Section 2: Other Papers

0291 Next Generation User Skills

Authors

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Abstract

Possibilities for the digital literacies required in everyday living, learning and working in the United Kingdom in 2013.

The world is awash with statistics on the impact of the web on 21st century living, learning and working. They are accompanied by the pronouncements and predictions of experts from every camp, from those heralding a new brave new world of co-creation and choice, to warnings from the dark side in terms of ethics and educational standards, tempered by increasing recognition that 'we' may no longer be in control of such matters.

Meanwhile, surveys report that around 80% of businesses have invested in IT and 60% have websites. Whilst the extent and value of adoption differs significantly across businesses and sectors, the foundations for new ways of working and doing business are broadly in place, with older and static businesses typifying the laggards. It would not be unsafe to project that, by 2013, even more people will be required to use ICT in the workplace and in their everyday lives, increasingly involving online communication and web-based applications.

This represents a scenario to which those responsible for developing curricula and awards must respond – in the primary and secondary phases, vocational and applied learning, work based and adult community provision and higher education.

To ensure the relevance of and to influence the ongoing enhancement of user ICT provision and the associated awards, Digital 2020 and the Scottish Qualifications Authority jointly commissioned Sero Consulting to develop a vision for ICT user skills in 2013 – 'Next Generation User Skills' – taking account of:

- Skills that all employers will need, which they may not currently recognise.
- Skills that people (especially young people) will already have, but which may not be accredited.
- Essential skills for living and learning in a digital age.

This paper is drawn from the resulting public report, 'Next Generation User Skills – Working, Learning & Living Online in 2013' (September 2008), which provides:

Introduction

To ensure the relevance of and to influence the ongoing enhancement of user ICT provision and the associated awards, Digital 2020 (Digital 2020 is the digital skills partnership for Yorkshire & Humber — www.digital2020.org.uk) and the Scottish Qualifications Authority (www.sqa.org.uk) jointly commissioned Sero Consulting to undertake research in ICT User skills.

The focus was the vision for ICT user skills in 2013 — referenced as 'Next Generation User Skills' — taking account of:

- **Skills that all employers will need**, which they may not currently recognise — including web presence, information productivity, market research, infrastructure management.
- **Skills that people (especially young people) will already have**, but which may not be recognised or accredited.
- **Generic occupational skills** that people will need — such as remote working, online communication, information research, lifelong learning and, not least, management of their digital environment.
- **Essential skills for living and learning** in a digital age — including communication, accessing public services and underpinning personal e-confidence.

Working closely with e-skills UK (e-skills UK is the Sector Skills Council for Business & Information Technology — www.e-skills.com), the team sought to

- Consider **scenarios** for the use of web, digital media, communications, business and social applications in 2013.
- Take account of **emerging needs** across industrial sectors, in SMEs and micro-businesses, in public sector employment, in the community and at home.
- Identify skills requirements mapped within a high level cross-cutting **framework**, complementary to the definition of National Occupational Standards.
- Highlight **opportunities & barriers** relating to definition, delivery and achievement of awards.

This paper is drawn from the resulting public report, 'Next Generation User Skills (NGUS) — Working, Learning & Living Online in 2013' (September 2008), which highlighted opportunities and barriers, mapped to national credit and qualification frameworks and to available awards. This paper provides:

- **An overview** of the current ICT user skills landscape.
- **A model** representing the digital activities and competencies that might constitute the 'Next Generation User Skillscape'.
- **A mapping** of that activity space on to tools and awards, with a **gap analysis** identifying weaknesses in provision.
- An overview of the recommendations to the report sponsors.

Appendices to this paper covering Recommendations, Stakeholder Consultation, the Awards Mapped, and the Frameworks/Standards

- An overview of the current ICT user skills landscape.
- A model representing digital activities and competencies that might constitute the 'Next Generation User Skillscape'.
- A mapping of that activity space onto tools and awards, with a gap analysis identifying weaknesses in provision.
- An overview of the recommendations to the report sponsors.

Landscape are available at www.sero.co.uk/ngus.html, along with the original report.

Why Next Generation User Skills?

Evidence of change

The world is awash with statistics on the impact of the web on 21st century living, learning and working. These are accompanied by the pronouncements and predictions of experts from every camp, ranging from the denial of real educational or economic significance through to the heralding of a new brave new world of co-creation and choice (learner led education, consumer as contributor, etc). All this is accompanied by persistent warnings of the dark side in terms of ethics, educational standards and employer requirements — tempered by increasing recognition that 'we' may no longer be capable of controlling of such matters.

In the Spring of 2008, several major research pieces were launched:

- An in-depth summary of access to the internet and its uses across the UK population in the Oxford Internet Institute's Internet Surveys (www.oii.ox.ac.uk/microsites/oxis/publications.cfm).
- Ofcom's Social Networking Research (www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/socialnetworking) informed the research carried out by Dr Tanya Byron for her Review of the risks (www.dcsf.gov.uk/byronreview) faced by children in their use of the internet and video games.
- Ofcom's Media Literacy Audit (www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/children) of the UK, with separate analysis for Scotland.
- e-skills UK's IT & Telecoms Insights research (www.e-skills.com/Research-and-policy/Insights-2008/2179), covering industry trends & skills implications.
- The University College London 'Google Generation' (www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx) higher education study, jointly commissioned by JISC and the British Library.

