# ICT AND ITS ASSESSMENT AT 16: AN ENQUIRY INTO THE PERCEPTIONS OF YEAR 11 STUDENTS

**Peter Robert Bradshaw, M.A.**

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## Abstract

This study, conducted between 2006 and 2011, enquired into student perceptions of Information and Communications Technology (ICT) and its assessment at aged 16. The prevailing orthodoxies amongst writers, commentators and educationalists are that the subject does not reflect the learning and use made by young people of technology. The voice of the learner, so often lauded in aspects of school democracy and in formative assessment, has not been heard in respect of the high-stakes assessment at the end of Key Stage (KS) 4 in schools in England. This research was a step in filling that void.

Taking an interpretive phenomenological approach three phases of empirical data collection were used each building on the previous ones. To bring the student perception and voice to the fore a repertory grid analysis was initially used to elicit constructs of learning and assessment directly from the students. This was followed by a questionnaire and semi-structured interviews across a sample of state-funded schools in England. The use of a multiple-phase data collection allowed phenomena to be distilled with successively more depth at each phase.

Three phenomena emerged as central to the students' views. Firstly students identified ICT as a subject that was predominantly about their future lives. They equated what they were doing in school with their perceptions of the needs of future education, employment and as a tool for life. Secondly they, in common with many commentators, saw creativity and ICT as being intrinsically linked. Thirdly their views were dominated by the culture of the school in which they were studying. The institutional habitus gave an enculturation to their perceptions which coloured everything else. Thus they valued creative and open-ended activity in the use of technology, but only where that contributed to formal, in-school, learning.

# Acknowledgements

This thesis is dedicated to my family - my wife, Julie, parents, Jo and Ron, and to the children, Matt, Chris, Ruth, Sarah and Fiona. Without their support and encouragement it would not have been possible for me to complete it.

Its inspiration came from all of the people I have worked with over the years, teachers, researchers, and supporters of education and technology. Most importantly it was inspired by students. It is for them that the enquiry was undertaken - to find their voice, their perceptions, in an assessment system that is often berated by others.

I thank all of those school staff, teachers and, particularly, students who enabled the empirical part of the study. Although they remain anonymous for ethical reasons, they played the greatest part. Without them there would have been no research.

Finally I thank all who have advised and helped me. Especially my supervisors, Dave Needham and Tina Byrom, and also Sue Wallace, Karen Chantrey Wood, Sarah Younie, Peter Twining and Stevie Vanhegan. They have helped me define the pathway for this six-year journey and guided and accompanied me along it.

# Prologue

This research, and resultant thesis, was carried out in schools, with 16-year old students as respondents. It enquired into, and reports on, the views of those who were in the final year of Information and Communication Technology (ICT) courses in Key Stage (KS) 4[1] at English secondary schools. Specifically it reports on their perceptions of the subject and its assessment. The enquiry required access to students and schools, which was facilitated by my work as a lecturer in Education. Indeed, in many ways my career path since leaving university in 1979 had led to my interest in the domains of this thesis – assessment, technology and learning.

This career path, spanning over 25 years at the point at which this research commenced, led to my identity as 'teacher in higher education'. 'Identity' here is multi-faceted with aspects of configured, social and existential (Gibson, 2001). For me these were respectively seen in the way in which I acted as a teacher, the way others reacted to me as a teacher or programme leader and the things I held dear, including in my career.

I had been proactive in moving, as a teacher, from school to university and in taking on aspects of the role that were particular to the higher education sector. It was important to me to move on, and to be seen as having moved on, from being a school teacher. I became involved in working with design of new programmes of teaching and assessment. Universities, unlike schools, have the authority to set their own examinations and confer their own awards. In contrast, qualifications taken by school students are administered by external awarding bodies not by schools themselves. I had been a chief examiner for many years in ICT and had experience of assessment design at that level. As a university teacher I have been able to bring that experience into the development of new awards. Here then is the nexus of the three domains of interest mentioned above.

[1] The English school system is divided into four Key Stages – KS1 for pupils aged 5 to 7, KS2 ages 7-11, KS3 ages 11-14 and KS4 ages 14-16.

In 2000 I had joined a university research and development project at Ultralab[2] specifying, implementing and facilitating online learning communities for the National College of School Leadership. Three years later I moved within Ultralab to work on projects on assessment and creativity and to lead the online cohorts of the MA in Education. This gave me an insight, and practical experience, of teacher education on a national scale, which facilitated a move to work on the Applied ICT strand of the PGCE[3] at Nottingham Trent University (NTU), leading it from 2006. Through this I had contact[4] with a range of schools in the East Midlands of England. While at NTU I worked on education programmes at undergraduate and postgraduate level and had a particular responsibility for quality assurance (QA). This is especially pertinent to discussions of validity of assessment here. The two aspects of initial teacher education - working with local schools and QA of assessment - led to the initial ideas for this thesis.

Working in a university combines aspects of teaching and research. Starting out on the journey to PhD meant that I had also become a student. Here my identity was multi-faceted – student, teacher and researcher. These were the names by which I was known and from which my identity was formed (Hall, 1990). This journey, and my changing identity, is reflected on in the Epilogue – the final chapter of this thesis.

The initial stimuli for the research came from students' and teachers' comments about ICT supplemented by an unease I had picked up while visiting schools and talking to trainee teachers about the OCR[5] National qualification in ICT. This course is designed to be "*particularly suitable for those who wish to study in preparation for (or alongside) employment in job roles where they will be expected to use IT and communication skills*" (OCR, 2006:12). It is an increasingly popular option for ICT in schools[6] (Vidal

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[2] Formerly a research unit at Anglia Ruskin University, Chelmsford, England.
[3] PGCE=Postgraduate Certificate of Education, a programme of initial teacher education in England.
[4] In 2009 I moved to the Open University to work on a professional development project for teachers of ICT and, since 2011 to lead the MA in Education. These roles continued to provide some access to schools.
[5] OCR=Oxford, Cambridge and RSA Examinations.
[6] 60,648 students were entered for OCR Nationals in 2008, representing 17.5% of the entries for ICT qualifications for the age group being considered. This rose to 118,081 in 2009 (34.8%) – see also Table 2.8.

Roderio, 2010) and was reportedly the fourth most popular qualification at 16 in England in 2009 (Paton, 2010b). There was a concern, however, that passing it "*look[ed] like a screenshot hoop-jumping exercise [with] endless amounts of 'evidence' seem[ing to be] the order of the day for all [ICT] qualifications*" (Teacher, 2006). This need for evidence is a criticism of much coursework, and was a factor in its review (QCA, 2006a). The concern expressed by the teacher here, however, is the need to print off many screenshots to prove that a skill had been accomplished rather than having a more direct assessment of the underlying knowledge and capability. There is also concern that such assessment methods do not take into account broader understanding of student capability garnered through teacher assessment over a period of time (ARG, 2003).

A further issue was raised in a discussion on the Naace[7] online community's mailing list where it was reported that conversations with students revealed that they do not appear to learn anything new in ICT at school. This discussion was summarised by Heppell (2007a) who contrasted the curriculum that was being experienced by students in their everyday lives with that which was handed down through the formal education system. The difference, he claimed, was partially caused by the rate of change of technology. What might be considered to be essential for inclusion in school curricula today would be obsolete tomorrow and, worse, was very quickly seen to be irrelevant by students, whose voice was not considered in the design of such curricula and its assessment (ibid.). Heppell's approach to curriculum, and one that he argues should be locked into policy, is for creative, technology-based projects that are "*mixed age, project based, [run] over a decent length of time, shared and not capped in any way*" (Heppell:2007b). This resonates with the approach taken by the Opening Minds project (Boyle, 2010) at KS3.

There has also been a long running debate in England about the standard of GCSEs with conservative commentators bemoaning a reduction in quality and challenge, and professionals and the government (of whichever party) maintaining the opposite. Both sides point to the improvement in results as

[7] Naace is the ICT subject association in the United Kingdom.

evidence for their arguments (see, for example, Daugherty, 1994; Mackinnon, 2009; Morrison, 2009).

An extract from The Times gives a typical example of this debate.

> *Welsh, headteacher of Bexley Grammar School, arguing for alternative qualifications, voiced a typical opinion when he said "We find that GCSEs don't stretch [our students] enough and don't develop the skills necessary for a university degree. We are looking for something with a little bit more rigour". This was countered by Dunford, General Secretary of ASCL[8] who argued that where students are not challenged by the syllabus, good teachers will always go beyond it. The qualification and its specification should not be the be all and end all of learning, he argues. Welsh, and others, look for alternatives and see more rigour (and perhaps more traditional examinations) in the international GCSE (iGCSE).*

Welsh and Dunford (2008:1)

Four vignettes are provided here to illustrate what would appear to be a mismatch between the experience of learning about, and with, ICT in schools and students' experience of learning, and use, of ICT out of schools. The first is from a school teacher, the second from a national newspaper in England and the final two directly from students.

The first vignette was reported by Boulter (2006) on a weblog:

> *Fixed in my mind was a conversation I had with a year 8[9] pupil[10] a year or so ago who stayed after class to show me her Piczo[11] site. I had known for some while that some pupils were dabbling with such*

[8] ASCL - The Association of School and College Leaders.
[9] In England, students in year 8 are aged 12-13.
[10] Throughout this study I shall use 'student' to refer to those at school except, as here, when quoting others.
[11] http://www.piczo.com – a photo website builder.

*sites but I had not really acknowledged, or even taken the time out to see what they were actually doing. Whatever it was they were doing with these sites it had to be trivial surely? This young lady, perfectly polite, just above average ability, steadily working towards level 5[12], was quite unexpectedly explaining to me how she had prepared in Photoshop[13] (not available in school) an image she had obtained from the Internet. She then exported the image from Photoshop in a suitable file format then posted it to her Pixo site. When posting it she added HTML[14] code that had been emailed to her by a friend that produced a glitter effect on the image (a sort of My Little Pony horse if I remember correctly).*

*She then went on to show me the rest of her site. She explained how she modified the html template and how she had created different categories on her site and linked between them. This was not a level 5 dialogue I was having with this pupil and as she showed how her collection of virtual friends left comments and HTML tips on her site, her tangible friends that had stayed behind with her made grabs at the mouse saying "Can I show him mine?". It became clear to me that this was not just the activity of a geeky isolate, this was a representative of a community of young people taking control of the technology. "How much time do you spend on this?" I asked. "Every night!" she answered. "My Dad is always complaining that he can't get to use the computer. He keeps asking me what I am doing. I try to explain but he doesn't understand."*

Many questions arose for me in the reading of this:

- How can we have an assessment system that allows for this sort of thing?

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[12] Level 5 here refers to a level of attainment in the UK National Curriculum. It is the expected minimum level for all students in year 9 (aged 14) to have achieved.
[13] Photo and image editing software.
[14] HTML=Hypertext markup language, a coding for writing webpages.

- How do we change the way we approach the assessment of ICT? Do we need to or is it about 'validation' of what has been learnt?
- Is it about providing the opportunity for students to share their learning in exactly the way Boulter has done?

Naughton (2007:12), writing in *The Observer*, provided the second vignette:

> *There's a surreal quality to it, conjuring up images of kids trudging into ICT classes and being taught how to use a mouse and click on hyperlinks; receiving instructions in the creation of documents using Microsoft Word and of spreadsheets using Excel; being taught how to create a toy database using Access and a cod Powerpoint presentation; and generally being bored out of their minds. Then the kids go home and log on to Bebo[15] or MySpace[16] to update their profiles, run half a dozen simultaneous instant messaging conversations, use Skype to make free phone calls, rip music from CDs they've borrowed from friends, twiddle their thumbs to send incomprehensible text messages, view silly videos on YouTube and use BitTorrent[17] to download episodes of Lost[18]. When you ask them what they did at school, they grimace and say: "We made a Powerpoint presentation, Dad". Yuck!*

It was interesting to note the plethora of names of pieces of software in these accounts. Even just a year later many of them seemed out-dated. By 2008 students would, for example, probably have been using iPlayer[19] or 4oD[20] to watch missed television programmes, update profiles in Facebook[21], and post images on Flickr[22]. This was evidence of the changing technological landscape, leading to a disparity between school curricula and assessment and students' exposure to, and experience with, technology (Macfarlane,

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[15] http://www.bebo.com – a social networking site.
[16] http://www.myspace.com - a social networking site.
[17] A service for compressing and downloading large multimedia files.
[18] A television drama series.
[19] http://www.iplayer.com – the BBC's on-demand programme archive.
[20] http://www.channel4.com/programmes/4od - Channel 4 television's on-demand programme archive.
[21] http://www.facebook.com – a social networking site.
[22] http://www.flickr.com – an image sharing site and online community.

2001; Threlfall and Nelson, 2006; Heppell, 2007b). While the use of different software does not imply different underlying learning, knowledge or skills, many of the things that Naughton (op.cit.) describes would have been impossible only a few years earlier. No software would have existed to make these tasks accessible to all but a few technological experts.

A third account was heard directly from a student. Tellingly, for this thesis, he put assessment at the heart of ICT education:

> *I find our education is based around assessment and therefore we are given what is required to pass these exams at the highest possible ability. We might even be given the syllabus of what is expected. Would it not be better to be given a greater depth of knowledge and a more true knowledge than just given what is required to pass exams?*

Student recorded by Millwood (2008)

The final vignette, also from a student, addressed this mismatch between assessment and what is done beyond school from another angle - that of the inadequacy of the examinations. Writing on a gaming forum[23] a 16-year old said:

> *... just did AQA[24] GCSE[25] a few days ago and I am sure anyone else who did will agree it is shamefully and embarrassingly easy for GCSE.*

(‘addonai’, 2007)

This was from someone who has just taken an examination. This view that ICT assessment is too easy was echoed in by the popular press (see for example Daily Mail, 2007).

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[23] UK Gamespot at http://uk.gamespot.com.
[24] AQA is a UK awarding body – The Assessment and Qualifications Alliance.
[25] GCSE – General Certificate of Secondary Education, the predominant qualification taken by 16-year olds in England, Wales and Northern Ireland.

It was these vignettes and other comments like them that inspired me to undertake the research. I wanted to find out how representative they were of students in schools who were approaching their ICT examinations and undertaking coursework. I wanted to find out their perceptions of the subject and of its assessment at 16. It was with these issues in mind that I set out on the journey towards a thesis. A journey that was not without surprises and changes of direction but one that maintained the notion of the primacy of hearing the student voice from the outset. As with all journeys there was a start and a destination. The former is described above, the latter was more complex and had three components. One is the 'thesis' – i.e. the findings and what it is I believe as a result of the journey; a second is the production of this printed artefact embodying the thesis; the third is the change of personality as I moved from being a teacher through being a student to being a researcher - the changing identity referred to above. At the end of this thesis, an Epilogue presents a reflective account of that journey. And so it began…

# 1. Introduction

This thesis critically analyses students' perceptions of ICT and its external summative assessment at 16 in state-funded secondary schools in England. There has been much volatility in this area over the last 30 years, and this context for the enquiry is now described. Firstly, the diverse range of ICT qualifications is examined followed by an overview of the use made by students of ICT in non-formal contexts. Having set the context for the enquiry, the introduction concludes with a statement of the research aims and an overview of the structure of the rest of this thesis.

In the 1980s new awards and curricula were developed by the Business and Technology Education Council (BTEC), a merged organisation succeeding those set up following the report of Haslegrave (1969). These included new versions of the National Diploma which had been around in various forms since the 1930s (Williams and Raggatt, 1998). BTEC complemented the RSAEB[26] and City and Guilds, who were also offering vocational qualifications. It could be argued (see for example Fisher, 2004) that the establishment of a another large body, outside of the existing examination boards, to deal with vocational awards led to the division between vocational and academic qualifications which successive government initiatives have tried to address (Williams and Raggatt, op.cit.; Ecclestone, 2004).

A review of vocational qualifications offered by all these organisations, the establishment of National Council of Vocational Qualifications (NCVQ) and the concerns over employability led to a series of new initiatives through the second half of the 1980s and early 1990s. The Technical and Vocational Education Initiative (TVEI), Certificate of Pre-Vocational Education (CPVE) and Diploma of Vocational Education (DVE) embodied the concept of vocationally-related qualification that was later revamped with the launch of the General National Vocational Qualifications (GNVQs). At approximately the same time the GCE O level and CSE awards[27] for 16-year olds had been replaced by GCSEs (in 1986) and underpinned by the new National

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[26] The RSAEB here is an awarding body, not now connected to the Royal Society of Arts which was the board's progenitor.

[27] GCE O level – General Certificate of Education, Ordinary level; CSE – Certificate of Secondary Education.

Curriculum[28] (1987). The GCSEs aimed to unify what had been a two-tier system with GCE O levels being aimed at a more academic student than CSEs (Williams and Raggatt, op.cit.).

GNVQs sought to bring vocational slants to education for 14-19 year olds in school and college, paralleling the NVQ[29] system for those who were in work, and providing an alternative to GCSE. Here were the first attempts at parity of esteem[30] between the academic (or general) and the vocational qualifications (Ecclestone, op.cit.). However, these reforms still did not bring the perception of parity of esteem or wider spread take up of vocationally-related qualifications in the 14-19 sector (Oates, 2009). Subsequently, following the Tomlinson Report (DfES, 2004a), the GNVQ awards were phased out to be replaced by a new range of qualifications. For 16-year olds, these included GCSEs in Applied ICT, the Digital Applications qualifications from Edexcel[31] and, from 2008, a suite of Diplomas aimed at 14-19 year olds. One of these Diplomas was in the specialism of Information Technology (IT), with all other Diplomas having ICT as a mandatory functional skill (QCA/e-skills UK, 2006).

For these reasons, there is a landscape of multiple qualifications in ICT at 16. These include GCSEs (which exist in two formats – short and full course[32]), Applied GCSEs, OCR Nationals, BTEC courses, DiDA courses and Diplomas. In all cases schools are required to cover the curriculum of the National Curriculum for ICT at KS4 and the specification of these qualifications generally covers these requirements.

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[28] The National Curriculum was introduced in England in 1988 and is defined, primarily, as a set of subjects of which ICT is one.

[29] National Vocational Qualification.

[30] The concept of parity between vocational and general qualifications is, at the time of submission of this thesis, again under UK Government scrutiny. The Wolf Report stats that this might be a futile exercise, claiming that "*[i]n recent years, both academic and vocational education in England have been bedevilled by well-meaning attempts to pretend that everything is worth the same as everything else*" (DfE, 2011b:8) and looking to develop vocational pathways that are robust in their own right.

[31] Commonly referred to as DiDA (Diploma in Digital Applications) although other qualifications are available: Certificate/Award in Digital Applications (CiDA/AiDA).

[32] A GCSE short course is at the same level as a full course, but counts only 50% towards measures of school and student performance.

| Type of qualification | No. |
|---|---|
| GCSE short course | 7 |
| GCSE full course | 7 |
| GCSE double award | 6 |
| Other vocationally-related qualifications | 38 |
| Edexcel DiDA suite (general qualification) | 4 |
| Other | 5 |
| Diploma | 3 |
| **TOTAL** | **65** |

**Table 1.1**. Qualifications available at 16

This plethora of qualifications is represented on Ofqual's[33] Register of Regulated Qualifications[34]. At the point of data collection for this study there were 65[35] approved qualifications in ICT/IT[36] for 16-year olds at level 2[37] as shown in Table 1.1. Along with the piecemeal development of qualifications described earlier, another reason for this diversity is the location of ICT in both general and vocational domains of qualification. As with all GCSEs, those in ICT are classified as 'general'. Similarly the DiDA suite is also seen as 'general'. This gives an implicit view that the learning in these courses is classroom-based rather than looking to the world of work or beyond school. This rather runs counter to the National Curriculum and specification of the qualifications in ICT (QCA, 1999, 2001) which require students to look beyond general study to ICT is applied outside of school. Qualifications such as the OCR and BTEC Nationals, on the other hand, are classified as 'vocationally-related'. ICT offers a wide choice of qualification to schools, to teachers and, theoretically, to students. In practice, however, it is the

[33] Ofqual is the government agency responsible for standards and quality of qualifications in the UK (except Scotland).
[34] http://register.ofqual.gov.uk/Qualification - launched in November 2010 to replace the National Database of Accredited Qualifications.
[35] This had risen to 73 by the end of the research.
[36] ICT and IT are variously used to label curricula and qualifications. ICT is used in the main throughout this report as it is the more common in schools. Unless stated otherwise it is intended that the use of ICT in this thesis includes courses labelled IT.
[37] Level 2 is the level of GCSEs grade A*-C and is the most common level at which 16-year olds take qualifications.

school, or teacher, who makes the choice through restricting the offering available or through making ICT compulsory. This practice became particularly prevalent during the late nineties and early years of the 21st century where GNVQ ICT counted the same[38] as four GCSEs in school performance measures[39]. This made it an attractive proposition for schools (Mansell, 2007)[40] as a student required only five passes in total for a school to be able to include this performance in its institutional measure. This thesis does not focus on the provenance of the choice of qualification being taken except where it impacts on the perceptions of students to the course they are studying.

The diversity of ICT courses is complemented by an increasingly wide use of ICT by students outside of school (Lewin, 2004; BESA, 2005, 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011; Ofcom 2011). The teacher's influence is seen by Freedman (2009) in a survey of 15-year olds. Here it was found that students use online tools for homework more than for recreational activities. This bears out the findings of the Realtime Generation survey (Logicalis, op.cit.), which found that only 10% of 13-17 year olds claim not to use the Internet for homework. In contrast Valentine et al. (2006) found that choice in technology use outside of school tended to be made by students rather than directed by teachers. As a specific example, social networking to be important or very important in the lives of 70% of 13-17 year olds. This was an increase from 54% in 2008 and by 2011, 96% of secondary school students had an active Facebook profile (Ofcom, op.cit.).

Valentine et al's research (op.cit.) was of a wider age group, however, and this may be a significant factor for the difference in findings. Berry (2008,

[38] Such comparisons are meaningful only for the purpose of reporting school performance.
[39] Performance at age 16 is tabulated by school and used as a measure of a school's effectiveness. All qualifications have a points tariff associated with them that is used to calculate a school statistics for the tables. The points tariff is found on the Register of Regulated Qualifications http://register.ofqual.gov.uk/ (prior to 2010, the National Database of Approved Qualifications).
[40] This situation was affected by the Government decision (DCSF, 2008) to publish school performance tables that required English and mathematics to be included in the fives subjects achieved A*-C in GCSE (or equivalent). The new UK Government elected in 2010 has further modified the criteria with the introduction of an 'English Baccalaureate' measure (DfE, 2011a). ICT is not a subject that counts towards this measure.

also cited by Freedman, op.cit.) found that 12-year olds' favoured activities were games, supporting this age-related difference (see also Berry, 2009). As students get nearer to GCSE and other 16+ examinations, the imperative of studying may be stronger. Or perhaps that is what 15-year olds want us, as researchers, to hear. When students were asked 'How much do you think your teachers know about your use of technology at home?' Berry found that there was "*a perception that their teachers really knew very little about how they were using technology out of school – with over a third claiming their teachers knew nothing about this*" (Freedman, op.cit.).

Ipsos-MORI (2007) reported that ICT was seen as a support for traditional teaching methods, supplementing it rather than replacing it. Here ICT is a tool with 79% of students reporting that it provided "*a fair amount*" or "*a lot*" of support (ibid.:45). Although this use, as a tool to support study, was fairly widespread, only 36% of students said that their ICT skills were stretched by it (ibid.:45). Green and Hannon's (2007) report for Demos[41] contains much about how and what young people have learnt with a conclusion that they have some control of their learning. The report describes how their construct of learning could be articulated or manifested in some way through the act of teaching others. This is outside the scope of this research, which is restricted to the perceptions of students engaged in a course leading to an externally assessed qualification. Instead constructs of learning are made explicit through an examination of these perceptions.

This study is located in the student view of ICT and its assessment and draws on theories of personal construction of the world and in particular of learning. The starting point is Kelly's theory of personal construct psychology (PCP) (Kelly, 1955; Fetherston, 1997; 1999; Fransella, 2003) and students' perceptions of their own and peers' ICT capability. In particular the study builds on the experience corollary to PCP (Kelly, op.cit.), which states that learners frame their own questions and provide answers about how they construct the world. This research will elicit these questions and answers, taking account of the tension reported by McFarlane (2001) between formal

[41] Demos is a UK think tank which "*analyse[s] social and political change, which [they] connect to innovation and learning in organisations*" (Demos, undated).

assessment of the externalisation of ICT processes and the intrinsic understanding.

There is much research about assessment with ICT (Thelwall, 2000; McFarlane, op.cit.; Harlen and Deakin Crick, 2003; McCormick; 2004) but little about the perceptions of assessment of ICT. McCormick's taxonomy (op.cit.) for the relationships between ICT and assessment does include 'Assessing ICT skills and understanding' but the focus of his research is on the affordances of the use of ICT for assessment. Similarly, Harlen and Deakin Crick (op.cit.), writing on ICT and assessment, deal with how technology is used in assessment and how it helps assess creative and thinking skills in different ways to other media. This study is located in the assessment and learning of ICT and is not concerned with these well-reported uses of ICT for assessment.

In summary, the starting points of the study were anecdotal observations of a mismatch of the ICT capability covered by formal assessment and that manifested across all settings – formal and informal. It was located in the experience of students who are taking external assessments in ICT at 16 and sought to elicit their perceptions directly rather than in the second hand way of the vignettes in the Prologue or of the theoretical perspective of educational commentators. In doing so the intention was to derive from these perceptions the student view as to what would form a valid basis for assessment of ICT at 16.

The study's aims were thus:

1. To critically analyse the ways in which students aged 16 construct their ICT capability at 16.
2. To critically analyse the student perceptions of assessment of ICT at 16.
3. To develop a theoretical base to evaluate the construct validity of assessment of ICT at 16.

From these aims a number of themes were derived to form the landscape for the next chapter - the literature review. To study the first aim required a review and investigation of the concepts of learning (including how learning of ICT is developed in a range of contexts), the ways in which ICT is perceived and how personal constructs of its learning are manifested. These would be set against an exploration of the education policy for the curriculum and assessment of ICT at 16 in England. The second aim had the underpinning concepts of the processes, perceptions and policies of assessment. The final aim required investigation into the theories of assessment and, again, the policy landscape that determines how these theories are put into practice in English education. Figure 1.1 represents this deconstruction of the aims into these underlying themes. Within the themes (on the right of the figure) are three overarching topics – learning, assessment and perception. It is these that are used for the literature review. The policy agenda, in the bottom right of the figure, impacts on all of these and provides a fourth topic.

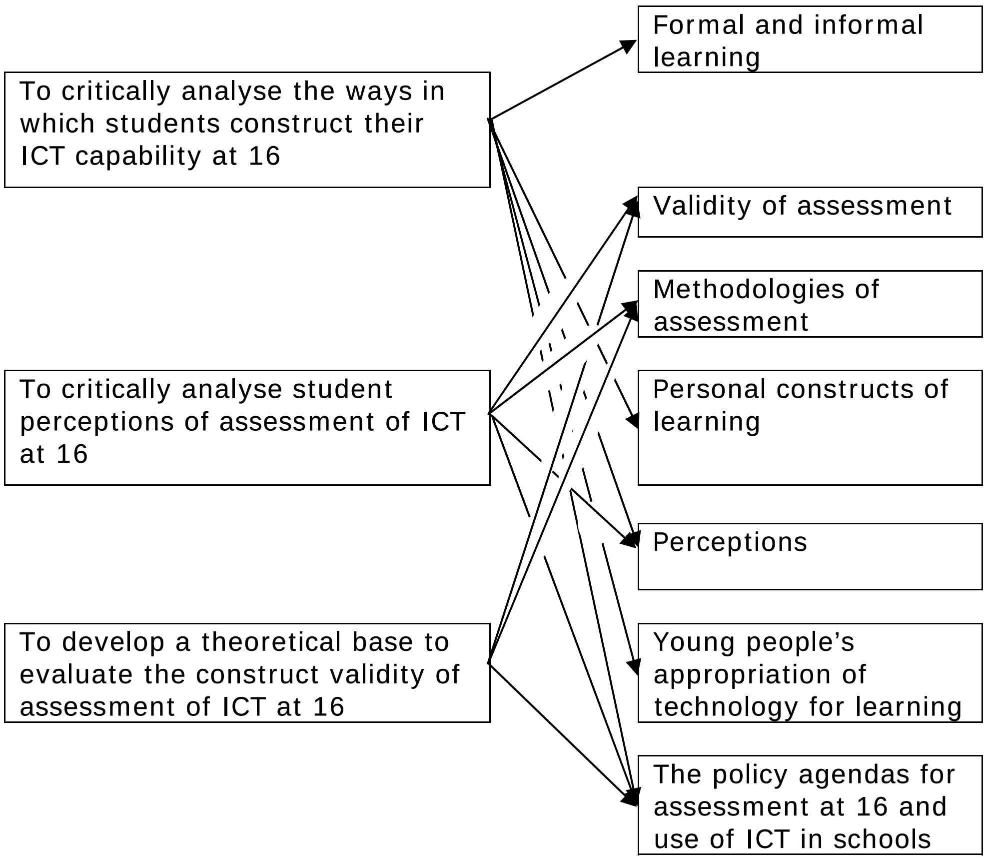


**Figure 1.1**. A deconstruction of the three aims of the study

The review of literature in chapter 2 is structured around these themes and provides a basis for the methodological approach, and the empirical methods employed, which are reported on in chapter 3. There was an iterative approach to the study with three phases of data collection, each building on the previous one. Chapter 4 develops the discussion of methods employed in the light of preliminary findings. Phenomena encapsulating the findings from the data are discussed and triangulated with the literature in chapters 5, 6 and 7. The structural relationship between chapters 2 to 7 is shown in Figure 1.2.

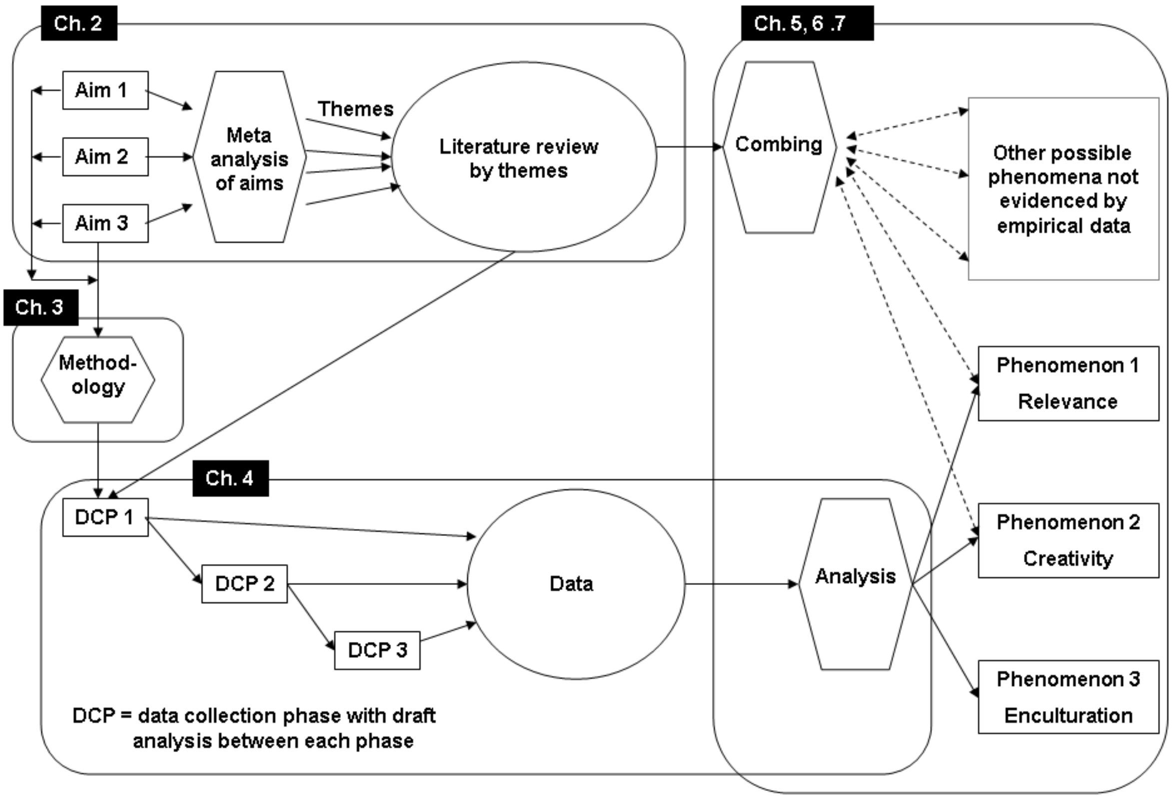


**Figure 1.2**. The structure of the thesis, chapters 2 to 7

Conclusions are discussed in chapter 8 including addressing the aims of the study. Finally, an Epilogue provides a reflective commentary to the process of completing this research, thesis and PhD.

# 2. Literature review

In the previous chapter an initial discussion of the aims of the study led to a theoretical framework consisting of four themes - learning, assessment, perception and policy. This framework is shown in Table 2.1 and is used in this chapter to structure the review of the literature. The essence of the review was to examine what is known about each area in the context of the research aims. In doing so the locus of the thesis was defined in what is not known. A summary of this locus is provided at the end of the chapter.

| Concept | Contextualisation within the aims of the study |
|---|---|
| Learning | The nature of learning of ICT at 16 and how such learning is constructed by students. |
| Assessment | The nature of assessment of ICT at 16 and its relationship to learning of ICT at 16. |
| Perceptions | Students' espoused views of the subject ICT, their learning of it and is assessment. |
| Policy | The impact of education policy on learning and assessment of ICT at 16. |

**Table 2.1**. The conceptual framework for the literature review

The chapter starts with the literature of the nature of learning and then proceeds to look at how this is conceptualised in a digital era with particular respect to the learning of ICT. This is followed by a discussion, in section 2.2, of issues of curriculum and qualification design given the diverse nature of ICT in schools in England. The nature of assessment is considered in section 2.3 examining how the theoretical and pragmatic aspects of the assessment of ICT capability. A synoptic section (2.4) then discusses the literature around student perceptions of learning and assessment in general. The impact of policy illuminates all of these topics and is considered throughout where appropriate.

## *2.1. Issues of learning, ICT and digital literacy*

This thesis was an enquiry into student perceptions of ICT, of their learning of it as a subject and of its assessment. The meaning of 'learning' here is complex. Eraut (1994; 2000) identifies three types of learning - formal, informal and non-formal. This typology is re-iterated by the European Community in its mapping of the learning landscape (EC, 2001). For Eraut (1994) formal learning is characterised as that in which there is a teacher and a prescribed learning framework defined by external specification which leads to a qualification. He contrasts this with the informal learning in which the framework and, perhaps, the teacher is absent but where a qualification is still obtainable. For him the non-formal is what is learnt outside of any such frameworks or taught environments.

The place of ICT in the curriculum, and in life, may be mapped onto the three part typology of learning contexts espoused by Eraut (1994). It is defined as a subject (QCA, 1999; 2007a), it is promulgated as an essential part of other subjects (QCA, 2007b) and it is a ‘tool for life’ (Owers, 2004; QCA, 2004; HM Treasury, 2006). Table 2.2 shows this mapping and the contexts pertinent to this enquiry into student perceptions of ICT.

| Type | Contextualised for 16-year olds | Contextualised for 16-year olds learning ICT |
|---|---|---|
| **Formal** | Learning of a subject through its teaching in timetabled lessons in school. | Learning of ICT in ICT lessons. |
| **Informal** | Learning of a subject as incidental to the formal learning above, perhaps in other lessons. | Learning of ICT in other subjects, learning from peers in lessons. |
| **Non-formal** | Learning of a subject outside of school lessons. | Learning of ICT at home or other non-school contexts. |

**Table 2.2.** Mapping of ICT learning against Eraut’s typology (1994)

Eraut’s trichotomy (op.cit.) is disputed by other commentators who argue that non-formal and informal are synonymous or, at least, cannot easily be distinguished. For Schön (1983) the informal comes about through reflection on the formal. Ellis (1990) has a continuum from the formal to the informal, where the latter is largely conversationally based, whether this be with peers or teachers. It implies, for him, a negotiation of task or outcome. Knowles’

(1975) concept of self-directed learning also fits into this definition of the informal as being the antithesis of formal – it is not organised externally.

Rogers (2003) approached this categorisation of learning from a view of the way in which learning takes place, rather than the context in which it takes place. For him there are two poles – acquisition and formalised learning. In the former learning is 'accidental' and comes from a focus on the task rather than the learning itself. This may be seen in ICT where new software is learnt through exploration. In the latter learning is an object in itself, as in the classroom or directed learning with others. This rather simple view is developed by Sefton-Green (2004) who considers informal learning to include all those experiential aspects of learning that are "*voluntary, accidental or embedded in people's day-today lives*" (p.2). These, he argues, lead to "*notions of wonder, surprise, feelings, peer and personal responses, fun and pleasure*" (ibid.). Citing Sutherland et al. (2001) a link is made between learning, perception and assessment where the learning is found to be devalued unless it leads to a qualification.

The learning (and assessment) objectives inherent in qualification specifications embody formal learning and, complementarily through what is omitted, informal and non-formal learning. Eraut (1994) regards formal learning as whatever is explicitly represented in the learning objectives and criteria. Downes (2006) argues that informal learning is not formless, however, and that there are tacit objectives, echoing the concept of tacit knowledge (Schön, op.cit.; Eraut, op.cit.). Here what is learnt by accidental learning in considered on a par with that which is learnt through planned teaching.

This study was primarily concerned with perceptions of ICT courses and their assessment and hence of formal learning. There has been, however, a proliferation of access to ICT in non-formal settings, such as the home and community, during the lifetime of this study (Lewin, 2004; BESA, 2005, 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011; Ofcom 2011) and it was expected that this access colours students' perceptions of ICT. Underwood and Banyard (2008) identify four spaces in which learning takes place: the school environment including aspects such as culture and affluence of the institution; the teaching space; the personal learning space and the living space. They argue that the informal spaces of home and other personal learning spaces are now being used for formal and academic learning as well as the more traditional informal and non-formal learning (Eraut, 1994) that characterised their use in the 20th century. In this respect students are supplementing the formal learning spaces of school and classroom. The reasons for this shift are to do with young people's[42] appropriation of technology at a faster rate than their teachers and other adults[43]. Today's school students are "*claiming part of this digital world as their own and using it as a vehicle for personal independence*" (Underwood and Banyard, op.cit.:10). This access to multiple opportunities for learning ICT had to be reflected in the empirical phase of this study (see chapters 3 and 4).

Having identified multiple contexts and spaces for learning, of ICT and in general, its nature is now considered. For Piaget (1973), discovery is at the heart of the development of the child's mind. He stresses the need for the teacher to provide opportunities and environments in which the children can be spontaneous so that they may drive their own learning and construct meaning from their discoveries and past experiences. Rather than a slavish correction of errors, Piaget encourages the discovery of appropriate solutions by the child. This creative approach of problem-solving (echoed by NACCCE, 1999, Facer and Williamson, 2004 and Robinson, 2010 and discussed below) is attributed to the individual in Piaget's model of development (op.cit.). He sees learning as a social activity, however, in which learners come to their solutions through interaction with others.

In his theories of developmental learning Vygotsky (1978) put this notion of social learning at their heart, rather more so than Piaget. He argues that observing merely the individual is not thorough enough to understand children's development (Vygotsky, 1986). Learners need to be observed in the context of their surroundings and the others with whom, and from whom, they learn (see also Papert, 1980; Wenger, 1998).

[42] Tapscott (1998) labels the current generation of school students 'millenials' and attributes characteristics to them as a population – including the capability for technology referred to here.
[43] See also Mabrito and Medley (2008) for a discussion of how this is impacting on teachers' understanding of student texts.

This aspect of learning as a social endeavour is also central to Bruner (1996) in his development of a pedagogy that includes the concept of 'scaffolding' through interaction with others by which social learning takes place, resonating with Vygotsky's Zone of Proximal Development (ZPD) (op.cit.). The ZPD provides a model for incremental learning, be it formal, informal or non-formal. Only the other actors in the zone differ in the different contexts – formal learning is with and from teachers and school-assigned classmates, non-formal learning is with and from family and friends. These different groups are, of course, not mutually exclusive but the context influences the way in which the learning is assimilated from them (Reay et al., 2001). Wenger (op.cit.) argues that learners need to explore meaning with fellow learners to come to clear understandings of the structures and concepts that they are engaged in. These two are influenced by the type and place of learning (ibid.). This notion of negotiation is at the heart of the constructivist approach (Vygotsky, op.cit.).

Much of the foregoing can be applied to any subject. This study was, however, concerned with ICT in particular. Learning a subject necessarily reflects the nature of the subject itself (Lings and Desforges, 1999). In the domain of this thesis, namely year 11 of English secondary schools, the subject matter of ICT is defined by both the National Curriculum (QCA, 1999[44]; 2007a) and the GCSE criteria for specifications[45] (QCA, 2001). In both of these what students have to learn is defined in terms of knowledge, skills and understanding. While this typology of content is the same for all subjects, the notion of 'skill' takes on a greater resonance in ICT as it is also one of the key skills defined as being essential across all subjects. This is seen in the preamble to all subject documents in the 1999 National Curriculum, which identifies "*suggested opportunities for pupils to use information and communication technology (ICT) as they learn the [named] subject*" (QCA, 1999:12). In the 2007 revision, implemented in 2008, this use of ICT in other subjects is developed to five statements of statutory requirement including that "*pupils should be given opportunities to apply and develop their ICT capability through the use of ICT tools to support their*

[44] The 1999 National Curriculum is the statute in force during the data collection part of this study.

[45] Some readers may prefer *syllabus* to *specification*. The latter is the official name for that which lays out what is to be studied (the syllabus) in any subject and how it is to be assessed. It may also contain guidance to the teacher as to how it is to be taught.

*learning in all subjects*" (QCA, 2007b). For students learning ICT, then, there is the knowledge and understanding for both the subject itself and other subjects. ICT is seen as pervasive across subjects and on learning in those subjects.

The European review carried out by Balanskat et al. (2006) analysed data published on the impact of ICT on learning and schools with the majority of the data coming from the United Kingdom (UK) and complementing the work of Passey and Rogers (2004). It included qualitative studies based on the opinions and perceptions of three groups: teachers, students and parents. The review found that all groups consider that ICT has a positive impact on students' learning and that, according to teachers, students' subject-related performance and basic skills (calculation, reading and writing) improve with ICT. These findings are corroborated by Selwyn (2011). The review (Balanskat et al., op.cit.) finds that "*ICT impacts on competency development – specifically team work, independent learning and higher order thinking skills – that are not yet recognised by many education systems*" (p.7) and argues that such competencies need to be included in assessment systems. In other words assessment needs to go beyond the use of the tools. This is recognised in the National Curriculum in England (QCA, 1999; 2007a) but the report implies that much assessment is based on the lower level skills and ability to 'drive' software. Here is an important distinction between a definition of curriculum and its assessment. Balanskat et al. (op.cit.) imply that the former is less constrained than the latter and that this is particularly true in the case of ICT because of its technological locus.

Johnson et al. (2010) discuss the rapid pace of change in ICT and its impact on learning. They identify five key trends that, they claim, will impact on education and learning by 2015.

- Technology is empowering students through media for communication and socialising. No longer an isolating influence; the ubiquity of technology allows students to learn through the exploration of ideas beyond the classroom.
- Technology is impacting on the way people work and collaborate supporting a mobile workforce.

- Innovation and creativity are more greatly valued than in the past, with implications for the design of learning experiences.
- There is an increasing interest in alternative models of education including online, independent or 'just-in-time' ways of learning.
- The concept of a learning environment is changing from a physical space to one in which the boundaries between local and global, physical and virtual, are becoming blurred.

