathways

Competence domain	1.2 Communication, collaboration and participation
Aim	Communicate, collaborate and participate in a digital environment
Rationale	Build individual confidence in the mechanics that underpin online activity
Prerequisites	Baseline skills test/survey
Objectives	Be able to communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact and participate with communities and networks. *Learning outcomes: to be defined in relation to finalised activities.*
Subject matter	Communication and collaboration tools such as: Email, Skype,
Level 1: Baseline	E.g. Understand synchronous and asynchronous communication
Level 2: Intermediate	E.g. Principles of email and email groups
Level 3: Advanced	E.g. Principles of Skype and video conference tools
Evidence of Achievement	Capture outputs from learning activities.

Competence domain	1.5 Security and Privacy
Aim	Maintain secure interactions on the Internet
Rationale	Reduce anxiety; reduce stress; enhance confidence.
Prerequisites	Baseline skills test/survey
Objectives	To be able to protect personal data, apply security measures and exhibit a safe and responsible attitude. *Learning outcomes: to be defined in relation to finalised activities.*
Subject matter	The relationship between security and privacy

Level 1: Baseline	E.g. Articulate personal privacy needs and privacy fears. Basic concepts of security and vulnerability e.g. email scams and phishing
Level 2: Intermediate	E.g. Secure webpages, privacy setting on devices
Level 3: Advanced	E.g. Protecting yourself, finding and changing default settings on web applications.
Evidence of Achievement	Capture outputs from learning activities

7.2 Learning Pathway 03: Day to day pathways

Competence domain	2.1 Create and maintain bonds
Aim	Use a mobile internet device for regular communication with friends, family and professionals.
Rationale, motivation	To counteract loneliness, to make new friends.
Prerequisites	Foundational pathway
Objectives	To build personal and professional networks for happiness and career advancement. *Learning outcomes: to be defined in relation to finalised activities.*
Subject matter	Recognising/understanding the differences between weak and strong ties. Asynchronous and synchronous and persistent communications.
Level 1: Baseline	E.g. Setting up a synchronous communication such as Skype. Locating others.
Level 2: Intermediate	E.g. Persistent communication techniques such as status updates. Twitter. Participation in communities and etiquette.
Level 3: Advanced	E.g. Facebook increasing social capital and moving strengthening weak ties to strong ties. Knowing how to create and separate personal and professional online identities.
Evidence of Achievement	Capture outputs from learning activities

Competence domain	2.2 Participate in online transactions
Aim	To enable participants to safely and productively

	engage in online transactions.
Rationale, motivation	Alleviate the stress and anxiety associated with online transactions.
Prerequisites	Foundational pathway
Objectives	To provide participants with a set of tools and skills that will allow them to participate in simple online interaction without fear or anxiety and to be able to troubleshoot and follow-up on the results from their online activities. *Learning outcomes: to be defined in relation to finalised activities.*
Subject matter	Types of online transaction and the levels of risk associated with each. Understanding the flow of actions that underpin online transactions to allow for problem solving and follow-ups.
Level 1: Baseline	E.g. Communicative online transactions, feedback and posting on websites
Level 2: Intermediate	E.g. Online shopping.
Level 3: Advanced	E.g. Online banking transactions and personal management and accounting.
Evidence of Achievement	Capture outputs from learning activities

7.3 Learning Pathway 03: Vocational pathways

Competence domain	3.3 Peer to peer learning
Aim	Engage in meaningful peer supported learning
Rationale, motivation	Continuing professional development, leisure
Prerequisites	Foundational pathway
Objectives	To develop the ability to study and learn effectively in a technology-rich environment that include formal and informal settings. *Learning outcomes: to be defined in relation to finalised activities.*
Subject matter	Identification and realisation of personal and professional learning goals.
Level 1: Baseline	E.g. Participate in group study using digital/digitised resources and learning materials
Level 2: Intermediate	E.g. Use of digital tools to support critical thinking, writing, note taking, reference management, time

	and task management; being assessed and attending to feedback in digital formats
Level 3: Advanced	E.g. Engage in a meaningful online learning activity that would be a reflection of the CareNet course with peers.
Evidence of Achievement	Capture outputs from learning activities

Competence domain	3.4 Employability
Aim	Enhance the employability of the care worker
Rationale, motivation	Gain employments, increase employability, mitigate risk of losing job.
Prerequisites	Foundational pathway
Objectives	To develop the care worker and care giver ability to develop personally and professionally to improve their confidence and employability. *Learning outcomes: to be defined in relation to finalised activities.*
Subject matter	Bringing together resources on personal and professional development.
Level 1: Baseline	E.g. Understand personal training needs; identify sources; job search.
Level 2: Intermediate	E.g. CV builder tools, Europass, submission to Job Boards. Building a 'LinkedIn' profile.
Level 3: Advanced	E.g. Life planning: ability to make informed decisions and achieve long-term goals, supported by digital tools and media, including, for example, reflection, personal and professional development planning, CV building, identity and reputation management, showcasing achievements. Networking with appropriate professional contacts, including follow-ups;
Evidence of Achievement	Capture outputs from learning activities e.g. Online professional profile; Personal planning recorded; CV up to date; Skill gaps identified and noted.