Meanwhile, from a business perspective, the third annual Yorkshire and Humber survey of business ICT adoption (Yorkshire Forward, 2008 — www.yorkshire-forward.com/helping-businesses/improve-your-business/best-practice/benefit-from-ict/ict-benchmarching-study) indicated that 82% of the region's businesses have invested in IT, of whom three quarters (60% if all businesses) have websites. Whilst the extent and value of adoption differs significantly across the range of businesses and sectors, the foundations for new ways of working and doing business are broadly in place, with older and static businesses making up large numbers of the laggards.

It would not be unsafe to project that by 2013 even more people will be required to use ICT in the workplace, increasingly involving online communication and web-based applications.

What we do and how we do it

It is widely recognised that these changes are, for increasing numbers of people, impacting on what we do with ICT (especially online) and also how we do it.

At the start of the NGUS investigation, the team considered the wide range of existing online services as well as business and education practices, to draw up an indicative map of 'what we do' with ICT. In Figure 1 they are loosely clustered in the diagram to represent thematic associations (e.g. record keeping, shopping, selling, paying bills), with the vertical axis

Figure 1: Activities and capabilities ladder

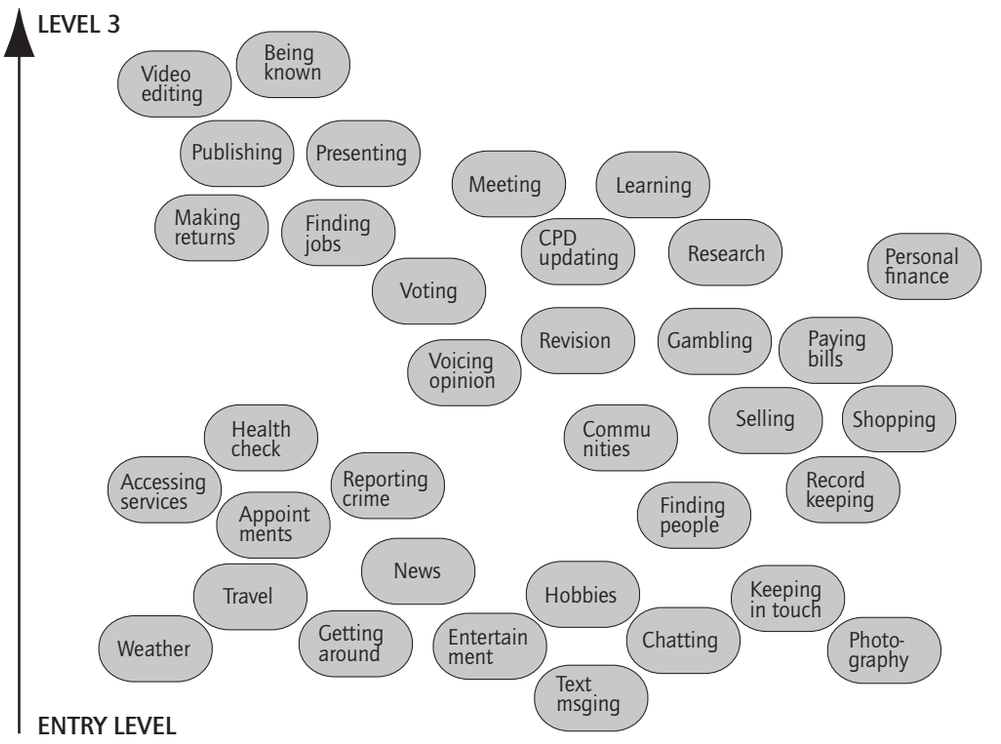


Figure 2: ICT mediation model

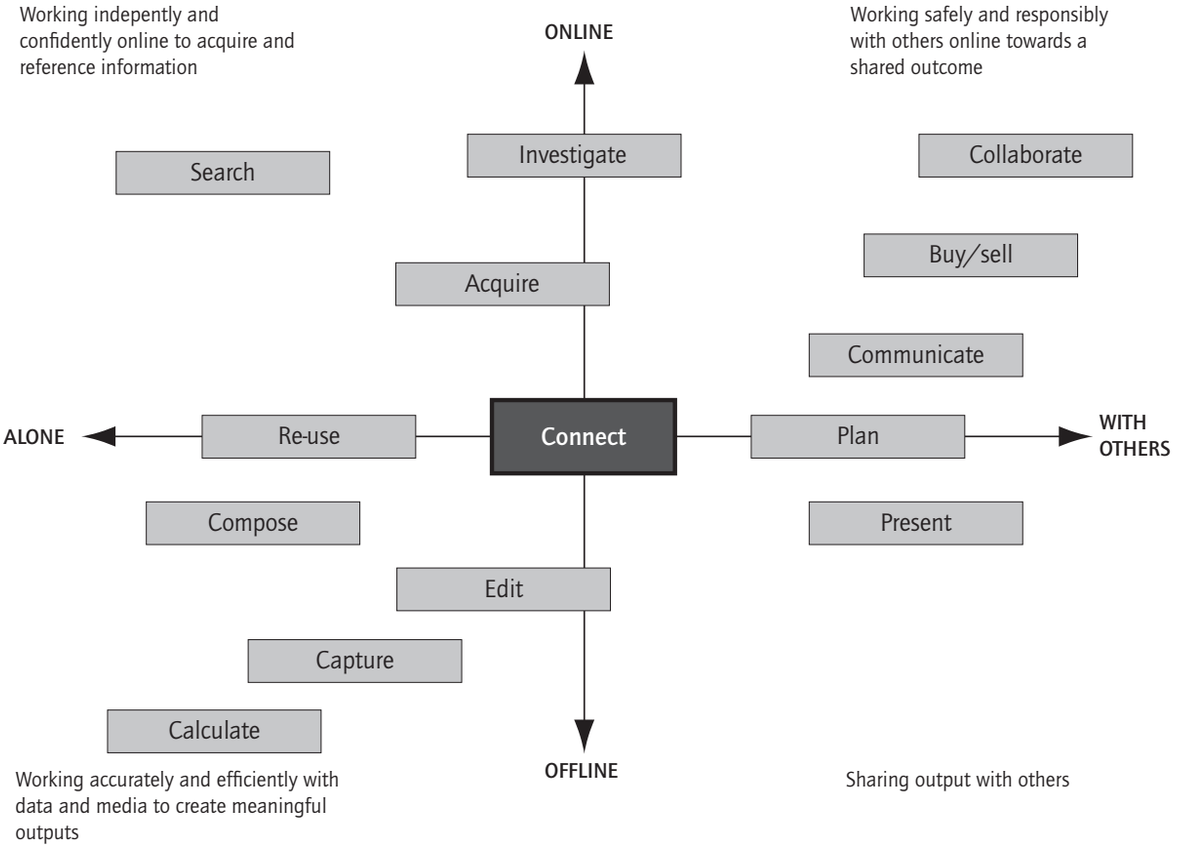
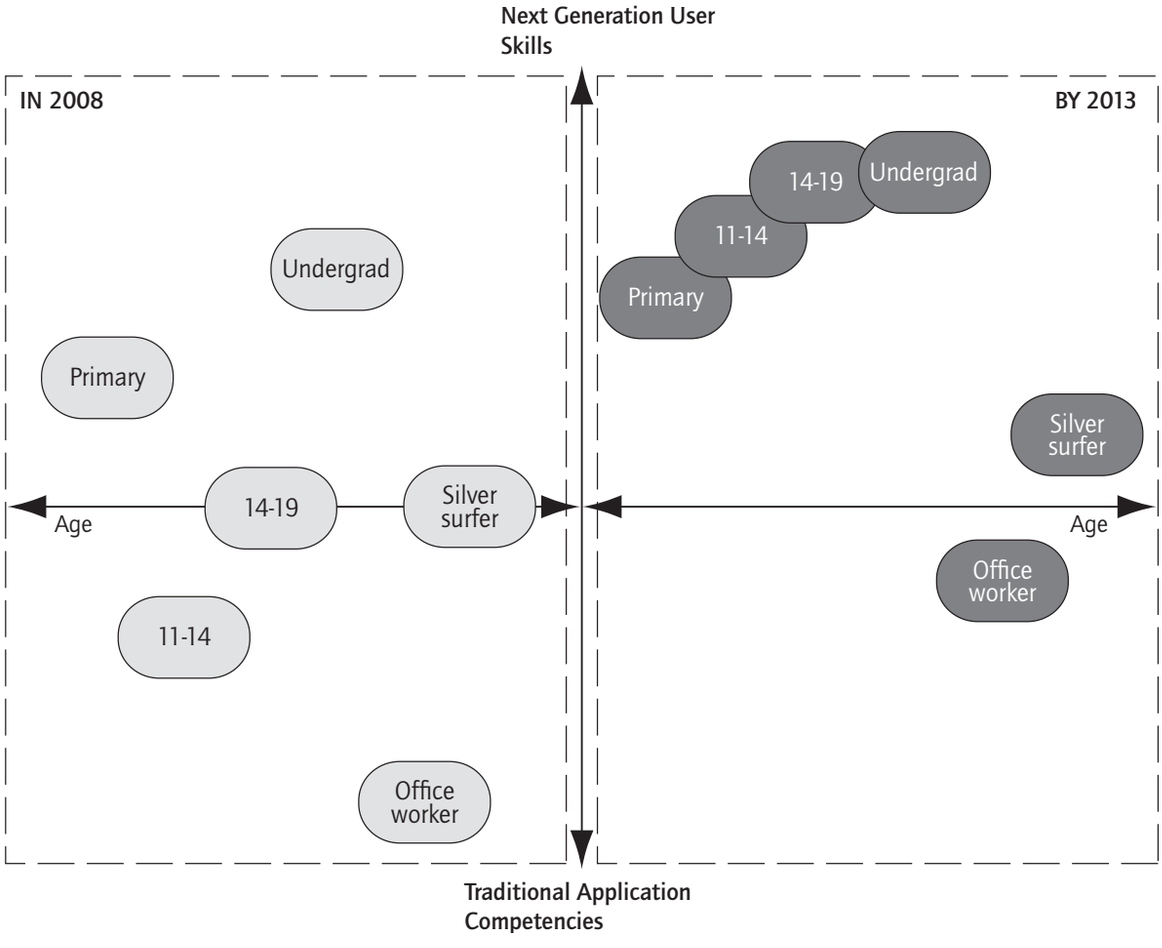


Figure 3: Potential shift by education sector



indicating levels of capability and confidence (e.g. finding out about the weather is lower level than finding jobs).

There is also recognition that the web is transforming the way we go about many activities. The ICT mediation model (Figure 2), originated by Genny Dixon of e-Skills, illustrates the interplay between the online/offline and the collaborative dimensions. For example, what was once much more private (such as buying books or insurance) has been enhanced by the involvement of strangers in the form of ratings and reviews. This significantly changes the everyday requirements for 'digital literacy'.