From these trends Johnson et al. (ibid.) interpret key challenges for education in schools.

- The need to develop teachers' digital literacy as the importance of ICT as a key skill grows. The digital divide here is due to different levels of education rather than wealth.
- Educational practice is not keeping up with the changes in the ways in which students think and work. To do so means a move away from system-imposed content to learner-centric process. Concomitant with these shifts is a need to develop an assessment system to match.
- The nature of 'school' needs to be re-evaluated if it is not to become a rigid frame in which changes cannot take place. Opportunities exist to allow learners to lead their own learning, for formal learning to take place in contexts other than school, and for the recognition of informal learning at home and online. These opportunities need to be taken but, they argue, existing structures make this difficult.

These challenges provide a landscape against which this enquiry into student perceptions was set.

Developing the theme of changing working practices, The Digital Britain report (BERR, 2009:63) estimates that 22 million adults use digital technology on a daily basis. For the digital economy – those who are engaged in creating, designing and managing digital systems – this figure is put at two million. The report categorises this engagement in three ways, mirroring Eraut's learning typology (1994). It is against this backdrop that the qualification system is set. Table 2.3 exemplifies the three categories by activities that 16-year olds might be expected to undertake and typical qualification specifications.

| Category | Type of work[46] | Activity | Specification exemplar |
|---|---|---|---|
| **Digital Life Skills** | Non-formal | Accessing social networks.<br>Accessing information online. | Communication tasks.<br>Research tasks. |
| **Digital Work Skills** | Informal | Creating reports, presentations. | Scenario-based coursework framed in an authentic work setting. |
| **Digital Economy Skills** | Formal | Creating digital video.<br>Maintaining website. | Creating product for third party. |

**Table 2.3**. Mapping skillsets from Digital Britain (BERR, 2009) to 16-year olds' activities and specifications

The skills contained in Table 2.3 may be seen as aspects of the broader notion of 'digital literacy' (Hague and Williamson, 2009)[47]. Citing the work of Newman (2008), Hague and Williamson build a model in which developments in digital literacy are represented by moves from closed to open enquiry, underpinned through five processes as shown in Figure 2.1. The progression in the model mirrors the findings of Underwood et al. (2008) on e-maturity of an institution. The left-hand axis is not a hierarchy but, instead, represents an iterative set of processes. At any one stage a student may be evaluating what they have found before moving on to define the next stage of a problem's solution. It is interesting to note that they use the word literacy here, with its connotations of 'natural use'. The word used in the National Curriculum for ICT is 'capability' (QCA, 1999). Both of these words, 'literacy' and 'capability', imply an understanding and internalisation of knowledge and a learning beyond skills.

[46] The three categories of skill (BERR, 2009) can be seen to be analogous to three categories of learning of Eraut (1994).
[47] The notion of digital literacy is examined more fully later in this chapter.

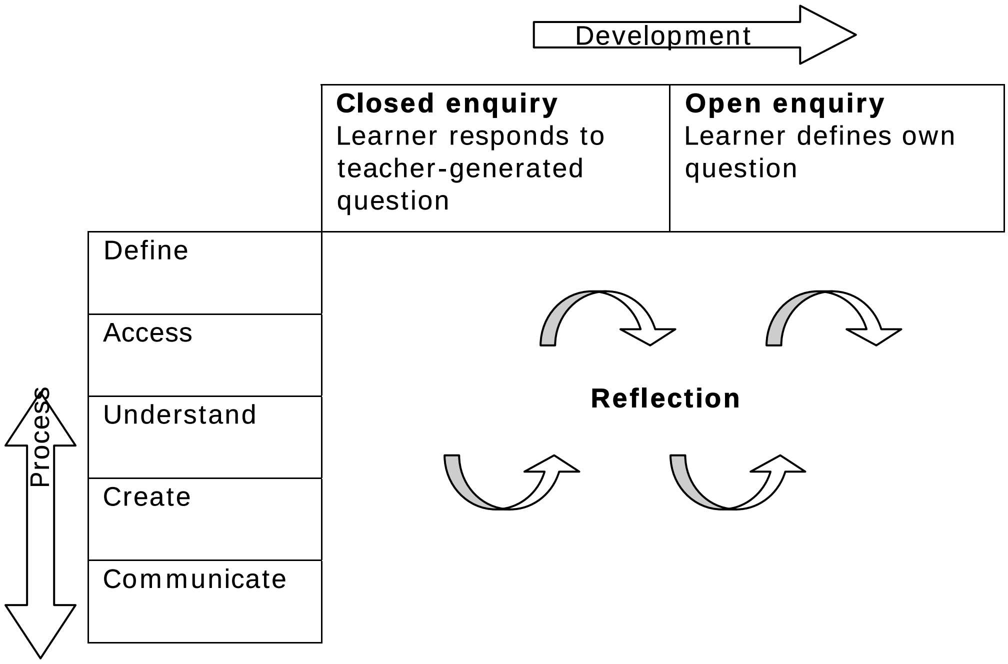


**Figure 2.1**. A model of digital literacy (after Hague and Williamson, 2009:8)

The model contrasts with the more linear approach to setting assessment levels in the National Curriculum (QCA, 1999 – see also Appendix 1). A fuller analysis of this movement in the way young people learn and think is provided by Tapscott (1998:142). He describes it as a move to interactive learning with concomitant vectors of change as shown in Figure 2.2.

| | | |
|---|---|---|
| from linear learning | → | to hypermedia learning |
| from instruction | → | to construction and discovery |
| from teacher-centred education | → | to learner-centred education |
| from absorbing material | → | to learning how to learn |
| from schooling | → | to lifelong learning |
| from one-size-fits-all | → | to customised learning |
| from learning as torture | → | to learning as fun |
| from teacher as transmitter | → | to teacher as facilitator |

**Figure 2.2**. The changing ways of thinking for the digitally literate learner (after Tapscott, 1998:142)

Minded of Tapscott's model (ibid.) of the digital literate learner and Craft's emphasis on learning possibilities (2011) the study had to consider the extent to which students perceived their learning to be in the space represented by the right hand column of Figure 2.2.

Taking a broader view, beyond the UK statutory curriculum, Oblinger (2008) lists those skills which schools should be focusing on as shown in Table 2.4. These represent a subset of social and cultural competences associated with new media as advocated by Jenkins et al. (2006). These are the ones, Oblinger (op.cit.) says, that all institutions have an obligation to help students cultivate as "*learners have the most difficulty attaining [them] on their own*" (p.20).

| | |
|---|---|
| **Judgement**. The ability to distinguish the reliable from unreliable information. | **Practice**. The opportunity to learn-by-doing within authentic disciplinary communities. |
| **Negotiation**. The flexibility to work across disciplinary and cultural boundaries to generate innovative, alternative solutions. | **Research**. The activity of searching, discovering, and disseminating relevant information in a credible manner. |
| **Synthesis**. The capacity to follow the longer argument or narrative across multiple modalities. | |

**Table 2.4**. New media skills and competences for a digital curriculum (after Oblinger, 2008:20-21)

A number of related issues are identified by Williamson et al. (2005). They address these to policy makers and practitioners in the education community. Those which are pertinent to consideration of assessment and student perception are:

- *ICT literacy, in its highest form, has the potential to change the way we live, learn and work.*
- *ICT is changing the very nature and relevance of knowledge and information.*

- *ICT literacy cannot be defined primarily as the mastery of technical skills.*

(p.5)

In the amplification of the first bullet point Williamson et al. state that:

> *The transformative nature of information and communication technologies might similarly influence and change not only the kinds of activities we perform at school, at home and in our communities but also how we engage in those activities.*

(p.5)

Taking Oblinger's focus (op.cit.) on student research, judgement is required to distinguish reliable from unreliable. This has been a source of contention at both school and university levels as plagiarism is spotlighted as an issue (see for example its focus in the Logicalis survey, 2009). Explicit guidance on this was issued by the body charged with overseeing quality and standards in qualifications (Ofqual, 2009) even though this was reported wrongly in the press (Shaw, 2010; Paton, 2010a) as being an attack on the use of Wikipedia[48] by students. Ironically such false reporting would have been a help to those learning about the reliability of information.

The Ofcom (2011) report on young persons' new media literacy shows that only 44% of 12-15 year olds make some type of critical judgement about search engine results, whereas 31% believe that all such results must be truthful. Similarly nearly a quarter of young people never check websites they visit for the first time for veracity or accuracy. These figures have remained static across 2009 and 2010 according to the report.

The concept of multiple modalities is important here as students move beyond text. There has been a proliferation of the means to create, share and edit images, sound and video supported by enhanced functionality of mobile devices. These range from websites such as YouTube[49] and Flickr to default features of social networking sites. In all cases the objects

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[48] http://www.wikipedia.com - a wiki-based encyclopaedia.
[49] http://www.youtube.com – a video sharing website.

themselves are surrounded with tools that allow for annotation, interlinking and discussion to create what Oblinger (op.cit.) cites *The Economist* as calling the “*era of peer production*” (p.25). The scale of this usage of tools is evident from Ofcom (op.cit.), with 96% of 12-15 year olds having an active Facebook profile, 61% using it to upload photographs and 31% having an avatar that lives or plays in a virtual world. For Livingstone and Hope (2011), however, there is a significant issue here with “*a school curriculum that focuses in ICT on office skills rather than the more rigorous computer science and programming skills which high-tech industries like video games and visual effects need*” (ibid.:5). Such a curriculum, they argue, does not reflect young people’s non-formal uses of technology.

The increase in use of technology by students (Lewin, 2004; BESA, 2005, 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011; Ofcom 2011) appears to have been accompanied by a falling in the proportion of teachers who are ‘confident and competent’ with ICT (BESA, 2009). This latter measure reportedly fell from 68% in 2007 to 60% in 2009 and supports the challenge posed by Johnson et al. (2010) of teachers needing to become digitally literate themselves. When looking at particular tools, the proportion has fallen in all categories (interactive whiteboards, learning platforms, web, e-mail, presentation tools, word processing and general computer skills).

When considering just one aspect - the use of a virtual learning environment (VLE)/learning platform – less than 20% of schools reported that their teachers were confident in its use (BESA, op.cit.). This contrasted with the findings of Dailly and Price (2010) who found that confidence was around 40% but this latter study also included further education where VLEs are more embedded (Becta, 2008a). Nevertheless the increasing access to technology by students, and the concomitant opportunities for learning, is not matched by confident use by their teachers. An OECD-PISA[50] comparison (OECD, 2006a) carried out in 2003[51] included aspects relating to ICT in schools. While insufficient numbers of UK schools responded for some statistical comparisons to be valid, those that did reported greater school-based use of technology than any other country other than Hungary. The

[50] OECD-PISA – Organisation for Economic Co-operation and Development Programme for International Student Assessment.
[51] The PISA studies of 2006 and 2009 did not ask questions about ICT.

study showed that students use a wide range of tools at home, with games, the use of Internet and word processing being the most prevalent. It also found that positive attitudes to technology do not correlate with any other measure in a simple way. The use of the tools did not lead to either a significantly positive or negative attitude (ibid.).

For Owers (2004) this use of tools is intrinsically linked to deep learning. His thesis is that we are essentially a tools-based culture and that we learn through creating artefacts with tools. This echoes the constructionism of Papert (1980) and puts a premium on such creative activity. Crook and Harrison (2008), in their summary of research into students' use of Web 2.0, also see opportunities in the use of technology to develop higher level learning and thinking skills. Further, they argue, digital tools also support skill acquisition post-16 in line with the implementation plan for the recommendations of the Leitch report (HM Treasury, 2006).

Boettcher (2007), building on the work of Damasio (1999) and Bransford et al. (2000), studied students' use of learning platform and mobile devices, arguing that the way learners learn is influenced by the tools they are presented with. The context for learning is intrinsic, she says, to the perception and mode of that learning (after Dewey 1933; Vygotsky, 1986). For this study the issue became one of identifying what students use at home and at school and their perceptions of how this use contributes to learning and achievement.

Brown et al. (1989) take activities as their starting point and conclude that the use of tools is central to defining the activity. The use of tools, they observe, can be learnt (and indeed taught) in the abstract but it is only when they are applied to a context do students build a "*rich implicit understanding of [the way] in which they use the tools and of the tools themselves*" (ibid.:33). This is developed in the activity theory of Engeström et al. (1999), in which outputs from activities are the representations of learning. For learning to take place, argue Brown et al. (op.cit.), the use of tools must be actively situated in the context of the communities that use the tools. Put another way, the use of the tools is influenced by the meaning placed on them by the community. Here then is importance of habitus on the use of tools, and on learning (Bourdieu, 1984; Ecclestone, 2004).

Downes (2005), in coining the phrase 'learning 2.0' connects dimensions of learning with technology. His notion of is that as online tools are changing from transmission (so-called Web 1.0) to participation (Web 2.0) and that there is a concomitant impact on learning. The new tools allow greater interaction with a learning community and to collaboration in that learning. For Wesch (2008) this means that learners could control their own learning to such an extent that they learn through the online medium independently of school systems, setting their own goals and objectives. This is seen in the model of NotSchool[52] (see for example de Freitas, 2006), which takes this transformation one step further and accredits learners' achievements through post hoc mapping (Duckworth, 2005). Here the qualification choice is not the starting point, activity is. Once achievements have been demonstrated, qualifications can be claimed.

Taking a more technocratic approach, Blees and Ritberger (2009) argue that such changes in tools and learning require a rethinking of the learning platform with an infrastructure designed to accommodate Web 2.0 tools. It may be, though, that students will simply appropriate whatever tool they have access to (Bevort and Breda, 2008), for example on the web at large, and that to try to contain this in a 'learning environment' is rather futile. Such appropriation is ad hoc (ibid.), however, and a learning platform can provide a baseline of commonly required tools to ensure an entitlement to their access.

Selwyn (2008) defines Web 2.0 as applications which "*share a common characteristic of supporting Internet-based interaction between and within groups*" (p.4). Additionally, Crook (2007) identifies four human dispositions, which are reflected in the activities provided by Web 2.0: "*the playful, the expressive, the reflective and the exploratory*" (p.7). Turning to learning, he argues that the new tools provide affordances in the areas of collaboration,

[52] http://www.inclusiontrust.org/notschool - a UK-based international online learning community offering an alternative to traditional education for young people who, for a variety of reasons, are unable to engage with formal learning institutions.

publication, literacy and inquiry (ibid.). Aspects of play are also central to Craft's (2011) analysis of learning in a digital future. Valentine et al. (2006) report that the linked concepts of exploration and inquiry emerge as important motivators for the home use of technologies. This is less the case in school. They further report that students value this 'freedom' offered by technology (ibid.). On the other hand Claxton (2008) argues that those who may be good at passing exams, who have learnt to think in the narrow way needed to succeed, tend to compete with others rather than collaborate with them. This is counter to one of the key approaches to problem-solving (Piaget, 1973; Vygotsky, 1978; Papert, 1980; Tudge and Caruso, 1988) where collaboration and social learning are paramount.

Crook (2008) argues that Web 2.0 technologies, which encourage participation and creation rather than passive consumption of information, fit well the previous UK government policy agenda (Becta, 2008b)[53] in providing for personalisation and with educational theories of constructivism and constructionism. In the assessment arena they also provide platforms for peer assessment and review through their inherent provisionality (Crook, op.cit.). The extent to which these aspects of assessment, and "*the playful, the expressive, the reflective and the exploratory*" (Crook, 2007:7) aspects of Web 2.0 tools feature in GCSE and other specifications is a moot point[54]. Not least because of the rapid evolution of the tools in contrast with the "*widespread recognition that in some respect subject content is inevitably out of date as it takes time to develop quality standards and to design curricula*" (Gillen and Barton, 2010:4). If curricula lag behind such evolution then the higher stakes assessment (Popham, 1987) will be even more dated (Balanskat et al., 2006; Heppell, 2007a). For Kirkland and Sutch (2009) assessment reform can be considered as part of the wider landscape of innovations, in which they identify three layers. These are the micro – the individual teacher, classroom or lesson, the messo (sic) – typically at the level of the school and the macro – the national[55] educational system. Assessment processes are part any reform agenda but are also one of the primary barriers along with curricula and teachers' self-perceptions as they are the slowest moving elements of the system in which the innovation is to

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[53] At the time of submission of this thesis the status of this policy was unclear as there had been a change of the government in the UK.
[54] The eVIVA project (Ultralab, 2005) reports on such use at KS3.
[55] 'National' refers to 'English' in the context of this study.

be situated, due to the inherent risks involved in changing high-stakes elements (ibid.).

Web 2.0 tools can increase motivation, stimulate new lines of enquiry, encourage collaboration and allow for extended work beyond the classroom (Crook et al., 2008). The Logicalis survey (2009) would suggest that these affordances match well with young people's behaviours – 59% saying that collaboration is something they do for some or all of the time while working on homework tasks. The public examination system, on the other hand, constrains collaboration as its principal paradigm is one of assessment of the individual (QCA, 2009). Students themselves appear to see the increase in formal opportunities for collaboration online as important – 79% expressing a desire for this when asked by Logicalis (op.cit.). In exploring students' use of Web 2.0 tools[56] inside and outside of school, Luckin et al. (2008) found, however, that this use was largely confined to consuming rather than creating content. Where content was created it was largely unsophisticated, such as uploading unedited photographs from a mobile phone. This simplicity of use is echoed in the findings of Dailly and Price (2010) on student attitudes. Further corroboration is found in Oxford Internet Survey (Dutton et al., 2009) which reports that over twice as many respondents reported uploading photos or updating status than did writing a weblog or updating a website. As participatory tools become more widespread it would seem that this does not lead to more sophisticated use but rather easier performance of simple tasks.

Most school students' Web 2.0 use reported by Luckin et al. (op.cit.) was found to be outside school and for social purposes thereby denying the educational benefits identified by Crook (2008) with only a "*few embryonic signs of criticality, self-management and meta-cognitive reflection*" (p.4). Luckin et al. (op.cit.) found that barriers to meeting these objectives included the lack of technical skills, and of the awareness of when and how a range of technologies could be used (see also Crook et al., 2008, for a discussion of barriers).

[56] The use of Web 2.0 here includes communication through instant messaging and online gaming as well as web-based activities such as the use of social networking, wikis and blogs.

As with Johnson et al. (2010), Luckin et al. (op.cit.) argue that teachers also need to develop digital literacy skills. Perhaps more tellingly they caution against overestimation of students' capabilities in this area arguing that simply because learners use tools this does not mean that they make sophisticated use of them. Crook and Harrison (op.cit.) report that teachers tend to see social networking as 'play' and learners saw it as something private. Both attitudes appear to deny its use in formal learning. Gillen and Barton (2010) argue that, through their inherent aspects of creativity, collaboration and criticality, digital literacies should be about bridging these perceived gaps between school and non-school. Without this there is surely little prospect of formal assessment processes encompassing them (ibid.). Crook and Harrison (op.cit.) cite this need to harness the potential of the tools in schools as a key message for policymakers but report that "*many innovating teachers feel that current curriculum and assessment structures inhibit and de-incentivise the creative use of Web 2.0 technologies*" (p.42).

In an attempt to bridge the divide between non-formal use of technologies and formal learning, Churches (2008) developed a taxonomy of the cognitive attributes of learning based on the familiar work of Bloom (1956) and Anderson and Krathwohl (2001). This newer taxonomy is set in the digital world. It could be argued that the mapping is only partial as there is a concentration on communication and Web 2.0 tools, together with elements of algorithmic thinking and programming. The presence of the 'communication spectrum' alongside the taxonomy underlines this emphasis. Spreadsheets, databases, modelling and simulation tools are not included. Also absent are the higher level skills that the National Curriculum embeds into ICT although these are represented in the earlier taxonomies, which complement that of Churches. The extent to which the taxonomy applies to 16 qualifications can be seen a mapping of it to the markscheme for GCSE coursework. Table 2.5 presents this mapping for the analysis phase of the AQA specification (AQA, 2005).

Churches (op.cit.), in deriving the digital taxonomy from the earlier one of Anderson and Krathwohl (op.cit.), points out that 'Creating' is probably not the highest level skill when applied to technology. This corresponds to Tapscott's observation (1998) that learning for young people is moving from instruction to construction. Creation, and creativity, is becoming increasingly significant in education (Craft, 2011). There is resonance here with Piaget's concrete operational stage (1973) and Papert's constructionism (1980) where making and building things were key to the early stages of thinking and learning. The change in significance highlighted by Craft (op.cit.) is their move to later stages of formal education, with the affordances of new technologies.

| Anderson and Krathwohl taxonomy level (2001) | Churches digital taxonomy statements (2008) | Statements from assessment criteria for 'Analysing' (AQA, 2005) |
|---|---|---|
| Creating | Designing<br>Constructing<br>Planning<br>Inventing<br>Devising<br>Making | Producing a detailed description of the problem, clearly describing appropriate sub-problems and the links between them. Clearly and appropriately recognising which ways will lead to aspects re-usable over time. (13-15 mark band) |
| Evaluating | Checking<br>Critiquing<br>Hypothesising<br>Testing | Stating in reasonable detail the desired outcomes which are usable as performance criteria in evaluating the solution. (10-12 mark band) |
| Analysing | Organising<br>Deconstructing | Identifying and describing more than one way of tackling the problem. Producing a reasonable description of the problem, stating sub-problems and the links between them. (10-12 mark band) |
| Applying | Implementing<br>Using | Stating some desired outcomes which are not entirely usable as performance criteria in evaluating the solution. (7-9 mark band) |
| Understanding | Interpreting<br>Summarising | Identifying a way of tackling the problem. Stating some desired outcomes. (4-6 mark band) |
| Remembering | Identifying<br>Listing | Listing an aspect of the problem (1-3 mark band) |

**Table 2.5**. Mapping of digital taxonomy statements to GCSE (using the AQA (2005) specification A coursework marks for 'Analysing')

Thus learning in a digital age can be re-conceptualised to include digital literacy (Hague and Williamson, 2009), tools can be seen to be at the heart of this literacy and deep learning (Owers, 2004; Boettcher, 2007) and the traditional taxonomy of cognitive skills (Bloom, 1956) can be recast to take account of them (Churches, 2008). In the formal learning context, all of this is enacted in the context of the school. Churches' taxonomy and digital literacy describe the attitude and capability of a student to embed technology. Hague and Williamson (op.cit.) define it to be an amalgamation of knowledge of digital tools (hardware and software), critical skills of evaluation and contextualisation and social awareness. By the last of these they mean "*understanding [one's] identity, collaborating, and communicating to audiences in context*" (p.8). For them this goes beyond functional ICT skills to becoming evaluative and critical of new media.

While digital literacy refers to the use of technology for learning by a student, Underwood et al. (2008) define a corresponding term for an institution: 'e-maturity', the extent to which a school has embedded technology into the curriculum. They found a school's e-maturity to be a weak positive indicator of student success in the use of technology. More important, they found, were the attitude of the individual student to using technology at school and at home, the propensity for the student to persist with problems and the challenge set by the school. Where students were set challenging and more open-ended problems with technology they tended to achieve higher levels. This reflects the higher cognitive demand required of students at those higher levels as they move beyond skills to showing understanding (QCA, 1999).

Technology, and technological developments are becoming increasingly associated with 'personalisation of education' (Rudd et al. 2006; DfES, 2006a; OECD, 2006b; Selwyn et al., 2008) although this phrase has become a shibboleth in education, meaning different things to different people. Underwood and Banyard (2008) view it as being located in the dimension of control of learning and learning spaces. Bird (2006) had additionally seen assessment as being within its domain echoing Black and Wiliam's work on assessment for learning (1998). Hargreaves (2004), in advising the UK government on its introduction, identifies nine 'interconnected gateways' to it, as shown in Table 2.6. Four of these are centrally pertinent to the study in this thesis. These are indicated by an asterisk.

| | | |
|---|---|---|
| Curriculum | Learning to learn | Workforce development |
| Assessment * | Learning establishment organisation and design | New technologies * |
| Learner voice * | Mentoring | Advice and guidance |

**Table 2.6**. Hargreaves' nine 'gateways' to personalisation (2004)
(* indicates those that are most pertinent to this study)

The Gilbert Report (DfES, 2006b) takes Hargreaves' model and addresses its implications when considering the future of curriculum, learning and assessment. It locates personalised learning as being assessment-centred, learner-centred and knowledge-centred. There is a need, the report argues, to recognise that learning builds on what is already known, what is learnt outside the classroom and to learner attitudes (see also Bransford et al., 2000; Demos, 2007). Central to these are social and cultural capital (Bourdieu, 1984): an agenda of personalisation must address students' heterogeneous habitus (Bourdieu, 1977) as well as the objectives of the system (Underwood and Banyard, op.cit.). As with Selwyn et al. (op.cit.) and Rudd et al. (op.cit.), the Gilbert report (DfES, op.cit.) makes the link between personalisation and technology. It states that "*…schools therefore need increasingly to respond to: [...] far greater access to, and reliance on, technology as a means of conducting daily interactions and transactions*" (p.10). This relationship is shown in Table 2.7.

This forms the basis for the later work of Underwood and Banyard (2008) who found that, for personalisation, positive attitudes of the school towards student participation and autonomy were more significant than a developed use of technology. The continued pace of technological change and the ubiquity of personal, multi-functional devices[57] for learners and teachers will, they argue, strengthen the relationship between learning and teaching through dialogue between teachers and pupils (ibid.). With personalisation, though, may come a fragmentation of learning experience and learner autonomy resulting in divergence from curricular objectives (ibid.). This effect is magnified as the boundaries of formal and non-formal learning are

[57] See Johnson et al. (2010).

blurred (DfES, op.cit.) and learning activities take place in school, home and elsewhere (Smith et al. 2005).

| **The influences of technology on learning** |
|---|
| Broadening the range of resources available to learners, through either guide or self-directed study.<br>Enabling participation in collective formative assessments.<br>Providing virtual access to experts and others, broadening learning contexts.<br>Enabling interaction and collaboration, in class and beyond.<br>Blurring distinctions between formal and non-formal contexts, between school, home and community.<br>Increasing variety and pace, leading to increased motivation.<br>Increasing relevance through access to authentic domains for learning. |
| **Supporting factors** |
| Engagement with parents.<br>Learner voice.<br>Integrated whole-school systems. |

**Table 2.7**. Technology's contribution to personalising learning (based on DfES, 2006b:29)

## *2.2. Issues of curriculum and qualifications*

Having considered the concepts of learning in general, and the changes in the learning landscape due to technology and new media literacies in particular, the review now turns to curriculum and qualifications. These embody the formal aspects of learning for the students who are the subjects of this study. Their perceptions of ICT learning and assessment will be coloured by their general constructs of what it is to learn ICT, the particular context of their schools, the specific curricula and courses they are following and the criteria for the qualifications they are aiming to achieve. This section provides a 'bridge' between learning, considered in section 2.1 and assessment, which is considered in the section 2.3.

Following the publication of the Leitch report (HM Treasury, 2006) on the need to foreground skills development by 2020, an argument developed as to how this might be best reflected in the regulation and development of qualifications (Kingston, 2007). On the one hand The Qualifications and

Curriculum Authority (QCA) had this responsibility and claimed to have the bigger picture of learning, education and skills (see for example QCA 2001; 2009). On the other hand the sector-skills councils who are charged with development of skills related to employment (HM Treasury, 2004). ICT falls between these two approaches representing both a subject in its own right and tool-based skills for learning. The difference between these approaches leads to different conceptions of learning – one with the priority on knowledge and understanding, the other on skills and utility. The need for both aspects is inherent in Lings and Desforges' analysis (1999) of the notion of a curriculum subject.

As with all other subjects, the National Curriculum for ICT lays out descriptors of what students might be expected to be able to at each of eight levels. Each level is defined by statements describing typical student performance at that level (QCA, 1999 – see also Appendix 1). Government policy has taken this notion of level and applied it to an age-related target. Thus it is expected that the majority of 11-year olds should be at level 4, of 14 year-olds at level 6 (DCSF, 2010). The issue here is the conflation of two uses for levels. On the one hand they are describing attainment and on the other they are determining age-related norms[58], which are then used to judge school performance. Lower-level skills are more prevalent in the descriptors of attainment in the lower levels and understanding at the higher levels (QCA, 1999). With the use of levels for age-related targets there is an implication here that students develop skills when young and understanding later. This mirrors the developmental stages of learning of Piaget (1973) but conflicts with the notion of assessment of skills, rather than deeper understanding, at 16.

As an example, the OCR Nationals are claimed to be "*particularly suitable for those who wish to study in preparation for (or alongside) employment in job roles where they will be expected to use IT and communication skills*" (OCR, 2006:12). Thus to achieve high grades one needs to demonstrate high levels of applied skill. Such achievement though, would only lead to low National Curriculum levels and hence would be part of the programme of study only for young students. This is reflected in the internal study into the

[58] See Mansell (2007:6 et seq.) for a discussion of the problems of using this measure of performance for different purposes.

introduction of OCR Nationals sensationally reported in the Times Educational Supplement as the "*GCSEs that 11-year olds could pass*" (Stewart, 2007). Such criticism is not confined to ICT with media concerns typified by an article in The Daily Mail (Paton, 2007a), attacking 'easy' subjects especially those related to vocational qualifications at 16. These concerns became part of the policy agenda when Michael Gove, Secretary of State for Education, announced a review of the National Curriculum. Here the criticism was not explicitly one of lack of difficulty but of inappropriateness as "*some schools have been tempted to steer students towards certain qualifications because it appears to be in the school's interests even when it's not in the student's*" (Gove, 2010:1; see also Mansell, 2007). Such issues were part of the remit of the Wolf report (DfE (2011b) into a redefinition and focus for vocational education which complemented a narrower focus on 'academic' subjects for school performance measures (DfE, 2011a). This latter point in discussed on page 40.

Curriculum design and debate about the place of new technology is not just about its use to develop skills, however. This can be seen in the National Curriculum (QCA 1999; 2007a) and the GCSE criteria (QCA, 2001) which emphasise knowledge and understanding alongside skills. Greenberg, reported in Gatto (2005), identifies six key principles on which, he claims, there is a reasonable consensus between school leaders, business and government[59].

- There is a need to move beyond a curriculum based on content given the rapidly increasing information available to learners.
- There is an inculcation by schools of systems which promote students' self-assessment and reward rather than have them be reliant on external motivations.
- Communication and conversation are at the heart of learning.
- Learner voice is paramount if students are to take a full role in democratic society.
- Technology makes it possible for students to learn what, when and wherever they want, and so schools must provide methods by which learners are responsible for their own timetable.

[59] He writes from a North American perspective.

Noticeable by its absence from this consensus, though, is any statement on assessment although there is resonance with Heppell (2006a) writing on that subject, who argues for the learner to be placed at the centre of assessment processes, surrounded by a learning community of peers, experts and others.

The place of ICT in the curriculum has been in a state of flux during the past 25 years. Introduced initially as part of the technology subject in the National Curriculum in 1988 it became a separate subject in 1995. The GNVQ awards introduced in the 1990s then saw the introduction of IT[60] as a mandatory key skill as well as a subject in its own right. This resulted in increased numbers of students taking an ICT qualification at levels 1 and 2[61]. (Ecclestone, 2004). Further minor revisions took place for 'Curriculum 2000' prior to the period during which this research was undertaken. This period commenced under the influence of the reviews of 14-19 education (DfES, 2004a; 2005). Changes in qualifications following the withdrawal of GNVQs in 2005 and replacement with new courses (see page 10) were followed by a new National Curriculum in all subjects in ICT (QCA, 2007) and changes to the status of ICT in performance measures.

The subject could, at the start of this research contribute four of the five passes required by a student for inclusion in school performance measures (QCA, 200b). This led to their 'marketisation' (Mansell, 2007) of GNVQ and successor qualifications with schools entering many students for them precisely because of the likely positive impact on league table performance measures, not because of the interests of the students (ibid.). Further changes saw ICT become compulsory functional skill in the Diplomas (QCA/e-skills UK, 2006) and the introduction of a specialist Diploma in IT. There was low take up of this, however, because of the demanding application process to allow schools to offer them and because of their specialised nature (Ertl et al., 2009). Towards the point of empirical data collection, ICT became

[60] Prior to the Stevenson Report (1997) there had not been a distinction between IT and ICT. The subject was universally known as IT.
[61] GNVQs were offered at three levels (Advanced, Intermediate and Foundation) corresponding to levels 1, 2 and 3 of the National Qualification Framework. The qualifications listed here replaced them at levels 1 and 2 (i.e.GCSE level). Level 3 is outside of the scope of this study as it was offered only to students post-16.

subordinate to English and mathematics in those school performance measures (DCSF, 2008b) and it was then excluded from subjects that contributed to the 'English Baccalaureate' measure (DfE, 2011a)[62]. This was implemented so as to "*reveal the way in which past performance tables actually encouraged many many great schools and great heads to offer certain non-academic subjects rather than more rigorous academic subjects*" (Gove, 2011:1). Here the criticism is that some qualifications lack rigour, rather than that are merely easy. This contradicts earlier pronouncements (Gove, 2010).

This fast changing landscape for ICT (McCormick, 2004; Williamson et al., 2005; Johnson et al., 2010) has been accompanied by a development of a plethora of qualifications and associated assessment opportunities. It is against this backdrop of diverse provision for assessment of ICT at 16 that this study is carried out. During the period of this research there has been an increase in the numbers of students registered for ICT qualifications at 16 (see Table 2.8).

| | **Full GCSE** | **Appl'd GCSE** | **Short GCSE** | **GNVQ**[63] | **OCR Nats.** | **DiDA suite** | **Other** | **Total** |
|---|---|---|---|---|---|---|---|---|
| **05/06**[64] | 90.9 | 43.5 | 99.0 | 55.4 | - | - | * | >288.8 |
| **06/07** | 78.4 | 26.5 | 77.9 | 48.7 | 5.0 | 68.8 | 58.2 | 363.5 |
| **07/08** | 65.2 | 14.5 | 64.0 | - | 85.3 | 114.2 | 52.7 | 395.9 |
| **08/09** | 53.1 | 7.9 | 45.2 | - | 118.1 | 82.6 | 69.0 | 375.9 |
| **09/10**[65] | 44.1[65] | 5.3[65] | 39.6[65] | - | 242.9[66] | 83.9[67] | * | >415.8 |

**Table 2.8**. Entries for ICT at age 16 (thousands)
(data from Vidal Robeiro (2010) unless noted; * = no data available)

This increase in the take up of formal ICT is matched by that in access to ICT outside of school (Lewin, 2004; BESA, 2005; 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011; Ofcom 2011). There is, however, a mismatch

[62] The later changes did not affect the study as students had opted for courses in 2007, but they do have significance for any further research.
[63] Withdrawn from 2007.
[64] DfES (2007).
[65] DfE/BIS (2010).
[66] Stewart (2010).
[67] Edexcel (2010): Summer entry only.

between the learning that occurs in each of these settings, with the formal not building on the non-formal (BESA, 2010). Nevertheless, an individual with high ICT capability may have developed this through any or all of the three settings - formal school programmes, use of ICT to support other formal study, and use of ICT in non-formal contexts and activities (Beswick, 2011). Here then schools (and, in theory, students) have more choice of qualifications in ICT. The question remains though, as to whether they are fit for purpose in a subject that is fast moving and pervasive (Williamson et al., 2005; Johnson et al., 2010).

A different approach is offered by the International Baccalaureate at 16 and 18 where, to pass, students must be successful in a range of subjects. This, it is argued (see for example Gardner et al., 2008; Frean, 2008:1) allows for more creativity and ingenuity to be shown by students as they move from 'formulaic' GCSEs. The change of UK Government in 2010 signalled a culmination of this debate when it was announced that iGCSEs were made available to schools (DfE, 2010a) and consultations were launched on a possible English Baccalaureate to encourage students to "*study a wide range of traditional subjects*" (DfE, 2010b:44; 2011a). While the EBacc has not been introduced as a qualification the concept is being used in performance tables. ICT, as discussed above, does not form part of the subject 'menu'. It is striking, too, that these calls for new examinations refer primarily to GCSEs. Other qualifications are generally not referred to including the ICT qualifications taken by a large proportion of the 16-year olds in England.

Boston (2009) had criticised the Conservative Party[68] think tank prior to the election of 2010, not because they proposed a broad core of study, along the lines of the Baccalaureate but because they did not go as far as suggesting replacement of GCSEs. Boston's views as the immediate past chair of the Qualifications and Curriculum Authority suggests perceived systemic problems in the qualification system.

While there have been many redesigns of assessment of ICT and new qualifications at 16 over the last 30 years (Williams and Raggatt, 1998;

[68] The Conservative party is the major partner in the UK Government elected in May 2010.

Ecclestone, 2004) the former Education Secretary, Estelle Morris, has also called for such an abolition of high-stakes examinations at 16 given the trend towards significant choices of subject and pathway being made at 14 and the school leaving age rising to a de facto 18. As long ago as 2001 she said that the GCSE is no longer an end-of-school examination and that students would be better served with key exams at 14 and 18 (Garner, 2001). She repeated this call in 2011 asking:

> *We have been trying for over a decade not to get children to leave school at 16 ... so why are we still running a leaving exam at 16? [Government ministers] aren't going to repeal legislation on staying on until 18, so it makes a nonsense of GCSEs*.
>
> (Morris, 2011)

## *2.3. Issues of assessment*

This literature review has so far considered issues of learning and of curriculum design and qualifications with respect to students taking ICT courses at 16 in England. This section considers issues of assessment, which are germane to students' perceptions. This discussion is framed through a consideration of aspects of validity and reliability and the types of assessment.

### ***2.3.1. Validity and reliability in assessment***

At the heart of this study is the student perception of assessment of ICT at 16. In vernacular terms this could be seen to be an enquiry into the perceptions of the validity of the assessment from the student point of view: do students perceive the assessment they are taking to be 'valid'. Validity, however, has technical meanings in the arena of assessment - indeed it has several meanings. These are now examined.

Gipps and Murphy (1994) discuss the semantic issue of the meaning of 'validity' in the context of assessment. They relate validity with bias, or lack of it. If a test, or assessment, is valid it is free from bias – although, they point out, the reverse does not necessary follow; assessments that are free from bias are not necessarily valid. They cite Messick's unitary model of construct validity (1989), which developed the original ideas of Cronbach and Meehl (1955). In this model the key question is: is the assessment constructed so that it measures what it intends to measure, and is it free from bias? This construct validity is regarded as one of the three dimensions - the others being content and criterion. Gipps and Murphy (op.cit.) argue that no content or criteria can ever be free from bias, and hence these are less dominant aspects when looking for validity. For them the dominant dimension is that of construct validity - does the assessment measure what it purports to, in a way that is free from bias. In line with Gipps and Murphy (ibid.), Ridgway et al. (2004) define construct validity as the extent to which a test measures what it claims to measure. They see construct validity as being composed of four aspects:

- *Content validity: are items fully representative of the topic being measured?*
- *Convergent validity: are constructs which should be related to each other actually observed to be related to each other?*
- *Discriminant validity: given the domain definition, are constructs which should not be related to each other observed to be unrelated?*
- *Concurrent validity: does the test correlate highly with other tests which supposedly measure the same things?*

(ibid.:24)

Here then content validity is part of construct validity rather than something separate from it as in the model of Gipps and Murphy (op.cit.). Ridgway et al.'s model for construct validity (2004) can be applied to the assessment of ICT. Table 2.9 identifies such a mapping.

In the arena of assessment, validity can have a very different meaning – that which is connected to validation. The European inventory of validation of non-formal and informal learning (ECOTEC, 2007) uses the term to mean the process of recognising (as valid) that which has been learnt outside of school. This might be equated to the process of Accreditation of Prior Experiential Learning (APEL) in Higher Education. In APEL non-certificated learning, and perhaps informal or non-formal learning, is validated against assessment criteria that have been designed to assess formal learning. A judgement (assessment) is made to see if the learning claimed as APEL does equate to that which might be learnt formally. It is used to exempt learners from parts of programmes (see Garnett et al., 2004).

| **Aspect of construct validity** | **Manifestation in the assessment of ICT** |
|---|---|
| Content validity: are items fully representative of the topic being measured? | How is ICT constructed by students and the system and does the assessment measure those constructions? |
| Convergent validity: are constructs which should be related to each other actually observed to be related to each other? | Is there convergence between the assessment objectives and learners' constructs? |
| Discriminant validity: given the domain definition, are constructs which should not be related to each other actually observed to be unrelated? | Central to this is the perception of students of what is important and how the different contexts for learning ICT – the ICT classroom, other school lessons, home and elsewhere – overlap and differ. |
| Concurrent validity: does the test correlate highly with other tests which supposedly measure the same things? | The relationship between teacher assessment, test results, and the student perceptions of their own (and others') achievements in ICT[69]. |

**Table 2.9**. Construct validity and assessment of ICT
(after Ridgway et al., 2004:24)

In school situations a similar practice to APEL is used in awards such as the Certificate in Personal Effectiveness (CoPE) available from ASDAN[70] (2008). Within the CoPE framework, awards are achieved through demonstration achievement of the criteria from evidence gained in a range of situations and activities. That the awards are available at KS4 (i.e. for 16 year olds), can include evidence of the use of ICT, can contribute to measures of school performance[71] and carry UCAS[72] tariff points would seem to make them

[69] This aspect is outside the scope of this study which is not considering perceptions after the year 11 assessments.
[70] ASDAN - Award Scheme Development and Accreditation Network.
[71] The CoPE has equal weighting on the performance tables as a full GCSE.

suitable qualifications for the group under study in this research. They do not, however, have a significant percentage of the market (Vidal Rodeiro, 2010) denying students this opportunity to select the ICT activities from which they wish to present evidence for assessment. In contrast the qualifications that appear in Table 2.8 each have tightly defined specifications for assessment activities (Edexcel, 2000; 2005; OCR 2000; 2006; AQA, 2009) with little choice for students.

Central to these two processes, ensuring validity and validation of non-formal learning, is the concept of peer or community validation of skills, knowledge and understanding. In the case of validity it is that the extent to which the students, teachers and other future stakeholders perceive the qualification to measure ICT capability. In the case of validation it is the approval given to evidence presented that to indicate that it meets the assessment criteria. For APEL this recognition is by the university community of work done outside of it (Garnett et al., op.cit.). Within CoPE it is the authentication of work by someone who can vouch for it (ASDAN, op.cit.).

Watts (2008) makes the analogy with money in considering this issue of what makes assessment valid in the perceptions of students and those in the wider community. The validity of currency is completely bound up in the purpose to which it can be put. Thus the validity of an assessment is defined by the 'value' of the underlying qualification (ibid.). Gronlund (2005) describes this as the unitary nature of validity as opposed to the different types of validity defined by others (e.g. Cohen et al. 2007; Ripley, 2007; Gipps and Murphy, 1994; Messick, 1989). Further Gronlund (ibid.) argues that this notion of validity also encompasses reliability, which is discussed below (see page 51 et seq.).

This aspect of validity is characterised by some future value or worth. It has predictive elements (Watts, op.cit.) and can lead to consequences. Indeed Messick (1989) terms it 'consequential validity'. For example one might see that the value of assessment is to do with its use for gaining employment

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[72] UCAS – Universities and Colleges Admissions Service (for entry to UK higher education institutions). ASDAN qualifications contribute to the points score used on the UCAS application form, although it should be noted that not all institutions recognise the awards.

with associated elements of a cultural exchange value (Bourdieu and Passeron, 1990). The assumption here is that the capability demonstrated in the process of passing the assessment will also be manifest in the future situation e.g. employment. This is more likely to be the case if there was authenticity in task and test (Tombari and Borich, 1999; Dochy & Moerkerke, 1997). A further dimension of Watts' view (op.cit.) is that of face validity. An assessment is valid if the test appears recognisable to those taken it and to those to whom the qualification is 'presented' e.g. employers or further education establishments. This then leads to the question of how appealing the test is to students. Chisnall (2005) discusses a similar approach in a different field – that of the methodologies of marketing research surveys. Central to his approach is the need for face validity in the eyes of those being surveyed. Clearly though, he argues, if the 'test' is not recognisable then the 'market' will not value, or engage with, it. For Chisnall (ibid.) a key component is that of 'attitude' although it is very difficult to encompass in a scientific way:

> *The measurement of behavioural factors such as attitudes… has been attempted by a variety of techniques… the ones that are the most reliable and valid from a technical viewpoint generally being the most difficult […] to apply.*
>
> (p.234)

This has crucial implications for this research which is focused on perceptions and, concomitantly, attitudes. This is discussed in the considerations of methodology and data collection (see section 3.4, page 99).