8. Details of the 'ICARE' instructional design approach

The primary benefit of using an instructional design model is that it provides a systematic approach to development of learning situations and can increase the possibility of learning taking place. The secondary benefit of using an instructional design model lies in its ability to be used by individuals and multi-disciplinary teams to use the same vocabulary and to visualise the associated processes during building the elements of a course.

For CareNet we propose the use of the learning design elements from the ICARE model that can be used to help structure the way that learning materials and activities are combined. It adopts a pedagogical approach that falls under a constructivist, active learning rubric:

> **Constructivism:** this theory asserts that learners construct their own knowledge and understanding, based on their personal interpretation of the subject. This will differ between learners as they all bring a unique set of experiences to the learning situation. Engaging students in meaningful activities forms the basis of their learning.

It is based on the Dick & Carey (1978) instructional design model outlined in *the systematic Design of Instruction* and pioneered by San Diego State University. An adapted version was used at Middlesex University, UK (Mojab & Huyck, 2001). It puts forward a *systems view* of instruction rather than viewing instruction as a sum of isolated parts. The model addresses instruction as an entire system, focusing on the interrelationship between context, content, learning and instruction.

According to Hoffman et al. (1998) "*I CARE is distilled from basic instructional design practice, adapting various systems or 'steps of instruction' to what seemed to us to be particularly useful components for an online course*". Middlesex University's departure from the original model allowed a different, less linear flow (Woodman et al, 2001).

The initial model assumed a linear progression through the five sections, whereas the adapted version encouraged close links between the 'connect', 'apply' and 'reflect' sections making it possible to categorise materials and interactions under the five main headings and provide multiple learning paths. The decisions regarding the management and organisation of learning and instruction are now left to the learners; they could either follow the suggested navigation path by following the links in the content or dip in and out of sections depending on their needs (Figure 3). The evolution of the model also opened up the opportunity for the design of medium to large scale learning events and took into account some of the advantages offered by the new technology.
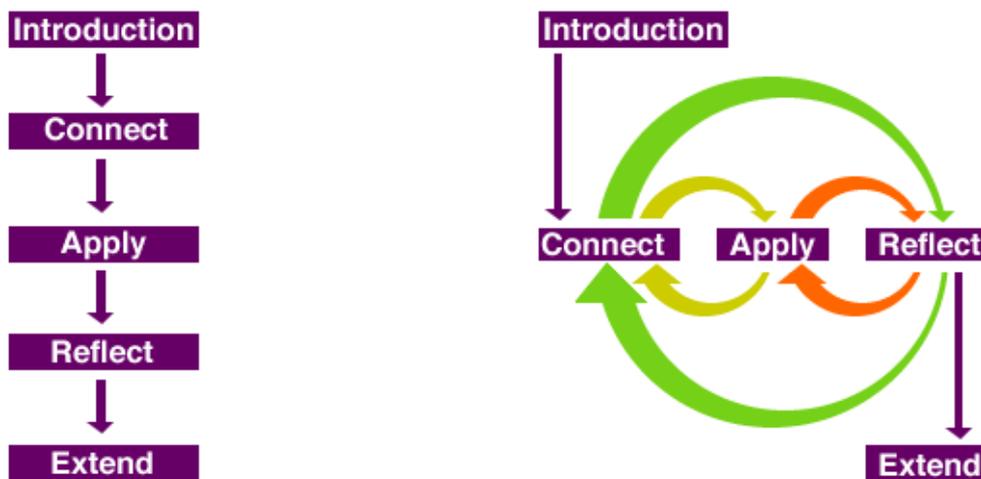
I CARE original model	*I CARE* as used by Middlesex University

Figure 3: Comparison of differing ICARE models that have been adopted (Mojab & Huyck, 2001).

An active task-based learning approach

An active as opposed to passive approach to study is widely acknowledged to be more beneficial to the learning process. Within the learning design model we suggest that the elements that direct the flow of learning should be underpinned by an active learning pedagogy[3]. The learning and teaching approach should be driven by activities and support technologies that promote both student engagement with the materials and interaction amongst the learners, in this way developing and reinforcing the development, acquisition and application of knowledge.

We have two broad understandings of what active learning represents:

1. Individually, students are active in the way they approach their learning and adopt appropriate learning attitudes and strategies to successfully achieve their learning goals e.g. strategic learning. Chickering and Gamson (1987) describe the kinds of indicators for active learning in relation to their 'seven principles of good practice' that include, for example, students carrying out additional readings on topics that they introduce and discuss in the classroom. This understanding of active learning is closely related to notions of the self- directed study as first described by Knowles (1975: 18):

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[3] This is a broad pedagogical approach that emphasises student engagement with their education within an environment defined by learner- centred processes and is often used as umbrella term that refers to several models of instruction that focus the responsibility of learning on learners.

In its broadest meaning, 'self directed learning' describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.