System response to change

It is increasingly recognised the second generation of web-based applications (defined loosely as 'web 2.0') has significant implications for harnessing information technology across the education system.

The impact of learner expectations and the implications for styles and modes of learning, teaching and research are already recognised to be crucial considerations within the education system, as evidenced by the Becta commissioned research into Web2.0 technologies for learning at Key Stages 3 & 4 (partners.becta.org.uk/index.php?section=rh&catcode=_re_rp_02&rid=14543) and the JISC/BL commissioned 'Google Generation' higher education study (www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx).

It is however possible that the implications of what appear to be largely 'social' or 'personal' applications (ranging from casual communication in Twitter to platforms such as Personal Learning Environments) are underestimated in terms of economic value to UK plc.

Will these methods of working (of communicating, collaborating and contributing) become core skills and attributes in the world of employment by the time, for example, current 11 year olds leave school — the essential Personal Learning & Thinking Skills for 2013?

Can the education system and its qualification frameworks play a vital role in harnessing the native ICT capabilities of young learners not only for teaching and learning but also to catalyse the workplace skills of the future?

Assuming that young people will accept the incorporation of 'their' skills in to education, this will depend on a number of complex and often systemic factors:

- Do the **behaviours** of digital natives fit the purposes of education and employment?
- Are **teachers and lecturers** across subject areas capable of supporting and adding value to such ways of working?
- Are they compatible with **curriculum** design and **assessment** methods?
- Will the **risks** be surmountable in terms of safety, quality and other ethical issues?

Assuming that is the case, designers of curricula and qualifications for young people must look ahead to develop the 'next generation' technology based competencies that will be required in the workplace of 2013. As illustrated in Fig.3, that will involve shifts of emphasis in all education and training sectors, and not least in secondary school and college provision.

However, this NGUS investigation has underscored the complexity of the operating environment in which curriculum and qualifications are developed, not only in the UK but in the wider European context (www.ecompetences.eu/site/objects/download/3871_071011eCompParis.pdf). The identification and implementation of change in the IT User skills space is perhaps uniquely complex on account of the speed and uncertainty of technological change, coupled with differing rates of adoption and therefore levels of perceived need across stakeholders in industry and education.

This is illustrated when we consider the potentially conflicting and sometimes complementary influences on this 'skillscape':

- **Tools** — software tools and online services are developed ahead of need or demand and are therefore not widely recognised in industry consultation.
- **Awards** — as in any education system, the awards have a critical mass and lifecycle of their own. They may furthermore be addressing the same space from different educational perspectives.
- **Stakeholders** — the range of agenda and levels of urgency cannot be easily reconciled. Consider, for example, the tension between volume demand for entry level ICT skills in such as the NHS with the Leitch (www.dcsf.gov.uk/furthereducation/index.cfm?fuseaction=content.view&CategoryID=21&ContentID=37) focus on Level 2 and beyond.
- **Real world activity** — Meanwhile, everyday people from silver surfers to primary learners are inventing their own digitally enabled workflows and learnflows.

A future for IT awards

These challenges raise the issue of the relationship between the development of these 'next generation' ICT and digital skills and the ICT curriculum itself.

Curriculum & Awards
Awards based specifically on 'office' applications are unhelpful
Low levels of real information literacy are a core concern
ICT Functional Skills are the new user skills benchmark
The ITQ can incorporate any new user skills as they evolve
The ITQ is for occupational skills, so it should steer clear of Web 2.0
User skills are not an issue for the 'Google Generation', so awards are unnecessary
User skills should be embedded in other curricula

Character & Scope
User skills awards need regularly updating
User skills need to be industry or role specific
User skills are generic and independent of purpose
User Skills are not about competence in isolated applications
The Internet and Web 2.0 is transforming how IT is used at work
User skills should encompass content creation and social software

Instruction & Pedagogy
User skills should be treated as an everyday language
User skills should be taught remedially not generally
User skills delivery should be scenario and project based
User skills are best developed through informal learning
User skills beyond applications cannot be reliably assessed
Instruction and Web2.0 skills are incompatible
Teacher and instructor capability is the critical success factor

1. Acquire – download data, media, software
2. Buy – goods, services
3. Calculate – cost, business plan
4. Capture – sound, image
5. Collaborate – with a group for work or leisure
6. Communicate – with one or more people (asynchronous), report something

7. Compose – text (e.g. a message, a document)
8. Create – edit, combine digital media (e.g. a film, a podcast)
9. Disclose – my identity, personal details
10. Explore – a simulation, scenario, projection or role
11. File – store information, records
12. Illustrate – a document with an illustration or layout

13. Learn – school, CPD, personal interest
14. Meet – conference or other synchronous activity
15. Navigate – find and travel to places (i.e. using maps, GPS)
16. Organise – an appointment, meeting, project
17. Present – information
18. Publish – a digital artefact, a website, a podcast

19. Reference – something for the future (e.g. bookmark)
20. Register – for a public, commercial or open service
21. Search – for information
22. Sell – goods or services
23. Share – information, recommendations, media, other social networking
24. Survey – gather information, elicit votes

In England, the widely reported disinterest in ICT as a subject amongst digitally adept learners from KS3 onwards is variously attributed to a combination of the content of curriculum and the capabilities of the teachers. Whilst the 14–19 Diploma in IT suggests new curriculum possibilities, the supply of teachers may be worsening. Graduate Teacher Training Registry statistics for 2008 (www.gttr.ac.uk/providers/statistics/applicantstatistics/2008) show a significant decline in IT applicant numbers for England, Scotland and Wales.