The face, predictive and consequential aspects of validity link to some use of the assessment in the future. It is not an end in itself, or an end to the 'means' of learning. Gulikers (2006) places assessment in a timeline with learning preceding it and utility following. She remarks on the number of metaphors that are used to describe this - "*the tail wags the dog* (Gibbs, 1992), *the real test bias* (Frederiksen, 1984), *the washback effect* (Alderson & Wall, 1993), *the backwash effect* (Prodromou, 1995)" (Gulikers, op.cit:11)[73]. These phrases provide allusions to the psychological importance of the assessment or test to the student throughout their learning and

[73] All cited in Gulikers (op.cit.) italics in original.

beyond. The ‘backwash’ or ‘washback’ is that learning is completely distorted by the test (see also Mansell, 2007; Bew, 2011[74]). What is learnt, in a formal setting, is determined by the implicit or explicit curriculum of the assessment process (ibid.). The ‘real test bias comes’ when the test itself, and hence the learning, is distorted to meet the perceived needs of a real situation (ibid.). ICT assessments often require students to produce a product for a ‘real client’ (Edexcel, 2000; 2005; OCR 2000; 2006; AQA, 2009). That this is not possible in most cases and is recognised by the specifications. For example the centre handbook for the OCR National qualification in ICT states:

> *Wherever possible centres should generate evidence from the real work environment, where it is not possible to produce evidence in this way, assessment objectives may be assessed through simulation of a real work environment.*
>
> (OCR, 2006:25)

Having considered the relationship between validity and student perception, as seen in attitudes to assessment an qualifications, this section of the review concludes with an overview of the theoretical bases of validity as analysed by Wiliam (1996). This model is chosen because of its unifying structure and its applicability to the National Curriculum and hence to schools: the domain of this study. The model builds on four facets identified by Messick[75] (1992). These four facets cover the issues that give rise to assessment, those which follow from it, and a consideration of the bounds of the assessment and its impact within, and beyond, those bounds. These are labelled inferences, consequences, within-domain and beyond-domain as shown in Figure 2.3.

Wiliam’s model has two axes. The left-hand one concerns the temporal nature of the assessment and its validity. In the upper row, the inferences for the validity at the point of assessment, is the evidence for validity in the assessment as it stands (Messick, 1980). To this Wiliam adds consideration of the extent to which such evidence is subject to interpretation (Moss, 1992). This interpretive aspect is crucial to this study with its focus on

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[74] Although the Bew Report focused on KS2 tests in primary schools, its findings are congruent to the others cited here.
[75] Subsequently enhanced to six facets (Messick, 1996).

student perception and, hence, on interpretation. The lower row, the future consequences of the validity of the assessment, considers the impact of the assessment looking forward beyond the time of the assessment.

| | | Within-domain | Beyond-domain |
|---|---|---|---|
| Now | **Inferences**<br>Evidential basis (Messick, 1980)<br>Interpretive basis (Moss, 1992) | Construct validity (Messick, 1980)<br>Construct representation (Embretson, 1983)<br>Meaning | Construct validity and relevance/utility (Messick, 1980)<br>Nomothetic span (Embretson, 1983)<br>Significance |
| Future | **Consequences** | Value implications | Social consequences (Messick, 1980)<br>Impact (Madaus, 1988) |

**Figure 2.3**. Facets of validity (adapted from Wiliam, 1996)

The top axis considers the place of assessment within- and beyond-domain. This differentiates the inferences and consequences that come from, and impact on, the subject of the assessment from those that are external to it. Each quadrant will now be examined in turn.

The top-left quadrant deals with within-domain inferences. Here the evidence for, and interpretation of, validity is considered. In the top-left quadrant Wiliam (op.cit.) cites the work of Popham (1978) in trying to establish tests that are both valid and which test all of, but no more than, the domain that is subject to the assessment. Wiliam criticises the validity of National Curriculum tests for being unrepresentative of the domain because of their length compared to the length/volume of learning. The same criticism can be levelled at assessment at 16. This is especially true in ICT where significant learning is undertaken beyond formal settings (Lewin, 2004; BESA, 2005; 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011). This then gives rise to issues of construct validity (Messick, 1980, 1989; Gipps and Murphy, 1994; Ridgway et al., 2004) as the test is not measuring what it purports too – namely a student's ICT capability. It is not even doing so for the whole specification as any formal external assessment can only offer partial coverage due to time constraints. Aspects, including those arising from informal and non-formal learning (Eraut, 1994; EC, 2001) are, potentially, not tested at all.

Embretson's view (1983) of the evidence for validity distinguishes between construct representation and nomothetic span. In the former, the top left of Wiliams' model, assessment is designed so that it is situated in tasks that represent that which is to be assessed. In the latter it is designed to correlate with other tasks deemed valid. Here is the evidential basis for beyond-domain validity. In ICT this would require things done outside of formal settings to be considered when assessments were made. This was discussed earlier in the context of APEL or CoPE awards (see page 45). Embretson (ibid.) goes further however to include activities which may be deliberately undertaken by the student outside of the formal setting in order to meet the requirements of assessment. This is in contrast to assessing activities that have already been completed with the evidence being presented post hoc. Wiliam (op.cit.) also makes a distinction was between what has meaning within the assessment and what has significance beyond it. This notion of significance relates closely to notions of authenticity (Tombari and Borich, 1999). If an assessment is to be useful to those outside of the system that administers it there needs to be some real use and purpose in the criteria.

The research for this thesis was situated between the two parts of Embretson's model (op.cit.). In the context of this study construct representation is using what the students have learnt by way of ICT capability to provide an assessment. Nomothetic span is using some assessment that correlates to this as measured by other views, for instance those from outside of the formal assessor role (e.g. peers). Perceptions of assessment will be informed by both. Thus the study straddles within- and beyond-domain.

For beyond-domain inferences and consequences (i.e. the bottom row of Figure 2.3) Wiliam (op.cit.) cites the predictive nature of the use of test results in which high performance in X predicts high performance in Y. He cites Guilford's seminal article (1946) in saying that it doesn't matter how this correlation is arrived at, merely that it is reliable. For ICT at 16 there may be aspects of the achievement that is given far greater importance than maybe it should. A learner who gets Functional Skills level 2 in IT[76], for example, is deemed to have achieved the same level as one who has a GCSE in ICT. In principle it does not matter how the level 2 was achieved, it still carries the same consequential validity for wherever a level 2 qualification is required. The impact of the assessment, or its successful passing, is agnostic of the means by which it was achieved (Madaus, 1988). Employers or college tutors accept the qualification as a badge with the route by which this was achieved not being unpicked or scrutinised for validity against their needs and purposes. At 16 a similar example may be seen in the widely varying specifications (e.g. Edexcel, 2000; OCR 2000; AQA, 2005; 2009) that all lead to qualification with the same name – GCSE ICT.

Having considered validity, the second aspect of assessment to be discussed is the extent to which it is reliable (Messick, 1989; Gipps and Murphy, 1994; Wiliam, 2001; Gronlund, 2005). While, for Gronlund (op.cit.), reliability is bound up in validity as a unified concept, for others the two exist separately. Wiliam (op.cit.) discusses the issues of validity and reliability inherent in testing. Reliability is reduced because of the inability of students to perform exactly the same way in two identical tests. If they were to take the same test several times then they would expect to get different scores (ibid.). This is impossible to prove as a test cannot be taken again without it either being a different test or without learning from first attempt altering performance; the position is a theoretical one.

Wiliam (ibid.) also looks at the reliability of levels in National Curriculum assessment. These are analogous to grades in the reporting of performance at 16. He points out that it is intuitively unreliable to say a student who scores 75% must be 'better' than one who scores 74%. If the results are reported as grades, however, it seems more acceptable that a student with a higher grade has done better than one with a lower even if the raw score difference is one or two marks. This is just as unreliable a conclusion as between 74% and 75% (ibid.). Here is tension between validity and

[76] The functional/key skill component of ICT learning is referred to as IT (Information Technology).

reliability. Sometimes making a test reliable means it becomes less valid. Wiliam (ibid.) cites the example of the divergent thinker who comes up with an alternative good answer that is not on the mark scheme and who therefore receives no credit (op.cit.). With the proliferation of uses of ICT outside of formal settings (Lewin, 2004; BESA, 2005; 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011) students are increasingly likely to come up with idiosyncratic answers that nevertheless demonstrate the requisite knowledge or understanding. This presents issues for reliability if acceptable answers are not on the mark scheme and are deemed inadmissible.

### *2.3.2. Types of assessment*

Summative assessment is traditionally undertaken in one of two ways – by written examination or coursework for school qualifications and through observation of performance in workplace situations (Williams and Raggatt, 1998). Thus in the early 1980s GCE O/A levels and CSEs were complemented by a few vocational, or technician awards, (such as for accounting technicians) and employer-based qualifications. There was some engagement with employers for example, in the East Midlands, Rolls Royce developed numeracy tests that could be sat by school students and then used in job applications to the company, or elsewhere. These developments could be seen to be in response to the view, prevalent then as perhaps now, that school-leavers' competence in basic skills were too low and that traditional schooling did not prepare students for the world of work (ibid.).

GNVQs broadened the range of options for gathering evidence of assessment. While the performance criteria were well defined (see for example RSAEB, 1993) the mode of assessment was left to the teacher, or assessor. Examples of the types of activity that might produce evidence are shown in Table 2.10. This provides a set of possibilities that is much more wide-ranging than those in ICT specifications current at the time of this study (Edexcel, 2000; 2005; OCR 2000; 2006; AQA, 2009). The types of assessment that are used in the Diplomas, however, is very much that as listed in Table 2.10 above alongside the traditional examination (Ertl et al., 2009). This range of assessment activities includes many which can take place in 'authentic' contexts (Tombari and Borich, 1999), rather than being artificially constructed in the classroom, with the concomitant benefits for learning and motivation discussed in section 2.4 below.

| **Types of evidence** |
|---|
| Naturalistic observation of (workplace) activities. |
| Expert witness evidence. |
| Witness testimony. |
| Candidate reports. |
| Reflective accounts. |
| Assessment of prior learning/achievement. |
| Professional discussion. |
| Verbal/written questions. |
| Projects/assignments/case studies. |
| Audio/video as evidence. |
| Product evidence. |
| Simulation/role play – permitted in a very limited number of units. |

**Table 2.10**. List of evidence types (adapted from City and Guilds, 2010:12)

The Capey Report (NCVQ, 1995) into assessment of GNVQs recommended greater use of external assessment. This resulted in a revamp of the assessment process so that there was more use of tests and greater similarity to GCSE/GCE awards (Williams and Raggatt, 1998). This was partly to address what had been seen as a burdensome assessment methodology (ibid.) and to tackle the lack of perceived parity of esteem between the two systems of awards – GCSE/GCE and GNVQ (Oates, 2009).

In 2006 the government took a view that coursework was unsuitable as a valid tool for GCSE assessment and instigated a subject-by-subject review of its use (QCA, 2006a). The outcome was to reduce the amount of assessment outside of time-limited examinations and to issue policy directives aimed at increasing validity. Thus the then Secretary of State for Education, Alan Johnson, speaking in response to the QCA review said "*[as] a result of the QCA's report, we will be … stipulating that… coursework must be supervised in classroom style*" (BBC, 2006). This may have been partly driven by the need to respond to a perception of public opinion as reported in the tabloid press (see for example Daily Mail, 2007). This policy has been taken on by the new UK Government from 2010 and a further review of coursework was hinted at by the current Secretary of State with a need for reform of the examination system "*and, for many subjects, [...] a return to traditional exams and less coursework*" (reported by Paige, 2011:18). Such interference in, or control by, government of the assessment system was criticised by the Chair of Cambridge Assessment (Garner, 2008). Ofqual (2009) raise another concern, which may be related – that of the increasingly complexity of the qualification system. Constant tweaking should be avoided at the risk of undermining reliability they claim.

ICT was, however, exempt from the recommendations of the 2006 review. QCA (op.cit.) stated that this was because of the confusion brought about by the introduction of functional skills, which, philosophically, had to be assessed in a practical 'coursework' mode if they were to fulfil the claims of allowing individuals to work "*confidently, effectively and independently in life*" (QCA, 2008). Consequently, coursework in GCSE ICT specifications is able to contribute up to 40% of the final assessment compared to the norm of 20%. This exemption gave a particular flavour to assessment in the subject that, it might be assumed, affects student perceptions of it.

This anachronistic position of ICT was exacerbated by the intention to use controlled test environments for assessing functional skills (QCA, op.cit.). Such a move constrains the opportunities for individual responses to problems over a period of time that are desirable in respect of assessing creativity (NACCCE, 1999) and does not acknowledge those dimensions of learning which are to do with social interaction (Tudge and Caruso, 1988). There is a danger that the assessment becomes divorced from the reality of the use of ICT and that assessment tasks are not authentic and hence become separated from the learning in the minds of the student (Dochy and Moerkerke, 1997).

Just as Hargreaves (2004) and Bird (2006) put assessment into models of personalised learning so Black and Wiliam (1998) and Harlen (2007) put learners at the centre of the assessment process. The Assessment Reform Group, in analyzing assessment reforms (Gardner et al., 2008), point to the large number of projects that have been conducted over the last decade or so that have learner-centredness, along with creativity and authenticity, as one of their commendable aspects. High-stakes assessment and engagement by awarding bodies are noticeably absent from these projects, however, reflecting the straitjacket of regulation and public scrutiny these are subject to (Gardner et al., op.cit.) – 'high-stakes' (Popham, 1987) is not just for the learners and schools, it is for the awarding bodies too. As Gardner et al. (op.cit.) put it "*initiatives in assessment do not always take full account of [...] the needs of all of the key communities involved*" (p.1).

In looking at this high-stakes school testing some of the validity is driven (or driven away) by beyond-domain impacts such as league tables of school performance - these are much higher stakes for schools than learners (Mansell, 2007) and so the validity of the assessment is corrupted (Wiliam, 1996). This can be seen in ICT where the four-GCSE equivalent[77] GNVQ qualification was often suspected of being used to improve performance table results (Paton, 2007a; Gove, 2011) rather than benefit the learners. Kirkland and Sutch (2009) summarise as teachers being concerned with their own individual students' attainment, schools having an eye to league tables and the system being bound by comparability and standards processes. This reinforces the negativity associated with excessive testing (Tate, 2001; Gardner et al., 2008; Hargreaves, 2009). On the other hand Gardner et al. find that rooting such changes in classroom practice and allying them to assessment for learning (DCSF, 2008a) is seen as a successful strategy and is embraced by teachers. Similarly when formative assessment is embedded in innovation it tends to be successful (Gardner et al., op.cit.). In such a climate it is therefore difficult to change high-stakes summative assessment in any agile way. Yet agility is precisely what is needed when considering the changes in technology and its uses (Facer, 2009). Facer argues that such agility leads to a need for a wide range of different responses. In such diversity, she claims, is the ecology for meeting differing, and unknown, future needs. It will emerge

> *Only if educators, researchers and communities are empowered to develop localised or novel responses to socio-technical change –*

[77] Such comparisons are meaningful only for the purpose of reporting school performance.

> *including developing new approaches to curriculum, to assessment, to the workforce and governance, as well as to pedagogy.*
>
> (ibid.:9)

A necessary condition for such agility and diversity, Facer argues, is a national policy agenda that facilitates rather than constrains (ibid.). Such a policy would seem to be unlikely (Mansell, 2007).

While this study is located in the domain of assessment of ICT and not assessment with ICT (as distinguished by Macfarlane, 2001), there has been one key development in the last few years that attempted to merge the two. In 2003 the QCA were tasked with developing an on-screen testing system. It was to be first used with national tests at 14 for the end of KS3 in ICT. The intention was that these tests were to be compulsory for 2008 but after several pilots and iterations of the testing system, the government was advised that these tests should become optional (BBC, 2007).

One of the significant reasons for failure of this innovation was that the technology used for administering the tests could not keep up with the technological changes in the wider world.

> *The experience of developing the ICT tests has been that the full range of planned innovation has not been delivered. In particular, the tests have adopted more traditional approaches to test design, and teachers generally have not been persuaded that the tests reflect improved practice in ICT teaching.*
>
> (Ripley, 2007:5)

The practice to which Ripley refers is codified in the Becta's online self-review framework (2008b). This includes the need for schools to "*[r]eview, monitor and evaluate opportunities to extend learning within and beyond [the] school*" and to "*[m]eet pupils' expectations for the use of ICT*". These aspects may be hard to achieve if the assessment process is non-authentic (Dochy and Moerkerke, 1997).

The development and subsequent marginalisation of high-stakes on-screen testing of ICT illuminates a recurrent theme in the literature. Assessment regimes cannot keep pace with changing technologies and their appropriation in non-formal contexts by teenagers. For students of ICT, the content of curricular assessment should relate to the use of technology beyond the classroom and, presumably, on the non-formal learning experiences (Eraut, 1994) which are so widespread in this subject (Lewin, 2004; BESA, 2005; 2010; Ipsos-MORI, 2007; Beswick, 2011). As Gardner and et al. (2008) put it *"[a]ssessment should promote public understanding of learning goals relevant to students' current and future lives"* (p.16).

While this research is not about the use of ICT for assessment, or e-assessment, the literature in this field naturally covers some of the ground that is pertinent to the study, particularly in what it has to say about assessment principles in a technology-enabled society. Despite the failure of the on-screen test pilot referred to above, technology is being introduced into the administration and assessment of 16+ examinations. Examples of this include e-portfolios (Edexcel, 2005b; Hartnell-Young et al., 2007) and ubiquitous school and local-area VLEs with intrinsic and extensive formative feedback tools (Becta, 2008a). The issue here is the need for policy imperatives that allow students a range of ways of creating and submitting evidence of ICT capability to match the plethora of technological tools and platforms that they use in their formal and non-formal learning (BESA, 2010).

Ridgway et al.'s work (2004), subsequently updated by Ripley (2007) discusses the nature of assessments, both formative and summative, in relation to the use of technology. They link this discussion to the purpose and validity of assessment. These are their paramount considerations, echoing the primacy accorded to construct validity by Gipps and Murphy (1994). Further, and linking to the concepts of learner voice (Rudduck and Fielding, 2006; Walker and Logan, 2008; Facer, 2011 – see pages 73 et seq.), these considerations place the learner at the centre of the process of assessment. Of particular note, in relation to this study that aims to make perceptions explicit, is the mendacity quotient (Ridgway et al., 2004). This describes the features of the summative assessment that require students to only demonstrate what they know. Unlike formative assessment, there is no feedback on what is not known, and hence it is hidden. This resonates with Tombari and Borich's (1999) arguments on the use of on-going authentic assessment where what is known or not known is subservient to the needs of the authentic situation.

For Heppell (quoted in Futurelab, 2008) the key issue is one of providing authentic evidence, organised and narrated for the audience by the student. In this way employers, and others, will go beyond the certificate. The e-portfolio, for example, becomes a transcript of the journey, through exploration, from learning to assessment. He uses the analogy of the assessment of a piece of art or student videos (Heppell, 2007b). It is in the response of the audience that judgement and reputation is derived. Here too is a manifestation of the nomothetic span of validity (Embretson, 1983). Teachers, students, parents, all of us, he claims, are very good at making judgements of quality even in the absence of precise criteria. Indeed, strict criterion-referencing may not be possible in an era of technological diversity. In such circumstances media-rich products and personalised responses move to the heart of learning (Heppell, 2006a).

Williamson et al. (2005) discuss evidence-centred design of assessments and identify a framework for their evaluation. This framework consists of four dimensions: the purpose of the assessment, the proficiencies being measured and their relationship to claims being made about them, the evidence to be presented for assessment and how it will be interpreted, and the design of the activities and how they relate to the production of evidence (ibid.).

Such an instrumental approach to the evidence-based assessment implies definable criteria. This is at odds with the much more creative use of ICT demonstrated by students at BAFTA[78] for example. Here students have a very open-ended brief and the assessment of the evidence is very subjective. Nevertheless claims that it is a valid means of demonstrating capability are secure (Heppell, 2006b). The commonality between these two views of

[78] BAFTA – the British Association of Film and Television Arts sponsors and hosts of an annual presentation *Be Very Afraid*, which showcases creative uses of technology by teenagers.

assessment comes with the interpretation of those who 'use' it to make judgements about the abilities of the students following assessment (or, in the case of BAFTA, of presentation). Williamson et al. (op.cit.) also discuss the need to tie assessment into rapidly increasing technologically-enabled social networks. This has resonance with peer assessment as students judge, and are judged, by others through the development of assessment for learning strategies in England (DCSF, 2008a). It brings Williamson et al.'s framework (op.cit.) closer to that of Heppell (op.cit.).

The peer network of the learner also brings a further dimension to the perception of self-efficacy (Ridgway et al., 2004). Learning is social (Vygotsky, 1978; Bruner, 1996; Wenger, 1998; Craft, 2011) and learning of ICT is carried out in a range of settings within that social space. Here learners often have overt access to each other's achievements. Working with social network or collaborative tools, for example, provides an immediate sense of the capabilities of peers (Ridgway et al., op.cit.; Ripley, 2007). This access to others will also impact on students' self-perception as they receive and reflect on feedback (Underwood et al., 2008). Although this feedback may be on formal or non-formal learning, it is unlikely to be used for formal assessment at 16, which relies on external judgements or teacher testimony and marking.

## *2.4. Student perceptions of learning and assessment*

Having considered issues of learning, of digital literacy, of curriculum and of assessment, this review concludes with a discussion of the literature germane to the central aspect of this enquiry namely that of student perceptions of these issues.

Kelly's PCP theory (1955) takes the constructivism of Vygotsky (1978)[79] and emphasises each individual's unique construction of the world but in contrast with Piaget's later ideas (1973) emphasisess the social nature of such constructions. The meanings that students put on the process and subject of learning is formed and articulated with reference to the context in which they

[79] The date here is of the English translation, Vygotsky predates Kelly by some time.

find themselves (Kelly, op.cit.). Here is an integration of cognitive psychology and socio-cultural factors. Learners do not learn, or construct learning in a vacuum but in relation to the milieu in which they are situated (ibid.; Bruner, 1996; Wenger, 1998).

This influence of the context on construct is embodied in the cultural and social capital of a student's habitus (Bourdieu, 1984). Learners construct their view on their learning through a lens that is coloured by the culture in which they learn – school, home, society – and those with whom they learn (ibid.). Croninger and Lee (2001) develop this argument to include the importance of the structural and membership characteristics of learner networks, and their place in relation to institutions (i.e. school). For them the perceptions of school, and hence of learning, are significantly affected by their relationship to peers and teachers (see also Reay et al., 2001).

While Bourdieu's ideas of habitus (op.cit.) provide a context for the formation of the students' constructs of their learning, Kelly's PCP theory (op.cit.) and its development and use by others (including Bannister and Fransella 1986; Fetherston, 1997; 1999; Fransella, 2003) provide a framework to probe and explain them. Kelly postulates that a person's perceptions are driven by what has gone before and on how future events are anticipated. The essence here is on looking forward based on the past. There is resonance here with the temporal aspects of Wiliam's model of validity (1996), as shown in Figure 2.3, and the notions of face, consequence and predictive validity (Messick, 1989; Gronlund, 2005; Gulikers, 2006; Watts, 2008).

For Fransella (2003), Kelly's work provides a unified theory in which individuals are self-regulating in the way in which they view the world, anticipating events in the light of experience and the influence of society and those around them. These events are then enacted, or encountered, and the individual reacts to them to formulate their anticipation of future events (op.cit.). Contextualising this to learning, students anticipate and assimilate new knowledge, skills and understanding based on what they have learnt before. For Fetherston (1999) this includes, significantly, misunderstandings and misconceptions which may be built upon and magnified with PCP providing a framework for the analysis of these behaviours. Moving to the learning of the 'Net Generation' Barnes et al. (2007) report a goal-orientation with students focused on school assignments and then moving onto the next stage. Here is the anticipatory dimension of PCP, although Kelly's work is not cited directly by Barnes et al. (ibid.). Their study is characterised by schools in which technology is ubiquitous. Tools such as the Internet, online communication and video media are commonplace and become tacit, or transparent, to the learner as aids to learning. Citing Oblinger and Oblinger's study of university entrants (2005), Barnes et al. (op.cit.) argue that this saturation by technology leads to different ways of learning. Students are seen to make more use of exploratory techniques, exploiting technology to meet goals. The exact ways in which the tools are used are not necessarily taught but acquired accidentally in 'non-formal' (Eraut, 1994; EC, 2001) settings. This echoes the problem-solving approaches alluded to by Piaget (1973) and developed in Facer and Williamson's report (2004) on creativity in relation to technology use. Craft (2011) adds participation, play and creativity to the heart of the future school. Facer (2011) goes further arguing for a reconceptualisation of school in which the community it serves learns together with inter-generational collaboration and participation. In such a context student perceptions would be directly influenced by family and community in both formal and non-formal contexts.

Kelly's PCP (op.cit.) gives a framework for exploring students' constructs of their learning. These constructs are influenced by the availability of technology (Oblinger and Oblinger, op.cit.; Barnes et al., op.cit.). The impact of ICT tools on perceptions of ICT, its learning and its assessment has been researched in a few studies that are precursors to this thesis (Somekh and Mavers, 2003; Jarvis et al., 2005; Brown and Hirschfeld, 2008). This research will now be reviewed.

Somekh and Mavers (op.cit.) found that when technology is used as a resource and locus for their learning, students relate differently to each other and to the teacher. Building on this Somekh and Mavers established student conceptions of ICT in 'their world'. The research was based on the views of 10-14[80] year olds through concept mapping tasks that elicited views of ICT in school, at home and in social contexts (ibid.). These tasks drew on earlier

[80] Although the respondents were cited as being 10-16 years old the main focus of the enquiry was the statutory testing at age 11 and 14.

studies of ICT use and on the activity theory of Engeström et al. (1999), which considers the constituent rules and structures that underpin learning in all of these contexts. Somekh and Mavers (op.cit.) recognised explicitly that the teacher, although part of these structures, was constrained by the institution of school (McNeil, 1986; Papert, 1993) that restricted their ability to respond to the upheavals brought, or made possible, by technological change (Lankshear et al., 2000). In contrast they found that children (in primary and secondary schools) had a "*rich conceptualisation of technology and its role in their world*" (Somekh and Mavers, op.cit.:418) that went beyond what was contained in standard curriculum and assessment specifications and tasks. This research pointed towards an "*urgent need to develop more exploratory frameworks for teaching ICT*" (ibid.:418) to meet students' developed view of the uses of ICT. This call for exploration in learning is echoed by the findings of Barnes et al. (2007) discussed above, by Selwyn (2008) in examining the use of Web 2.0 tools (see p.30 et seq.) and in the need to centralise play in learning (Craft, 2011).

The study of Jarvis et al. (2005) was carried out as part of the evaluation of the Department for Education and Skills' Testbed Project. It consisted of an investigation into student perceptions of ICT at age 12/13[81], as opposed to the 16-year olds in the study for this thesis. The key findings of the report were that students saw ICT as being more than just a subject but as something that was a tool to be used across subjects and which linked school and home through both homework tasks and Internet usage. At this point in their school career students did not appear to value ICT as a separate subject and saw it as being rather duplicating of things done in other subjects. They mentioned the use of "*spreadsheets, collecting and analysing data, and finding images for presentations [...and that] they enjoyed designing leaflets and advertisements but found control technology*[82] *tedious*" (ibid.:26). They also reported that students found spreadsheeting tedious and repetitious. Mathematics lessons were found to feature the highest usage of ICT of any other subject accounting for some of this repetition.

[81] The report refers to the respondents as being in Year 8.
[82] The revised National Curriculum from 2008 has placed control technology in design and technology.

Brown and Hirschfield (2008) reported on student's perceptions of assessment across a wide range of subjects. They reported four dimensions of these perceptions:

- Assessment acts to improve the quality of learning.
- Assessment is used to make students or schools accountable.
- Assessment is irrelevant or ignored.
- Assessment is enjoyable.

They further found that there was a relationship between each dimension and student achievement. The highest achievers were those who saw assessment as being part of learning and those who saw it as part of an accountability regime or as being irrelevant tended to perform least well. This relationship, Brown and Hirschfeld (ibid.) argue, relates to theories of self-efficacy (Bandura, 1997) and self-regulation (Zimmerman, 2001) where those students who took ownership of their learning and its assessment were likely to achieve more than those who were directed primarily by teachers and schools. This, Zimmerman argues, is due to the feedback loop in which self-regulating students change their behaviour in the light of formative assessment. It implies a phenomenological perspective in which the student acts on the reflections of previous actions and feedback (McCombs, 2001). This perspective is developed in the methodological argument of this thesis in chapter 3.

The sense of enjoyment noted by Brown and Hirschfield (op.cit.) contrasts with the earlier findings of Harris et al. (1995) who report a tendency for students taking GCSE courses to feel rushed by coursework. Similarly Rudduck et al. (1994) found that the natural motivation and interest in learning seen in 13-year olds was diminished by the externally imposed deadlines and demands of formal assessment at 16 - albeit that these are mediated through teacher intervention.

Barnes et al. (2007) found that high-school and college students appeared to show more independence and autonomy in their approaches to learning. This implies a creative approach (NACCCE, 1999; Facer and Williamson, 2004; Robinson, 2011; Craft, 2011) in contrast with goal-orientation theory (Dweck, 1986). Students are not only set on achieving a goal, they are learning new techniques as they do so and the affordances (Gibson, 1979; Pea, 1993) of the technology provide an assurance of success. This in turns leads to an enhanced self-efficacy (Bandura, op.cit.) as they believe that problems will yield to the technology. The 'what' that is to be learnt is determined by the external environment of course specification, school and college but the 'how' is determined by the student, supported by technology (Barnes et al., op.cit.).

This autonomy reflects an earlier study by Tapscott (1998) who reports that the scope for access to information afforded by the Internet meant that there was less reliance on teachers as the source of transmitted information. While guided by teachers in terms of the 'what', the tools are sourced by the student for the 'how'. Further, he reports, the output from the tasks is determined partly by learners' perceptions of what makes for success, rather than the narrower constraints of the teacher or assessment criteria (ibid.). Thompson (2007) sees this as a trend towards becoming creators and not just consumers of learning (see also Papert, 1980; Crook, 2008; Craft, 2011).  This development is also identified by Underwood et al. (2008) as a key component of successful moves towards to the policy goal of 'personalised learning' (DfES, 2006a; OECD, 2006b). On the other hand the findings of Underwood et al. (op.cit.) also show that where students perceive greater choice and autonomy there is an associated reduction in their attainment – perhaps, they surmise, because the extra choice adds to the work and cognitive loads at the expense of achievement of learning objectives. Kelly's choice corollary to PCP (1955) argues against this, however, stating that individuals make choices that allow them more freedom in their own systems. The difference is that external assessment is not part of the student's own system – it is imposed from outside (Underwood et al., op.cit.).

For Wiliam (2007), the key issues are to provide environments which are well-regulated and where students are engaged (Ehrlich, 1998). The former he coins the 'pedagogy of contingency' and is necessary, he argues, because learning is unpredictable and systems need to provide scope for assessing those unexpected outcomes (Wiliam, op.cit.). This regulation-with-contingency sits uneasily with the notion of schools as disciplinary institutions (Foucault, 1979) and teachers prioritising the need for order over the need for deep learning (McNeil, 1986) and subsequently exercising power of the students' learning (Foucault, op.cit.). When teachers are in this position of power there is a tendency for 'overt instruction' (McNeil, op.cit.). While this may seem to deny creativity it is one of the four components of the New London Group's pedagogy for digital literacy (Cope and Kalantzis, 2000). Gillen and Barton (2010) critique this use of overt instruction and emphasise instead the role of a teacher in guiding students' learning allowing space for creativity and exploration (see NACCCE, 1999; Facer and Williamson, 2004; Robinson, 2006; Selwyn, 2008; Craft, 2011). The notion of 'flow' (Csikszentmihályi and Csikszentmihályi, 1992) combines the concept of a pedagogy of contingency, and its concomitant guidance or overt instruction, with engagement and motivation. Here motivation is not just an output from an engaging activity but a pre-requisite input.

Ecclestone and Pryor (2003) conceptualise the journey that a person makes through his or her learning experiences. This they term a 'learning career'. The research reported above sits at particular points on this journey. For Somekh and Mavers (op.cit.) it is national tests at 11 and 14; for Jarvis et al. (op.cit.) it is year 8, aged 12/13; for Brown and Hirschfield (op.cit.) it was 13-17 year olds. This thesis is also set at a particular point, looking at perceptions of assessment at 16. Ecclestone and Pryor (op.cit) argue that these key points are represented by "*assessment events and the practices by which they are enacted [and that these] are especially influential*" on these learning careers (p.477). So much so that they postulate that separate 'assessment careers' can be identified in learners' progression from primary education through secondary and beyond. For the students taking examinations at 16 in this study, such an assessment career will have been built up of external national tests at ages 7, 11 and 14[83], the formative assessment of everyday classroom activity and internal summative tests. Between the ages of 13 and 16, during KS4, much of this formative assessment is directed towards improvement of coursework and so impacts directly on the summative assessment at 16, which is the focus of this study.

These assessment events may interact with and distort the habitus of the learner (Bourdieu, 1984) and are significant contributors to the development

[83] These ages correspond to the end of the first three Key Stages of education in England.

of social and cultural capital (Ecclestone and Pryor, op.cit.). They also distort the school context so that the institutional habitus (Reay et al., 2001) becomes oriented towards the needs of examinations. The reasons for choosing particular courses, if there is a choice, reflect the impact of peers, family on that choice and of students' own perceptions of the future learning journey (ibid.). Here again is resonance with the Vygotskyian notions of the ZPD (1978), social learning and constructivism (ibid.; Bruner, 1996; Wenger, 1998) and with the development of habitus and cultural capital (Bourdieu, op.cit.).

Ecclestone (2004) argues that those aspects of learning central to the student's habitus are formed at the nexus of the communities and networks to which the student belongs and courses he or she takes. Her study reports a transformation of student approaches to learning by the assessment and formal processes of school. Here there is a subordination of the influence of a learner's non-formal learning contexts, including home, in favour of those of the assessment system, she argues (ibid.). In Bourdieu's terms (1984) it is the institutionalised dimension of cultural capital that is being given pre-eminence over the embodied. Social capital (ibid.), self-evidently, comes from all of the communities to which the learner belongs. It is the educational system, and the school in particular, that is exercising the power over what the student values. This relates back to the ideas of Foucault (1979) and McNeil (1986) discussed earlier. Ecclestone (op.cit.) further argues that the cultural capital of learners is invested in the progression routes through the system. In other words, success in one phase or subject opens doors to the next but the need for that success is also a driver in choice of subject, qualification or pathway. The learning career is shaped by the assessment points on it. The courses already taken and the communities belonged to are the crux of student behaviours and perceptions of the subjects they study. They are fundamental to students' choice of educational pathway (e.g. vocationally-related versus academic), to their targets (e.g. whether to aim for Distinction) and their attitudes (ibid.). Another view of this learning journey is given by LSIS (2006) in which it is defined in terms of starting with course choice, moving through study and learning and on to assessment and subsequent qualification. Sutherland et al. (2001) report on student perception of this journey, finding that learning was devalued in the minds of students unless it leads to a qualification.

The pre-eminence of the influence of the institution is underlined in other studies into aspects of the post-14 learning landscape. Reay et al. (2001) discuss it in the context of student choice for higher education. At the heart of this is ‘choice’ in the same way as it is for students choosing courses for 16+ qualifications. Their findings are that it is the institution which has the most significant impact on student choice. It is more important, they find, than peers and family in determining the learning journey. Cochrane and Straker (2005), on the other hand, found that students themselves did not see teachers as significant in influencing choice. Ball et al. (2000) discuss the choice facing students at 16. The choice at this age is much wider than for the students in the study for this thesis. For 16-year olds there is the possibility of changing school or college, of leaving education, of taking up apprenticeships. These are more significant than merely choosing courses at KS4. The findings though are the congruent with those of Reay et al. (op.cit.) and Ecclestone (op.cit.) with the influence of the teachers and classes attended being key factors in the decision.

The influence of the school, and its cultures, are also crucial to Brown et al.’s development of notions of situated learning (1998). The pervasive cultures for the majority they claim are the “*cultures that they observe, in which they participate, and which [...] are the cultures of school life itself*.” (p.34). They argue that school students do not have sufficient exposure to authentic domains for learning and assessment. Such domains require the application of knowledge, skills and understanding to real situations rather than ones contrived solely for learning (Dochy & Moerkerke, 1997; Tombari and Borich, 1999). Rather than use the real domains, the school provides the contexts for learning. This is less true in some courses than others. For example, the Diploma in IT (QCA/e-skills UK, 2006), with its necessary employer engagement, goes some way towards redressing the balance. Even if this is the case, and employer engagement is proving difficult to maintain (Laczik and White, 2009), it will only be applicable to the minority given the take up of the Diploma courses (Vidal Rodeiro, 2010).

Dweck (1986) argues that authentic activities (Tombari and Borich, 1999) increase motivation and relevance. The motivations of students in their approach to summative assessment at 16 are central to their perceptions of it and hence to this study. Ridgway et al. (2004) additionally offer consequence, exchange value and lack of agency as three other dimensions of summative assessment. The first two of these are seen in the importance placed, by students, on what happens after the assessment. Thus, summative assessments often "*have a value outside the classroom - for certification, access to further courses, and careers*" (ibid.:8). The third dimension, of lack of agency, reflects the fact that students see summative assessment as something that is done to them, resonating again with the issues of institutional dominance discussed earlier and learner voice (see pages 73 et seq.).

For Chedzoy and Burdon (2007) motivation is one of the reasons perceived by secondary school students for their success or failure. If they felt motivated they were more likely to succeed. Building on the work of Weiner (1986; 1992), Chedzoy and Burdon (op.cit.) list a range of other factors which also contribute to student perceptions of learning and assessment including context, task and their view of the teacher. In GCSE and other coursework at 16+ the role of the teacher in mediating the external coursework means that student perceptions of task are bound up in perceptions of teacher (Kozulin and Rand, 2000).

Tombari and Borich (1999) identify three branches of a cognitive paradigm of motivation – attribution theory (Weiner, 1986), self-efficacy theory (Bandura, 1997) and goal theory (Dweck, 1986). Attribution theory holds that students' motivations are influenced by the attributions of control, causality and stability. Citing Weiner (op.cit.), Tombari and Borich (op.cit.) argue that motivation is increased when students believe that success is due to things in their control rather than outside of it. If there is a belief that success will be determined by the nature of the assessment task rather than their own efforts then they are likely to be de-motivated. Authentic tasks are more likely to engage students and give them the sense of being in control and having a stable situation that together cause success (ibid.).

The second aspect of Tombari and Borich's framework for authenticity is self-efficacy theory (Bandura, op.cit.). This explains how students' perceptions of their own ability to succeed affect their success although there may be an element of 'self-fulfilling prophecy'. Tombari and Borich (op.cit.) describe how Eccles (1985) carried out research to improve self-efficacy through task modification. Where tasks were more hands-on and opportunities were provided for teacher intervention to increase students' self-belief, their motivation increased and attainment was higher. This links to the work of Honebein et al. (1993) where the setting of authentic tasks was found to put the locus of control into students' hands.

Tombari and Borich's (op.cit.) third, and final, aspect in relation to authenticity of assessment is goal theory. They draw here on Dweck's work (1986), in which two types of learner are identified: those who are 'task-focused' and those who are 'ability-focused'. Dweck studied students attempting difficult mathematical problems. She identifies as task-focused those students who continued to try and to solve a problem even when it did not yield to previously successful techniques. Ability-focused students, on the other hand, are identified as those who define their ability in terms of high grades and success. If they cannot solve a problem they ascribe this to it being impossible and do not persevere. These two traits, and one can assume that students exhibit different approaches in different contexts, can readily be applied to the domain of learning and assessment of ICT. Some students will persevere with technology long after others have decided either that the problem is intractable, and to do with the technology itself, or that it is beyond them.

A theoretical case has been made here for authenticity in task and assessment. Running counter to this is the way in which the high-stakes nature of the tests at 16 allows them to dominate over teaching and learning (Wiliam, 1996; Gulikers, 2006; Mansell, 2007). According to Hodgson and Spours (2008), authenticity is sacrificed for the requirements of the test. They report that "*the focus on preparation for GCSE [...] examinations encourages mechanical and instrumental learning habits in young people*" (p.1) and argue for

> *A much greater focus [to] be given to curriculum, pedagogy and learning rather than to qualification outcomes, accountability measures and narrow forms of assessment.*
>
> (p.11)

The specifications for the applied GCSE qualifications for 14-19 year olds, including those for ICT, were designed to address this and to put learning into a real context (DfES, 2005). The same design consideration was applied to the Diplomas with, additionally, some assessment also situated in the real world and an emphasis on locating abstract tasks in authentic contexts, the promotion of experiential learning and creativity (QCA/e-skills UK, 2006; QIA, 2007). That the specification of the Diplomas had employer engagement at their heart offered authentic opportunities for learning and assessment (Ertl et al., 2009). This situated learning (Bruner, 1977; Brown et al., 1989) poses challenges for teachers as they have to ensure that learning is meaningful for the learners and that it is "*fully related to the context in which it is produced*" (Macleod and Golby, 2003:354).

In Greenberg's analysis (reported in Gatto, 2005), however, there is a lack of any direct link between what is taught and learnt and the world beyond school. By this is meant that there is no suggestion of 'vocation' although there is the clear direction of preparing young people for the future (see also Claxton, 2008). Gatto (op.cit.) goes further when observing that no one believes that great scientists are trained in science classes or poets in English classes casting doubt on the nature of ICT as a 'vocational' subject. A similar view, albeit not confined to ICT, comes from a headteacher at a top independent school in England. Baker (2007) reports Anthony Seldon of Wellington School as saying that the university admissions system forces too much emphasis to be placed on the results at GCSE and GCE A level[84] at the expense of an 'interesting' curriculum and student experience. A more damning indictment was delivered by government adviser Alan Smithers who saw schools as turning into examination factories (Paton, 2007b). Further evidence of this mismatch came from the chairmen of BT[85] and of Tesco plc[86] for whom GCSEs and A levels had become devalued with qualifications that do not meet the needs of employers (Hough, 2009).

Web 2.0 with its affordance of publishing and sharing in public spaces provides an arena for authentic tasks through engagement with real

[84] GCE A level=General Certificate of Education, Advanced level. The qualification most taken by 18-year old students in schools in England.
[85] BT, based in the UK, is one of the world's leading providers of communications services.
[86] The leading supermarket in the UK.

audiences (Dweck, 1986; Tombari and Borich, 1999; Crook and Harrison, 2008; Cook, 2010). For Gillen and Barton (2010) this authenticity is not guaranteed by new technologies but can be facilitated by them. They cite the use of ultraportable devices in helping to take learning out of the classroom and into personalised contexts as exemplified by the *Personal Enquiry Project* (pp.17-18). For Brown et al. (1989) such moves to authentic activity are essential if learning to use and exploit tools is to be fully embedded in students' experiences and go beyond the culture of the school. Craft (2011), argues that students' use of the web for communication brings increased opportunities for creativity, collaboration and "*playful co-participation*" (ibid.:90; see also Gross, 2004; OfCOM, 2011). For Selwyn (2011) such creative endeavours are not the concern of assessment systems with schools trying to "*resist all of the potential disruptions of digital technology*" (p.151).