2. Active learning also relates to a set of activities and pedagogical approaches that direct and support students in their interaction with resources and with each other (Bonwell and Eison, 1991), and is strongly associated with collaborative and cooperative forms of learning enterprise. For example see Cusea (1992), Johnson et al. (1998).

Classic examples of the types of activity that exemplify an active learning approach include can be found in Barkley, 2004).

For activities that provide a sound basis for peer-learning and shared enterprise the emphasis should be on tasks that are social, dialogic, problem solving, cooperative, promote shared experience, collaborative, reflective, and engage in critical dialogue.
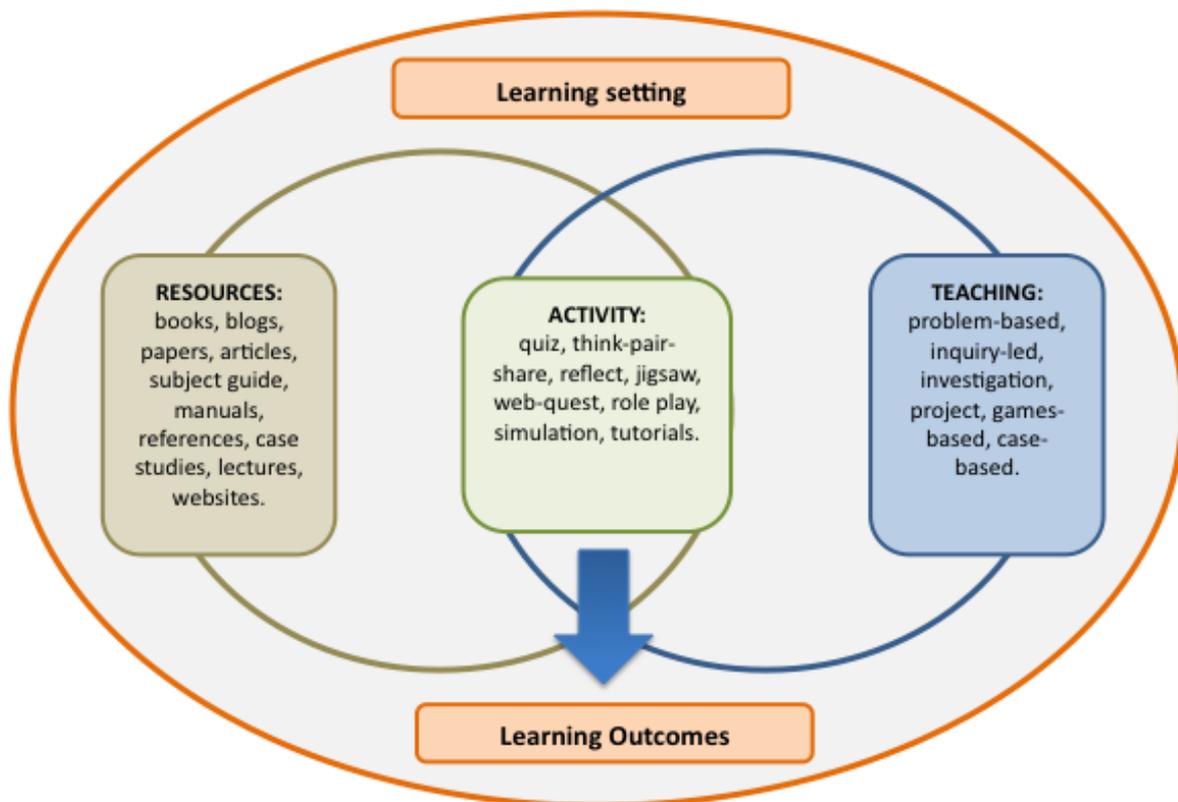

Figure 4: Activity design approaches in context. In the learning design process we expect to use a storyboarding approach. This is a pragmatic methodology for learning development teams that helps in the definition the elements that need to be drawn together to produce the micro and macro tasks under each of the learning

pathways and associated competence domain. The stages are loosely broken down into: articulate aim/s; define learning outcomes; assessment criteria; design activity to demonstrate learning, identify the resources we bring to the activity.

9. Draft curriculum delivery overview

The following describes a guideline for the delivery of the curriculum to the target groups. Note: to be confirmed with project partners

Pilots 1: May to June 2013		
Focus: Care-worker training		
	Learning Pathway	*Comments*
A.	Baseline skills test	*Can be conducted at the relay centre with support person*
B.	Foundation pathway	*Care worker completes*
C.	Day to Day pathway	*Careworker reviews*
D.	Vocational pathway	*Complete Part 1 – transitional competence 3.1 critical to complete*

Pilots 2: September to October 2013		
Focus: Care-workers (CW) working with older persons (OP)		
	Learning Pathway	*Comments*
A.	Baseline skills test	*Can be conducted at the relay centre with support person or by CW*
B.	Foundation pathway	*OP aided by CW (and support person guidance)*
C.	Day to Day pathway	*Joint activity between CW and OP*
D.	Vocational pathway	*Complete Part 2.*

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