In the light of these trends, are there grounds to challenge the role of ICT as a discrete subject area with its own 'user' qualifications if schools and colleges are to harness information technology for new modes of working and living, as well as for learning and teaching?

During the Next Generation User Skills research, a number of challenges were raised regarding the nature of ICT curriculum and awards and the associated pedagogical challenges. The following statements (drawn from the consultation Topic Guide) represent issues to be taken in to account by those developing educational policy or designing curriculum and qualifications relating to ICT user skills.

When consulted, delivery organisations and practitioners almost universally recognised the continuing tendency to structure awards in silos which do not represent emerging user activity or its likely trajectory. As illustrated in Figure 4, traditional qualification silos are symptomatic of

1. Isolation of activity workflows — for example, office v. networking or media v. office.
2. Outdated levelling — for example of infrastructure and even digital media skills in higher level professional awards.

Awards such as DiDA (Edexcel) and NC Digital Media Computing (Scotland) suggest new approaches, but still fall short of the near total convergence of the 'participation-media-admin-infrastructure' skillscape required of the 21st century digital citizen. Too much is left to the imagination and experience of the tutor in respect of NGUS- related emphases. Furthermore the size of awards and the combinations necessary to cover the NGUS space (e.g. Digital Citzen plus Digital Cre8or plus ECDL from the BCS portfolio) are unattractive in terms of both funding and learning models.

Figure 4: Qualifications silos

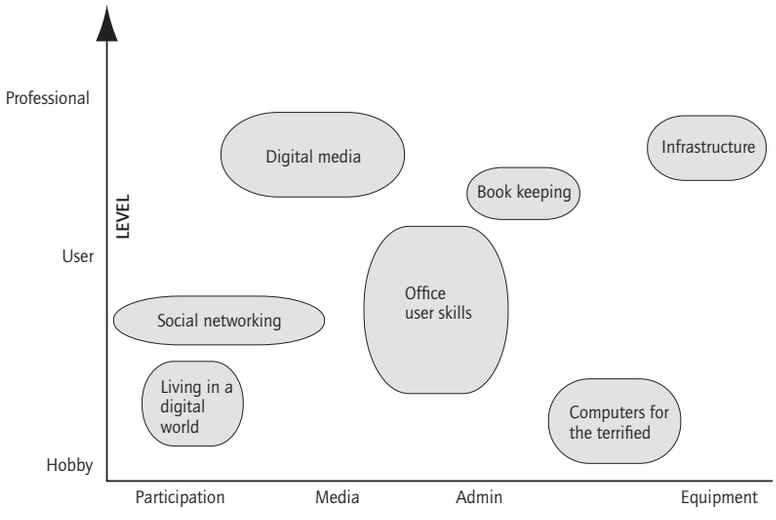


Figure 5: NGUS ecosystem

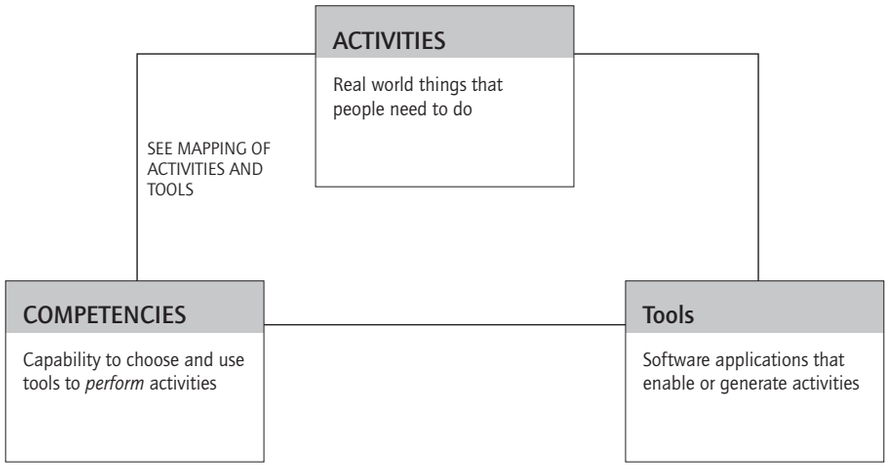
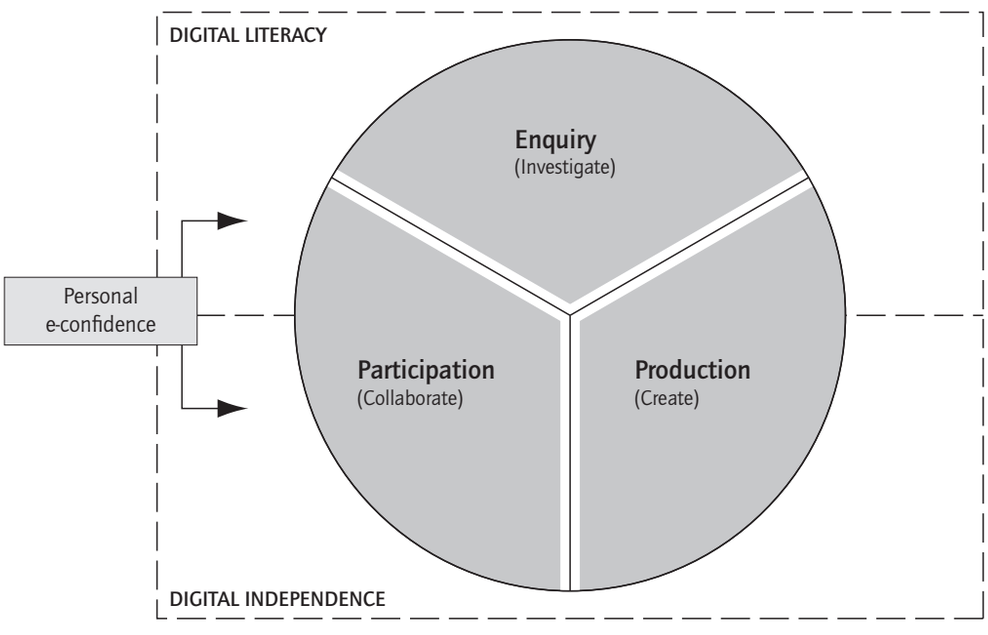