Archbald and Newman (1988, cited in Cumming and Maxwell, 1999) introduce the concept of authenticity to achievement. They identify several characteristics pertinent to this study defining authentic achievement as one that:

- emulates adult mastery;
- demonstrates production of knowledge rather than reproduction of the work of others;
- is based in pre-existing knowledge leading to in-depth understanding;
- integrates and synthesises ideas from a range of sources; and
- has a value beyond assessment or utilitarian function.

O'Rourke (2001) describes a project in Australia, which builds on this concept of authenticity and locates it in the learning and assessment of ICT. Starting from the standpoint that ICT provides students with greater opportunities for communication, collaboration, thinking and creativity, she identifies challenges to assessment processes. These, she argues, develop from students having significant control in the construction of their portfolios so that assessment is done with students rather than to them. The project further uses rich, authentic tasks providing evidence of learning in multiple domains. The challenges identified are those of reliability and manageability of divergence.

In discussing authenticity, Messick (1996) points out that what is authentic in one context is inauthentic in another. Honebein et al. (1993) illustrate this with the example of learning to pass a particular test. While the learning may be decontextualised from the real world (and hence non-authentic in hat context) the learning is authentic within the framework of the test. They go further in problematising this by observing that this dilemma is precisely the one that employers, or government, anguish over. There are two classes of complaint about education they say – that students do not do well enough in tests, and that students "*do not solve problems in the real world*" (ibid.:89). These two issues pull assessment design (and student perception of it) in different directions. They conclude that authenticity requires activities that are:

- owned by the learner;
- project based (and hence holistic); and
- suitable for tackling from multiple perspectives.

This leads to the need for students to experience authentic assessment that they recognise as being relevant and useful to their future lives (Dochy & Moerkerke, 1997).

Authentic tasks would, it seems, be crucial to the successful design of curricula and assessment. Two opposing views are found however. Gardner et al. (2008) argue that changes in learning in the 21st century and the ubiquity of new technologies may result in any consequent changes to assessment being seen as fads by teachers. For example, setting assessment in authentic tasks and development of 'real' projects has not been successful, they argue, as they are seen as top down initiatives. Ecclestone (2004) found that the assessment of outcomes, in itself, generates motivation and engagement for students on vocationally-related courses whether or not the tasks are authentic. This, she argues, is allied to the gain in social and cultural capital that success offers and that it is not dependent on the authenticity of the tasks. For Facer (2011), however, the key is for adults and students to work together. She talks of a "*new contract for between generations*" (p.40) so that the debate about educational futures, including assessment, moves away from just being "*debates about children amongst adults*" (p.39). Here Facer sees a redefining of what it is to be 'school' as socio-technological change brings a redrawing of boundaries between formal and informal learning (ibid.).

As discussed above, the self-regulating learner (Zimmerman, 2001) and the need for students to learn with and from others (Vygotsky, 1978; Papert, 1980; Bruner, 1996; Wenger, 1998) are constrained by the influence of the institution (Foucault, 1979; McNeil, 1986; Ecclestone, 2004). The institutional habitus (Reay et al., 2001) is dominant over the individual in formal learning contexts. It is in these contexts that the study for this thesis is set. Student perceptions are sought from those still at school who are undertaking formal external courses in ICT. It is their voice which is sought. The review now considers this concept of learner voice and how it is expressed in the context of high-stakes assessment at 16.

In the domain of assessment, learner voice is held as crucial - learners are seen to be at the heart of their own learning. Whether it is in the outcomes of learner designed systems (see for example Ruddock et al., 2006; Mitra and Dangwal, 2010), embedding of peer review into formative assessment processes (as exemplified by guidance from the DCSF, 2009) or in the use of self-assessment to develop an understanding of those processes (Walker and Logan, 2008). High-stakes assessment such as that undertaken at 16, however, is somehow outside of this frame. In the design and development of such qualifications, learner voice is noticeable by its absence. Bullock and Wikeley (2001) saw this absence as a "*setback*" (p.67) to the very notion of students' engagement with their own learning.

This absence of involvement of the students in assessment design can be contrasted with the pre-1986 'Mode 3' examinations at 16, which were designed by teachers to suit the needs of their local contexts and be more suitable for their students (Hammersley and Hargreaves, 1983 – see, in particular, pp.197 et seq.). The notion of meeting student needs and of student choice (if not voice) in such qualifications was seen, however, to make the job of teaching harder as teachers had to devise the assessments (ibid.). It had also been condemned, many years previously, by the Dainton Report which saw it as a factor in the decline in science and mathematics study (DES, 1968) as students opted away from perceived harder subjects.

This echoes the concerns of the current Government (DfE, 2010a; Gove, 2011).

Learner voice is now well established as an approach in schools (Rudduck and Fielding, 2006; Walker and Logan, 2008). It is concerned with understanding and vocalising the student interpretation of the institutional framework as a whole. The way in which any programme of learning and assessment is implemented, however, is mediated, and controlled, by the institutional framework (McNeil, 1986; Mansell, 2007). Traditionally the movement for learner voice was restricted to the confines of the institution. For example, government guidance (DfES, 2003) is aimed at what schools might do improve student participation and research and literature (see for example Rudduck and Fielding, op.cit.; Walker and Logan, op.cit.; Selwyn et al. 2008; and the summary of Rudd et al., 2006) describe and analyse practices in individual schools. Its application to the wider educational arena is absent although Selwyn et al. (op.cit.) allude to possibilities of the use of new technologies to engage with learner voice outside of school and to provide a means to reconfigure curriculum and assessment. This goes beyond the usual domain of learner voice – that of engagement in the 'civic' life of the school (ibid.). Such use of technology for participative engagement of learners is also touched on, albeit at a school level, by Rudd et al. (op.cit.). While learner voice is seen as just one of the gateways to personalisation (Hargreaves, 2004 – see Table 2.6) the involvement of the learner in the system of teaching and learning is, by definition, a necessary requirement. Similarly Walker and Logan (op.cit.) conclude that involving learners is an ideal way to develop skills, ensure they have a greater say in the activities of the institution and inspire them to take the lead. In the ICT domain this practice has been developed by the SSAT[87] (2011) in its 'Digital Leaders' programme whereby students are enabled to embed and lead school's use of technology within the curriculum.

Claxton (2008) takes a wider and more revolutionary view. For him, these issues are not about tinkering with curriculum or assessments but about answering the fundamental questions of how what is learnt is decoupled from

[87] SSAT – The Specialist Schools and Academies Trust - http://www.ssatrust.org.uk - is an independent, not-for-profit, membership organisation for secondary schools in England and internationally.

the school context so that it may be applied and used in the variety of unknown contexts to be faced by young people. This uncertainty, he argues is not something to fear. He observes, however, that students become fragile in the face of problems rather than facing them confidently. Such observations are not confined to those who attain lower grades. Here there is a reliance on school which, he argues, inhibits real learning. This reinforces the much earlier findings of Rudduck et al. (1994) that institutional rather than educational aspects dominate secondary school learning.

## *2.5. Chapter summary*

The foci for the literature review were learning and assessment of ICT and student perceptions. These foci came from the aims of the study. Throughout the chapter these were considered from the point of view of students at 16, with the influence of educational policy in England discussed where it impacted on the arguments. In combination with the author's epistemological and ontological stances, the key findings from the review, lead to a discussion of the methodological approach in the next chapter and to the design of research instruments for the empirical study.

In reviewing aspects of learning, it is clear that the subject ICT is manifested in a range of skills and in knowledge and understanding. These together lead to the notion of ICT capability. Learning, and the development of the capability, takes places in a range of contexts – formal, informal and non-formal. While this is true of all subjects the rapid development of technology and its ubiquity in school, home and other settings, leads to a particular emphasis on out-of-school learning for ICT. This emphasis is reflected in the methodological discussion and the design of the empirical study in subsequent chapters.

Students' perceptions of ICT are formed not just from school but from the other contexts and from the influences of friends and family and their respective uses of technology. Given this range of contexts and subsequent application for ICT, the authenticity of learning and its applicability to both non-school tasks and future education, employment or life in general is paramount. This is compromised, however, by the need for external assessment to be valid and for an approach that provides coursework tasks that are constrained by external awarding bodies. Authenticity is a subjective concept but some indicators of it are that it produces work that has utility beyond assessment and leads learners to emulate adult mastery.

The issue of authenticity is related to the validity and reliability of the assessment. Any assessment has to be designed to ensure that it assessing what it intends to. The curriculum and subject matter being tested, however, should reflect the use of ICT in non-school contexts given the proliferation of such use. Consequently the research needed to allow students to explore the extent to which they see that their assessment as being fit for purpose and their views on its coverage of both formal and non-formal learning. Regarding reliability, issues arise because of the changing nature of technology, students' appropriation of it and frequent policy initiatives for education in general and 16+ assessment and ICT in particular. For an assessment to be reliable it needs to produce the same results if taken again. The fast changing nature of technology and the uneven appropriation of it in non-school contexts mean that this is difficult to guarantee. The aim of the research was to gauge perceptions of students, each of whom will only go through the assessment process once. While there is rapid change in technology and perturbations in the methods of assessment and range of qualifications available, each student will only experience the programme of study in force at the time they are at school. The methodology therefore focuses how to ascertain the individuals' responses and perceptions rather than considering differences over time between groups.

It is in this analysis of students' perceptions that the thesis' new knowledge is located. Much has been researched into, and written on, the needs of future society, the shape of ICT curricula and the nature of learning assessment. School students' responses to current provision at 16 are not well reported, however. Methodologically this requires an approach that gives students the opportunity to set the agenda for the data collection. Learner voice initiatives have tended not to include students in matters of high-stakes assessment, which is still something that is externally imposed.

The empirical research began with a view to this gap identified in the literature. The intention was to hear the students' voice. To do so an appropriate methodology and approach to data collection and analysis was devised and this is discussed in the next chapter.

# 3. Methodological approach

This research study examined school students' perceptions of their learning of ICT and associated assessment processes. It focused on the learning and assessment of students aged 15-16 (year 11) in schools. This chapter discusses the methodological considerations resulting from this context and the stance of the researcher. This led to the research being undertaken in a qualitative, naturalistic, interpretive frame. The chapter begins with an overview of these considerations and then proceeds to discuss them in detail. This is followed by an exposition of the principal methodological approach, that of interpretive phenomenology. Discussions of bias and ethics follow and the chapter concludes with an examination of the implementation of the methodology by way of an analysis of the methods of data collection used.

The underpinning ontology of the researcher was that of nominalism (Cohen et al., 2007). By this is meant that no absolute truth was being sought. The view of the world is understood to be that which is articulated through the perceptions of students. This led to naturalistic, interpretive (Patton, 1990; Roman and Apple, 1990; Robson, 1993) epistemological stance being adopted for the inquiry - the approach was anti-positivist (Cohen et al., 2007). What was found was only revealed through the subjective and interpreted hermeneutics of respondent and researcher as seen through the lenses of question, response and subsequent coding, analysis and re-interpretation. Here then is a ideographic methodology (Cohen et al., 2007) – what was being sought was the view of individuals rather than a generalised truth. To draw conclusions against the research aims, however, the axiological approach was to identify key phenomena from across these views.

This chapter analyses this stance and approaches, their appropriateness for this study and the particular methodological use of phenomenology (Husserl 1913/1982; Merleau-Ponty, 1945/2005; van Manen, 1990). The epistemology of the interpretative phenomenological tradition (Lopez and Wills, 2004; Langdridge, 2007) is discussed together with the multiple hermeneutic perspective (Alvesson and Sköldberg, 2000). The interplay of these multiple lenses with the power relationship of student and teachers as represented by symbolic interactionism (Blumer, 1969; Lansheere, 1993) is also considered. Figure 3.1 locates the enquiry's underpinning ontological and epistemological approaches and the influence of particular aspects of methodology.

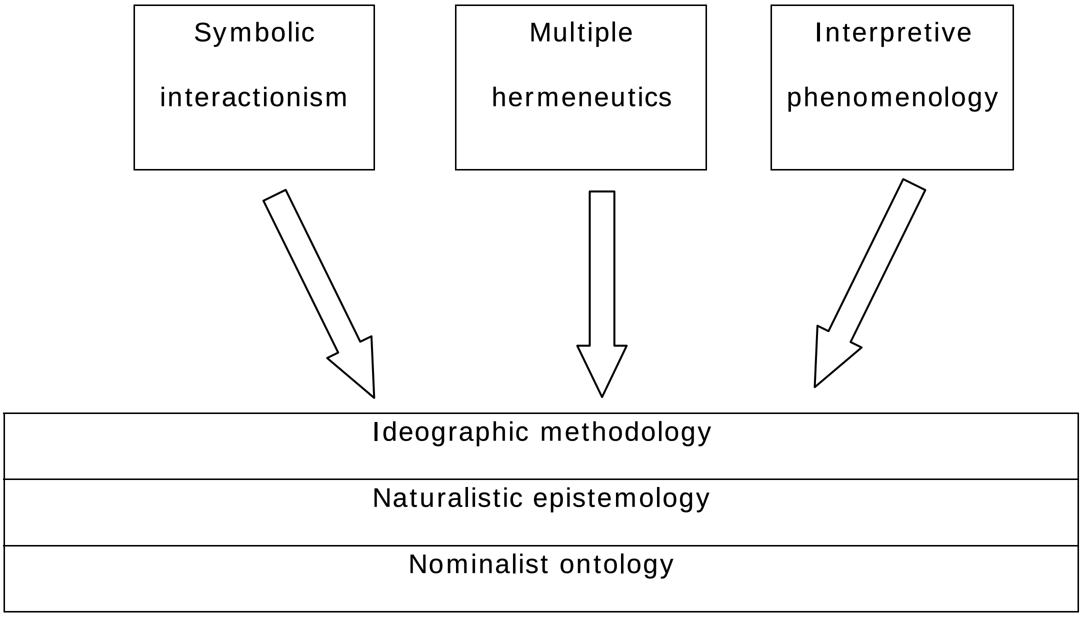


**Figure 3.1**. Paradigms and methodologies of the study

Taking a scientific, or positivist, approach to this research would have required an objective view to be taken of its context (Cohen et al., 2007). This objectivist standpoint would then have led to a philosophical stance in which the world of the students was held to be knowable and describable and would have yielded to wholly quantitative techniques (ibid.). Such a realist ontological approach would not have resonated well with the study's basis in individual perceptions of learning and its assessment. As Denzin and Lincoln (2000) note "*objective reality can never be captured*" (p.5). A consequence of this basis in perception and interpretation would have been that a wholly quantitative approach to this investigation would yield 'deficient' results (Reeves, 1993). Roman and Apple (op.cit.) mark this distinction strongly, stating that:

> *Naturalistic [research] diametrically opposes and provides a methodological alternative to the allegedly intrinsic positivism of the natural sciences, quantitative sociology and experimental research*.
>
> (p.47)

In exploring the way in which students construct their own learning, the research paradigm was qualitative (Robson, 2002). It used the human instrument of students and, through multiple hermeneutics, the researcher. It explored tacit knowledge, personal learning constructs and perceptions through qualitative methods, and adopted purposive sampling through selection of students who were following a range of ICT courses. It reflected on learning in natural settings of home and school. It had, therefore, an approach that is naturalistic (Robson, 2002) and interpretative (Denzin and Lincoln, 2000).

Eisner and Peshkin (1990) argue that research positioned in the naturalistic, qualitative, field of enquiry can only be examined using qualitative or ethnographic tools. In the case of this study, however, there were two disparate domains under investigation. Firstly there were the student perceptions of ICT capability, learning and assessment. These were subject to qualitative study being naturalistic and interpretive. Secondly, and in contrast, there is the field (Bourdieu, 1977) in which the study was located – the education system and the policies of schools and examination, or awarding, bodies. The latter could be critiqued from a qualitative perspective – bringing in notions of critical theory (Horkheimer, 1937) – but there is also a wealth of quantitative data available to describe and explain the impact of the development of assessment of ICT. Here is a resonance with Hammersley (1983) when he said:

> *There is direct conflict… between the methodological assumptions built into [national educational] policy and those now characteristic of much educational research.*
>
> (p.ix)

By the latter he meant the qualitative, interpretive and ethnographic (ibid.)

Further tension is apparent when one considers, on the one hand, the praxis of the theory espoused by the policy and the practice in the classroom and, on the other, the praxis of students' use of ICT and their underlying implicit constructs. It is this last dimension – students' theories and perceptions of their use of ICT – that is at the crux of this enquiry. Students' perceptions of

ICT capability are influenced by the views of their peers and others who they interact with in informal learning contexts, and by the actions of their teachers and schools in the formal learning context (Blumer, 1969; McNeil, 1986; Lansheere, 1993; Mansell, 2007). These two influences will be, to some extent, working in different directions to influence the perceptions and, moreover, are set against a changing landscape of technological development (Allen, 2008; Livingstone and Hope, 2011).

These tensions, nevertheless, were embraced by taking an approach that did not seek to resolve them into an absolute truth (Denzin and Lincoln, op.cit.). The competing influences on students' perceptions were considered as subordinate to the articulation and analysis of those perceptions themselves. Students take note of these influences, deliberately or sub-consciously, when forming their view of ICT and its assessment. They are engaged with learning in a range of social spaces – at school and at home - and they act on the influence of these spaces (Bourdieu, 1984). This resolution of tensions into the research aim of analysing the student perceptions, rather than their provenance, leads to the enquiry being aligned with the naturalistic approach as defined by Cohen et al. (2007).

Cohen et al. (ibid.) identify two paradigms for inquiry – normative and interpretive – to describe the perspectives of positivist and anti-positivist epistemologies respectively. They describe three essential differences between these paradigms. Firstly, there is a difference in the way in which the subjects of the research are regarded. In the normative model, they say, human behaviour is governed by rules that can be investigated by the methods of natural science (ibid.). For the interpretive inquirer, the individual perspective is paramount with the "*central endeavour [being] to understand the subjective world of human experience*" (Cohen et al., ibid.:22). The students in this study are being asked to describe their perceptions of their learning. This subjectivity places the inquiry firmly in the interpretive domain.

Secondly, there is a difference in the conception of behaviour and action (ibid.). For the normative researcher, humans act according to rules and their behaviour may be seen as a direct result of the things that have happened to them in their past. There is a cause and effect, which can be predicted. This resonates with the behaviourist orientation of learning theory (Skinner, 1953). In the interpretive paradigm, by contrast, the focus is on action - *"behaviour with meaning"* (Cohen et al., op.cit.:23). Human actions are based on experience, interaction with others and shared, negotiated meaning. For the students in this study, use of ICT is developed and carried out in a context of interaction with others. Learning is constructed as a result of this learning, much of which may take place in non-formal contexts.

Thirdly, Cohen et al. (ibid.) identify a difference in the way in which theories are developed. Normative researchers strive to find general theories that can be described by rules and that can link the inputs of external influences to the outputs of behaviour. Here reality is external to those being studied. For the interpretive researcher, the theory is one that emerges from the individuals' experiences and their interpretations of them. It arises from the many particular instances and is grounded in the data that arises from the research (Glaser and Strauss, 1967). In this study, the focus on learning and the perceptions of individuals provided a reality that could not be generalised across the population. Individuals' previous experiences, expectations of courses and contexts yield "*multi-faceted images of human behaviour"* (Cohen et al., op.cit.:23) and deny the possibility of a universal theory.

Table 3.1 summarises these differences and confirms the interpretive nature of this study. Spradley (1980) has this approach as being akin to the explorer, as opposed to the engineer. The explorer seeks "*to describe [what is found]" rather than to answer the question 'what did you find?"*' (cited in Hitchcock and Hughes, 1995:18). Robson (1993) takes this metaphor back into the methodological approach. For him, an interpretive approach requires the researcher to develop understandings and lines of enquiry from the data collected, with the analysis of the data interweaved with the collection process itself. Here there is "*An initial bout of data collection is followed by analysis, the results of which are then used to decide what data should be next collected"* (p.19).

| | Normative paradigm | Interpretive paradigm | This research |
|---|---|---|---|
| **View of subjects** | Governed by rules | Centrality of individual's subjective view | Based on students own perceptions |
| **Behaviour / Action** | Past experiences predict behaviour | Action based on interaction | Students interacting with others |
| **Theory** | Generalisable, universal theory | Multi-faceted, individualised | Individual contexts and experiences |

**Table 3.1**. Normative and Interpretive approaches based on Cohen et al. (2007)

Thus the enquiry was within the traditions of naturalistic, interpretive research. Figure 3.2 maps aspects of the approach against the characteristics of such an epistemological stance as outlined by Cohen et al. (op.cit.). With such a naturalistic stance there were issues of the extent to which the findings can be generalised. For Schofield (1990), generalisability is not applicable to the qualitative study. Linking the concept of naturalistic enquiry with qualitative evaluation, he argues that the context-specific nature of such enquiry and the changes that are constantly shifting the site of that enquiry, mean that generalisability, although often assumed by the audience for a study, cannot usefully be expected (ibid.).

At best, then, this study was an enquiry into the perceptions of a *given set* of students, rather than students *in general*. The students would have interacted with other students and would have been influenced by them and by teachers, family members and friends in how they perceived their learning, and the importance they attached to demonstrated learning and use of ICT – knowledge, understanding, skills and attributes (see Bourdieu, 1977 and considerations of habitus in chapter 2).

| **Aspects of the enquiry with methodological assumptions** | **Characteristic of the naturalistic approach as defined by Cohen et al.** |
| --- | --- |
| School students choose to use ICT in a range of ways and contexts, not just those prescribed by school and examinations. | People are deliberate and intentional in their actions and activities. |
| Students are engaged in networks in school and online. | People actively construct their social world. |
| The technology and available tools are constantly changing. This state of flux is exacerbated by the whims of fashion – in which teenagers and their social group may use some technology that is 'flavour of the month' for a short while, only to then drop it (Allen, 2008). | Situations are fluid and evolve over time. |
| By definition, students' perceptions of ICT and of assessment will be personal. Further, their contexts will be influenced by their experiences in the contexts of their home and family, friendship groups, their class within a school and the school itself. | Events and individuals are unique and non-generalisable. |
| Perceptions of students form the central basis for the research. | The world should be studied through the eyes of participants not researchers. |
| Students interact with others based on their own perceptions of the context. Their use of ICT is mediated by these perceptions. | People act on their interpretations of events. |
| Each student is in a shared context with other students, family and friends. | There are multiple interpretations of events, in a multi-layered reality. |

**Figure 3.2**. The study and characteristics of naturalistic inquiry

(after Cohen et al., 2007:21-22)

Any findings could not be usefully generalised across the whole population, and any one individual could not be regarded as a 'case' of a generalisable set. On the other hand the approach of interpretive phenomenology (see below) provided for the isolation of phenomena that encapsulates the perceptions of the set of individual respondents.

For Eisner and Peshkin (1990), qualitative research is synonymous with ethnography. Other writers distinguish the two. While the enquiry was carried out in the "*natural setting*" (Atkinson and Hammersley, 1994:121), the researcher was not fully immersed in that setting (Roman and Apple, 1990) being one to *"look, listen, take part…"* (Hitchcock and Hughes, 1995:120) rather than "*equal member of the group*" (ibid.). The methods of ethnography were thus not appropriate here.

On the other hand Ball (1993), in considering ethnographic research, has much to say that is pertinent to the context for this enquiry. There are considerations of the research role as being 'responsive and adaptive' to the setting, of the social processes of data collection, the perception of researcher as authority (see also symbolic interactionism and bias below) and the need to consider both casually obtained data and that which is deliberately elicited (ibid.). The approach is to elicit data through deliberate and formal processes yet the interpretive and multiple hermeneutic epistemology also yields some data which is 'casually obtained' in the sense that it emerges in the interpretation (ibid.). As discussed above, despite these considerations, the study was not ethnographic. Neither was it action research. If it had been, the outcomes of research would have influenced the practice of the researcher (McNiff and Whitehead, 2002). While these outcomes may inform the work of others they present an analysis of the findings from the point of view of an outsider.

The study was, however, located in the specific culture of schools and was implicitly informed by the practice of others, the teachers of the students. Within these contexts the relationship of the learners to those who teach them, and who make decisions on assessment and curriculum on their behalf, was an influencing factor on the formation of perceptions. This is the domain of symbolic interactionism.

Lansheere (1993), in discussing this methodological approach, contrasts the British and American viewpoints. He identifies the former as being based in class differences and the latter as being exemplified by teacher as representative of mainstream culture as student as part of subculture/s. This can be interpreted here as the teacher representing the systemic examination and assessment process and student as being informed by informal identification of ICT capability – from peers and other non-school (or at least non-curricular) uses.

Blumer‘s original (1969) definition of symbolic interactionism includes three aspects:

- Human beings act toward things on the basis of the meanings they ascribe to those things.
- The meaning of such things is derived from, or arises out of, the social interaction that one has with others and the society.
- These meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he/she encounters.

These can be clearly related to the context of this enquiry in relation to the way in which students interact with technologies and learning and what they mean by ICT capability. There are those meanings that they ascribe to ICT capability that come from there own constructs and those that come from the social groups they belong too - especially peers (Bourdieu, 1984). These meanings are modified through the use of the tools and change over time. There is also elements here of the feminist tradition in allowing respondents to "*talk for themselves*" (Atkinson et al., 1993:25). On the other hand the relationship with the system of 'school' would lead to an institutionalised view (Foucault, 1979).

## 3.1. Phenomenology and hermeneutics

The ontological locus of the methodology has been shown to be in the naturalistic (Roman and Apple, 1990), interpretive tradition (Cohen et al., 2007), with a feminist viewpoint (Atkinson et al., 1993). This is ameliorated by the symbolic interactionism (Blumer, 1969; Lansheere, 1993) inherent in the power relationship of the education system, schools, teachers and students (see also McNeil, 1986). It is through these lenses that the data collected was seen. The complications of the methodological discussion do not end there, however.

For Collins and Hussey (2003) positivism is at one end of a continuum. At the other is not the generalised anti-positivist objective viewpoint of Cohen et al. (2007) but rather the specific methodology of phenomenology. For Collins and Hussey (op.cit.) this term represents *“reality as a projection of human imagination”* (p.48). Under this definition this study was undoubtedly phenomenological and not positivistic. More significantly though, the definition is congruent with the study’s aims of analysing perceptions, which may be construed as precisely projections of human imagination. The positivistic approach, already dismissed in this chapter, is also seen here to be incompatible with the interpretation of phenomena.

At the heart of these considerations of perceptions are the differences in the hermeneutics of Husserl (1913/1982) and Heidegger (1927/1962). For the former the importance of the existence of the objects of consciousness *only* in the way in which they are perceived by the consciousness. For the latter the autonomy of such objects irrespective of the sense we bestow on them with any such sense being subjective and distorted by the context of observer and observed. This perception is then reported linguistically and Wittgenstein’s concept of the language game (1953) filters any such sense. Underlying all, however, is the description of what it is that manifests the perception. The essence of this manifestation is in the phenomena that describe it (Merleau-Ponty, 1945/2002; see also an overview by Routio, 2007). For Heidegger (op.cit.) these are only describable through the interpretation of the researcher rather than as an absolute (Husserl, op.cit.). This distinction has led to the eidetic and the hermeneutic branches of phenomenology (Cohen and Omery, 1994; Lopez and Wills, 2004; Langdridge, 2007; Finlay 2009). In the former the emphasis is on the development of a rich description of the phenomena by respondent, building up a detailed life view (Smith and Osborn, 2003). In the latter the description is mediated by the researcher, and by the context in which the phenomena are being reported by the respondents. Paralleling this dichotomy is, on the one hand, Giorgi’s focus on the generalisation of the ‘lifeworld’ (Giorgi, 2008; Finlay, op.cit.) in which several standpoints are taken and reduced to their essential commonalities to describe the phenomena being studied and Smith’s IPA approach (Smith and Osborn, 2003; Smith et al., 2009) which takes the hermeneutic and non-generalisable account to be irreducible. This latter approach is developed by Conroy (2003) and expanded below.

In this research the hermeneutic stance is taken. This is because of the symbolic interactions (Blumer, 1969) between adult researcher and student respondent, and the influences of the cultural capital (Bourdieu, 1984) of the school context, made a purely eidetic or descriptive approach untenable. Everything was mediated through the interpretations of individuals and coloured by the relationships between them. Crucial to the descriptive approach is the stripping away, epoché (Husserl 1913/1982), or bracketing (Schutz, 1970; Giorgi, 1985; Finlay, 2009) of the researcher’s own standpoints and interpretations. Although this is made easier here as the author was located in a different place to the respondent students it is not entirely possible due to the interpretations placed on the reporting. As an adult outside of the system, the findings were interpreted through another lens which obscured the true descriptions of the constructs leading to some bracketing as a matter of course. The interpretive lens is multi-faceted and the hermeneutic is not singular.

This multiple interpretation - the viewing and reporting of the world through a series of lenses - forms the triple hermeneutics of Alvesson and Sköldberg (2000). Here the student perceptions are distorted by reporting and recording of researcher and respondent and coloured by the context of research (see Figure 3.3). As the researcher was also part of the context of the enquiry, the educational system, the contextual lens may also be regarded as having distorted the perception of what was being reported by students and also the way in which the data was analysed. This multiple and sequential interpretation was not done in the absence of context.

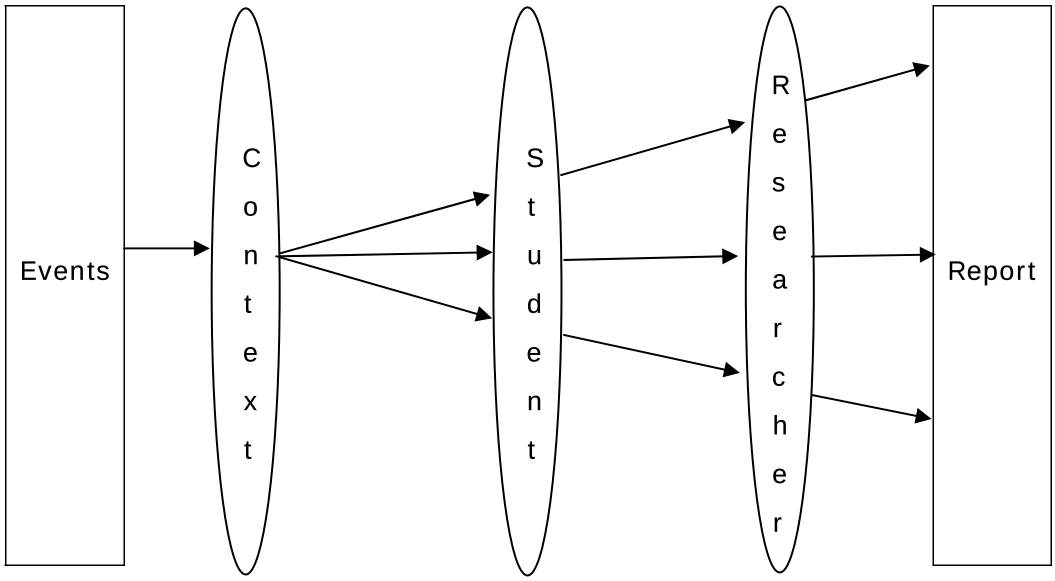


**Figure 3.3**. The lenses of the triple hermeneutic

Conroy (2003) examines, or rather re-examines, ‘interpretive phenomenology’ (IP) and develops a hermeneutic spiral of ever-deepening interpretation (this is discussed in detail later in this chapter and shown in Figure 3.4). Her methodology and methods for examining perceptions may be considered as an enhancement of the linear model of Figure 3.3. In the context of psychological nursing, the usual context for IP, Conroy’s hermeneutic spiral (ibid.) produces rich case descriptions. This was not the intention here as would be the case in the tradition of interpretive phenomenological analysis (IPA) (Smith and Osborn, 2003; Smith et al., 2009) in which her work is located. The differences between the approach of Smith and Conroy and that taken here originated from two sources. These were the aims of the study and from the context in which it takes place.

Firstly, the study did not set out to describe, in exhaustive detail, the lived experience of a single individual, or a small number of individuals (Conroy, op.cit.). In IPA this would be the intention and the approach would require iterative interviews with the same respondents (ibid.). This study’s aims, in looking for student perceptions of ICT and its assessment, were to interpret the views of a number of students to draw out phenomena that are applicable across respondents rather than a rich description of each respondent's perceptions. Secondly the study was set in schools where students experience ICT as a group rather than merely individually. Their interpretations of this experience were mediated through the interactions of members of their classes and between teachers and classes. Here the approach of symbolic interactionism (Blumer, 1969; Lansheere, 1993) was pertinent as the views of students were influenced by those interactions and by the relative power positions of the respondents and those who taught them.

Thus an interpretive phenomenological approach was taken, as opposed to an eidetic one, but the tradition of IPA per se was not followed. The interpretation here is located in the 'perceptions' of the title of this thesis with 'perceptions' equating to 'interpretations'. 'Perception' was used because of the ambiguity of multiple meanings of 'interpretations' inherent in the study.

'Perception' has a particular meaning in the philosophical arena involving theories of how we interact with our environment in an aesthetic sense (Berleant, 1997). This meaning was rejected in favour of a rather more pragmatic view after Varela and Shear (1999). They offer a framework for examining perception in terms of its constituent parts of what, why and how. In this research these may be written as:

- The perceptions of students about what ICT and its assessment are.
- The perceptions of students about why ICT and its assessment are important (or not).
- The perceptions of students about how ICT is presented, taught, learnt and assessed.

Conroy's model (2003) builds on the emergent traditions of the IPA (Smith and Osborn, 2003; Smith et al., 2009). In IPA the key instrument is the in-depth interview with a respondent, exhaustively carried out to ascertain the 'true' perception of that individual's reality. Instead of the IPA's circling metaphor for investigation, with researcher and respondent engaged in a loop of exploration of meaning, Conroy's approach conceives of a hermeneutic spiral after Heidegger (1998, cited in Conroy, op.cit.). Here meaning is refined in stages with the view that IPA is *“an interpretation of participants’ interpretation [and] work[ing] with participants to see which points are salient*” (Conroy, op.cit.:11). The six stages taken from the original text (pp.:16-17), are:

1. Attending to footprints and concurrent preliminary interpretation.
2. In-depth interpretation.
3. Second reader introduction to the narratives.
4. Paradigm shift identification.
5. Exemplar development.
6. Principle development.

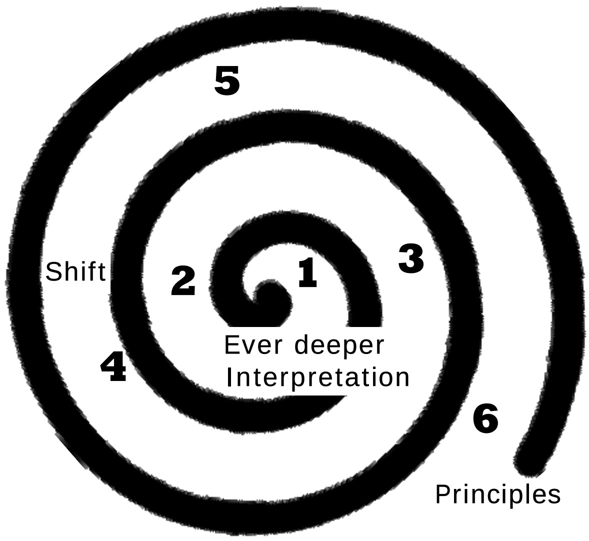


**Figure 3.4**. Hermeneutic spiral development of IPA(interpretive phenomenological analysis), after Conroy (2003:16)

This process is shown in Figure 3.4. Within the research into student perceptions of ICT, however, the approach was better represented by taking some of these the other way round – going from the general abstract toward the centrality of an interpretation of a core truth. For this study, also, the stages were not quite the same as those proposed by Conroy (see Table 3.2 below). This reflects a difference in methodological approach deemed necessary by issues of access and the shifting nature of student perception due to the timeline of examinations. Students will necessarily be responding at different times in relation to their final examination or submission of coursework (Ball, 1993).

Conroy (ibid.) proposes revisiting the same respondents in a short time span and that they will be, inter alia, in the same place relative to the issue they are reflecting on. Here, though, different students were visited (for reasons of access and sampling) and they were in a different place relative to their perceptions of their course and its assessment due to the nature of year 11 in school. Students who have just started the year have a different understanding of the requirements of assessment, and content of the course specification, to those who are much nearer the summative examination point. The IPA approach which Conroy bases her work on is fundamentally about in-depth repeat interviews with a very small number of respondents (Conroy, op.cit.; Smith et al., op. cit.). This study involved a larger number of respondents who will not be interviewed repeatedly. Most fundamentally, the study was concerned with phenomena drawn from analysis of multiple, rather than individual perceptions. The commonality between the approaches is seen as phenomena are refined through iterative empirical research phases in both cases.

| **Conroy (2003)** | **This research** |
|---|---|
| Attending to footprints and concurrent preliminary interpretation. | Attending to footprints and concurrent preliminary interpretation. |
| In-depth interpretation. | In-depth interpretation by the researcher. |
| Second reader introduction to the narratives. | N/A. |
| Paradigm shift identification. | Identification of key viewpoints and constructs of perception. |
| Exemplar development. | Development of framework for further investigation. |
| Principle development. | Development of emergent concepts that influence perception. |

**Table 3.2**. Methodological stages in Conroy's approach compared to stages in this research.

A spiral still existed but it is about developing a core truth from abstract generalisations. The 'truth' being sought was not an absolute truth but rather an amalgam of viewpoints consistent with the methodological approach described earlier. Neither was it the 'truth' of one person as would be the case in IPA and in the psychological nursing context to which Conroy's methodology is applied (ibid.). Table 3.2 compares Conroy's stages with those in this study.

In summary then, this research used a phenomenological approach in which the lived experiences of students were interpreted. The reduction of the descriptions of these experiences through multiple interpretations did not include bracketing of the views and experiences of the author. The purity of the Husserlian description is rejected in favour of the Heideggerian subjective reasoning. The eidetic is rejected in favour of the interpretive.

## *3.2. Bias*

The collection of data in any naturalistic, interpretive enquiry will be subject to bias (Cohen et al., 2007). It was important to put aside pre-conceived notions of student perceptions of ICT and assessment - especially given the starting points for the thesis in anecdote and teacher/adult reportage. Nevertheless the methodological standpoint recognised such an attempt to be futile and thus any findings will be biased in line with Alvesson and Sköldberg (2000).

The Prologue to this work gave a number of vignettes which acted as catalysts for the study. Encapsulated in these stories and accounts were a number of perceptions, either explicitly told or implicitly contained in the manner of their telling. It would have been easy to set these up as hypotheses or, worse, as self-fulfilling prophecies. For example a hypothesis could have been framed around a notion of 'this is what was observed anecdotally so this is what is going to be proven or disproven'. Less obviously, but equally as dangerously, these vignettes could have provided a framework for the study. Even if they were not used as hypotheses, they could have steered the questioning to such an extent that they almost became so. The research would then have been biased to finding out the extent to which they are generally true.

A second source of bias came from the author's background as 'teacher of ICT'. This had two possible implications. Firstly the respondents might have seen the author as ‘teacher’ rather than as ‘researcher’. They could have picked up on mannerisms, knowledge etc and interpreted these to have come from a teacher, responding accordingly. This would have skewed their responses towards the system or official view - further cementing the methodological locus of the study within symbolic interactionism. The locating, and equating, of the author by students as ‘a teacher’ would have been compounded by their introduction to the research by their teachers and the conducting of it on school premises in school time. This was necessary from the point of view of access, but it will have biased the responses.

Secondly, there was potential bias due to the patterns of the school year. Ball (1993) provides pertinent insight into how the sampling process for a naturalistic study in school should be undertaken. There are the key aspects of place, people and time. On the last point Ball says “*different times of school year would yield different data*” (p.39). Further Ball warns about the dangers of being associated with key informants due to the possibilities of increased bias. This was unlikely as the author was not part of the students’ everyday life although they may associate the research, and hence the researcher, with the teachers who are part of that life. This issue of status gives rise to the potential for bias (Soltis, 1990), which can be mitigated by the critical analysis of responses. For Phillips (1990), objectivity and subjectivity cannot be regarded as right and wrong, they are equally subject to the need for critical analysis.

Thus there was bias in the interpretation of the students in their espoused perceptions. There was also bias in the second hermeneutic of the author’s interpretation (Alvesson and Sköldberg, op.cit.). ‘Teacher values’ could have been ascribed to the responses. The author’s background makes it likely interactions with students were of the teacher-student type and student responses could have been interpreted through the lens of a teacher. The interpretation of the data was subject to the biases and pre-held beliefs resulting from that background (Robson, 1993; Cohen et al., 2007).

A final source of bias in the approach came from the author’s knowledge of the domain. This may have meant that the direction of students’ responses were predicted, with ‘reading between the lines’ or prompting with follow-up questions that were laden with the author's interests, inter-connections or assumptions. Similarly lines of discussion may have been closed down in the belief that all had been said. In this respect knowledge of the domain, while crucial for understanding of responses, would have been a distorting factor in the data collection and subsequent analysis.

There is further inherent bias in the results obtained in such a study, whatever method had been adopted. This bias comes from two sources, one due to nature of the curriculum and the other due to the nature of the population being enquired into.

The ICT curriculum at 16 in England is heavily prescribed. The National Curriculum (QCA, 1999; 2007a) determines the overall content and subject map, the common core for GCSEs (QCA, 2001) further constrain those qualifications as do the specifications for Diploma (QCA/e-skills UK, 2006), National awards (OCR, 2006) and the Digital Applications suite (Edexcel, 2005). Consequently the curriculum is tightly regulated and students' perceptions of it, and of its assessment, will have been through the filter of that regulation.

The students who were informants and respondents in this study were a skewed population, as each of them was engaged in the study of ICT with the objective of gaining a qualification. Being located within this endeavour will have distorted their perceptions of it. Such bias in population is inevitable as it was only being inside a course that allowed students to comment on it with any real knowledge. Had students been sampled who were not taking an ICT course then a different study would have been conducted – perhaps into perceptions of ICT assessment at the point of options at 14 – one which could be the subject of further research (see section 8.5).

## *3.3. Ethical considerations*

The enquiry was situated in secondary schools and the respondents and informants are necessarily under 16. This posed both ethical and access issues.

As a member of staff in a university school of education, the author had certain contacts which could be leveraged to provide access. These were the contacts with schools in the partnership for initial teacher education. For the first two rounds of data collection access was gained to classes in one of the schools in this partnership. For the third phase data collection, the author used contacts obtained through a national mailing list of a subject association. This yielded access to a number of schools across the country.

| **BERA ethical guideline paragraph and summary** | **Steps taken in this research to conform to guideline** |
|---|---|
| 10/11. Voluntary informed consent. | All participants, their teachers and parents were asked to give consent by signing a form explaining the purposes of the research (see Appendices 2 and 3). |
| 12. Deception. | No deception was used in the research. All questioning and other methods of data collection were fully explained to the respondent students. |
| 13. Right to withdraw. | Explanation of the provision for withdrawing this consent was given together with contact details. |
| 14. Children's consent. | Students were asked to consent independently of their parents and teachers. |
| 17. Legal requirements. | The researcher's Criminal Records Bureau (CRB) clearance form was given to the schools in which the enquiry took place so that a copy could be kept on record. |
| 20. Incentives. | No incentives were given. |
| 23. Privacy. | All data collection was recorded and analysed anonymously. No school or student names were used in the reporting. |
| 24. Data protection. | Electronic data was kept only for the purposes of the research, to be destroyed once the research is completed. |

**Table 3.3**. BERA ethical guidelines and this study

The study was undertaken under the auspices of the Nottingham Trent University's School of Education. As such ethical clearance was provided by submission of the proposal to the Research Degrees Committee of the

College of Arts, Humanities and Education (AHE). This research involves respondents who are under 18 and so are considered 'vulnerable' under the guidelines of the British Educational Research Association (BERA, 2004), which inform the ethical clearance for research projects in AHE. The research was conducted in line with these guidelines and clearance was given by the committee at the commencement of the project. Table 3.3 summarises the steps taken to ensure compliance with the BERA guidelines.