Figure 6: NGUS competency model



A. Enquiry
A1. Formulate questions as online enquiries
A2. Find, gather and collate information
A3. Research & evaluate on-line content and services
A4. Manage references (e.g. bookmarks) in context
A5. Explore a virtual scenario or simulation
A6. Use information to support decision making

B. Digital Literacy
B1. Understand on-line safety, security and privacy
B2. Recognise social responsibility (ethics)
B3. Understand and respect digital property rights
B4. Compose communications to suit target recipients
B5. Learn critically from reviews of published work
B6. Organise, format and enter data

C. Participation
C1. Communicate and share information
C2. Create and maintain an online identity
C3. Submit ratings, reviews and recommendations
C4. Contribute appropriately to networked community activities
C5. Use shared applications
C6. Work collaboratively online towards a goal
C7. Moderate and manage the activities of an online group

NGUS 'Skillscape'

Skillscape components

Section 2 recognised that the operating environment for IT skills and associated qualifications is made especially complex on account of the dynamic roles played by

- Tools — emerging and sometimes disruptive technologies, manifested in software and services which can generate as well as facilitate activity.
- Activities — evolving user behaviours, evidenced in personal and shared workflows and learnflows.

Tools and Activities are therefore not simply industry mandated, as top down responses to business requirements. The interplay is that of a dynamic and chaotic ecosystem, which drives the definition of and demand for 'Competencies' — the capabilities required to deploy the best combination of tools in desired activities.

The following sections describe the emerging landscape of activities, competencies and tools, which are indicative of the requirements for curriculum and qualifications on the 2013 horizon.

Activities

A core set of 24 'real world' ICT enabled activities are proposed, listed in alphabetical order. They represent the activity landscape introduced in Section 2.2. Whilst some of the activities can be undertaken at several levels (e.g. Communicate, Illustrate), others are more easily 'levelled (e.g. Acquire, File).

Whilst there are many alternatives and potential additions, it is suggested that a group such as this provides a sound indicative framework for assessing requirements and evaluating awards.

Competencies

The NGUS investigation distilled competencies into 34 cases divided into 5 groups:

As illustrated in Figure 6, two competency groups which represent the underpinning foundations of personal e-confidence are assumed to be required by all users:

- Digital Literacy — including safe and social conduct.
- Digital Independence — including management of the IT environment.

These support three broad and complementary areas of competence:

- Enquiry — including the ability to investigate resources.
- Participation — including the ability to collaborate.
- Production — including ability to create media.

In 2008, each NGUS competency group may be required to a greater or lesser degree by different user types. However, each group is becoming increasingly integral to personal effectiveness in living, learning and work. The 34 competencies are are shown opposite.

D. Production
D1. Create digital artefacts (diagrams, designs)
D2. Capture digital media (visual, audio)
D3. Edit digital media (visual, audio)
D4. Integrate (mash-up) applications and content
D5. Publish digital content (web, PDF, e-book)
D6. Enable content to be discovered online
D7. Control versions of digital assets

E. Digital Independence
E1. Understand technology operations and concepts
E2. Install, link and network hardware
E3. Install and update software
E4. Manage personal infrastructure and data
E5. Use a range of digital and interactive devices
E6. Make appropriate ICT tool selection
E7. Explore and self-learn digital technologies
E8. Synchronise devices and data

A mapping to broader frameworks of life skills offers an important reflection on the coverage and significance of the 34 NGUS competencies. The following table maps the five NGUS groups on the Scottish Curriculum for Excellence (www.ltscotland.org.uk/curriculumforexcellence), the Personal Learning & Thinking Skills (PLTS, www.qca.org.uk/qca_5866.aspx) and US NETS framework (www.iste.org/AM/Template.cfm?Section=NETS).

NGUS Competency Group	Literacy	Independence	Enquiry	Participation	Production
Curriculum for Excellence (LTS, Scotland)					
Successful Learners					
Effective Contributors					
Responsible Citizens					
Confident Individuals					
PLTS—Personal Learning & Thinking Skills (QCA, England)					
Independent Enquirers					
Effective Participators					
Team Workers					
Creative Thinkers					
Reflective Learners					
Self-managers					
NETS—National educational Technology Standards (ISTE, US)					
Creativity and Innovation					
Communication and Collaboration					
Research and Information Fluency					
Critical Thinking, Problem Solving, Decision Making					
Digital Citizenship					
Technology Operations and Concepts					

Tools

Like the categorisation of activity and competency above, any listing or grouping of software tools will always be incomplete and contentious. Again, however, an indicative list is helpful in determining the shapes and hues of a constantly changing landscape (or 'skillscape'). It deliberately contains just one example in each case. Depending on the way a user interacts, some tools are classified as 'applied' (e.g. Google or e-Bay).