The enquiry was not a piece of action research but, from an ethical perspective, it yielded similar issues to such studies. The author was working in relationship with the schools concerned and reflecting on the findings. Such results, although not directly fed back into practice, as would be the case in action research, could affect the nature of the relationship with those schools. This would come about through a different knowledge of the schools resulting from the findings of the enquiry.

As such it is useful to consider the set of ethical principles for action research identified by Robson (1993). Those which are pertinent to this research are protocol, involvement, authorisation, confidentiality and right to report. These are now considered in turn.

***Protocol***

Schools involved in the enquiry, were kept informed of its objectives and methods being undertaken. Negotiations and arrangements were normally made through an ICT co-ordinator, although in some cases it was through a member of the senior leadership team. Approval was obtained for access to the school, with precise details of timings and the students to be surveyed or interviewed. Any special circumstances appertaining to an individual needed to be ascertained before an interview is carried out. Questionnaire proformas and interview outlines were sent to schools in advance of visits. It was important though that these were not shared with students in advance as that could have led to collusion and, hence, further bias in the results.

### *Authorisation*

All schools were required to sign a consent form (see Appendices 2 and 3) to allow the research to be undertaken. Similarly, students had to have a consent form signed by their parents. In addition to the normal ethical clearance this provided it also gave an opportunity for consideration of the fact that such interviews were taking place in school time. The nature of the high-stakes qualifications being taken by these students meant that they were given explicit permission to be able to opt out of attendance, or their parents could ask that this was done. In the event this latter option was not take up by parents but some schools did swop the allocated students. Other schools who offered to take part withdrew their offers when it came to trying to find dates. This was because of the problems of releasing year 11 students for such activity at the expense of their usual lesson. Tied up with the issues of authorisation are those of access. Students, and schools, work to strict deadlines for coursework and year 11 is a pressurised time. Access was negotiated through prolonged discussions with possible sites – with teachers, headteachers and, in one case, governors. For reasons of child protection the researcher's CRB clearance was presented to all schools on arrival.

### *Confidentiality*

All responses were confidential. This was stated in the consent letters (see Appendices 2 and 3) and at the time of the interviews. For interview responses, students were told that they could ask for any response to be ignored and removed from the transcript. Such a request could be made during the visit or subsequently through the school contact. All responses were to be anonymised and it was explained that the use of first names in interviews was purely for reasons of politeness not for identification. For anonymised questionnaire responses, students were invited to pick a password that would serve to identify their responses should they want to have them removed from the data collection and analysis. Again this could be requested during the visit or subsequently via the school contact. All consent forms carried an e-mail address and mobile telephone number so that the researcher could be contacted. In the event, no requests were received to have data taken out of consideration for analysis.

***Right to report***

Once authorisation has been granted and interviews carried out, the transcripts must be available for use in the research. This need was made explicit prior to the data collection.

## 3.4. From methodology to methods

Having established the enquiry as one of interpretive phenomenology (Langdridge, 2007) with multiple hermeneutic perspectives of interpretation (Alvesson and Sköldberg, 2000), this section now discusses the methods of empirical research used to elicit, collect and organise data to address the research aims. Conroy's HPR[88] spiral (2003, see Figure 3.4) starts with a blank sheet of paper, proceeds to capture an overview of the situation from the perspective of the respondent and then applies iterative techniques to layer and enrich the understanding of that perspective. The focus is on the individual. In this study a similar process was adopted but moving from individual perspectives to those garnered from a multiple respondents.

The starting point was the same as for Conroy (ibid.) - no assumptions about student perceptions were made and a blank piece of paper was brought to the table. This was despite the genesis of the research being in anecdotes represented by the vignettes in the Prologue. These served as a catalyst for enquiry rather than as evidence resulting from it. Thus the first round of empirical research was to gain an overview of the constructs inherent in student perception. Here PCP theory (Kelly, 1955; Fetherston, 1997; 1999; Fransella, 2003) informs the approach of repertory grid analysis. Subsequent phases needed to enrich the findings of this first phase to develop an understanding of the student perception and to build a richer picture from which phenomena could be isolated. Unlike the approach of Conroy (op.cit.) this was not done by revisiting an individual. This was because an individual student's perception would be coloured by the stage of the course he or she was at (Ball, 1993). More importantly it was also because the research aims were to investigate student perceptions as a whole rather than those of an individual. Thus Conroy's spiral (Figure 3.4)

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[88] Conroy (2003) uses the term hermeneutical phenomenological research (HPR) where the more usual term is interpretive phenomenology (see Langdridge, 2007).

was modified. Starting from vaguely defined individual perceptions, greater depth and clarity were built up by testing the perceptions against a wider audience and in more detail through the range of instruments used.

The results of the first phase of construct elicitation were tested against a wider population for validity and leading to interim findings. A final phase was the discussion of these with individuals by way of semi-structured interviews. A richer picture was built up of the student perceptions layered by the phases of data collection and enriched by the multiple perspectives obtained from a number of students' views. Figure 3.5 shows these phases. This multiple phase approach resonates with Macbeath et al. (2003) who argue that for collecting data in school two approaches are needed: questionnaires to get breadth of response and interviews to get depth. Chisnall (2005) also suggests that obtaining the most reliable data requires the most difficult techniques (i.e. interviews).

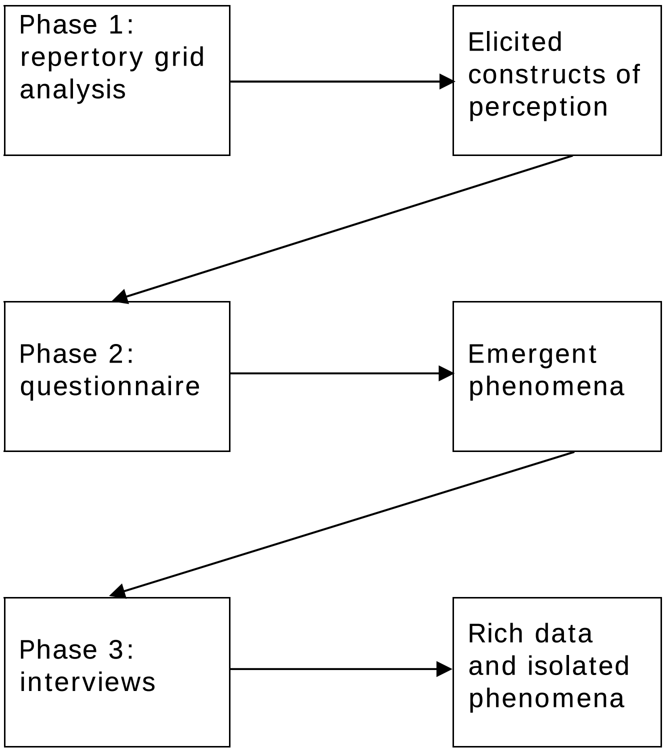


**Figure 3.5**. The three phases of data collection

Each phase is now discussed in outline. The inter-relation of the phases means the precise design of subsequent instruments depended on the data and findings from preceding ones (Robson, 1993). This iteration is reported on in the next chapter.

In the first two phases of data collection a single school was chosen that had a range of ICT courses at 16. The school was one to which there was access through the university-school partnership of initial teacher education. In this convenience sampling (Cohen et al., 2007) the researcher had was able to make follow up visits. It allowed for continuity between the first two phases for development of the in-depth interpretation required in the methodological approach (see Figure 3.5). The school was also selected because there was a range of courses being offered and all students took an ICT course of some description. This eliminated the variable of students opting for the subject or not, which could have had a significant impact on their perceptions. Including such students could provide opportunities for further research (see section 8.5).

The first phase, the repertory grid analysis, elicited students' perceptions of what it was that made up ICT and its assessment. This was done by use of a series of open-ended questions to students, derived from the research aims. Their responses were noted and they were then prompted to categorise them. From these categories constructs were elicited. A detailed explanation of this method and interpretation of findings from it is found on pages 106 et seq. The categories which emerged (e.g. ICT and its relevance to life, ICT for communications) then informed the design of the second phase instrument – the questionnaire. This was administered in the same school to the all of the students from the groups from which the students who completed the repertory grids had been drawn. This was due to the desirability of testing out the constructs on students with a homogeneous experience (after Langdridge, 2007). While the repertory grids had focused on an individual (or pair of) student's perceptions, the questionnaire was used to give a broader view and to provide, implicitly, a check on the validity of the data from the grid analysis. Three groups of students were identified by the school to respond to the questionnaire – those taking the GCSE short course, the GCSE long course and the Key Skills qualification respectively. There were 44 students in total. Three groups were chosen to give a mix of students and a sufficiently large sample. The intention was not to analyse for differences across the groups, as there would be other variables here that would be difficult to isolate – they had different teachers and there were a number of factors that led to their being placed in the three groups (e.g. teachers' perception of their ability, attainment in KS3, self-choice of course). Furthermore an analysis of variation between ICT courses was beyond the scope of the research aims, but could provide opportunities for further research (see section 8.5). The design of the questionnaire took into account the research aims and an analysis of the objectives of the specifications of the courses being followed by the students. Here was an implicit triangulation between those espoused objectives and the students' perceptions of what it is they learn in ICT. A detailed explanation of the questionnaire design and interpretation of initial findings from it are on pages 121 et.seq.

The data resulting from the second phase was used to inform the design of the third phase, that of semi-structured interview. Here the intention was to play the findings back to a smaller number of individual students to get a deeper view of their perceptions of learning and assessment of ICT. This iterative approach, in line with Conroy's spiral (2003), was designed to build in validity to the findings and to ensure, as far as was possible, confidence in the phenomena emergent from the analysis of data. The interview transcripts were combed and coded for themes (Smith and Osborn, 2003). Phenomena were then isolated in these themes and analysed against the raw data from all phases and against the literature

The interviews were with students sampled from a range of schools. An e-mail was sent to a number of mailing lists asking training providers and teachers of ICT if they would be interested in being a site for the interviews (see Appendix 6). A sample was drawn taking schools with different types of ICT courses. Schools were chosen in which the taking of an external assessment in ICT at 16 was compulsory. This was to ensure that issues to do with opting for the subject were eliminated, retaining a focus on the perceptions of students taking ICT. Thus the sampling was opportunistic (Cohen et al. 2007), coming from those which the researcher had access to. It was also purposive (ibid.; Langdridge, 2007) in that schools were looked for that gave a variety in terms of ICT courses being offered to eliminate, as far as possible, effects due to a particular qualification. Interpretive phenomenological approaches usually aim to minimise the different experiences of the sample (Langdridge, op.cit.) but here the decision was taken to use a heterogeneous set of schools to keep the focus on student perceptions of ICT rather than perceptions of a particular course or school. Five schools were identified to cover the range of common assessment qualifications and type of school. Table 3.4 shows the breakdown of the sample chosen.

| | **Type** | **ICT qual. at 16 taken by sample** | **Number of students interviewed** | **Group interview** |
|---|---|---|---|---|
| **School H** | Selective 11-18 | Compulsory Short course GCSE | 3 | Yes, with one extra student present |
| **School E** | Comprehensive 11-16 | Compulsory OCR National ICT | 4 | Yes |
| **School U** | Selective 11-18 | Optional CiDA | 2 | Yes, but only with CiDA students |
| | | Optional AS Computing | 2 | |
| **School J** | City Academy 11-18 | Optional Diploma in IT | 4 | Yes |
| **School L** | Secondary Modern 11-16 | Compulsory CiDA | 3 | Yes, but cut short by school bell |

**Table 3.4**. Sample of schools used in the third phase interviews

A geographical spread was achieved with each school being in a different local authority area and spread over four regions of England. It was planned to interview up to four students in each school. This is perhaps more than was needed to gain a rich view of the phenomena at work in student perception in the school but allowed for possible absences on the day or technical failure in the recording device. A semi-structured interview approach was used to allow for the development of the responses and reflection on the findings emergent from the previous two phases. Follow-up prompts derived from these findings were used to elaborate answers. The approach also allowed freedom for new threads and perceptions to be reported by students. In addition to interviewing the students individually, they were also seen as a group at the end to ask some overarching summary questions around the assessment process. This allowed for triangulation against the individual answers and a group dynamic to yield richer responses (Lewis, 1992).

The next chapter details the precise design of the instruments, each one building on the previous. The data resulting from each phase of empirical research (i.e. from the application of each instrument) is subjected to an initial analysis. The interpretation of this then informs the design of the instrument used in the next phase. Isolated phenomena are then considered in detail in chapters 5, 6 and 7.

# 4. Methods: Design of instruments and initial interpretations

Having established the methodological approach, the design of the methods and instruments used for data collection are now discussed.

This study had three aims:

1. To critically analyse the ways in which students aged 16 construct their learning of ICT capability in formal and informal contexts;
2. To critically analyse the student view of assessment of ICT at 16;
3. To develop a theoretical base to evaluate the construct validity of assessment of ICT at 16.

These aims were investigated in a naturalistic, interpretive frame as explored in the previous chapter with three phases of data collection. The three phases followed the stages in Table 3.2, the hermeneutic spiral of interpretation and analysis (Conroy, 2003). The design of the latter phases was dependent on the results of the preceding ones. For this reason it is not possible to discuss the design of the instruments without some interpretation of the emergent results. The methods of empirical data collection, design of instruments and interpretation of initial results are thus presented as a single narrative with further results and findings interpreted and analysed in subsequent chapters.

The interpretive approach started from the premise of not knowing what the student perceptions were. Whatever was found would be interpreted through multiple hermeneutic lenses (Alvesson and Sköldberg, 2000) with students' perceptions coloured by the contexts in which they lived and learned (Foucault, 1979; Hammersley, 1993) and the reporting of them constrained by the relationship they perceived with the researcher (Blumer, 1969; Lansheere, 1993).

The first phase of data collection was the elicitation of student constructs of ICT and its assessment. This was followed by a wider-scale questionnaire, to gain a broader picture of those constructs, and then by in-depth individual interviews to probe the views being presented. Table 4.1 shows the phases as they map onto the stages of Conroy's spiral and its modification. This provides an expansion of Table 3.2, which constitutes the first two columns.

| Conroy (2003) | This research | Data collection phase |
|---|---|---|
| Attending to footprints and concurrent preliminary interpretation. | Attending to footprints and concurrent preliminary interpretation. | 1. Construct elicitation using repertory grid and subsequent analysis. |
| In-depth interpretation. | In-depth interpretation by the researcher. | |
| Second reader introduction to the narratives. | N/A. | |
| Paradigm shift identification. | Identification of key viewpoints and constructs of perception. | |
| Exemplar development. | Development of framework for further investigation. | 2. Use of questionnaire to exemplify constructs. |
| Principle development. | Development of emergent concepts that influence perception. | 3. Use of interviews, analysis and subsequent isolation of phenomena. |

**Table 4.1**. Phases of data collection and the hermeneutic spiral (Conroy, 2003), as modified in this research, mapped onto phases of data collection (based on Table 3.2)

Table 4.1 presents the phases linearly but, in the analysis of findings, there is iteration between them. Identification of key viewpoints and frameworks are repeated and refined at each stage under the interpretation of the researcher. Essential to the methodological approach is the ultimate goal, represented in the bottom right-hand corner, of the isolation of phenomena. It is through these phenomena that the student perceptions of ICT may be examined and the research aims addressed.

The repertory grid process, in the first phase, yields a number of 'personal'[89] constructs, describing perceptions about ICT and its assessment, which were then built into a questionnaire and tested against a larger population (second phase). Analysis of the results from the questionnaire led to the design of semi-structured interviews. These were used, with a wider sample, to gain a more in-depth view of the perceptions (third phase). The design of each of these phases is now described in turn with an exposition of how they emerge from the methodological stance and from the conceptual framework explored in the review of the literature. In order to discuss the design of subsequent phases some preliminary discussion of findings is also presented. The major part of this discussion, the interpretation of the results and the subsequent isolation of phenomena begins in section 4.4.

## *4.1. Phase 1: Repertory grid and construct elicitation*

The methodological approach is grounded in the interpretive tradition (Roman and Apple, 1990; Patton, 1990; Cohen et al., 2003). It is the interpretation of the students, filtered through the interpretation of the researcher that is paramount. Conroy's hermeneutic spiral (2003) starts with the 'blank sheet' elicitation of the respondents', in this case the students', interpretations of their world. This stage is unmodified in this research (see Table 4.1). The methodological approach requires that the researcher's viewpoint must initially be suppressed as much as possible. At this stage[90], it is 'bracketed' (Schutz, 1970; Giorgi, 1985; Finlay, 2009), following Husserl's notion of 'epoché' (1913/1982), to allow the view of the students to be clearly seen. To achieve this objective of bracketing a repertory grid was used as the first phase of data collection (Kelly, 1955; Cohen et al., 2007; Bell, 2011). This method requires the researcher to have no presumptions of the respondent perceptions. Data is elicited through prompts and then structured by the respondents. PCP considers not only what it is that formulates and describes someone's construct of the world but also, through

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[89] Kelly uses 'personal' but it is debatable as to whether this is the best term to apply when the method is used with a pair/group as was done in this study.

[90] The first stage, construct elicitation, allows for bracketing. Subsequent stages do not and the interpretation by the researcher is an integral part of the methodological approach, which is based on IPA (Smith and Osborn, 2003).

the organisational corollary to PCP theory (Kelly, op.cit.), how it is structured.

The students' constructs of ICT and its assessment elicited using a repertory grid technique were, in this research, a first 'cut' to be used for further data collection rather than as the primary data collection method. Thus the in-depth quantitative analyses found in its more typical uses in psychological settings (see, for example, Kelly, 1955; Beail, 1985; Fransella et al., 2003; Bell, 2011) were avoided. This was done to minimise the inherent dangers of moving from an interpretive to a positivistic frame that would have been in contradiction to the underlying qualitative methodology (Cohen et al., 2007). The repertory grid process is now described and is shown in Figure 4.1.

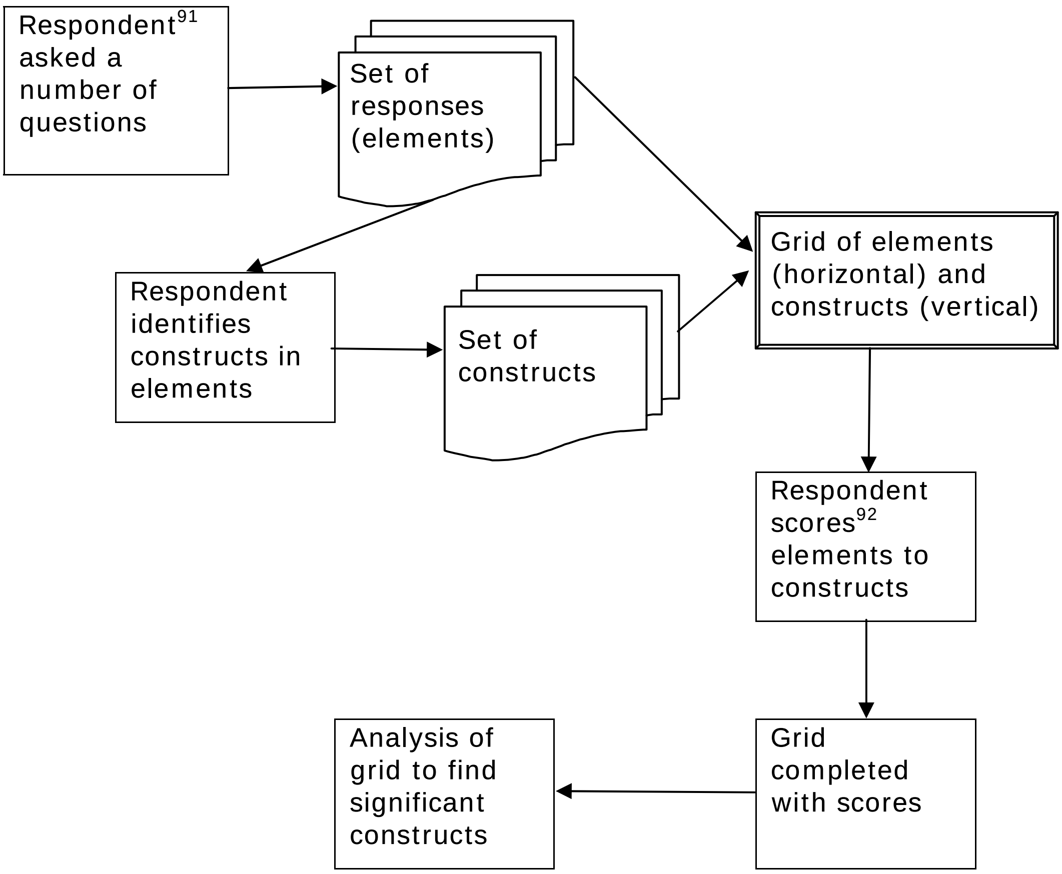


**Figure 4.1**. The process of construct elicitation
(after Kelly, 1955; Fransella, 2003; Cohen et al., 2007; Bell, 2011)

[91] In this phase of the study the 'respondent' was a pair of students.
[92] In bipolar constructs, as here, the scoring is simply aligning each element with one pole or the other of each construct (e.g. 'Happy' or 'Sad', recorded in a binary fashion as X or O). For a scale, a number would be assigned (e.g. between 1 and 5).

The repertory grid method starts with the researcher asking the respondents questions designed to prompt initial thoughts about the subject under consideration (Kelly, 1955; Fransella, 2003; Cohen et al., op.cit.; Bell, 2011) – in this case ICT and its assessment. Care was taken to use attitude-neutral questions to minimise any 'steer' or bias in the questioning (Cohen et al., op.cit.). These questions, their provenance and justification for inclusion are shown in Table 4.2.

| Question | Discussion, provenance and justification |
|---|---|
| ICT - what should you know about?<br>ICT - what should you be able to do? | These questions were targeted at aim 1. They focused on the curriculum of ICT as perceived in school, paraphrasing it in vernacular expressions of knowledge and capability respectively. |
| ICT assessment (coursework/exams) - what should be in them? | This question was targeted at aim 2. It was designed to open up thinking about assessment in the broadest sense. Exemplification of assessment types was given to both make the term more accessible to respondents and to focus on the approaching summative external assessment rather than any other assessments that were not part of the research. |
| If someone is 'good' at ICT, what can they do?<br>If someone is 'good' at using technology, what can they do? | These questions were partly derived from aim 3, partly from the need to expand perceptions beyond the school and partly to give a student view of the assessment criteria (through the use of the word 'good') inherent in aim 2. They required the student to personalise the view by thinking of 'someone'. This located the response in personal interpretation (after Kelly, 1955). |
| What technology do you use at home and not school? | This question was used where responses to the above had appeared not to have covered it. |

**Table 4.2**. Stimuli questions for the repertory grid elicitation

The responses, known as 'elements', to the questions are used to elicit 'constructs', in which respondents are prompted to offer 'poles' to represent some characteristic[93] in the initial responses (ibid.). The final stage of data collection in this method is for respondents to align all of their initial responses with one pole or the other of every one of the constructs. This

[93] Here 'pole' is meant to mean one aspect of a construct or its opposite. For example the construct happiness could be represented by the two poles 'Happy'-'Sad'. A more granular definition of a construct would be given by a scalar response of happiness (e.g. from 'very happy' to 'very sad'). The binary approach is taken here to avoid a quantitative methodological steer.

then yields a 'grid' of data which can be subjected to statistical or other analysis.

The questions were posed to four pairs of students, each pair drawn from a different year 11 class at a single school covering a range of ability and qualifications (GCSE full and short course and Key Skills). This was carried out in the March prior to the students' final GCSE exams in June. Each pair was asked the stimuli questions above and told to record as many responses as they could on separate small pieces of paper[94]. An example of the set of responses – or elements (Kelly, 1955) – is shown in Figure 4.2 as headings in the grid.. In this case only three stimuli yielded unique responses, with the other two merely providing duplicates which are not shown separately in the grid.

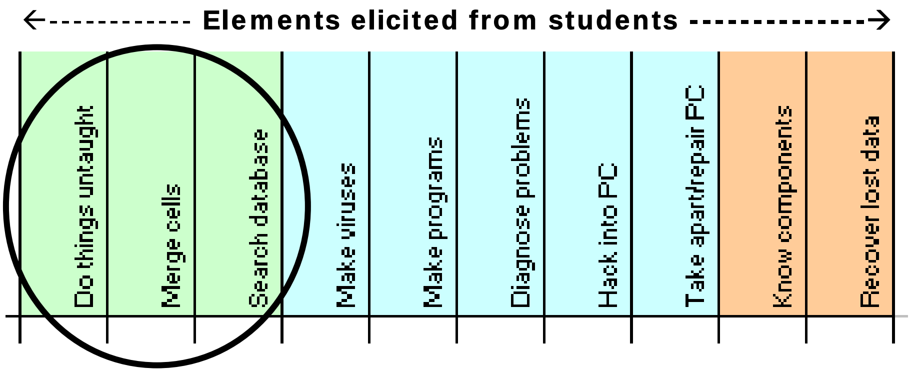


**Figure 4.2**. Example of elements elicited in the repertory grid process with responses to the first stimulus ringed[95]

As an example, in response to 'If someone is good at ICT, what can they do?' (see Table 4.2), the students in this pair gave the three responses shown in left-hand columns and ringed in Figure 4.2. These are 'Do things untaught', 'Merge cells' and 'Search database'. The other seven column headings are the responses to the other stimuli. These headings Kelly (op.cit.) refers to as 'elements'.

[94] Kelly's original method suggests 'cards'.
[95] The original shading in the headings was colour-coded to show which stimulus the element came from but, as that is not used further in the analysis, a greyscale image is used here.

Once all of the elements had been recorded the same pair of students was then asked to identify two that had a characteristic in common and a third which did not share that characteristic[96]. Thus two ‘poles’ were identified by the students – one pole shared by two responses, the other represented by the third. In the example here it could be that ‘Make viruses’ and ‘Make programs’ share the characteristic ‘Write software’ whereas the ‘Take apart PC’ does not share that characteristic. Alternatively ‘Make programs’ and ‘Recover lost data’ might be seen to share a characteristic ‘Solve problems’ whereas ‘Merge cells’ does not.

The characteristics identified by the students were the ‘personal constructs’ of Kelly’s theory (op.cit.). It is important to restate that, as with the elements, the constructs were elicited from the students. They represent their view of the world, however idiosyncratic. The ‘naming’ of the constructs (characteristics) was done by the students with some consultation with the researcher to clarify meaning. Responses were identified by students and the question asked ‘What do these two have in common that the third does not?’. Answers to this are the ‘poles’ of the construct. This process was repeated until no new constructs were found by the students. For the example in Figure 4.2 the elicited constructs, as described by the students, are shown in Table 4.3.

| **First pole (emergent)** | **Second pole (emergent)** | **Second pole (implicit)** |
|---|---|---|
| What PC does | What's in PC | - |
| Making | Knowing | - |
| Problem solving | - | Not problem solving |
| Not making things easier | - | Making things easier |
| ‘Shut down’ | - | Not ‘Shut down’ |

**Table 4.3**. Example of elicited constructs

Table 4.3 show the five constructs elicited from the students through having picked three elements - two that had something in common and one that did not. Thus for the first construct, students identified two elements that were

[96] This is the standard process in repertory grid use (see Fransella, 2003, and Figure 4.1).

associated with 'What the PC does' and one that was not and was, instead, associated with 'What is in the PC'. For this construct both 'poles' of the construct were named by the students. In this case, and that of the second construct, both poles were 'emergent' (Kelly, 1955; Fransella, 2003). For the last three constructs the second pole was implied as being an absence of the first pole – the students only named one pole. These constructs were then recorded in the grid. Where an implicit pole was used the nomenclature hi-lo (or lo-hi) was used to indicate the presence (hi) or absence (lo) of a characteristic.  This was the researcher's short hand (after Cohen et al., 2007). Figure 4.3 shows the five elicited constructs for the elements that were shown in Figure 4.2.

←-------- **Elements from students** ----------→

| Constructs from students | Do things untaught | Merge cells | Search database | Make viruses | Make programs | Diagnose problems | Hack into PC | Take apart/repair PC | Know components | Recover lost data |
|---|---|---|---|---|---|---|---|---|---|---|
| What PC does - What's in PC | | | | | | | | | | |
| Making - knowing | | | | | | | | | | |
| Problem solving hi - lo | | | | | | | | | | |
| Making easier lo - hi | | | | | | | | | | |
| "Shut down" hi - lo | | | | | | | | | | |

**Figure 4.3**. Example of constructs derived from elements

Having identified constructs, the next stage of the process was to align elements to them (see Figure 4.1). Taking each construct in turn, students were asked to consider all of the elements and align them with one pole or the other[97] - noting that they would have already aligned three elements in the emergence of the construct (see Kelly, 1955; Cohen et al., 2007 for further explanation of the method). Where students aligned an element with

[97] Note that where the repertory grid is the primary method of data collection, and statistical analysis is to be carried out, it is more usual (Fransella, 2003; Bell, 2011) to ask respondents to rate each element on a scale (e.g. with a Likert scale) with the extent to which it matches one pole or the other. The use of the binary alignment to one pole or the other is Kelly's original approach (1955) and is used here as there is no intention to use statistical techniques but merely to use the grid as the first stage in a hermeneutic interpretation.

one pole an O was recorded; for alignment at the other pole, an X. The body of the grid was then completed to show which responses were at each pole of the construct. An example of such a grid is shown in Figure 4.4. Further examples of this process are given in the interpretation of findings in this chapter and in the discussion of emergent phenomena in chapters 5, 6 and 7.

**←-------- Elements from students--------→**

| Constructs from students | Do things untaught | Merge cells | Search database | Make viruses | Make programs | Diagnose problems | Hack into PC | Take apart/repair PC | Know components | Recover lost data |
|---|---|---|---|---|---|---|---|---|---|---|
| What PC does - What's in PC | X | X | X | X | X | X | O | O | O | O |
| Making - knowing | O | X | X | X | X | O | O | O | O | O |
| Problem solving hi - lo | O | X | O | X | X | X | O | X | X | O |
| Making easier lo - hi | O | O | O | X | X | O | O | O | O | O |
| "Shut down" hi - lo | O | O | O | O | O | O | X | O | O | O |

**Figure 4.4**. Example of completed grid showing alignment of elements to poles of the constructs (O or X)

In Figure 4.4, it can be seen that for some constructs there is a relatively balanced spread of elements to each pole whereas for others there is a skewed response. Thus for the construct ‘Problem solving’, students associated six elements with it (the high pole, indicated by the Xs). The other four elements were not associated with ‘Problem solving’ in the perceptions of the students (recorded by an O, the low pole). On the other hand they associated only one element (‘Hack into PC’) with ‘Shut down’ – i.e. there is only one X on the bottom row of the grid. Having aligned all of the elements with poles of all of the constructs the objective for the interpretation and analysis is to determine the most significant constructs, which will inform the subsequent stages of data collection and eventual isolation of phenomena. This process, explained below, looks at the relative distributions of the O and X for each construct.

Figure 4.4 shows five constructs that were elicited from one pair of students. The process was repeated for all four pairs of students and Table 4.4 collates all of the constructs elicited.

| **Constructs elicited from students (as represented by poles)** | | |
|---|---|---|
| Benign | ←-→ | Malicious |
| Destroy data | ←-→ | Keep data |
| 'Shut down' (hi) | ←-→ | 'Shut down' (lo) |
| Creativity | ←-→ | Working to a list |
| Exam board | ←-→ | Underground |
| Requirements | ←-→ | Processes |
| Making | ←-→ | Knowing |
| Fast changing | ←-→ | Stays the same |
| Knowledge | ←-→ | Skill |
| Know what to do | ←-→ | Use program |
| What PC does | ←-→ | What's in PC |
| Needs knowledge of computers (hi) | ←-→ | Needs knowledge of computers (lo) |
| Learning | ←-→ | Entertainment |
| Entertainment | ←-→ | Job |
| Numbers | ←-→ | Words |
| Excel | ←-→ | Powerpoint |
| Calculation | ←-→ | Information |
| Data handling | ←-→ | Messaging |
| One off | ←-→ | Edit |
| Making easier (lo) | ←-→ | Making easier (hi) |
| Help to be quick | ←-→ | Long process |
| Online (i.e. use of Internet) | ←-→ | Offline |
| Relevance for later life (hi) | ←-→ | Relevance for later life (lo) |
| Taught | ←-→ | Intuitive |
| Problem solving (hi) | ←-→ | Problem solving (lo) |
| To get point across (hi) | ←-→ | To get point across (lo) |
| Wide audience | ←-→ | Personal |

**Table 4.4**. Complete set of constructs elicited from the repertory grid data collection

Some of these constructs are similar to each other. For example there are a number which consider working with different types of data: ‘Numbers – Words’, ‘Excel – Powerpoint’, ‘Calculation – Information’, and ‘Data handling – Messaging’. These constructs could be categorised as ‘Working with different types of data’. Such categorisation was a stage of the multiple hermeneutic interpretations. It is overlaying the researcher’s perception of similarities between constructs. Until this point the constructs were elicited directly from the students’ view of ICT. Now there was a layer of interpretation applied to their perceptions. This was an integral part of the methodological approach. The potential for bias and miscategorisation is mitigated by the multiple phases of data collection building up a richer picture of the perceptions (Smith and Osborne, 2003). Taking all of the constructs in Table 4.4, the researcher’s categorisation is shown in Table 4.5.

| **Constructs elicited from students** | **Category** |
|---|---|
| Numbers – Words<br>Excel – Powerpoint<br>Calculation – Information<br>Data handling – Messaging | Working with different types of data |
| Taught – Intuitive<br>Problem solving hi – lo | Using intuition |
| Relevance for later life hi – lo<br>Online - Offline | Relevance for later life |
| Fast changing – Stays the same | Changing nature of technology |
| To get point across hi – lo<br>Wide audience – Personal | Different audiences |
| Learning – Entertainment<br>Entertainment – Job | Formal/informal/vocational |
| One off – edit<br>Making easier lo – hi<br>Help to be quick – Long process | Knowledge of processes for efficient working practices |
| Creativity - Working to a list<br>Exam board – Underground<br>Requirements – Processes<br>Making – Knowing | Creativity v Set instructions |
| Benign – Malicious<br>Destroy data - Keep data<br>‘Shut down’ hi – lo | Malicious activities |
| Knowledge – Skill<br>Know what to do - Use program<br>What PC does - What's in PC<br>Needs knowledge of computers hi – lo | Knowledge v Skills |

**Table 4.5**. Categorisation of constructs

Having identified the constructs, and categories[98], the next stage was to identify which ones were the most significant. This is a standard part of the repertory grid analysis technique (Fransella, 2003; Fransella et al., 2003; Cohen et al., 2007) and is done by looking at the distribution of Os and Xs for each construct relative to every other. The purpose of this stage is to establish the key constructs, which, in this case, were to be used in the next phase of data collection – the questionnaire. The issue that immediately arises is what is meant by 'significance' in this respect. It is evident that some constructs have virtually all responses at one pole. For example, for the constructs elicited in Figure 4.4, students associated only one response with 'shutting down the PC'. This is shown in Figure 4.5.

| | Do things untaught | Merge cells | Search database | Make viruses | Make programs | Diagnose problems | Hack into PC | Take apart/repair PC | Know components | Recover lost data |
|---|---|---|---|---|---|---|---|---|---|---|
| "Shut down" hi - lo | O | O | O | O | O | O | X | O | O | O |

**Figure 4.5**. A non-discriminating construct

That only one element is associated with a construct indicates that the construct is an outlier and is dissimilar to other constructs that have more balance in the number of Os and Xs. The conclusion could be drawn that this means it is not significant as it is not representative. Alternatively it could be considered to be significant precisely because it is showing some feature that is not covered by the other constructs. Either interpretation would appear to be valid and both are used below.

Cohen et al. (ibid.) suggest a simple numerical calculation is carried out to identify which constructs are the key discriminators in relation to the elements and to the other constructs. An example of the process is given here, based on the grid in Figure 4.4. This analysis is reported on in detail in

[98] The phenomenological approach would suggest the use of 'themes' rather than 'categories' but this term was not used here to avoid any technical definition being ascribed to it. 'Themes' was reserved for the process of isolation of phenomena after the final phase of data collection.

chapters 5, 6 and 7 where the emergence of the phenomena are discussed. Establishing the key constructs is a crucial part of the isolation process.

To derive the relative significance of constructs a measure of correlation was used. This shows how representative (correlated) a construct was. There are two methods for this. One is a simple pairwise comparison after Cohen et al. (ibid.). The second is a more complex statistical analysis (see for example Bell, 2011) which is more appropriately used for scaled responses rather than the binary sets in this study. The first, pairwise, technique will now be worked through in detail for the constructs of Figure 4.4. In this first approach the index of correlation is calculated through comparing each construct with every other. Figure 4.6 shows just the first two constructs.

| | Do things untaught | Merge cells | Search database | Make viruses | Make programs | Diagnose problems | Hack into PC | Take apart/repair PC | Know components | Recover lost data |
|---|---|---|---|---|---|---|---|---|---|---|
| What PC does - What's in PC | X | X | X | X | X | X | O | O | O | O |
| Making - knowing | O | X | X | X | X | O | O | O | O | O |

**Figure 4.6**. Correlation (matches) between two constructs

Considering each element (column) in turn, one sees that the two constructs match in eight cases (shaded). In other words, eight of the elements are associated to the same poles in both constructs. In this respect they correlate.

As there are eleven elements one would expect, by chance, five such matches – half the total number of other elements. Thus the first two constructs are more positively correlated than by chance as there are eight matches and not five. There is a variation of three from what would be expected by from chance. Figure 4.7 shows the variation from chance for each pair of constructs from Figure 4.4.

| | What P | Making | Proble | Making | "Shut down" hi - lo | |
|---|---|---|---|---|---|---|
| What PC does - What's in PC | | 3 | 1 | 1 | -2 | |
| Making - knowing | 3 | | 1 | 3 | 0 | |
| Problem solving hi - lo | 1 | 1 | | 1 | -2 | |
| Making easier lo - hi | 1 | 3 | 1 | | 2 | |
| "Shut down" hi - lo | -2 | 0 | -2 | 2 | | |

**Figure 4.7**. Variation: pairwise matching of a set of constructs

Totalling each column (ignoring signs) gives a crude measure of variance for each construct. This is shown in Figure 4.8.

| | What P | Making | Proble | Making | "Shut down" hi - lo | |
|---|---|---|---|---|---|---|
| What PC does - What's in PC | 0 | 3 | 1 | 1 | 2 | |
| Making - knowing | 3 | 0 | 1 | 3 | 0 | |
| Problem solving hi - lo | 1 | 1 | 0 | 1 | 2 | |
| Making easier lo - hi | 1 | 3 | 1 | 0 | 2 | |
| "Shut down" hi - lo | 2 | 0 | 2 | 2 | 0 | |
| | 7 | 7 | 5 | 7 | 6 | |

**Figure 4.8**. Simple variance totals for a set of constructs.

For this set of constructs, there is actually very little variation in the totals. Three constructs have the highest variance (shown shaded) and could be considered to be the most significant for these students. The danger of reading too much into this analysis is self-evident from the results from this group which show all constructs to be of roughly the same significance. This was not the case for all groups, however, as the data in chapters 5, 6 and 7 shows. As discussed earlier, the significance of a construct may be derived from how different it is from others (high total variance) or how representative it is of others (low total variance). This technique was applied to all constructs elicited. This process yielded the following as being the constructs that had the highest or lowest variance:

- Excel - Powerpoint
- Data handling - Messaging
- Taught – Intuitive
- Relevance for later life hi - lo
- Making easier lo - hi
- Help to be quick - Long process
- Exam board – Underground

- Making – knowing
- Knowledge – Skill
- What PC does - What's in PC

These constructs are the most significant when considering the phenomena that lie beneath the student perceptions. They will be used later in this chapter in the process of isolation of phenomena.

The method outlined above is valid (Cohen et al. 2007) for binary grids i.e. where each element is assigned to one pole or the other. A more sophisticated measure of variance is to calculate the root-mean-square (RMS) correlation between each construct and all of the others. This is more appropriately used on data that has finer granularity than the binary X/O (Bell, 2011) as the statistical method has greater validity the more continuous the data is. The program GRIDSTAT[99] was used to calculate the correlations within each set of constructs to compare the results to those yielded by the simple arithmetic process above. This yielded the ten constructs with the highest and lowest correlation coefficients. These are shown in Table 4.6.

| **Constructs with correlation >=0.4** | **Constructs with correlation <=0.25** |
|---|---|
| Needs knowledge of computers hi - lo | Offline – Online |
| Taught - Intuitive | Destroy data - Keep data |
| Making - knowing | Entertainment - Job |
| Powerpoint - Excel | Relevance for later life hi - lo |
| Requirements - Processes | Exam board – Underground |

**Table 4.6**. Significant constructs from GRIDSTAT software (RMS correlation)

Combining the constructs from Tables 4.5 and 4.6 gives an overview of those which were significant in the students' reported perceptions. Figure 4.9 shows that four constructs are significant across both methods. These are indicated in bold in the box at the bottom of the figure. There are a further 12 reported by one method or the other.

[99] http://www.repgrid.unimelb.edu.au/downloads/gridstat.exe

| **Significant constructs from method 1 (Cohen at al, 2007)** |
| --- |
| Excel – Powerpoint |
| Data handling – Messaging |
| Taught – Intuitive |
| Relevance for later life hi – lo |
| Making easier lo – hi |
| Help to be quick - Long process |
| Exam board – Underground |
| Making – Knowing |
| Knowledge – Skill |
| What PC does - What's in PC |

| **Significant constructs from method 2 (Bell, 2011)** |
| --- |
| Needs knowledge of computers hi - lo |
| Offline - Online |
| Taught - Intuitive |
| Destroy data - Keep data |
| Making - knowing |
| Entertainment - Job |
| Powerpoint - Excel |
| Relevance for later life hi - lo |
| Requirements - Processes |
| Exam board – Underground |

| |
| --- |
| **Taught – Intuitive** |
| **Relevance for later life hi – lo** |
| **Exam board – Underground** |
| **Making – Knowing** |
| Excel – Powerpoint |
| Data handling – Messaging |
| Making easier lo – hi |
| Help to be quick - Long process |
| Knowledge – Skill |
| What PC does - What's in PC |
| Needs knowledge of computers hi - lo |
| Offline - Online |
| Destroy data - Keep data |
| Entertainment - Job |
| Powerpoint - Excel |
| Requirements - Processes |

**Figure 4.9**. Significant constructs from two correlation techniques

Using Table 4.5 on page 114, the constructs in the bottom box of Figure 4.9 are representative of the following categories (again with the most significant emboldened):

- **Using intuition**
- **Relevance for later life**
- **Creativity v Set instructions**
- Working with different types of data
- Knowledge of processes for efficient working practices
- Knowledge v Skills

The contribution of this categorisation (and the underlying constructs) to the isolation of phenomena is reported on in section 4.4. It can also be mapped onto the three ways of articulating perceptions - the what, why and how (Varela and Shear, 1999). Thus perceptions of students are about:

- what ICT and its assessment are;
- why ICT and its assessment are important (or not); and
- how ICT is presented, taught, learnt ad assessed.

This mapping shown in Figure 4.10 indicates that each dimension of Varela and Shear's typology (op.cit.) is represented by the most significant categories of constructs.

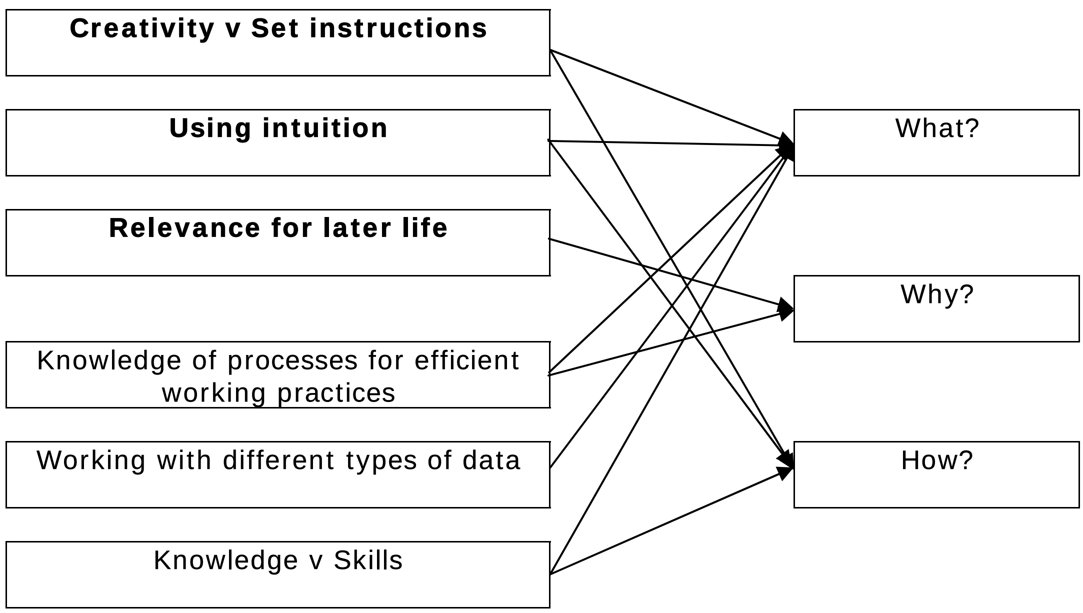


**Figure 4.10**. Significant constructs and dimensions of perception (after Varela and Shear, 1999)

This first data collection method was the beginning of the hermeneutic spiral. The elicited constructs represented, as purely as was possible, the perceptions of the students – or at least, of their interpretations of those perceptions. As discussed in the section on bias, and in the methodological considerations of symbolic interactionism (Blumer, 1969; Lansheere, 1993) and multiple hermeneutics (Alvesson and Sköldberg, 2000), these interpretations were further interpreted by the researcher to generate the categories. Thus the hermeneutic spiral moved the results away from the pure perceptions of students. They were both contextualised in relation to the object of discussion (Heidegger, 1927/1962) and subject to possible distortion through interpretation and application of statistical and analytical methods to the pure data. This interpretation is at the heart of the methodological approach of phenomenology. The significant construct categories represented in these results, while provisional, were used as the basis for the design of the instrument of the next phase of data collection - the questionnaire. This will now be discussed.

## *4.2. Phase 2: The questionnaire*

The first phase of empirical research established the key constructs in student perception. The next stage was to collect more data on these constructs through the views of a wider group of students. A questionnaire was used that would also act as pilot for possible questions to be used in the third and final phase of interviews. As discussed above (page 100) the students who responded to the questionnaire were from the same school as those who took part in the repertory grid analysis.

The questionnaire was designed from the results of the construct elicitation and with reference to the research aims. A further source was the subject criteria for GCSE ICT (QCA, 2001) which underpin the assessment framework the majority of these students were engaged in. The decision to enter some for Key Skills was taken after those students had followed the GCSE course for some time. It was felt, by their teachers, that they were not sufficiently capable of being successful at GCSE and so the alternative Key Skills assessment was chosen for them so that they would not finish year 11 without an ICT qualification. There are a number of lines of enquiry here that are outside the scope of this research (see section 8.5). That all students started on GCSE courses, however, renders the subject criteria (ibid.) a valid document to use as a basis for question design. Table 4.7 shows each question from the questionnaire, the reasons for its inclusion and the relationship it has to the research aims. The layout of the questionnaire is shown in Appendix 4.

| Question | Justification | Research Aim |
|---|---|---|
| Q1 Fe/male? | Gender differences were not pursued due to unbalanced samples (see also Epilogue, page 256-257). | This question, suggested by a supervisor, was outside of the aims of the study. |
| Q2 Which ICT assessment (i.e. qualification) are you taking? | This question was included to ensure that there was a range of students that matched those who completed the repertory grid phase (see Langdridge for a discussion of the benefits of homogenous samples). | If a cross cut of data[100] by ICT qualification had been carried out then aims 1 and 2 would have been pertinent. |
| Q3 Tick one box to show the extent to which you agree or disagree with each of these statements: *The subject ICT is relevant to later life and jobs / The tasks and questions in ICT coursework and exams are relevant to later life and jobs.* | One of the significant constructs from the grid analysis was 'Relevance of ICT for later life'. The question here then was – do the students' perceptions of the assessment match this perception of the subject (that it is important for later life)? A five-point Likert scale was used. | Aim 1 - student perception of ICT as a subject. Aim 2 – relationship of the qualification to later life Aim 3 – validity of the qualification's assessment. |

[100] The data was not subsequently cut by qualification type as the sample sizes available were insufficient for valid comparisons to be made.

| Question | Justification | Research Aim |
|---|---|---|
| Q4 List three things that you are really good at, or enjoy, doing with ICT/Technology. Where do you do these things? *At school/at home/mixture.* | Research diary notes from the first phase showed a concern that, when asked about ICT assessment, students only considered the use of ICT in school (and indeed in ICT lessons). Rarely were mentions made of ICT outside of school despite their dominance in initial anecdotes and other research (for example Crook et al., 2008; Underwood et al., 2008). This question was placed early in the questionnaire so that the concept of multiple settings of ICT use was introduced into the student mindset for later questions, thus attempting to mitigate the issue of institutionalisation. | Aim 1 – specifically an exploration of the relationship between student constructs of formal and informal learning within the field of ICT. |
| Q5 Think about exams and coursework in ICT. How important do you think each of the following are? *19 choices given*. | The ‘rows’, or facets, in the response table for this question were generated from a range of sources,– grid analysis (G), GCSE subject criteria (C), question 3 (3), other (O). A five-point Likert scale is used. As the study dealt with perceptions it was important to have a midpoint for respondents to express ‘no opinion’ (Chisnall, 2005). The facets of the question were: | Those labelled (G) addressed aims 1 and 2 - student perception of ICT its assessment.<br><br>Those labelled (C) addressed aim 3 - validity. |

| Question | Justification | Research Aim |
|---|---|---|
| | • Explaining what the parts of a computer are (G).<br>• Explaining what ICT may be used for (G).<br>• Being creative (G).<br>• Demonstrating your knowledge of ICT (G).<br>• Explaining how computers make tasks easier (G).<br>• Being tested (in coursework and exams) on things that you are taught at school in ICT lessons (G, 3).<br>• Being tested (in coursework and exams) on your use of ICT in other subjects (O).<br>• Analysing, designing and testing ICT systems as part of coursework (C).<br>• Being tested (in coursework and exams) on things that you learn outside of school (3, O).<br>• Showing how good you are at using spreadsheets and databases (G).<br>• Showing how good you are at using presentation software (like Powerpoint) (G).<br>• Relevance of ICT to later life and for jobs (G, 3).<br>• Relevance to technology use outside school (G, 3). | Those labelled (O) were from the initial anecdotes from which the aims were derived. |

| Question | Justification | Research Aim |
|---|---|---|
| | • Applying your ICT knowledge, skills and understanding to a range of situations (C).<br>• Showing that you have developed understanding of the wider applications and effects of ICT (C).<br>• Thinking about how you and others use ICT (C).<br>• Considering the impact of ICT applications in the wider world (C).<br>• Considering issues around ICT (e.g. social, economic, political, legal, ethical and moral issues) (C).<br>• Considering security needs for data (C). | |
| Q6 Outside of school, which of these do you do? *13 choices were given*.<br><br>Q7 Which of these do you think should be part of ICT assessment? | These two questions looked at the relationship between use outside of school and assessment of that use. This is a key relationship for aim 1 and 3. A free text box was included for other responses. The list of 13 given choices was based on Crook (2008). | Aim 1 considered student perception in formal and informal settings. Aim 3 considered validity of assessment. |
| Q8 Think of someone who you think is ‘good’ at ICT and using technology (both at school and outside). What things can they | This was a stimulus used in the construct elicitation, which led to a range of responses. Assessment determines how ‘good’ someone is at something. This question enabled | Aims 1 and 2 required data to be collected and analysed re students understanding of |

| Question | Justification | Research Aim |
|---|---|---|
| do that makes you think they are ‘good’ at ICT? (list up to THREE things). | students to think about this, while depersonalising it from themselves. | the nature of ICT and how this might be assessed. |
| Q9 What do you think of the assessment of ICT? Would you make any changes to the content of the coursework or exams? | This was a catch-all question to allow free response from students. The notion of ‘changes’ allows students to devise their model assessment specification for ICT. This was followed up in interviews. | All aims could potentially have been covered in response to this question, as it was free text. |

**Table 4.7**. Justification of questions in questionnaire

Having identified, and justified, the questions a discussion of the raw findings and an initial analysis is now presented. This is used in section 4.4 to show how the emergent phenomena are derived.

**Question 1 - gender**

Of the 44 students sampled, only 13 were female. This was a result of the opportunistic sampling, which did not take gender into account. The researcher was only able to see groups which were predominantly male. The aims do not specifically suggest an analysis by gender and so this data has been disregarded[101].

**Question 2 – assessment route**

Of the 44 respondents all but two claimed to be taking the GCSE full or short course. No further analysis of the questionnaire data by assessment route was made given this skewed sample[102].

**Question 3 – relevance to later life**

This question was framed with two five-point Likert scale responses. These showed the students' views of the subject ICT and its assessment in respect of its relevance - or face validity (Watts, 2008). The results show that students see more relevance in the subject ICT than they do in its assessment. Of the sample of 44 all but two respondents rated the subject ICT as more relevant than its assessment.

80% of respondents stated that ICT was 'relevant' or 'very relevant' to 'later life or jobs', but only 36% stated that ICT assessment was. A full breakdown of results is shown in Figure 4.11. This relationship of ICT and its assessment to later life was also addressed in question 5 where it was phrased in terms of importance. Responses to the two questions indicate that students feel that ICT assessment is important to later life, but not that it is relevant. This

[101] The inclusion of this question was suggested by a supervisor. See page 256-257 in the Epilogue for a discussion of this.
[102] The third phase (interviews) sampled students following a much wider range of qualifications, but again no comparisons were made across qualifications as this is outside the scope of the research (see section 8.5).

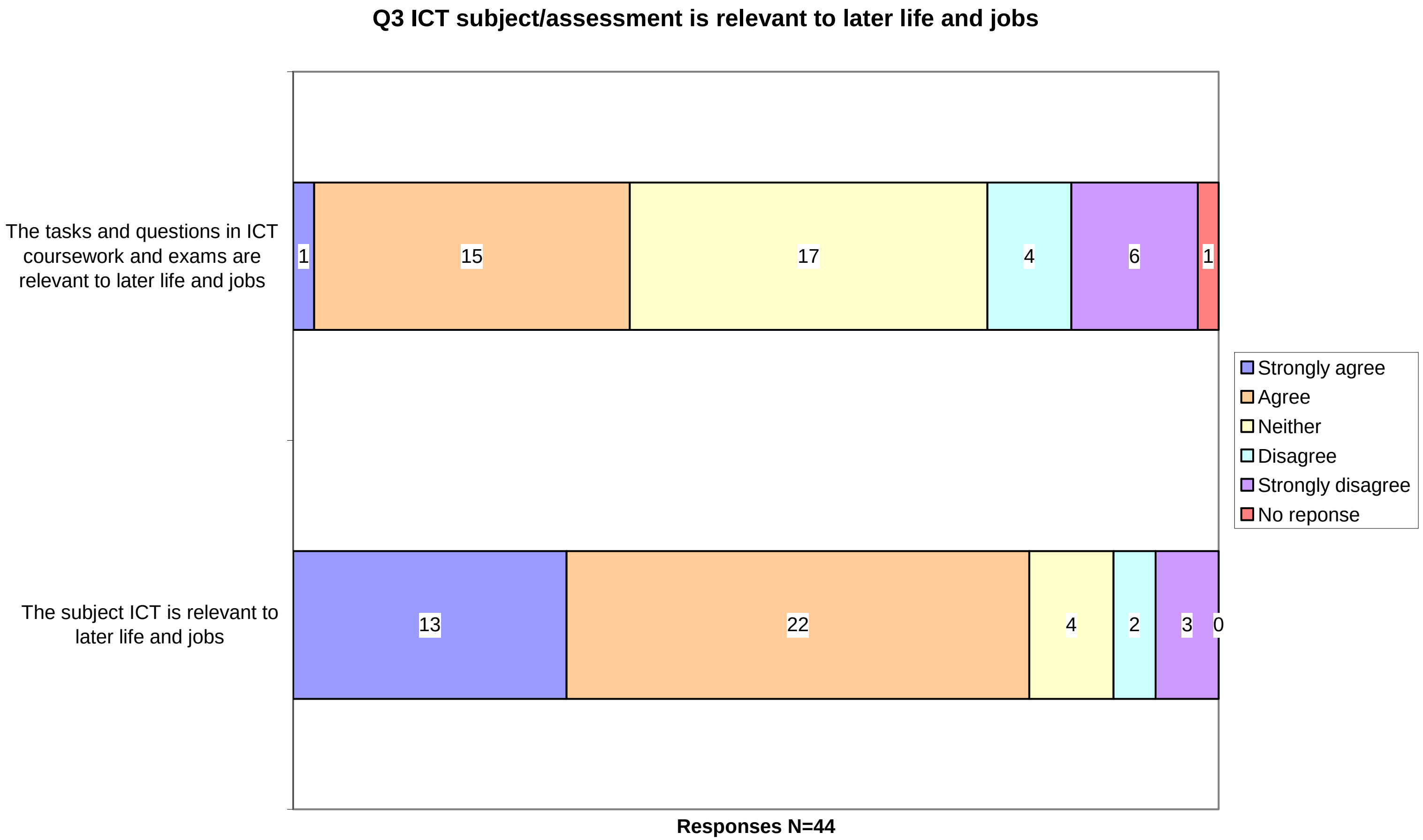


**Figure 4.11**. Question 3: Relevance of ICT to later life

could be indicating a general view of assessment and qualifications – that they are, per se, important. An alternative analysis would be that students do not see their current assessment as being relevant but that they see this as an important area to be addressed.

### Question 4 – ICT activity and location

Students were asked to state (up to) three things they were good at, or enjoyed doing, with ICT and to indicate whether each was done in school, out of school or both. Responses are grouped into categories, shown here with the most popular first (N=44):

- Communications (21).
- Games (20).
- Internet (17).
- Using Office Applications (17).
- Creative Uses (12).
- Music (9).
- Schoolwork (9).
- Generic Uses (8).
- Computing Type Uses (2).
- Auctions (1).
- Image download (1).

Only one activity was reported by more than two students as being done 'only in school' – this was 'Using Office Applications'. In contrast for activities done only out of school, 'Communications', Games', 'Music' and 'Creative uses' were each mentioned by 15-30% of the respondents. For activities done both in and out of school, 'Internet' was the most often cited followed by 'Games', 'Using Office applications', 'Communications' and generic uses. The responses for this question are shown in Figure 4.12. It would seem, therefore, that the use of Office applications (word processing, spreadsheets, databases etc) is associated with school. This reinforces the presence of these applications in the construct elicitation activity. They have a significant presence in the coursework tasks, requirements and guidance. It is perhaps unsurprising, therefore, that student perception, and use, of ICT in school is coloured by the experience of focusing on coursework using these tools.

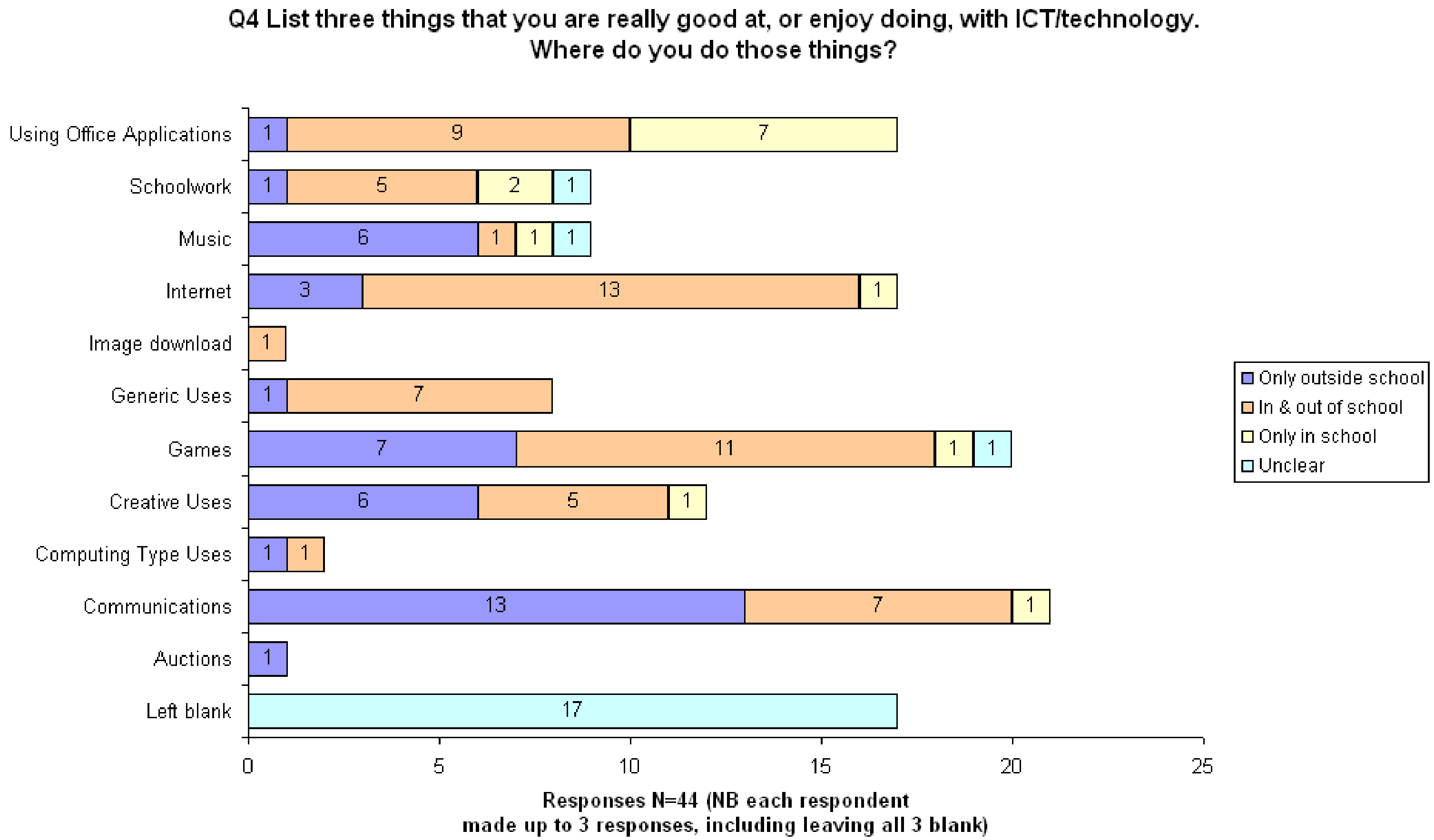


**Figure 4.12**. Question 4: What do you enjoy in ICT, where do you do it?

**Question 5 – the important aspects for ICT assessment**

This question provided students with a set of 19 aspects derived from:

- The constructs elicited in phase 1 of the data collection.
- The assessment objectives in the QCA (2001) subject criteria for ICT.
- The initial research aims.

Responses were asked for on a 5-point Likert scale as to how important these aspects were to the respondents. Results show that three aspects are rated as 'important' or 'very important' by 80% or more of the students:

- Relevance to ICT in later life and jobs (91%).
- Explaining what the parts of a computer are (80%).
- Applying your ICT knowledge, skills and understanding to a range of situations (80%).

Those aspects which were rated as 'important' or 'very important' by the fewest students were:

- Thinking about the way you and others use ICT (55%).
- Considering issues around ICT (social, economic, political, legal, ethical and moral issues) (55%).
- Being tested on things taught in other subjects (50%).
- Being tested on things learnt outside of school (45%).

These results are shown in Figure 4.13. Those characteristics which were had the lowest responses in the 'important' or 'very important' categories are largely to do with things beyond the ICT classroom. This contradicts the high ratings for the application of knowledge skills and understanding to 'a range of situations'. It could be that students did not interpret this to include situations outside of the classroom. This would seem unlikely, however, given the importance attached to ICT assessment being relevant to 'later life and jobs'.

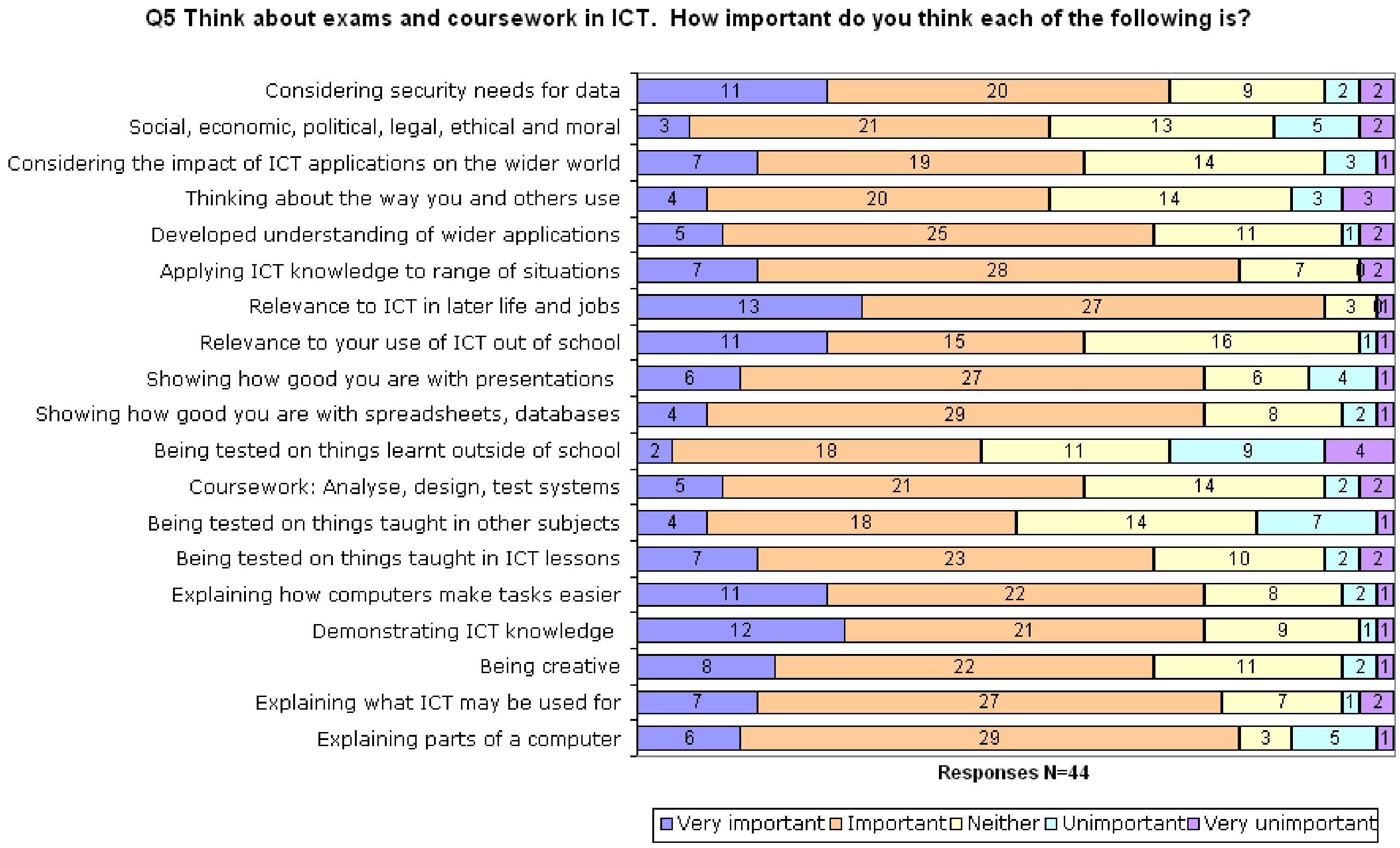


**Figure 4.13**. Question 5: Importance of aspects of ICT exams/coursework

When compared to the responses to question 3, the importance attached to assessment is perhaps surprising. Question 3 yielded 80% of respondents stating that ICT was ‘relevant’ or ‘very relevant’ to ‘later life or jobs’, but only 36% stating that ICT assessment was. As discussed above for question 3, this may mean that they do not perceive as much relevance in their current assessment as they do the importance of it. There is no significant difference between the mean ‘important’/’very important’ ratings for those aspects which were derived from the QCA assessment objectives (64%) and those derived from the elicited constructs (70%). Students do not appear to attach significantly more importance to personal constructs of ICT than to externally generated objectives.

**Question 6 – activities undertaken outside of school**

Question 6 asked students to state whether or not they undertook each of a set of 13 activities outside of school. The activities were drawn from those used in the research of Crook et al. (2008), complemented by those mentioned in the construct elicitation in the first phase of data collection. Activities reported by approximately three-quarters of the sample or more were:

- Keep in touch by social networking sites (82%).
- Upload things to social networking sites (77%).
- Keep in touch by e-mail (75%).
- Computer gaming (73%).

Three of these activities feature communication, corresponding to the findings of question 4. Indeed with the increase in online gaming (Ofcom, 2011), communication is also an important aspect of that activity for many teenagers.

The least reported activities of those presented were

- Write a blog (27%).
- Edit Wikipedia or other wikis (18%).
- Upload images to a website e.g. Flickr (14%).
- Use social bookmarking sites del.icio.us, Digg, Reddit[103] (9%).

[103] http://del.icio.us; http://www.digg.com; http://www.reddit.com

The last three mention specific websites. Facebook and MySpace were also mentioned as examples of the social networking sites cited as the most frequently undertaken activities. The other reference to a particular website, YouTube, was cited by just under half (47%) of the respondents. This question also provided opportunity for free text response. The most frequently mentioned activities given in this response were those that involved downloading – music, films and, perhaps seriously or perhaps rebelliously, pornography. The figures here were small however – 9% or respondents mentioning downloading music or films.

**Question 7 – the assessment of activities undertaken outside of school**

This question had the same 13 activities listed as question 6. This allowed for a comparison of students' perceptions of which activities should be assessed to which ones were undertaken. Activities that were most often identified as 'should be assessed' were:

- Edit images on a computer (73%).
- Edit videos on a computer (66%).
- Record and edit audio/music (59%).
- Computer gaming (50%).

These percentages are lower than those recorded in question 6 suggesting less uniformity of view, but it is noticeable that all of them, to a greater or lesser extent, are creative activities. This would seem to be pointing towards a perceived value in including scope for creativity with ICT in its assessment.

The least 'valued' activity for assessment was the one that came highest in question 6. Whereas 82% of the respondents reported that they 'keep in touch by social networking sites', only 23% thought it should be assessed. This was the same result as for 'write a blog', which is some ways is a very similar activity. Students here seem to be saying that although they use ICT for communication it is not something that they see value in assessing. In the free text field for this question, 'Scripting/programming' was mentioned by five respondents (11%) and 'Build/fix' a computer by four (7%). These were the most frequently mentioned activities that were not on the given list and their inclusion corresponds to the importance given to 'Explain what the parts of a PC are' in question 5 by the same respondents. In all cases this group of respondents rated this aspect as 'important' or 'very important'.[104] These activities are, again, creative. A comparison of the answers to questions 6 and 7 is shown in Figure 4.14.

| Activities that more students do at home compared to think should be assessed | Activities that more students think should be assessed compared to doing at home |
|---|---|
| Downloading. | Scripting/programming. |
| Gaming. | Using social bookmarking. |
| Looking things up in Wikipedia. | Editing wikis. |
| Uploading videos. | Editing videos. |
| Uploading to social networking site. | Editing images. |
| Keeping in touch: social networking. | Uploading images to Flickr. |
| Keeping in touch: e-mail. | |

**Table 4.8**. Activities done at home and those that should be assessed

Table 4.8 shows the activities that show the largest differences in numbers of students who do them outside of school compared to who think they should be assessed. It confirms that students place more value on assessing creative aspects (editing, programming) than they do to communication (keeping in touch, uploading) or leisure (keeping in touch, downloading, gaming).

**Question 8 – characteristics of someone who is 'good at ICT'**

This free text question was predicated on the basis that if assessment is to be fit for purpose then it should recognise and reward those who are 'good at ICT'. The question then was to gain students' perceptions of what was meant by good in this context. This is in line with aim 3 of the study, which is to explore the validity of assessment.

[104] It is perhaps significant that a new 'association' was founded in spring 2009 – at the same time of this research. Supported by The Chartered Institute for IT, 'Computing at School' promotes the subject of Computing at all levels of school education to allow for such specialist ideas to complement (or even replace) ICT – see http://www.computingatschool.org.uk

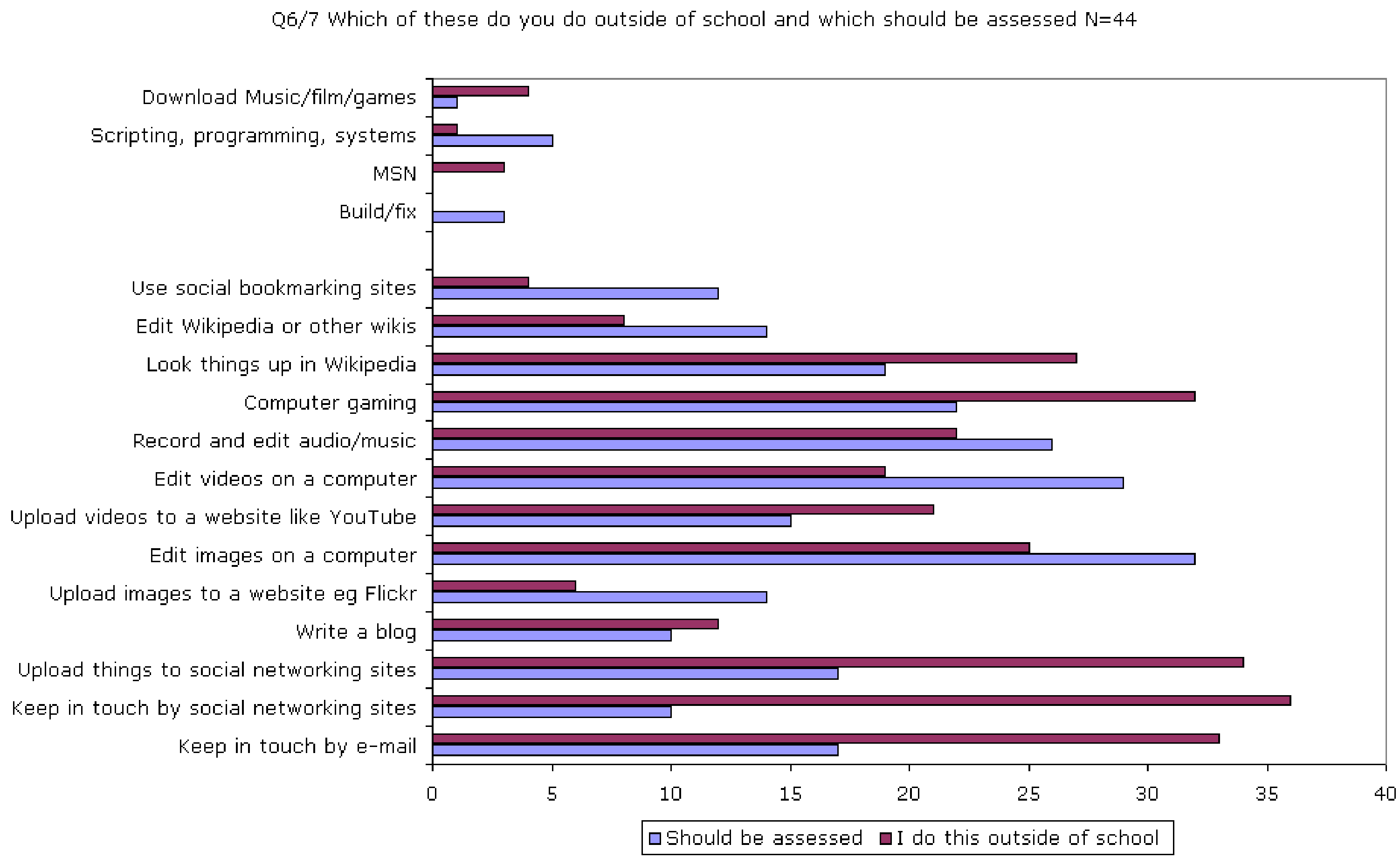


**Figure 4.14**. Questions 6/7: ICT outside of school? Should it be assessed?

Ten students did not respond to this question and a further two pairs wrote identical responses. There were thus 32 distinct sets of characteristics from the population of 44. The questionnaire prompted for up to three characteristics. Some students mentioned three, others mentioned one or two, some mentioned none. Table 4.9 summarises the responses.

| | Students | Mentions |
|---|---|---|
| **Creative** | 10 | 12 |
| **Generic** | 14 | 23 |
| **Programming** | 6 | 7 |
| **Technical** | 18 | 26 |
| **Office** | 4 | 6 |
| **Games** | 1 | 2 |
| **Research** | 3 | 3 |
| **Communication** | 3 | 3 |

**Table 4.9**. What identifies someone as ‘good’ at ICT?

Many of the responses were generic, for example ‘works (types) fast’, ‘knows what they’re doing’. Such responses could be applied to any aspect of learning or assessment and are not ICT-specific. If these are discounted the two most frequently mentioned characteristics of ‘being good at ICT’ were those associated with technical capability and with creativity. These were mentioned by 18 and 10 people respectively with 26 different mentions of technical prowess (students could give up to three responses and some gave three examples in the same category).

Examples of the responses for ‘technical’ capability included ‘They can solve common problems with computers’, ‘They know what each part does’, and [They] build, fix and maintain computers. Indeed, fixing a computer was the most often cited attribute. This corresponds to ‘Explain what the parts of a PC are’ in question 5. For ‘creative’ capability, responses included ‘[They] can produce multiple media on a computer’, ‘[They can] create a website’ and

‘They can use Sketch[y] Physics[105] and [create] really good designs’. Perhaps allied to both the technical and creative attributes, and at their intersection, is programming. This was mentioned by six students in response to this question. This supports the free text responses in question 7 where programming was the most frequently mentioned activity that should be assessed. It would also seem from the response to this question that students value those of their peers who understand how a computer works and can be creative with, or program, it. Where they see these attributes they conclude that someone is ‘good at ICT’.

**Question 9 – views on ICT assessment and possible changes**

This question was designed to allow students to identify what the ICT assessment might include if they were able to design it. It primarily addresses aim 2 of the study but informs aim 3 as it implicitly gives the student view of the validity of the current methods. Of the 44 students, 27 responses were received that indicated some changes. Of the others some were left blank or responses indicated that no changes were needed. The most commonly occurring issues were:

- Time – some students said they need more time (for coursework or for exam preparation), others said the exams should be shorter.
- Technical skills – as in the other questions, some students mentioned the need to include building computers or aspects of programming in the assessment.
- Practical – many students suggested that there should be less writing and more practical assessment.

Additionally four students indicated that the assessment was not challenging enough. Two said that the answers were just ‘common sense’ and two others complained about the need to ‘get things wrong’ to demonstrate that you can ‘fix it’. By this I understand that they are referring to the criteria that require students to show error-detection and correction or editing and amending following proof reading. They seem to be saying that this is not an authentic assessment task (Dweck, 1986; Tombari and Borich, 1999; Cook, 2010).

[105] An add-on for the 3D sketching software Google Sketchup – http://sketchup.google.com – designed to explore the laws of physics.

**Summary of questionnaire**

| Questions | Dominant answers | Possible phenomena |
|---|---|---|
| 1 Gender? | Insufficient data. | |
| 2 Which assessment? | Insufficient data. | |
| 3 Relevance? | That assessment is subordinate to subject. | Relevance to life; |
| 4 Three things respondent is good at. | Communication;<br>Games;<br>Internet;<br>Office. | Communication;<br>Tools;<br>Relevance to life;<br>Gaming;<br>Focus on qualification. |
| 5 Importance of ICT? | Relevance;<br>Knowing how computer works;<br>Application to range of contexts. | Relevance to life and future learning;<br>Tools;<br>Creativity/problem solving. |
| 6 Outside school? | Social networking;<br>E-mail;<br>Gaming. | Communication;<br>Creativity;<br>Gaming. |
| 7 Should be in assessment? | Edit images;<br>Edit video;<br>Edit music;<br>Games. | Creativity;<br>Gaming. |
| 8 What makes 'good at ICT'? | Solving problems;<br>Fixing computers;<br>Programming. | Creativity/problem solving. |
| 9 Comments/changes. | Technical skills should be included;<br>Practical elements should be included;<br>More time needed for coursework, less for exams. | Creativity/problem solving. |

**Table 4.10**. Questionnaire summary: responses and emergent phenomena

Table 4.10 summarises the findings from the questionnaire. It lists the dominant answers to each question and then examines these for possible phenomena. This last column is an application of the researcher's hermeneutic lens to the responses and represents another stage of the spiral of interpretation (Conroy, 2003) and a move from the eidetic, or descriptive, to the interpretive (Lopez and Wills, 2004; Langdridge, 2007).

This summary and the interpretation of the data from the questionnaire reveal five emergent phenomena:

- Relevance – of ICT for later life, answers which show the subject as utilitarian.

- Creativity – answers that focus on problem-solving or on the creation and editing of products.
- Tools – answers which focus on the use of tools.
- Communications – answers which show that ICT is often about communication (confirming the 'C' in ICT after Stevenson, 1997).
- Enculturation – the way in which student answers are influenced by the school and assessment context – is inherent in many of the responses. It is most clearly seen in the way in which Office tools and examination criteria dominate answers to question 4.

Figure 4.15 shows the linkage between the summary of questionnaire and the next phase of data collection – the interview. The figure also shows the five emergent phenomena and traces their provenance in the questionnaire responses. Using the phenomenological process of reduction (Husserl 1913/1982; Giorgi, 1985; Finlay, 2009) the interview phase aims to distil those phenomena which sustain across all levels of the spiral of hermeneutic interpretation in the rich descriptions of the respondents (Conroy, 2003; Lopez and Wills, 2004; Smith and Osborn, 2009).

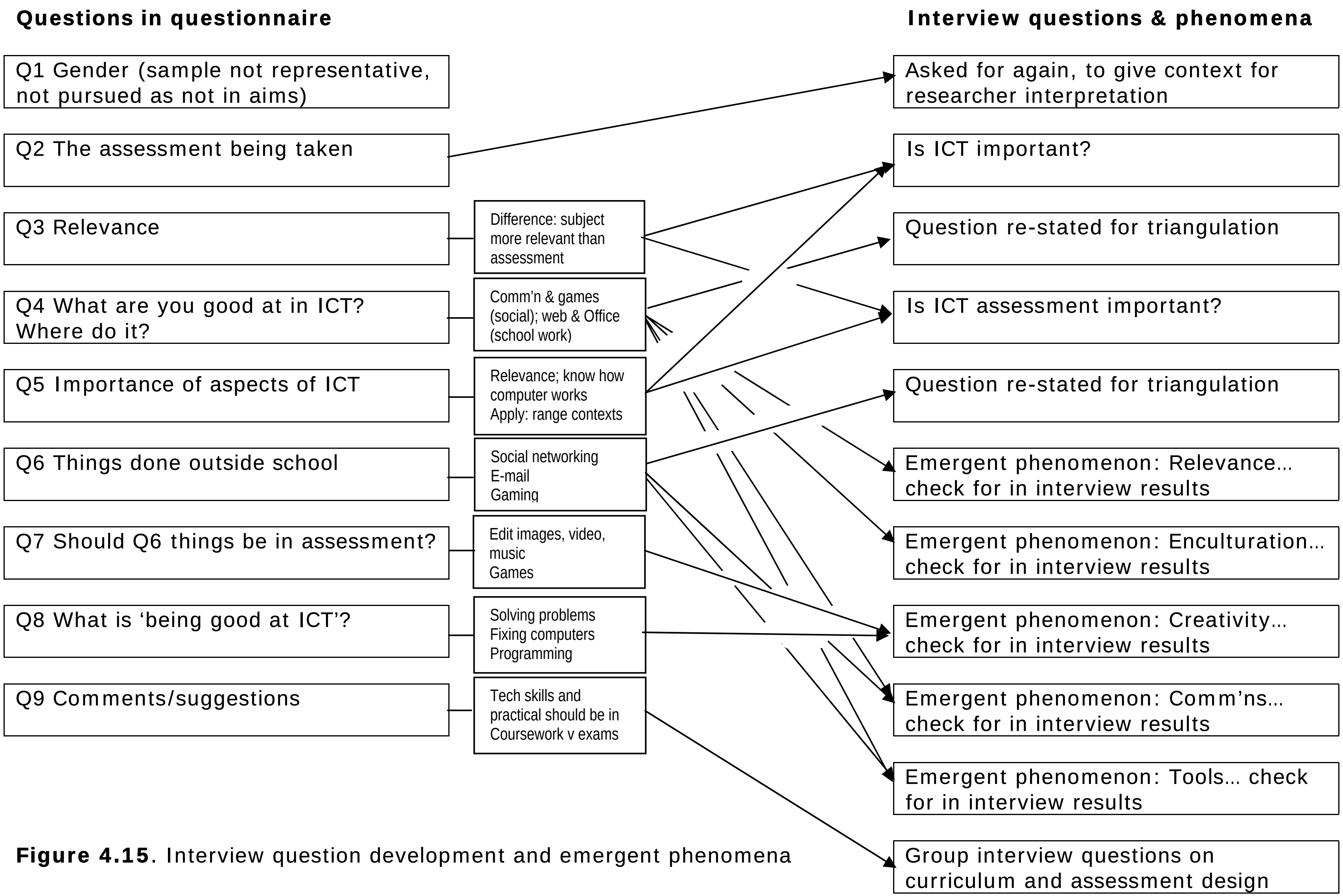


**Figure 4.15**. Interview question development and emergent phenomena

## 4.3. Phase 3: The semi-structured interviews

The previous section reported on the findings from the data collected in the second phase, the questionnaire. These in turn built on those from the first, construct elicitation, phase. The final empirical phase, the semi-structured interviews is now discussed. The design of the questions for these interviews follows on from the findings to date as shown in Figure 4.15 but allows for richer responses and dialogue to take place. Table 4.11 provides a commentary for the semi-structured interview prompts.

Copies of the questions (see appendix 7) to be asked and consent forms (see appendix 3) were sent in advance to the schools. Teachers were asked not to disclose these questions to respondent students so that they could not collude or over prepare beforehand. An issue with ascertaining perceptions is the interpretive hermeneutic associated with thinking about one's answers. With extra time and 'retrospection' this could distort the answers given (Travers, 2011). On completion of the interviews, all of which were recorded on digital audio, transcripts were made. These were then coded to identify emergent themes and phenomena, which are discussed in chapters 5, 6 and 7. A series of individual interviews was undertaken in each of the sample schools (see Table 3.4 on page 102) followed by one with the group of students as a whole so as to add richer responses (Lewis, 1992).