Mapping of activities and tools

Each of the three elements of the skillscape can be mapped against the others. For those involved in the development of IT user curricula, it is perhaps most thought provoking to consider the mapping of tools against activities.

Enquiry	Participation	Production
Media Capture and Manipulation		
Audio	Audacity	
Music	Garageband	
Photography	Photoshop	
Video	Moviemaker	
Presentation and Publishing		
Diagramming	Visio	
Presentation	PowerPoint	
Website Development	Dreamweaver	
Word Processor	Word	
Publishing Design	InDesign	
Data Entry and Manipulation		
Database	Access	
Spreadsheet	Excel	
Information Research and Knowledge Management		
Bookmarking	del.icioi.us	
Filing	Explorer	
Browser	Internet Explorer	
Information Gathering	Survey Monkey	
Information Discovery		Google
Learning Space		Moodle
Scenario Simulation		Sim City
Idea Recording		Mindmap
Collaboration		
Bulletin Board		Weight Watchers
Marketplace		Ebay
Messaging	Instant Messenger	
Personal Information Manager	Outlook	
Collaborative Environment	Ning	
Social Network		Facebook
Media Library		Flickr
File Sharing	Bit Torrent	

	Media				Presentation					Data		Knowledge								Collaboration								
Activities (Alphabetic list)	AUDIO	MUSIC	PHOTO	VIDEO	DIAGRAM	PRESENTATION	WEBSITE	WORDPROCESS	PUBLISH	DATABASE	SPREADSHEET	BOOKMARK	FILING	BROWSER	INFO GATHERING	INFO DISCOVERY	LEARNING SPACE	SCENARIO SIM	IDEA RECORDING	BULLETIN BOARD	MARKETPLACE	MESSAGING	INFO MANAGER	COLLABORATION	SOCIAL NETWORK	MEDIA LIBRARY	FILESHARING	OCCURENCES
Acquire																												13
Buy																												7
Calculate																												2
Capture																												4
Collaborate																												12
Communicate																												6
Compose																												9
Create																												10
Disclose																												7
Explore																												8
File																												6
Illustrate																												3
Learn																												20
Meet																												6
Navigate																												2
Organise																												8
Present																												8
Publish																												10
Reference																												7
Register																												5
Search																												10
Sell																												11
Share																												7
Survey																												8
OCCURENCES	5	4	6	5	3	3	3	6	5	6	7	8	14	18	6	8	8	3	6	7	6	7	6	16	15	6	2	

This example, developed by the project team, illustrates

- The prevalence of some tools — pervading a large number of activities; compare, for example, browsers or social networking applications with the media tools.
- The complexity of most activities — requiring mastery of multiple tools; compare learning or acquiring with calculating (whether with a spreadsheet or a simple calculator).

The activity / tool matrix represents, therefore, a powerful illustration to conclude this examination of the evolving IT user or digital citizen skillscape.

Regardless of the names of tools and activities with which it is populated, the mapping emphasises the rich competencies and the type of approach that will be required if awards are to support the learning and teaching of Next Generation User Skills. It underscores the recognition that the teaching of tools in isolation (regardless of how many are covered in the overall award) with a focus on 'menu mastery' does not address the NGUS requirement.

Mapping of competencies and awards

This section examines existing awards in the context of the proposed NGUS competencies.

Approach

A total of 101 awards (The 101 awards are listed in an Appendix to the original commissioned report, available at www.sero.co.uk/ngus.html) were identified in the 'Next Generation User Skills' space across the English and Scottish qualification frameworks, ranging from entry level user awards to higher level professional awards covering topics of NGUS interest. Whilst omissions may be identified, the team is confident that these awards are representative of the current coverage.

The team reviewed the awards in order to identify the key awards which could be seen as defining the current and future shape of IT User curriculum and qualifications, based on the assumption that the broader mass of awards are strongly influenced by such 'flagship' and high volume exemplars.

	Description	England	Scotland	Total
Key	Key award in shaping the future of user skills up to NQF Level 2/SCQF Level 5 within the current paradigm of ICT skills qualifications	18	8	26
Yes	Strongly relevant to the NGUS space in terms of level and/or content	26	1	27
No	Not strongly relevant in terms of level and/or content	29	19	48
	Total Awards	**73**	**28**	**101**

This exercise identified 26 'key' awards (The 26 awards are listed in an Appendix to this paper, available at www.sero.co.uk/ngus.html), which became the focus of the subsequent mapping exercises:

English NQF	Total = 18	Entry3 = 4	L1 = 6	L2 = 8
Scottish SCQF	Total = 8	L3 = 1	L4 = 4	L5 = 4

The commissioned report maps and reviews these awards as follows:

- Maps each of the 18 English awards on to the 34 NGUS Competencies (in 5 groups in Section 3.3); the newly developed e-Skills unit in Collaborative Technologies is included as an indication of direction of travel.
- Maps each of the 8 Scottish awards on to the 34 NGUS Competencies (in 5 groups in Section 3.3).