<table>
<tr><th>Prompts</th><th>Justification</th><th>Relationship to aims</th></tr>
<tr><td colspan="3">Prompts for individual interviews</td></tr>
<tr><td rowspan="3">What ICT course are you following?<br><br>How is the course assessed (prompt: coursework, exams)?<br><br>Have you taken any tests or submitted any coursework for this course yet?</td><td colspan="2">This is a warm-up question to give an opportunity to say something factual. The results are included in sampling data shown in Table 3.4. There was no analysis between courses as the sample sizes are too small and a comparative study was not part of the aims of this research</td></tr>
<tr><td>Student perceptions of assessment may be coloured by the way in which the course they are taking is being assessed.</td><td rowspan="2">These prompts relate to aims 2 and 3. They give students opportunity to talk about their perceptions of these forms of assessment and the validity they see in them.</td></tr>
<tr><td>This leads into a discussion of what the students have done so far. This is needed to contextualise future responses – what they have done to date will influence their perceptions of the course and its assessment as a whole.</td></tr>
<tr><td rowspan="2">Did you opt for the course (or was there no choice)?<br>If so, what made you choose the course?<br>If not, would you have done had there been a choice? Why?</td><td rowspan="2">These questions are included because perception will be affected by the options available to the student - see the choice corollary to PCP (Kelly, 1955).</td><td>This relates to aim 2, perceptions of assessment.</td></tr>
<tr><td>These follow up prompts enable the students to talk about ICT as a subject, relating to aim 1.</td></tr>
</table>

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| Prompts | Justification | Relationship to aims |
|---|---|---|
| Is ICT important? Why/not?<br>Are ICT qualifications important? Why/not? | The ‘Importance of ICT’ emerged from the initial construct analysis as a proxy for perceptual reporting. This technique, of asking ‘What is important for you?’ is used in marketing analysis to gain insights into perceptions of goods or services (Martilla and James, 1977) and the process is borrowed from that domain.<br><br>The difference in student responses to two related questions in the questionnaire was very marked (see page 127). In the interview the questions were turned around to allow a freer response to why student perceived the subject to be important (or not). So they were not asked what aspects they saw as important, but whether they saw ICT and its assessment as important. | These questions are directly related to aims 1 and 2. |

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| **Prompts** | **Justification** | **Relationship to aims** |
|---|---|---|
| If someone is good at ICT – what does that mean to you?<br>- What would they be good at?<br>- Is this something that is assessed in the course? | This question borrows from the second part of Martilla and James' (1977) technique, namely that of performance. By asking students what they equate with 'good' a view of the curriculum and content is elicited. This could be probed later on when questions of design are posed to the students in the realm of 'what would an ideal ICT course look like'.<br><br>The follow up prompts prepare for the next question in looking at the relationship between the formal and informal. It considers student perceptions of the boundaries between formal and informal assessments. | This is especially pertinent to research aim 3 as it allows students to outline something of their perception of construct validity (Cronbach and Meehl, 1955; Messick, 1989; Gipps & Murphy, 1994) in the assessment of ICT – does the test assess what they consider to be important? |
| Are there things you do at home with ICT that are not part of the course?<br>- What are these? Should they be included? Why/not? | Here the locus of the questions moves firmly into a discussion of formal/informal. They triangulate the previous set but shift the focus from assessment to the course (and learning). | This is related to aim 1, as students are talking about what ICT means to them. It leads into curriculum design which is followed up in the group prompts at the bottom of this table. |

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| **Prompts** | **Justification** | **Relationship to aims** |
|---|---|---|
| What other comments do you have about the content of the ICT course you are on? Prompt: this is not about the teaching it is about the content. | These last two are catch-all questions to allow students to talk in depth on, respectively, any aspects of the course and its assessment. | This relates to aim 1, student perceptions of ICT as a subject. |
| What other comments do you have about the assessment process in the ICT course you are on? Prompt: this is not about the teaching it is about the assessment. | | This relates to aims 2 and 3, student perceptions of the assessment of ICT and it validity. |

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| Prompts | Justification | Relationship to aims |
|---|---|---|
| Prompts for group interviews | | |
| Imagine you are designing a new ICT course. What things would you include in it? What should people be learning about? Why?<br>How would the assessment work? What sort of things would people have to do? Why?<br>What would characterise a good pass? In other words, what would someone have to do to get an A in this course? Why? | These questions were asked of a group as they are rather abstract and future-looking and it may have been difficult for an individual to move from guided questions about how they felt now to a more open-ended situation. They also provided opportunity for students to revisit ideas that they had expressed previously, after a short period of reflection.<br><br>The prompts were designed to cover the subject/assessment divide and to look at again at issues of importance and performance. | These questions triangulate those asked of individuals. The primary focus is on aim 3 as students try out ideas of what a valid assessment process might look like. |

**Table 4.11**. Justification of semi-structured interview questions

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In the initial analysis of interviews three aspects of the use of ICT at home emerged most strongly: use of ICT for research, e-interaction (or communication) and games. Table 4.12 shows these three uses and an aggregation of the majority student view. The difference between the first row and the other two is marked. Here students are reporting on something (research) that is related very closely to school. This is evidence for students valuing those things that they relate to the qualification specification and leads to the phenomenon of enculturation (see chapter 7).

| | **Examples** | **Should be on spec?** | **Can be taught** | **Needs to be learnt** | **Differen-tiable** | **Access in school?** |
|---|---|---|---|---|---|---|
| **Research tool** | Searching<br>Copyright | Y | Y | Y | ? | Y |
| **E-interaction** | Facebook<br>MSN[106]<br>E-mail | N | N | N | N | N |
| **Games** | Various | N | N | Y | Y | N |

**Table 4.12**. Emergent themes for the home use of ICT

When talking about what they do in ICT and how they perceive the subject and its assessment, students overwhelmingly reported the requirements of the specification by what they produce and the tools which they use in the production e.g. posters, websites, spreadsheets and databases. Less explicit in their response was consideration of knowledge and understanding or reference to processes. What is produced is a key element of the evidence for coursework. This focus on the specification is a further manifestation of the phenomenon of enculturation. It also points towards creativity – or at least that aspect which is literally creating something. This product focus is also most often accompanied by a linkage to the world of work and is seen in the emergence of the phenomenon of 'relevance' as shown in the next chapter. On the other hand when asked what should be included in an ICT course many touched on issues of 'quality', 'evaluation' and what might be

[106] Formerly The Microsoft Network, MSN is now used as shorthand for the Microsoft instant messaging service.

termed the personal, social and health education (PSHE) of ICT – ethics, e-safety etc.

An example of an interview is given here, in the boxed text, by way of a vignette to illustrate the process and the emergent findings. It is presented in the form of a commentary and is taken directly from the researcher's notes following the interview.

Student M is doing a short course GCSE ICT. The school makes this compulsory for all years 10 and 11, with option to ICT AS/A level in year 12/13. All students do same course in years 10 and 11. They were taught ICT in years 7-9 and learnt a range of basic ICT 'things'. At the end of year 9 they were given a level and will get a grade at the end of the GCSE. A grade B is generally required to go on to A level. The student would have wanted to do full course GCSE had it had been available. Not enough resources for this as option, although resources improving. The student felt that the reason for the school deciding everyone should do the short course is that they (the school) feel it is important. ICT is 'part of every job' and is 'generally a big part of people's lives [so] to have a general understanding [of ICT] is good'.

When asked about the relative importance of this understanding compared to the ICT qualification he felt that the latter was a validation of the former. He said that 'anyone could say they understood' but that the qualified proved that they did. The course is assessed by coursework and the student described doing a big bit of the coursework in year 10, which has been submitted and feedback given to improve it. There are three components to the coursework based around a scenario set by 'them' (the exam board). The components are an interactive presentation, a weekly accounts system and an appointments system. Each of these three is based on the use of a specified and specific tool – Powerpoint, spreadsheet and database respectively.

There is also a written examination at the end of year 11. The student sees the coursework as 'quite good'. It assesses a number of different aspects going further than the things done in KS3. For example he has only just learnt how to make a database (NB: this is part of the KS2 and KS3 curriculum so it maybe that the assessment of it here means that it is more visible to the student. For whatever reason, his perception is that he has gone further and, as well, is learning new things). He saw examinations as a means to 'regurgitate' facts and found it hard to think of a question that could be asked in an exam for the things that he sees as important e.g. using Powerpoint. Having said that though he pointed out that he had not yet done an exam in ICT other than one in year 10. He related the content of an exam to the content of the syllabus. Conversely he did not use the word syllabus when talking about coursework. He said that you can get guidance in coursework - I inferred that this was seen as a good thing. The student saw that some ICT could be done in other subjects and that there was a link between his favourite subjects (English and art) and his favourite topic in ICT (making presentations). This link centred on creativity and he said that he liked making presentations it gave him the 'freedom' to do what he wanted with the tools (i.e. Powerpoint).

Outside of school he said that he used the Internet for research, news and sport and for downloading music. He said that they were taught how to find things and frame searches. He also said he had taught himself how to use iTunes[107] for downloading and organising music and acknowledged that this, as well as the things covered in school constituted 'learning'. When asked if this should be in the GCSE course he distinguished between things like this that were specialise and things like 'making a presentation' which can be applied to many jobs. When asked to think about what makes for 'good' in ICT he focused on the ability to pursue and read about an interest. There was no mention of quality criteria, merely the ability to stick with something. This contrasts with others who went on to look at this from a problem-solving angle.  He saw this tenacity as a potential problem for assessment as, left to his own devices, he would choose only to do those parts of the course he enjoyed (presentations in his case). For him, GCSE is about 'teaching you', not just about 'giving you choice'.

The commentary for this interview shows some of the emergent themes which are discussed in the next section and chapters 5, 6 and 7. It is given

[107] The digital media player from Apple.

here to show that these themes do not emerge naturally but are woven into the accounts given by students. To isolate the phenomena, a structured analysis was carried out. This is now presented.

## *4.4. Isolation of phenomena*

In the preceding sections, the methods employed to collect the data have been discussed and justified and an initial presentation of findings given. In this section the structure of the next three chapters is discussed. These chapters are based on the phenomena that are derived from the empirical study and its analysis and from the data, issues and themes emergent from the literature review.

In deriving the phenomena the data is analysed to identify categories and recurrent themes. The data came from the three-stage iterative process of repertory grid, questionnaire and interview. This process is a modification of that of Conroy (2003) where successive interpretive hermeneutic stages are applied to the context under study. This iteration is represented by the spiral (ibid.) which seeks to give an ever-richer illumination of the object under enquiry – in this case, student perception of ICT and its assessment. In the case of this study this iterative process came from the aims, which led to questions for repertory grid elicitation of constructs. The responses were used to develop questionnaires and the questions refined in interviews. At each stage the perceptions, or interpretations, of students are seen through the researcher lens – a multiple hermeneutic (Alvesson and Sköldberg, 2000).

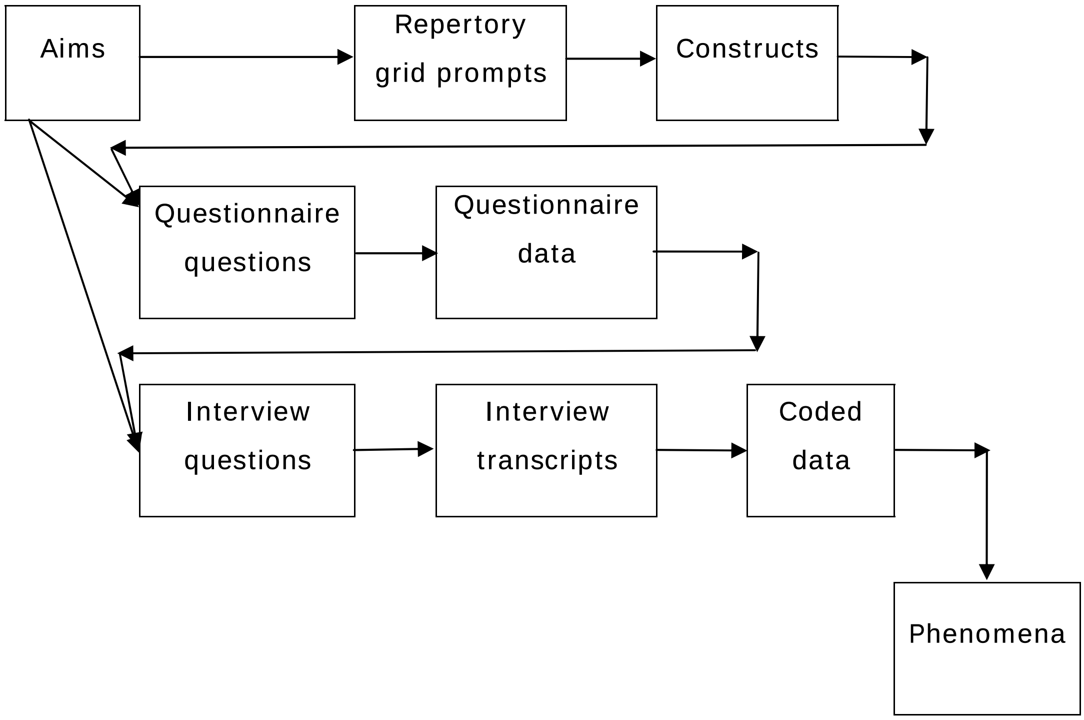



**Figure 4.16**. From aims and iterative data collection to phenomena

After the final stage of empirical research, the data that emerges from the interviews is the refined data from the whole process. This iteration, starting from the aims and leading to an isolation of phenomena, is shown in Figure 4.16. The isolation of the phenomena is achieved by combing the interview data through a thematic coding of the transcripts. An example of this combing is shown in the tabulation of Appendix 8. In the coding of what is important to students, a proxy for perception (Martilla and James, 1977), 91 statements are identified, which through further combing leads to 12 categories. These are shown in Figure 4.17. Through a process of reduction (Heidegger, 1927/1962), analysis of the statements from the interviews and the themes that run through them, three phenomena are identified:

- Creativity and focus on product.
- Power dominance of teacher over student.
- Relevance of ICT to later life.

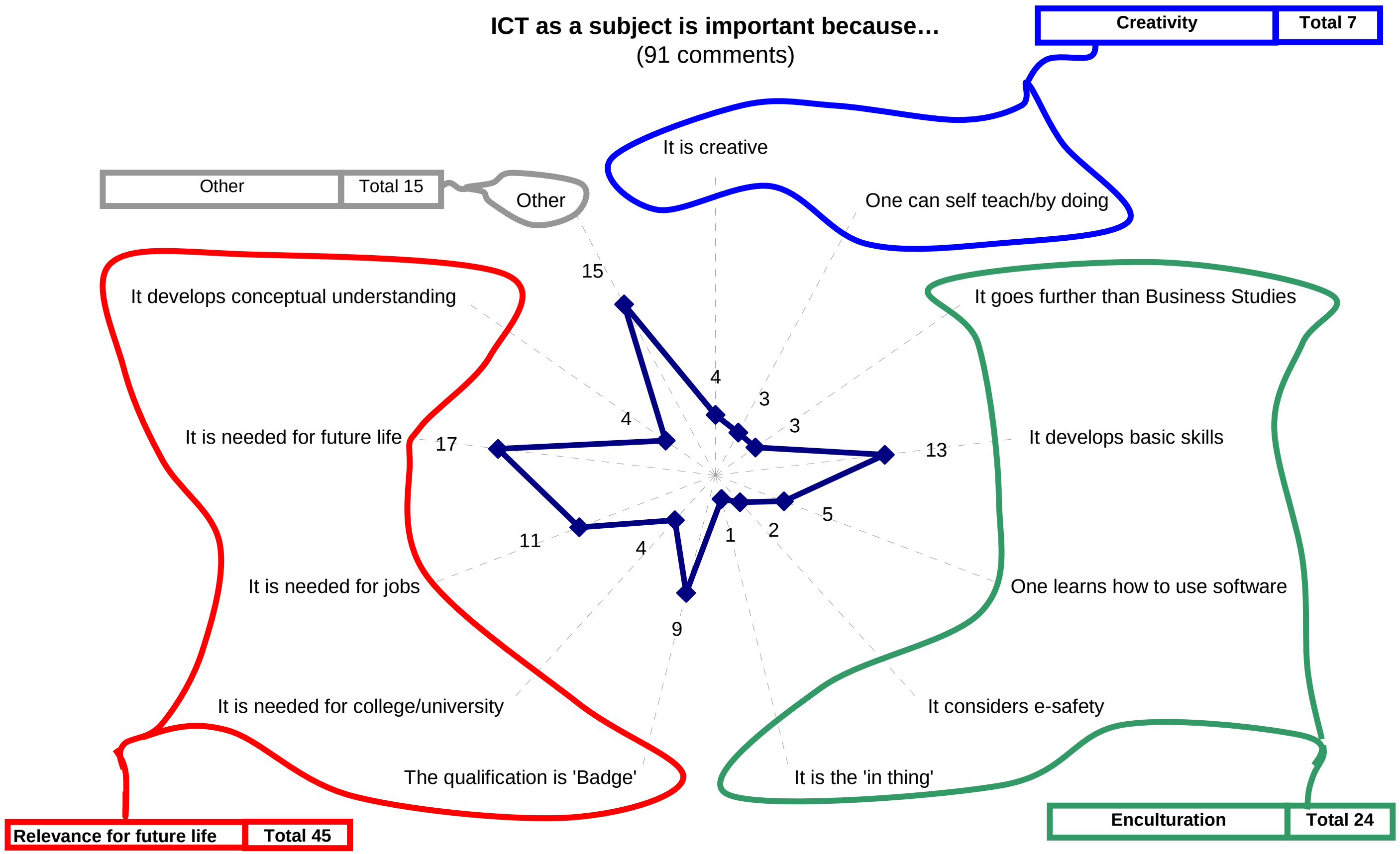



**Figure 4.17**. Importance of ICT and emergence of phenomena

Teacher dominance and the power relationship is a manifestation of the enculturation noted in the interpretation of the questionnaire results. Taking this to be super-ordinate the three phenomena may be written as:

- The relevance of ICT.
- The place of creativity in ICT.
- Enculturation.

A brief outline of each is now given to orientate the discussions in chapters 5, 6 and 7 by way of definition.

**Relevance of ICT**

This is located in the face validity of Watts (2008) and Chisnall (2005). Here relevance is equated to utility for some future purpose rather than some abstract notion of life relevance. The latter is located here in the concept of digital literacy.

**Creativity**

Facer and Williamson (2004) view creativity as

> *Central to children's abilities to work imaginatively and with a purpose, to judge the value of their own contributions and those of others, and to fashion critical responses to problems across all subjects in the curriculum.*

(p.6)

**Enculturation**

Grusec and Hastings (2007) define this as the process whereby one's surroundings define the requirements of the culture one finds oneself in. Thus for the school student, their perception of the culture of learning and assessment is defined by that of the school, their teachers and, more widely, the education system (Reay et al., 2001; Giddens, 2006). This is a specific example of habitus – the way in which students adapt to learning in a particular subject (Bourdieu, 1980; Roth, 2001). This phenomenon is also evident in Brown et al.'s development (1989) of notions of situated learning. The school does not provide an authentic domain however. In this respect enculturation runs contrary to relevance. Students may think that something is relevant solely because the culture and authority figures say it is. This shares much with the methodology of symbolic interactionism (Blumer, 1969; Lansheere, 1993).

Having identified three phenomena from the coding of statements of importance in the transcripts, the same lens was also applied to the statements of positive and negative attitude to ICT as shown in Figure 4.18. 160 comments were made by students that indicated either a positive or negative attitude. On analysis and combing, ten categories emerge. Of these eight have a positive net rating i.e. more positive comments than negative. Two have a net negative rating – moral, social & ethical aspects of the subject and use of ICT for social networking or chat. The eight categories have been combed into the three phenomena indicated above, with the majority providing evidence for the emergence of ‘relevance’. Enculturation is seen here in respect of the student perception of assessment systems and creativity in the making of things and programming. Games playing, which also falls under this phenomenon has as many positive comments as it does negative. This could have been coded under enculturation given that specifications do not make allowance for recognising student achievement in games contexts.

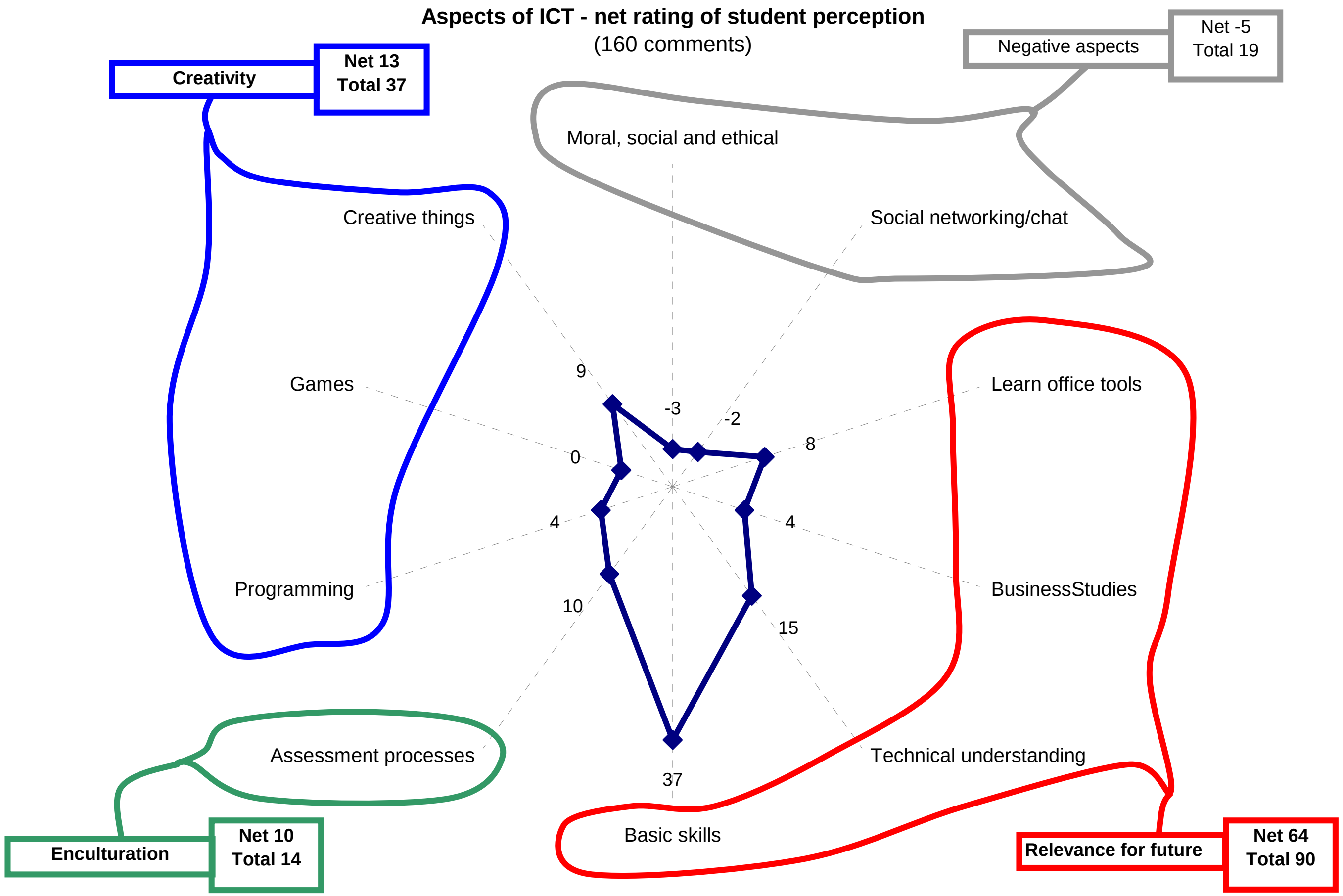



**Figure 4.18**. Positive and negative views of ICT, emergent phenomena

Each of the three phenomena, relevance, creativity and enculturation, derived from the empirical data is now discussed in turn in the chapters that follow. The discussions will reflect back onto the literature review, which has been combed for the perspective of others on the phenomena that have emerged. The relationship between the literature review, the empirical data and the emergent phenomena is shown is Figure 4.19, repeated here from the Introduction (Figure 1.2). In this figure the three phenomena are shown on the right, with their provenance from the empirical data shown by the solid arrows.

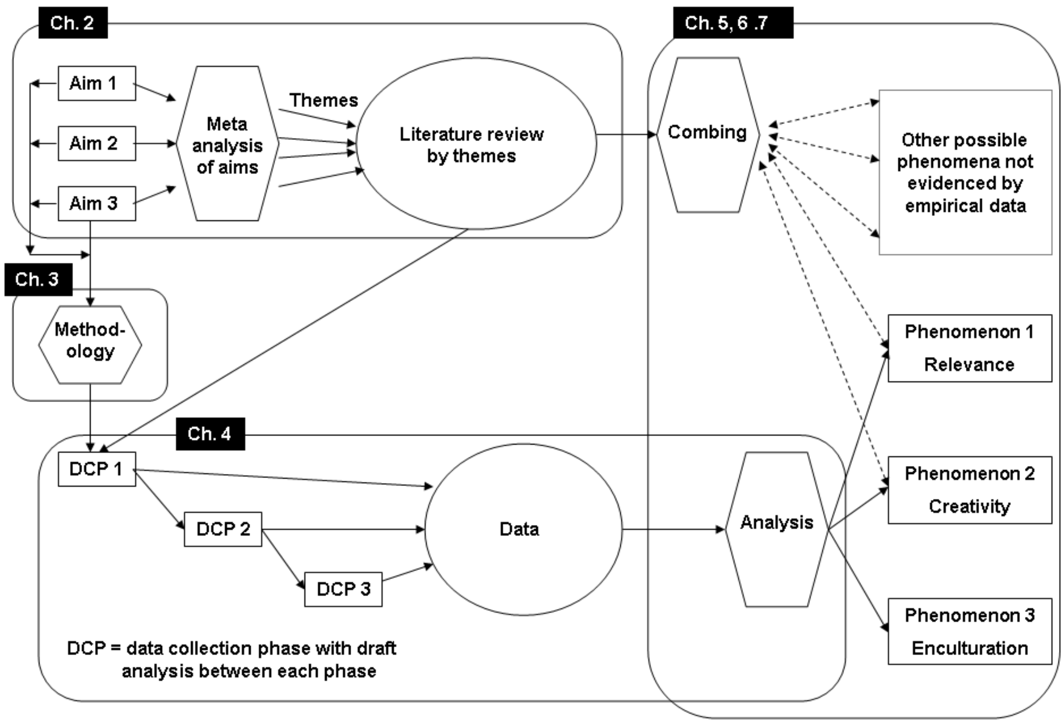



**Figure 4.19**. Mapping of phenomena from data and literature review

The literature review was not combed for phenomena that were not emergent from the data. This is a consequence of the hermeneutic spiral in which the data from each phase refines the phenomena (Conroy, 2003). With this epistemological and ontological approach the view is taken that the elicited findings from the empirical stage are paramount.

# 5. The relevance of ICT to students

In this chapter, and the two that follow, each phenomenon emerging from the analysis of the empirical data is discussed with findings analysed in detail. The first of these is the student perception that learning and assessment of ICT is intrinsically bound up with relevance for later life, study or employment.

There are five contributory sources from which this phenomenon has been isolated. These five sources are the literature (referring back to chapter 2), the documents which encapsulate the ICT curriculum and its assessment at 16 and the sets of data from each of the three phases of empirical research. As with all of the phenomena the isolation of 'relevance' ultimately comes from the iterative empirical data collection, culminating in the interviews and the coding of the responses. Having distilled this phenomenon at the end of this spiral of interpretation, its presence in the other sources is now analysed. Within the overarching phenomenon, three sub-themes may also be identified, represented by these quotations from the interviews:

> *I think it's important to understand how to use [ICT] I guess, because that's what's going to happen in future life.*
>
> (Student T, School H, transcript page 4)

> *ICT is like such a big part of any job you can get now… it's important that everyone has a basic understanding of it.*
>
> (Student A, School H, transcript page 3)

> *Well computers are going to be main technology in a few years so of course I need to learn how to use them… Probably in college [courses]…*
>
> (Student M, School L, transcript page 3)

Respectively, these sub-themes are:

- the general relevance of ICT for later life;
- the relevance of ICT for jobs and the world of work; and

- the relevance of ICT for further and higher education.

For students ICT is a life skill, something to show to employers or a passport for progression into college. The data sometimes points sharply at one or other of these sub-themes as in the quotes. Elsewhere it is a more generally phrased, with an indication of the pervasive future utility of ICT. The phenomenon of ‘relevance’ is now analysed, tracing its emergence in the empirical phases and setting this against the backdrop of the context provided by the literature and the curriculum and assessment documentation.

## *5.1. Relevance of ICT and the empirical study*

The first phase of empirical data collection was the elicitation of key constructs. This process, and the raw findings from it, are explained and presented in section 4.1, pp.107 et seq.. Crucial to this process is that the elicitation of constructs is designed so that they emerge directly from the students (Kelly, 1955; Fransella, 2003). There is no prompting by the researcher that leads to the constructs. Rather the prompts used elicit the students’ own personal construct fields based on the elements identified by them. Nevertheless, the phenomenon ‘Relevance’ emerged very directly and explicitly in response to the one of the prompts for one of the pairs of students that were interviewed in this first phase of data collection. Figure 5.1 shows the repertory grid analysis for this pair of students.

<------------ **Elements from students** ----------->

**Constructs from students**

| | Databases | Know about Excel | Presentations | Flowol | Charts | Formulas | Relevance to real life | Problem solving | Keep up to date | Stay after school / Researching | Workings of computer | No handwriting | Music / iTunes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Numbers - Words | X | X | O | X | X | X | O | X | O | O | O | O | O |
| Excel - Powerpoint | X | X | O | X | X | X | O | X | O | O | X | O | X |
| Needs knowledge of computers hi - lo | X | X | O | X | X | X | O | X | X | X | X | O | X |
| Relevance for later life hi - lo | X | X | O | O | X | O | X | X | X | X | O | X | O |
| Fast changing - Stays the same | O | O | O | O | O | O | X | X | X | X | O | O | O |
| Entertainment - Job | O | O | O | O | O | O | O | O | X | O | O | O | X |
| To get point across hi - lo | O | O | X | O | X | O | X | O | O | O | O | X | O |
| Learning - Entetainment | X | X | X | X | X | X | X | X | X | X | X | O | O |
| One off - edit | O | O | O | O | O | O | X | X | X | X | X | O | O |

| | Numbe | Excel - | Needs | Releva | Fast ch | Enterta | To get | Learnin | One off - edit |
|---|---|---|---|---|---|---|---|---|---|
| Numbers - Words | | 4.5 | 2.5 | 0.5 | -1.5 | -1.5 | -1.5 | 1.5 | -2.5 |
| Excel - Powerpoint | 4.5 | | 4.5 | -1.5 | -3.5 | -1.5 | -3.5 | 1.5 | -4.5 |
| Needs knowledge of computers hi - lo | 2.5 | 4.5 | | 0.5 | -1.5 | -2.5 | -5.5 | 3.5 | -0.5 |
| Relevance for later life hi - lo | 0.5 | -1.5 | 0.5 | | 2.5 | -1.5 | 0.5 | 1.5 | 1.5 |
| Fast changing - Stays the same | -1.5 | -3.5 | -1.5 | 2.5 | | 2.5 | 0.5 | 1.5 | 5.5 |
| Entertainment - Job | -1.5 | -1.5 | -2.5 | -1.5 | 2.5 | | 0.5 | -4.5 | 1.5 |
| To get point across hi - lo | -1.5 | -3.5 | -5.5 | 0.5 | 0.5 | 0.5 | | -2.5 | -0.5 |
| Learning - Entetainment | 1.5 | 1.5 | 3.5 | 1.5 | 1.5 | -4.5 | -2.5 | | 0.5 |
| One off - edit | -2.5 | -4.5 | -0.5 | 1.5 | 5.5 | 1.5 | -0.5 | 0.5 | |
| | 2 | -4 | 1 | 4 | 6 | -7 | -12 | 3 | 1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 4.5 | 2.5 | 0.5 | 1.5 | 1.5 | 1.5 | 1.5 | 2.5 |
| 4.5 | | 4.5 | 1.5 | 3.5 | 1.5 | 3.5 | 1.5 | 4.5 |
| 2.5 | 4.5 | | 0.5 | 1.5 | 2.5 | 5.5 | 3.5 | 0.5 |
| 0.5 | 1.5 | 0.5 | | 2.5 | 1.5 | 0.5 | 1.5 | 1.5 |
| 1.5 | 3.5 | 1.5 | 2.5 | | 2.5 | 0.5 | 1.5 | 5.5 |
| 1.5 | 1.5 | 2.5 | 1.5 | 2.5 | | 0.5 | 4.5 | 1.5 |
| 1.5 | 3.5 | 5.5 | 0.5 | 0.5 | 0.5 | | 2.5 | 0.5 |
| 1.5 | 1.5 | 3.5 | 1.5 | 1.5 | 4.5 | 2.5 | | 0.5 |
| 2.5 | 4.5 | 0.5 | 1.5 | 5.5 | 1.5 | 0.5 | 0.5 | |
| 16 | 25 | 21 | 10 | 19 | 16 | 15 | 17 | 17 |

**Figure 5.1**. Repertory grid analysis leading to phenomenon of relevance

'Relevance for later life' was the sole response of this group to the stimulus question 'ICT assessment (coursework/exams) - what should be in them?' - it is the column heading ringed in Figure 5.1. Thus this phenomenon had a key place in the students' perceptions. This prominence persisted through the other phases of data collection.

Figure 5.1 shows that this pair of students gave 13 responses (column headings) to the stimuli questions. From these they extracted constructs (row headings)[108]. Note that, for this pair of students, ‘relevance’ was both a response to a stimulus and an elicited construct – it appears as both a column heading and a row heading, as shown by the ringed text in Figure 5.1. This is because the students could not express it in any other way when they derived constructs from their responses. They saw their response as things that were relevant to future life or not.

When considering the variation between the constructs it can be seen that, for this pair, ‘Relevance’ scored 10 (see shaded figures at the foot of Figure 5.1), by far the lowest of all of the constructs. This indicates that it is the construct that is related most strongly to the other constructs and, as such, has the least significance in its own right. Thus ‘relevance’ is a construct that has emerged as being bound up in the others - it is a ‘meta-construct’ i.e. one that that is representative of the others. In the categorisation of constructs, moreover, no other was found to be similar to it and it was a category in its own right (see Table 4.5 on page 114). As such, it was one of six key constructs that were used in the construction of the instrument for the next phase of data collection – the questionnaire.

The design of the questionnaire was based on the outcomes of the analysis of the construct elicitation and with the research aims in mind. Having identified relevance as both a construct in its own right and as a categorisation of constructs it featured explicitly in the questionnaire. The full questions, and justification for their inclusion, are found in Appendix 4 and Table 4.7 respectively. There were two questions (Q3 and Q5) that were explicitly about the phenomenon of relevance, and one (Q6) that was tangentially connected:

- Q3 Tick one box to show the extent to which you agree or disagree with each of these statements: *The subject ICT is relevant to later life and jobs / The tasks and questions in ICT coursework and exams are relevant to later life and jobs.*
- Q5 Think about exams and coursework in ICT. How important do you think… the following are? *Applying your ICT knowledge, skills and*

[108] See section 4.1 for a full explanation of the method of construct elicitation.

*understanding to a range of situations (C)... Relevance to ICT to later life and for jobs (C, 2*).

- Q6 Outside of school, which of these do you do? (Tick as many or as few as you wish, or tick none). *A list of 13 choices was given.*

In responding to question 3 students ascribed significantly more relevance to ICT the subject than to its assessment: 80% agreeing or strongly agreeing with the statement that ICT was relevant to later life compared to only 36% with the statement that assessment of ICT was. Thus the phenomenon of 'relevance' appears to manifest itself differently when students were asked about assessment. This could reflect a bias in the sample used for the questionnaire.  It could also reflect different interpretations of relevance given the different sub-phenomena of relevance for college, for later life and for employment. By putting the parts of question 3 together there may also be an element of comparison in the responses. Students could have been answering a different question – 'Compared to ICT as a subject, how relevant is its assessment?' By putting the two questions next to each other this comparator effect is possible and would bias the figures (Robson, 1993; Bradburn et al., 2004). The importance ascribed to relevance is reinforced, however in the responses to question 5. When asked what aspects of ICT were important, 91% of students rated 'Relevance to later life' as important or very important, the highest rating for any of the 19 characteristics – see Figure 4.13. Question 6, although not directly asking about relevance, gave students the opportunity to list those things done outside of school. This gave an insight into those things which they might see as relevant beyond the curriculum and provided a basis for interpretation of the third phase, interview, data on this phenomenon. Here responses emphasised the pre-eminence of communication in the student informal use of ICT. Three activities were reported by at least three-quarters of the sample:

- Keep in touch by social networking sites (82%).
- Upload things to social networking sites (77%).
- Keep in touch by e-mail (75%).

As students report doing these things outside of school, it could be concluded that they see them as relevant to life in general. This conclusion was not certain here and the third phase interviews gave opportunity for more in-depth analysis of the relationship between activities and perceived relevance.

The semi-structured interview questions were developed from the responses in the questionnaire, which in turn built on the constructs elicited at the beginning of the empirical phase. The prompts and questions used in the interviews, their derivation from previous phases of empirical data collection, justification for their inclusion is shown in Table 4.11 and the exposition of data collected from them is detailed in section 4.3. Relevance was not a prompted theme in this final data collection phase, unlike for the questionnaire. It emerged strongly, however, in the ways in which students talked about the importance of the subject and, where applicable their reasons for choosing it.

For example, here a student is talking about the Diploma:

> *I think IT is a subject in itself is so important now because in this growing world, IT is becoming core too. So if you can develop an interest in IT that will help you a lot. Also with things like IT diploma it's the practise and putting it into the real world, which makes it so good.*
>
> (Student T, School J, transcript page 5)

Students were asked to talk about what it was that was important to them about ICT. For some this importance will have been made explicit at the point of opting for their KS4 courses. They will have considered which subject to choose and their responses reflected that choice of ICT. They had chosen the subject over others and so had explored its importance. For others there had been no option to not take an ICT qualification. For these students the importance may not have been made explicit. 91 responses were identified in relation to this question of importance - the raw data is available in Appendix 8. Of these 91, 45 were coded as being associated with relevance for later life, in six categories. These are shown in Figure 5.2.

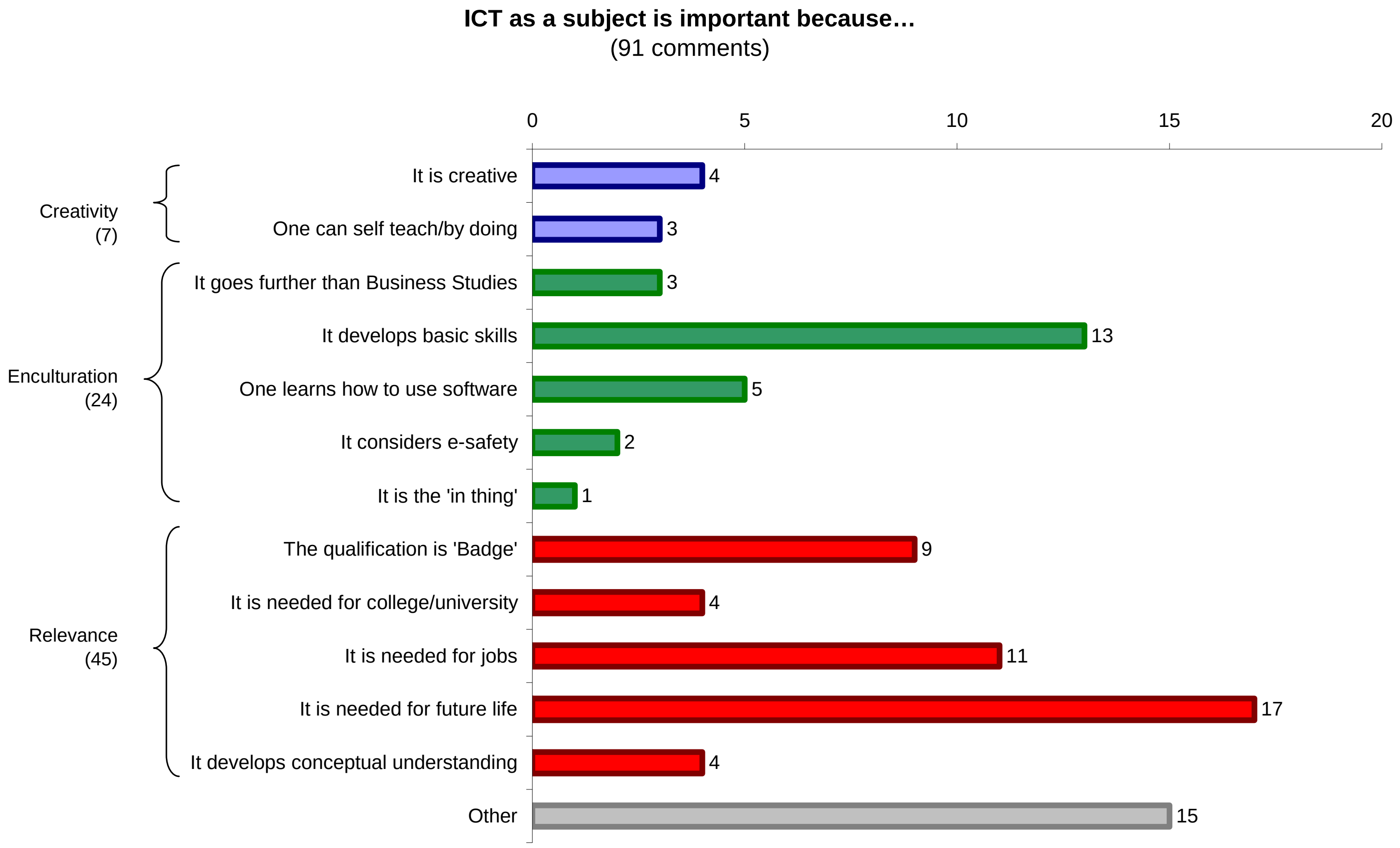



**Figure 5.2**. Importance of ICT, occurrences from interviews

Of these 45 statements that indicate ‘relevance’ as a phenomenon 21 unique responses can be identified. The remaining 24 are duplications with the same student repeating a point, or another student or students making the same point. These 21 responses can also be categorised according to whether students were discussing their perceptions of the importance of ICT as a subject, as a qualification or as their motivation for studying. Table 5.1 shows this categorisation of the responses.

| **Its importance as a subject** | **Its importance as a qualification** | **Its importance to me – motivations for study** |
|---|---|---|
| Things for future life / put into real life/face in real life.<br>Basic Skills.<br>Broad range of skills that you can use for a range of things.<br>Relate to real world.<br>Using computers more and more, part of everyday life.<br>Only subject that's 'good to have' beyond enjoyment. | Not necessary for all jobs but need to be able to do IT.<br>College entrance.<br>Badge for the future.<br>ICT important - used all over the world, qualification important for jobs.<br>CV and university entrance.<br>Qualifications important for jobs.<br>ICT course should contain things that are 'professional' not hobby. | Learn Basic Skills.<br>Part of job so important everyone does it (school motivation).<br>Part of people's lives so need understanding.<br>Qualification o do apprenticeship.<br>Job - IT technician.<br>Computers will be main technology (but not aiming for job in computers).<br>Good thing to have, things getting more technological/computers are the ‘in thing’.<br>Jobs need ICT. |

**Table 5.1**. Relevance of ICT and domains of importance

There is some duplication across the categories but these have been left in where students made the categorisation explicit. For example the importance for ICT for job was reported in relation to the qualification and as a motivating factor both personally, and at institutional level (see chapter 7 on the phenomenon of enculturation of student perceptions). In addition to this duplication there is also overlap in the responses. This is to be expected as they have all been coded as showing the perception that the importance of ICT (and its assessment) comes from its relevance to later life. Taking advantage of this overlap, the 21 responses in Table 5.1, all relating to relevance, may be regrouped to show the sub-themes of the phenomenon: life skill, jobs and further education as shown in Table 5.2.

| **ICT as Life Skill** | **ICT as key to jobs** | **ICT as key to further education** |
|---|---|---|
| Things for future life / put into real life.<br>Basic Skills/face in real life.<br>Broad range of skills that you can use for a range of things.<br>Relate to real world.<br>Using computers more and more, part of everyday life.<br>Only subject that's 'good to have' beyond enjoyment.<br>Learn Basic Skills.<br>Part of people's lives so need understanding.<br>Computers will be main technology (but not aiming for job in computers).<br>Good thing to have, things getting more technological/computers are the ‘in thing’. | College entrance.<br>Badge for the future.<br>CV and university entrance.<br>ICT course should contain things that are 'professional' not hobby.<br>Qualification to do apprenticeship. | Not necessary for all jobs but need to be able to do IT.<br>Badge for the future.<br>ICT important - used all over the world, qualification important for jobs.<br>CV and university entrance.<br>Qualifications important for jobs.<br>Part of job so important everyone does it (this is a motivation for the school).<br>Qualification o do apprenticeship.<br>Job - IT technician.<br>Jobs need ICT. |

**Table 5.2**. Sub-themes of relevance

Students report the relevance of ICT in respect of three different domains – life, jobs and further (or higher) education. As well as categorising relevance these three domains also reflect the future aspects of the non-formal, informal and formal learning contexts. As one student put it:

> *I think it is important to have a qualification in ICT... Well it’s good to have a qualification and be able to do it from that qualification. Not just that you've done it the once and now you can’t remember. It’s good to have it. It’s important because employers can have something written down that says that you can do it.*
>
> (Student L, School E, transcript page 1)

They also reported that ICT was more important than other subjects in respect of its future utility. Here a student refers to English and mathematics:

| | |
|---|---|
| *Researcher:* | *Do you think that's important that everybody gets a qualification in [ICT]?* |
| *Student:* | *Well it's really important now, because you need it to get into college.* |
| *Researcher:* | *What other qualifications would you say were important?* |
| *Student:* | *Maybe maths, English, so you can spell properly when typing.* |
| *Researcher:* | *Where does ICT fit into that? Is it more important than maths and English, or less?* |
| *Student:* | *I think it's probably more important because it's just going to be more needed.* |

(Student M, School L, transcript page 5)

## 5.2. Relevance of ICT and the literature

The literature reviewed in chapter 2 provides a context for phenomenon of 'relevance' that has been isolated from the empirical data representing student perceptions. This context is now discussed together with an analysis of the ways in which this phenomenon is represented in the documentation that define the curriculum of ICT and its assessment at 16.