Gap analysis

This section focuses attention on the Next Generation User Skills gap by examining the subset of 19 NGUS competencies which are covered by 50% or less of the 26 awards. The table summarises those mappings in terms of the number of NGUS competencies covered by each award and highlights perceived gaps in coverage.

In addition, as detailed below, C4 (Networked Community) & E7 (Self-learning) might also be considered as gaps.

Score shaded indicates 25% or less coverage (4 England, 2 Scotland, 6 in total)
Competency ***bold italic*** indicates likelihood of poorer match than assessed here

NGUS Group	Competency Statement	England out of 18	Scotland out of 8	Total out of 26
Enquiry	A3. Research and evaluate on-line content and services	8	4	12
Enquiry	A4. Manage references (bookmarks) in context	2	1	3
Enquiry	***A5.*** Explore a virtual scenario or simulation	10	2	12
Enquiry	A6 Use information to support decision making	7	4	11
Digital Literacy	B5. Learn critically from reviews of published work	2	1	3
Participation	C2. Create and maintain an online identity	1	2	3
Participation	C3. Submit ratings, reviews and recommendations	1	1	2
Participation	C5. Use shared applications	0	0	0
Participation	***C6.*** Work collaboratively online towards a goal	4	4	8
Participation	C7. Moderate and manage activities of an online group	1	0	1
Production	***D4.*** Integrate (mash-up) applications and content	6	0	6
Production	D5. Publish digital content (Web, PDF, e-book)	5	3	8
Production	D6. Enable content to be discovered online	3	3	6
Production	D7. Control versions of digital assets	0	0	0
Digital Independence	E1. Understand technology operations and concepts	4	6	10
Digital Independence	E2. Install, link and network hardware	1	4	5
Digital Independence	E3. Install and update software	2	1	3
Digital Independence	E5. Use a range of digital and interactive devices	6	2	8
Digital Independence	E8. Synchronise devices and data	6	0	6

For the first four competencies (**enquiry**, **digital literacy**, **participation** and **production**), the same gap skills exist in Scotland and in England. In the final competency (**digital independence**), there is variation between the countries with two gap skills in common and two in difference.

In the **enquiry** competency, awards typically only require information to be found and used, and do not progress to evaluation of that information or the associated services (A3). The common research skill of managing references or bookmarks is absent (A4). Using information to support decision making, is also absent (A6).

In the **digital literacy** competency, the skill of learning critically from the review of published work is weak (B5), being only present through teacher or peer review. Student and other course related work is widely published on the internet and thus this is an important omission. The gaps here and in **enquiry** suggest that awards need to strengthen building of critical information literacy skills.

The present generation have online lifestyles—it is therefore a concern that the largest number of skills gaps appear in **participation**. Managing an online identity (C2), rating and recommendation (C3) and contributing to social networks and communities (C4) are commonly used and essential skills, but are not systematically addressed in any of the qualifications on offer. Collaborative skills in using shared applications (C5), working

collaboratively online (C6) and managing an online community (C7) are almost universally missing. It is notable that the core skill of working together is present in the majority awards but the context is still in the real world as opposed to online.

Increasingly, online life (whether leisure, study or work) is not simply lived as a recipient or consumer; producing and sharing differing types of digital assets will be a key activity in the virtual world just as it is in the real world. In the **production**, gaps are generally present in the skills of integration (D4) and more surprisingly of publishing (D5) and being able to control version of digital assets (D7). Having your content and services readily and consistently discovered in the virtual world will be essential but is also missing (D6). These skills gaps can be found in awards in specialised units; however this approach does not address a world in which publishing and integration are increasingly in the hands of users.

In **digital independence**, Scotland and England share the gap skills of installing & updating software in general user units (E3)—surely required by every computer user—and of learning about digital technologies (E7). In England, gaps exist in understanding technology operations & concepts (E1), which is weakly covered, and dealing with network hardware (E2). In Scotland, gaps are to be found in using digital devices such as mobile phones (E5) and synchronising such devices (E8). The gaps here are significant as they relate to commonplace tasks.

In summary, these gaps indicate that award construction needs to take more account of maturing information literacies and of the common practice and demands involved in 'living online'. It is also apparent that many of these competencies are not derived from teaching and testing in applications (such as an office toolset). The practice of these 'new' competencies (which may be superficially associated with web 2.0, but are of wider import) is typically integrated in practice, lending itself to project based curricula.

Incorporating these competencies will present significant challenges to those who develop and deliver qualifications. Not only is the rate of change in online technology and capabilities is high (requiring a move towards annual updating of portions of teaching guidance), but also instructors may feel challenged by aspects of the associated practice (not simply technique) and assessment organisations may find it hard to address economically something less suited to hitherto successful online testing models.

Recommendations

Addressing the NGUS challenges within the context of national curriculum and qualifications strategies requires a systematic approach, which covers:

- A definition of the **skillscape.**
- The development of delivery **capability.**
- The design and introduction of new **awards and assessment** models.

The recommendations arising from the Next Generation User Skills investigation are therefore framed in the form of an end-to-end 'action plan', such as might be adopted by an agency responsible for both curriculum and awards development. In this respect the SQA is in a special position, as illustrated in its development of the PC Passport suite. Individual stakeholders (such as a Sector Skills Council, a toolset vendor, an economic development agency or those responsible for teaching standards) may play their parts in such developments through national, regional and local partnerships.

The seven recommendations are structured over an imagined four year timeline (Figure.7), further detailed in the commissioned report.

Figure 7: Recommendations overview