The relevance of ICT to later life, both as a subject and as a qualification, is bound up in its place in the technical and vocational educational curricula of the last 40 years (Williams and Raggatt, 1998). There is also a consonance between relevance and authenticity (Dweck, 1986; Dochy and Moerkerke, 1997; Tombari and Borich, 1999). Here authentic tasks implicitly and explicitly bring relevance to the subject. On the other hand the notion of relevance is subjective. Something is relevant for a student if it is the culture which they observe (Brown et al., 1989).

Relevance may also be seen in the relationship between the formal, informal and non-formal learning contexts Eraut (1994; 2000; EC, 2001) in which ICT is found. It is a tool for learning in the non-formal spaces of home and community (Lewin, 2004; BESA, 2005; 2010; HM Treasury, 2006; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011) and in the formal and informal spaces of school. This multiple use for ICT implies that relevance to the world of work and everyday life may well be found in the curriculum of the 16+ qualifications. This relationship is also internal to Ellis (1990) with his emphasis on learning from, and with, both peers and teachers and Sefton-Green's promulgation (2004) of learning being embedded in everyday life. A counter view is found in, for example, BESA (2010), where a mismatch of learning of ICT at school and young peoples' use beyond it is noted. The resolution of these views is found in this research through its emphasis on the internal constructs and perceptions of students themselves rather than an externally constructed view of their learning. The study is not about what could or should be learnt, but what the students perceive and conceive of what is being learnt.

At the heart of this perception of relevance is the provenance of the students' views and beliefs. Here is the habitus of Bourdieu (1984) coloured by the lenses with which they see the world – lenses of home, school, and society. Students construct the notion of the relevance of ICT learning in relation to these views and to those of the networks to which they belong (Croninger and Lee, 2001). In relation to elicited personal constructs, Fransella's unified theory of self-regulation (2003) implies that perception, and constructed view, is intimately related with their prediction of their future life. The relevance of ICT is thus subjective with this subjectivity informing the agency that students have to direct their own learning. Students' increasing digital literacy allows them to frame their own questions (Underwood et al., 2008; Hague and Williamson, 2009) as they move beyond schooling to lifelong learning (Tapscott, 1998).

This predictive aspect is also echoed by the place of the anticipated action in learning put forward by Barnes et al. (2007) tempered by internal perceptions of self-efficacy (Bandura, 1997), which mediate the extent to which learners perceive that what they are doing now may be of use in the future. The application of Bandura's premise depends on the extent to which students feel that they are able to apply learning for authentic tasks in the future, perhaps aided by the Internet and other technological tools (Tapscott, op.cit.). Without this they would, presumably, perceive less relevance as the tasks become relegated to the context of just achieving the qualification rather than for its future use. A further aspect here is flow (Csikszentmihályi and Csikszentmihályi, 1992) and engaging activity leading from the formal to the informal. In turn this leads to the development of social capital (Bourdieu, 1977) and learner becoming part of the society, taking the learning (in this case of ICT) beyond the school. For Ecclestone (2004) the relevance of ICT learnt at school to that which is needed beyond it is an intrinsic part of progression and development of cultural capital (Bourdieu, 1984) and the situatedness of learning (Brown et al., 1989).

On the other hand the student's perception of what is relevant is mediated and controlled by the institutional framework (McNeil, 1986) with learner voice (Rudduck and Fielding, 2006; Walker and Logan, 2008), and learner-centric activity, subjugated by the external framework of assessment and 16+ curricula (Rudd et al., 2006; Selwyn et al., 2008). Thus authenticity is sacrificed for the requirements of the test (Gulikers, 2006; Mansell, 2007; Paton, 2007b; Hodgson and Spours, 2008; Bew, 2011) and the university admissions system (Baker, 2007). This primacy of the tests runs counter to the personalisation agenda (Hargreaves, 2004), the call in the Gilbert Report for "*increasing relevance through access to authentic domains for learning*" (DfES, 2006b:29) and the blurring of distinctions between learning in school, home and community contexts (see also Smith et al., 2005). Reay et al. (2001) and Ball et al. (2000) give a context for student perceptions of relevance of qualifications for moving onto further or higher education, with the choices being governed by perception of learner and peers. If a subject is seen to have intrinsic relevance to future study, this will be a significant factor in its choice at school.

The phenomenon of relevance is also evident in the literature that defines and encapsulates the theoretical frameworks of assessment. Ridgway et al. (2004) and Ripley (2007) consider the use of technology in relation to assessment, linking notions of construct validity Gipps and Murphy (1994) with learner voice (Rudduck and Fielding, 2006; Walker and Logan, 2008). Here, they argue, that what the learner sees as relevant should inform notions of what makes for valid assessment. Gronlund (2005) and Watts (2008) develop this with the notions of predictive, or future-oriented, face validity or consequential validity (Messick, 1989). The need for assessment to recognise the importance of what is relevant to a student's future is underlined by the findings of Dweck's goal theory (1986) where students focus solely on gaining the qualification. Failure to make this connection between relevance and the content of assessment runs the risk of undermining discriminant validity (Ridgway et al., 2004) with students and, perhaps those who accept the qualifications as passports (e.g. employers, colleges, universities), losing faith in them as being valid evidence of ICT capability. This concern is seen in, for example, the Livingstone and Hope report (2011) and the enquiry by the Royal Society (2010) into computing in schools (2010). It is a consequence of the dilemma of setting tests that purport to having a relevance to a life that the student has not yet lived (Honebein et al., 1993). This makes problematic the need for assessment to provide opportunities for demonstration of adult mastery (Archbald and Newman, 1988, cited in Cumming and Maxwell, 1999) of skills associated with digital literacy (BERR, 2009; Hague and Williamson, 2009; Selwyn, 2011; Craft, 2011) and of social and cultural competences associated with use of technology and new media (Greenberg, cited in Gatto, 2005; Oblinger, 2008; Jenkins et al., 2010; Facer, 2011).

The uncertainty of what might be relevant for the future, magnified by the impact of rapid developing technology (Gardner et al., 2008; Facer, 2009; Johnson et al., op.cit.), also plays into Messick's observation (1989) that what is authentic (and hence relevant) for one situation is not authentic for another. In the absence of certainty about what might be relevant for the future, students draw on the views of others (Underwood et al., 2008) – family, teachers (see chapter 7) and peers (Ecclestone and Pryor, 2003; Ridgway et al., 2004). Learning is social and students develop their vocational knowledge, understanding and skills of ICT in a process analogous to the peripheral participation in a community of practice – in this case of other users of ICT (Vygotsky, 1978; Lave and Wenger, 1991; Bruner, 1996; Wenger, 1998; Craft, 2011). Claxton (2008) and Smith et al. (2005) add a further dimension to the concept of relevance – that of utility. In considering what motivates students to learn, their perception of what is useful (in the future) is seen as complementary to their perceived self-efficacy, the influence of peers, teachers and others and the need for authenticity. On the other hand, Archbald and Newman (1988, cited in Cumming and Maxwell, 1999) regard true authenticity to require activity that goes beyond the mere utilitarian tasks required for assessment.

'Relevance' is also seen in the documents that define the qualification system for ICT at 16. These documents are the GCSE subject criteria (QCA, 2001) and the Diploma criteria (QCA/e-skills UK, 2006). The subject criteria for GCSE ICT, as for other subjects, specify what candidates for the qualification must be able to demonstrate. Two observations may be made about the way in which these criteria are worded. Firstly it should be noted that they specify the subject by way of assessment and outcome rather than by learning and formative understanding. Secondly the audience for these criteria are the awarding bodies. This is evidenced by the phrase "*A GCSE specification must...*" (ibid.:1) - an instruction to those drawing up specifications. A further instruction, to schools, is that students must follow the National Curriculum for KS4 ICT. This is not explicitly part of the criteria for GCSE themselves but is in the preamble to those criteria: "*Specifications must also meet the requirements of the appropriate national curriculum order for ICT*" (ibid.:1). Schools do not require students following a GCSE ICT course to do any more study of the subject to cover the requirements of the National Curriculum. Thus this analysis is of the GCSE criteria rather than the National Curriculum itself. The criteria are applicable to GCSE full and short courses[109] and are listed in Table 5.3 with statements in brackets only applicable to the full course.

[109] A GCSE full course is one which counts as a whole GCSE in performance measures i.e. 20% of the 5 A*-C threshold. A short GCSE course is one which counts 10%.

| AO[110] | **A GCSE specification [in ICT] must require candidates to demonstrate their ability to:** |
|---|---|
| AO1 | Apply their knowledge, skills and understanding of ICT to a range of situations' |
| AO2 | Analyse, design, implement, test, (evaluate and document) information and communication systems (for use by others) and develop understanding of the wider applications and effects of ICT. |
| AO3 | Reflect critically on the way they and others use ICT. |
| AO4 | Consider, (discuss and review) the impact of ICT applications in the wider world. |
| AO5 | Consider the social, economic, political, legal, ethical and moral issues and security needs for data which surround the increasing use of ICT. |

**Table 5.3**. GCSE assessment objectives in ICT
(statements in brackets apply to the full course only)

An analysis of the assessment objectives gives a top level view of how the GCSE system perceives ICT in respect of the phenomena of relevance as shown in Table 5.4. Here each assessment objective gives is an analysed for presence of  the phenomenon of relevance. The emphasis shown here is for learning which looks beyond the classroom. This runs somewhat counter to the nomenclature of the GCSE as a 'general' qualification (as opposed to vocationally-related).

[110] AO=Assessment Objective.

| GCSE ICT subject criteria assessment objectives | Phenomenon of relevance |
|---|---|
| AO1: Apply [...] knowledge, skills and understanding of ICT to a range of situations. | This includes situations that students may find beyond school e.g. ones that will apply in later life, employment or study. This AO allows for students to problem solve and to apply solutions to problems in different contexts. |
| AO2: Analyse, design, implement, test, evaluate and document information and communication systems for use by others and develop understanding of the wider applications and effects of ICT. | This allows for students to interact with the world beyond the classroom, including the world of work. They will be able to see the application of ICT in contexts that they may meet in later life. |
| AO3: reflect critically on the way they and others use ICT. | Does not directly map to relevance. Others may include those in employment or further education. |
| AO4: Consider, (discuss and review) the impact of ICT applications in the wider world. | 'Wider' may be interpreted as 'beyond school' in which case relevance for later life is intrinsic to this objective. |
| AO5: consider the social, economic, political, legal, ethical and moral issues and security needs for data which surround the increasing use of ICT: these, as with AO2, locate the use of ICT beyond the classroom. | Here the use of 'social' and 'economic' gives perhaps the strongest indicators of later life, but the increase in the use of electronic systems for citizens' participation in local and national government is also pertinent here, under the 'political' label. |

**Table 5.4**. Relevance as a phenomenon in GSCE ICT subject criteria

The QCA, on behalf of the Department for Education and Skills, and in conjunction with the relevant sector skills council drew up criteria (QCA/e-skills UK, 2006) for each of the 'lines of learning' in the Diplomas. One of these lines of learning is Information Technology[111]. In common with all other Diplomas the criteria reflected the structure of the learning:

- Principal learning i.e. subject specific.
- Generic learning and transferable Skills (including a project and functional skills).
- Additional/specialist learning i.e. complementary awards that may be taken alongside the Diploma.
- Work-related learning.

The first of these is specified dependent on the subject (line of learning) being followed. Table 5.5 lists criteria (QCA/e-skills UK, 2006) for topics in IT at level 2, developed with the sector skills council for IT – e-skills UK. Each topic has 60 guided learning hours and so is approximately equivalent in extent to half a GCSE. As with GCSE, and all qualifications aimed at the 14-16 age group, the requirements of the National Curriculum are subsumed in these topics and the other aspects of Diploma learning.

Each of the topics in the principal learning map on to the phenomenon of ‘relevance to later life’ that emerged from the analysis of the empirical data collection of student perceptions. This is, perhaps, unsurprising given the Diploma’s focus on the world of work and its aim of “*Engaging students through an exploration of the real-world integration of technology*” (ibid.:6).

[111] As an indication of its more vocational nature, the line of learning here is called IT rather than ICT.

| Diploma topic outline | Phenomenon of relevance |
|---|---|
| **The potential of technology**. Using topical examples, learners will explore the transformational effect of technology on society, organisations and individuals, and examine the ways in which technology can help organisations and individuals to achieve their objectives. | This topic is focused on the world beyond school. It looks at aspects of IT in both employment and as a tool for life. |
| **Exploring organisations**. Using current examples from industry, learners will develop their understanding of enterprise and organisations, including exploring technology-enabled business processes. | This topic is focused on IT in the world of work. |
| **Effective communication**. Learners will develop their ability to communicate and operate effectively in a business-like environment, including understanding teams, communication methods and the consequences of different behaviours. | Although framed rather generally, the context for this topic is business and how technology aids communication in that context. |
| **Skills for innovation**. Learners will develop the ability to create proposals to address business challenges and opportunities. This includes the use of creative, investigative and numerical reasoning skills, and the interpersonal skills to negotiate agreements. | This topic is focused on the world beyond school. It looks at aspects of IT in both employment and as a tool for life. |
| **Technology systems**. Learners will assemble business-relevant technology systems; design, develop and test simple programs; and understand the principles of systems availability. | This topic is focused on IT in the world of work. |
| **Multimedia**. Learners will develop their understanding of contemporary digital media and its application for communication and entertainment. They will design and produce a multimedia product that demonstrates an understanding of business requirements, technical competence, and awareness of audience needs. | This topic is focused on IT in the world of work. |
| **Managing projects**. Learners will understand the principles of planning and executing a project and how this process is used in business. This knowledge will be applied in the development of task-based project plans for technology-related solutions. | This topic is focused on IT in the world of work. |

**Table 5.5**. Relevance and IT Diploma criteria at level 2

## 5.3. Chapter summary

The phenomenon of relevance was isolated from the analysis of data in the empirical data collection. In particular it was derived from a combing of the responses to the interviews. Analysis of this phenomenon has identified three sub-themes – a skill for life, a qualification or badge for employers and a passport for further study at college or university. These three themes are often intertwined in the literature and the data collected from students. They were most clearly evident as separate themes in the coding of the interview data but it is not possible to treat them as separate phenomena due to their interconnections and the way in which students sometimes report relevance broadly and sometimes narrowly as a sub-theme. This is most clearly seen in the relationship between relevance and authenticity within student culture (Dweck, 1986; Dochy & Moerkerke, 1997; Brown et al., 1989; Tombari and Borich, 1999) and the ambiguous meaning of 'qualification'. This term can mean both a qualification to do something i.e. a job or further study, or simply the endpoint of a course of study (Williams and Raggatt, 1998). A similar ambiguity is seen in the relevance of ICT in the range of formal and informal contexts (Lewin, 2004; BESA, 2005; 2010; Ipsos-MORI, 2007; Logicalis 2009; Beswick, 2011) and the embedding of ICT learning everyday life (Sefton-Green, 2004).

This ambiguity and the difficulty of resolving it was seen in the first indication of the phenomenon. This came in the repertory grid analysis where one pair of students used the phrase 'relevance for later life' as a direct response. It was unique in being both a response and a construct in this first phase process – students could not express it any other way. This led to it being seen as a significant construct in the analysis and hence one that was represented in the questionnaires. In consideration of relative importance students differentiated between the subject ICT and the related qualification (e.g. GCSE ICT). This matches the division between the 'life skill' and the 'passport for further education' with the latter requiring the formal qualification. Analysis of the documents that define the curriculum also showed 'relevance' as being a key aspect of the criteria for courses in ICT.

# 6. ICT and creativity in the student perception

The second phenomenon emerging from the research is the perception that students have of creativity and its relationship to, and function within, the subject of ICT and its assessment.

In this chapter student views on creativity and ICT and how they value it in terms of the assessment process are analysed. While the very nature of the multiple hermeneutic approach lends imprecision to the isolation of phenomena, ‘creativity’ is further subject to many nuances of meaning. For the purposes of this chapter, and the thesis, ‘creativity’ is taken to be present in those activities in which there is either some degree of freedom of response or where those activities have some kind of design or problem-solving component. In these latter cases, students respond either by creating a solution, artefact or product or by thinking creatively. In this sense the definition used by Facer and Williamson (2004) is key, where it is seen as

> *Central to children’s abilities to work imaginatively and with a purpose, to judge the value of their own contributions and those of others, and to fashion critical responses to problems across all subjects in the curriculum*.
>
> (p.6)

For some students, their views on creativity are constrained by the tools they have access to (Boettcher, 2007). Further limitations are imposed through the way in which they are taught (Craft, 2011) or the requirements of the assessment procedures of the course they are following (Mansell, 2007). These constraints are contributory factors in the phenomenon of enculturation, which is dealt with in the next chapter.

There are five contributory sources from which this phenomenon has been isolated as discussed in chapter 4. These five sources are the literature (referring back to chapter 2), the documents which encapsulate the ICT curriculum and its assessment at 16 and the sets of data from each of the three phases of empirical research. As with all of the phenomena the isolation of ‘creativity’ ultimately comes from the iterative empirical data collection, culminating in the interviews and the coding of the responses.

Having distilled this phenomenon at the end of this spiral of interpretation, its presence in the five sources is now analysed.

## *6.1. Creativity and the empirical study*

The first phase of empirical data collection was the elicitation of key constructs. This process, and the raw findings from it, are explained and presented in section 4.1. (pp.107 et seq.). Creativity emerged as a response across a number of constructs – and it should be noted that the method of construct elicitation is, in itself, creative. Students were presented with an open-ended set of tasks and freedom from any pre-determined frameworks. Whether this was likely to produce more or less emphasis on creativity in the constructs is debatable. In the absence of a framework, in the open elicitation, students may have fallen back on known structures to help frame their responses. On the other hand, the lack of boundary, may have allowed for the inclusion of 'left field' ideas.

Figures 6.1, 6.2 and 6.3 show the repertory grid analyses for three of the four pairs of students that were interviewed in this first phase of data collection (the fourth pair's grid is presented in Figure 4.4 on page 112 in the discussion of the method). Creativity did not emerge as a significant construct, *per se*, from any of the pairs. One pair had it as a construct, but it was not a significant one (following the standard repertory grid analysis method (Kelly, 1995; Fransella, 2003; Cohen et al., 2007)). Another pair had 'Problem solving' as a construct. For each of these pairs of students, however, the constructs elicited included ones that are related to the phenomenon of creativity and ICT. These are summarised in Table 6.1.

| Figure | Constructs relating to creativity and ICT |
|---|---|
| 6.1 | **Creativity v Working to a list of instructions**. Construct named by two emergent poles. Creativity explicit. |
| | **Examination board v Underground learning**. Construct named by two emergent poles. Creativity inferred from 'underground learning' with students having to find their own solutions to problems rather than follow examination board guidance. |
| 6.2 | **Being taught v Using intuition**. Construct named by two emergent poles. The use of intuition here equates to a creative response. |
| 6.3 | **Problem-solving**. This hi-lo[112] construct explicitly equates to creativity using the definition outline in chapter 4 and after Face and Williamson (2004). |

**Table 6.1**. Creativity in the elicited constructs

In Figure 6.1 there were 13 responses (elements) from which constructs were elicited. One of these was that students said that they 'should know about computers'. This was deemed too generic to be used in the subsequent discussion, leaving 12 elements – the row headings in Figure 6.1.

For this pair of students, the most significant construct (as shown by the pairwise correlation at the foot of Figure 6.1) was 'Examination board v Underground'. This construct expresses the perception of students that some things that they learn, and are assessed on, is determined by the examination board[113] and its specifications, while other things are learnt in an informal (underground)[114] way.

[112] A hi-lo construct (Cohen et al., 2007) is one in which one pole is implicit. Here the construct is 'problem solving'. The hi pole is where an element requires problem solving, the lo pole is for an element that does not (see chapter 4).
[113] These students used the term 'examination board' - more properly, it is 'awarding body', but in keeping with the ethos of construct elicitation, their own words are used.
[114] The students used the term 'underground learning' which has been interpreted here as 'informal learning' as this is the widely accepted term (see for example, Siemens, 2005) for what they were describing.

←-------------- Elements from students---------------→

| Constructs from students | Coursework | Computers | Spreadsheets | Powerpoint | e mails | Presentations | Large complex equations | Databases | Intent browsing skills | Hacking | Scripting | Working quickly - not confused | Video editing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calculation - Information | O | NOT USED - GENERIC | X | O | O | O | O | X | O | O | O | O | O |
| Creativity - Working to a list | O | | O | X | X | X | O | O | O | O | X | O | X |
| Wide audience - personal | O | | O | X | O | X | O | O | O | X | X | O | X |
| Benign - Malicious | X | | O | X | X | O | X | X | X | O | O | X | O |
| Destroy data - Keep data | O | | O | O | O | O | O | O | O | X | O | O | O |
| Online - Offline | O | | O | O | O | O | O | O | X | O | O | O | O |
| Exam board - Underground | O | | X | O | O | X | O | O | O | O | O | O | O |
| Data handling - Messaging | X | | X | O | O | O | X | X | X | X | X | O | O |

| | |
|---|---|
| B | 16/03/2009 |
| Sample | 2 students doing short course ICT |
| School | X |

| | Calcula | Creativ | Wide au | Benign | Destro | Online - | Exam b | Data handling - Messaging |
|---|---|---|---|---|---|---|---|---|
| Calculation - Information | | -1 | -1 | -1 | 3 | 3 | 4 | 1 |
| Creativity - Working to a list | -1 | | 4 | -2 | 0 | 0 | 1 | -4 |
| Wide audience - personal | -1 | 4 | | -4 | 2 | 0 | 1 | -2 |
| Benign - Malicious | -1 | -2 | -4 | | -2 | 0 | -3 | 0 |
| Destroy data - Keep data | 3 | 0 | 2 | -2 | | 4 | 2 | 0 |
| Online - Offline | 3 | 0 | 0 | 0 | 4 | | 3 | -1 |
| Exam board - Underground | 4 | 1 | 1 | -3 | 2 | 3 | | -1 |
| Data handling - Messaging | 1 | -4 | -2 | 0 | 0 | -1 | -1 | |
| | 8 | -2 | 0 | -12 | 9 | 9 | 7 | -7 |

| | Calcula | Creativ | Wide au | Benign | Destro | Online - | Exam b | Data handling - Messaging |
|---|---|---|---|---|---|---|---|---|
| Calculation - Information | 0 | 1 | 1 | 1 | 3 | 3 | 4 | 1 |
| Creativity - Working to a list | 1 | 0 | 4 | 2 | 0 | 0 | 1 | 4 |
| Wide audience - personal | 1 | 4 | 0 | 4 | 2 | 0 | 1 | 2 |
| Benign - Malicious | 1 | 2 | 4 | 0 | 2 | 0 | 3 | 0 |
| Destroy data - Keep data | 3 | 0 | 2 | 2 | 0 | 4 | 2 | 0 |
| Online - Offline | 3 | 0 | 0 | 0 | 4 | 0 | 3 | 1 |
| Exam board - Underground | 4 | 1 | 1 | 3 | 2 | 3 | 0 | 1 |
| Data handling - Messaging | 1 | 4 | 2 | 0 | 0 | 1 | 1 | 0 |
| | 14 | 12 | 14 | 12 | 13 | 11 | 15 | 9 |

**Figure 6.1**. Repertory grid for student pairing 1.

This construct ('Exam board – Underground') has been mapped onto the phenomenon of creativity in the sense that students learn things from a variety of sources and in a variety of contexts. For example, and as shown in Figure 6.1, students here said that something they should know about is 'Presentations', and something you should be able to do is 'Powerpoint'. The former they put on the examination board pole and the latter on the

Underground pole. In explaining this they said that the examination board defines what they needed to do with presentations and they learnt how to do it in a range of ways. How they respond to the set tasks involves an element of creativity, or problem-solving, as they use their peers and other resources in ‘Underground learning’.

The phenomenon of creativity thus first appears in this analysis with this emergence of the ‘Exam board-Underground’ manifestation of creativity as the most significant of the students’ constructs, and perception, of what ICT learning and assessment are.

The phenomenon is also seen in a second emergent construct for these students – ‘Creativity v Working to a list’. While this did not score as highly as others on the test of inter-dependency (the pairwise correlation) it nevertheless has students explicitly naming ‘Creativity’ as a pole for one of their constructs. The other pole is useful too in framing what they understand by ‘Creativity’. It is not ‘Working to a list’. Students here are expressing the notion that to be creative in ICT does not mean following a prescribed set of instructions. This is important when one considers the atomisation of assessment criteria (Kimbell, 1997) and the tight definition of assessment tasks.

In this construct students are expressing their perception that sometimes lists of instructions are given and need to be followed but that there are other things which they associate with creativity. Table 6.2 summarises the classification of elements to poles by this pair. The columns of this Table correspond to the X and O in the ‘Creativity v Working to a list’ construct row in Figure 6.1.

The process of repertory grid analysis forces every response to be allocated to one pole or the other, even though some of these responses (e.g. working quickly) may not appear to fit comfortably. Equally some things self-evidently fit one of the poles, perhaps because they were used in the trios that defined them (e.g. ‘Video editing’ equating to ‘Creative’). Moreover some concepts may appear to the reader to be misplaced, but it is the student respondent view which is paramount. Table 6.2, and Figure 6.1, represent *their* classification and hence *their* perceptions. Thus the presence of scripting on one side and hacking on the other may appear contradictory to a reader who understands that they require essentially the skills. There may be a number of reasons for this – perhaps, for example, these students had done some scripting so could apply creative solutions but would not know how to hack and so would need to follow a list. At this stage in the empirical process, however, the reasons for the constructs is unimportant. It is merely an exposition of the students' perceptions, their constructs of ICT.

| | **Creativity** | **Working to a list** |
|---|---|---|
| **Should know about…** | Powerpoint<br>E-mails | Coursework<br>Spreadsheets |
| **Should be able to do…** | Presentations | Large complex equations |
| **Should be in assessment…** | | Databases<br>Internet browsing skills |
| **If you're good at ICT you can do…** | Scripting (i.e. programming) | Hacking<br>Working quickly without being confused |
| **If you're good at using technology you can do…** | Video editing | |

**Table 6.2**. Responses on the 'Creativity v Working to a list' poles

Although 'Coursework' appears at the 'Working to a list' pole, 'Making presentations' is aligned with 'Creativity'. Here, it could be argued, that students are making a statement about the nature of the tasks in the coursework and how they communicate their solutions. On the other hand it could be that students are simply stating that coursework requires precise instructions because it is high-stakes. This relationship between coursework and perceptions of creativity (and, by extension, freedom in solving problems) is discussed further in the next chapter.

<-----------  Elements from students ------------>

Constructs from students

| | Ability to adapt to new hardware / software | Knowledge of ICT | Set up spreadsheets | Use Photoshop | Use different software | Solve probrns | Set up computer | Relevannt to adult life | Know about coursework | Prepae for further courses | Touch typing | Recover from crash |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Knowledge - Skill | X | X | X | X | X | X | O | X | O | O | O | O |
| Know what to do - Use program | O | X | O | O | O | X | O | X | O | O | O | O |
| Requirements - Processes | O | X | O | O | O | O | O | X | X | X | O | O |
| Help to be quick - Long process | O | O | O | X | X | O | X | O | O | O | O | X |
| Taught - Intuitive | O | O | O | O | O | O | O | X | X | X | O | O |

| | |
|---|---|
| C | |
| Date | 17/03/2009 |
| Sample | 2 students doing full course ICT |
| School | X |

| | Knowle | Know w | Requir | Help to | Taught - Intuitive |
|---|---|---|---|---|---|
| Knowledge - Skill | | 2 | -1 | -1 | -2 |
| Know what to do - Use program | 2 | | 3 | -2 | 2 |
| Requirements - Processes | -1 | 3 | | -2 | 5 |
| Help to be quick - Long process | -1 | -2 | -2 | | -1 |
| Taught - Intuitive | -2 | 2 | 5 | -1 | |
| | -2 | 5 | 5 | -6 | 4 |

| | Knowle | Know w | Requir | Help to | Taught - Intuitive |
|---|---|---|---|---|---|
| Knowledge - Skill | 0 | 2 | 1 | 1 | 2 |
| Know what to do - Use program | 2 | 0 | 3 | 2 | 2 |
| Requirements - Processes | 1 | 3 | 0 | 2 | 5 |
| Help to be quick - Long process | 1 | 2 | 2 | 0 | 1 |
| Taught - Intuitive | 2 | 2 | 5 | 1 | 0 |
| | 6 | 9 | 11 | 6 | 10 |

**Figure 6.2**. Repertory grid for student pairing 2

Applying the same processes to analyse Figure 6.2, the most significant construct is ‘Requirements v Processes’. This represents the students’ articulation that some things are learnt for the sake of the qualification and assessment (Requirements) and some are learnt for their own sake (Processes). This construct would have some connection with creativity were it not for the fact the students were not equating learning for its own sake with being self-taught or intuition. Rather they saw learning of processes as still being under the direction of the teacher in a constrained, non-creative way with particular reference to relevance for later life. This phenomenon of relevance has been discussed in the previous chapter.

The construct in Figure 6.2 from which the phenomenon of creativity is seen most clearly is ‘Taught v Intuition’. This was the second most significantly different construct for this group on the pairwise correlation (scoring 10 versus the 11 for the most significant). The use of the word 'intuition' aligns it with creativity after Facer and Williamson (2004). It is also closely allied to the construct 'Creativity v Working to a list' in Figure 6.1. There are senses in of the student finding his or her own way through a problem or being instructed how to do so. The mapping of these poles is shown in Table 6.3.

| Figure | Self-directed | Instructed |
|---|---|---|
| **6.1** | Creativity | Working to a list |
| **6.2** | Intuition | Taught |

**Table 6.3**. Self-direction and instruction in constructs

In the third pairing, represented by Figure 6.3, creativity did not emerge as clearly as from the two pairs discussed above. This pair's responses are included here for as they include the construct 'Problem solving'. This is a hi-lo construct (Cohen et al., 2007). By this is meant that one pole of the construct is 'High levels of problem-solving' and the other 'Low levels of problem solving'. Analysis of the grid shows this to be the most dependent construct for this pair of students. In other words, it is the construct which is most associated with all of the others. Thus although not significant in the same way as the creativity-related constructs in Figures 6.1 and 6.2 it is implicit in the way in which these students construct their learning of ICT.

←--------- Elements from students---------→

Constructs from students

| | Do things untaught | Merge cells | Search database | Make viruses | Make programs | Diagnose problems | Hack into PC | Take apart/repair PC | Know components | Recover lost data |
|---|---|---|---|---|---|---|---|---|---|---|
| What PC does - What's in PC | X | X | X | X | X | X | O | O | O | O |
| Making - knowing | O | X | X | X | X | O | O | O | O | O |
| Problem solving hi - lo | O | X | O | X | X | X | O | X | X | O |
| Making easier lo - hi | O | O | O | X | X | O | O | O | O | O |
| "Shut down" hi - lo | O | O | O | O | O | O | X | O | O | O |

| | |
|---|---|
| D | |
| Date | 17/03/2009 |
| Sample | One student doing full (foundation) course, one doing key skills |
| School | X |

| | What P | Making | Proble | Making | "Shut down" hi - lo |
|---|---|---|---|---|---|
| What PC does - What's in PC | | 3 | 1 | 1 | -2 |
| Making - knowing | 3 | | 1 | 3 | 0 |
| Problem solving hi - lo | 1 | 1 | | 1 | -2 |
| Making easier lo - hi | 1 | 3 | 1 | | 2 |
| "Shut down" hi - lo | -2 | 0 | -2 | 2 | |
| | 3 | 7 | 1 | 7 | -2 |

| | What P | Making | Proble | Making | "Shut down" hi - lo |
|---|---|---|---|---|---|
| What PC does - What's in PC | 0 | 3 | 1 | 1 | 2 |
| Making - knowing | 3 | 0 | 1 | 3 | 0 |
| Problem solving hi - lo | 1 | 1 | 0 | 1 | 2 |
| Making easier lo - hi | 1 | 3 | 1 | 0 | 2 |
| "Shut down" hi - lo | 2 | 0 | 2 | 2 | 0 |
| | 7 | 7 | 5 | 7 | 6 |

**Figure 6.3**. Repertory grid for student pairing 3

The grid in Figure 6.3 shows the elements that were identified with the 'high' pole of problem-solving, marked with an X. These elements originated as responses to stimulus questions as shown in Table 6.4.

| Question | Response/s |
| --- | --- |
| What should be included in ICT assessment? | Merging cells. |
| If someone is good at ICT what can they do? | Making viruses, making programs, diagnosing problems, repairing PCs. |
| What should you be able to do in ICT? | Knowing the components of the PC. |

**Table 6.4**. Problem-solving responses from a pair of students.

It is not immediately obvious why the students associated the first and last of the responses in Table 6.4 with high problem-solving ability. It could be conjectured that 'merging cells' was a solution to a particular problem that they had faced and that knowing the components of a PC is associated with the other responses of diagnosing and repairing problems. For the purpose of this analysis, however, the reasons why students associate responses with particular poles were less important than the emergence of the construct itself. Here creativity, in the shape of problem-solving, was elicited explicitly. That this was merely the first stage of the data collection meant that the constructs are subject to further scrutiny in the next stages. It was not important at this stage to explore why students construct their learning as they do but to identify what the constructs are for the focusing of subsequent data collection and analysis.

To summarise, in the first stage of data collection and analysis of repertory grids five constructs were elicited that pointed towards the emergence of the phenomenon of creativity:

- Learning by with or without a list of instructions to follow (from Figure 6.1).
- Learning through creativity itself (6.1).
- Learning informally (underground), rather than constrained examination requirements (6.1).
- Learning through one's own intuition, rather than being taught (6.2).
- Learning as problem solving (6.3).

The questionnaire was constructed based on the outcomes of the construct analysis and with the research aims in mind. 'Creativity' had emerged as a construct in its own right but not significantly. The analysis and discussion above showed how this phenomenon could be seen to be implicit in other constructs. Consequently it did not appear as a question in its own right in the questionnaire (the full questions, and justification for their inclusion, are found on in Appendix 4 and Table 4.7 respectively). Creativity did feature as a possible answer in multiple-choice questions, however, and students' responses to open questions also included a number of references to it, supporting its emergence as a phenomenon. The analysis of these responses is discussed here taking, in turn, each question that is pertinent to creativity:

- Question 5 – the importance of ICT, by aspect.
- Question 6 – the use of technology in the home.
- Question 7 – what should be included in ICT assessment?
- Question 8 – what shows that someone is 'good' at ICT?
- Question 9 – any general comments about assessment of ICT?

Question 5 of the questionnaire asked students to "*Think about exams and coursework in ICT"* and say "*How important do you think each of the following is?"* using a 5-point Likert scale for responses. There were two (out of 19) aspects that related to creativity: 'Being creative' and 'Analysing, designing and testing ICT systems'. 68% of students (N=44) rated 'being creative' as important or very important. For analysing, designing and testing ICT systems the figure was 59%. This compared to a mean of 68% for the 19 aspects as a whole. This question did not, therefore, yield creativity as being a key feature. This may be because of the relationship of the question to assessment where there may be less scope for creativity. In contrast the most important aspect was relevance, considered in the previous chapter (91% considering it important or very important). Things that are relatively easy to assess also scored highly: 80% for explaining what ICT can be used for and 77% for explaining what the parts of a computer are. On the other hand only 7% of students considered creativity to be unimportant or very unimportant. This was the third lowest percentage for any aspect.

Whereas question 5 was largely based on multiple responses, questions 6 to 9 provided opportunity for free text. Creative aspects came through more clearly here. Question 6 asked students to report on those things they did at home using technology. 13 yes/no options were given with a free text field at the end for students to add any other activities. The 13 options were derived from the activities mentioned in the initial construct analysis. Table 6.5 shows the number of students reporting that they did these activities (N=44).

| **Use of technology at home** | **n (N=44)** |
|---|---|
| Keep in touch by social networking sites. | 36 |
| Upload things to social networking sites. | 34 |
| Keep in touch by e-mail. | 33 |
| Computer gaming. | 32 |
| Look things up in Wikipedia. | 27 |
| Edit images on a computer. | 25 |
| Record and edit audio/music. | 22 |
| Upload videos to a website like YouTube. | 21 |
| Edit videos on a computer. | 19 |
| Write a blog. | 12 |
| Edit Wikipedia or other wikis. | 8 |
| Upload images to a website e.g. Flickr. | 6 |
| Use social bookmarking sites. | 4 |

**Table 6.5**. Question 6 – Students' home use of technology

Of these options, three were intrinsically 'creative':

- Edit images on a computer.
- Edit videos on a computer.
- Record and edit audio/music.

At least 43% (19/44) of students did each one of these activities. Interrogating the raw data further showed that 75% reported doing *at least* one of the activities. Of the remaining 25% all but two (4%) reported that they used computer games, with their implicit creativity. Thus for all but two students, creative activity is part of students' use of technology at home.

In the free text field three students indicated other creative activities.

- Making leaflets, invitations etc.
- Scripting in VBS[115], writing webpages in XHTML[116] and programming firmware (iPhone).
- Designing using Google Sketchup with the Sketchy Physics add-on.

These three students also reported that they carried out one or more of the creative activities from the list provided. These free-text responses are, therefore, in addition to those provided not replacement for them. The last two (scripting and Sketchy Physics) involve aspects of programming which were not present in the ICT course the students were following. This was commented on by these students in their responses to the final question of the questionnaire (see below).

Question 7 inquired into the students' view as to whether the activities in question 6 should form part of the assessment process. This would indicate the extent to which these activities were valued as part of the formal curriculum. Table 6.6 shows the number of students (N=44) who indicated that each activity should be part of the formal assessment process. The three most creative activities (i.e. those that involve editing) provided as options were ranked the highest by the students in response to this question. They placed more importance on these activities than the others when considering whether they should be in the formal assessment of ICT at 16. For each activity, the majority of students say that they should be. Analysing the raw data further, 34 students (73%) reported that at least one of these three activities should be assessed. Of the ten who did not think they should be assessed, exactly half said they did not carry out the activities themselves. So although the significant majority saw a place for assessment of creative activities, this did not depend on whether they themselves did them.

[115] VBS=Visual Basic Scripting, a programming language useable in Microsoft environments.
[116] XHTML= Extensible Hypertext Markup Language, a language used for coding in web pages.

| Aspect of home use of technology | n (N=44) |
|---|---|
| Edit images on a computer | 32 |
| Edit videos on a computer | 29 |
| Record and edit audio/music | 26 |
| Computer gaming | 22 |
| Look things up in Wikipedia | 19 |
| Keep in touch by e-mail | 17 |
| Upload things to social networking sites | 17 |
| Upload videos to a website like YouTube | 15 |
| Upload images to a website e.g. Flickr | 14 |
| Edit Wikipedia or other wikis | 14 |
| Use social bookmarking sites | 12 |
| Keep in touch by social networking sites | 10 |
| Write a blog | 10 |

**Table 6.6**. Question 7 – Aspects of home use that should be assessed

Looking at the free text responses for question 7, creative activities reported beyond those in the given options were given by five students:

- Decompiling applications; Programming; Scripting; Web design (*).
- Programming (*).
- Building and fixing computers.
- Create programs and games.
- Fixing simple things on computer.
- Build and take apart a computer.

The two responses indicated (*) are those from the students who indicated that they programmed in question 6. Other responses here show that a small number of students from this population (6/44=14%) would want these more hard-edged topics in the assessment of ICT. These topics are traditionally part of the syllabus of computing (as opposed to ICT) courses, which were not available as options to these students. They reflect the concerns of the Computing at School organisation, the enquiry by the Royal

Society (2010) into computing in schools and the Livingstone and Hope report (2011) into the needs of the video games and video effects industries and how these needs are not represented in school curricula. This need is also reflected by the re-introduction of computing at GCSE (OCR, 2010).

The final two questions asked students to report what they saw as indicators of someone being ‘good at ICT’ and what, if anything, they would change in the existing assessment process. These questions yielded further evidence of the importance of creativity and the need to include computer programming and/or construction, both of which are inherently creative activities. The latter was not confined to those who reported that these were things that they themselves did. Table 6.7 summarises the responses to these two questions as they related to creativity. Here computing aspects are dominant among the 16 students (36%) who reported on creativity or computing. Question 8 asked students to think of someone who is good at ICT and it maybe that this skew towards computing may have been because they knew the students who reported doing these activities out of school. Nevertheless there is further evidence here that students value the creative and computing activities as things that they should learn and be assessed on at 16.

| Student | Question 8 (what makes for ‘good at ICT’?) | Question 9 (what change would you make to the assessment tasks?) |
|---|---|---|
| A | Can produce multiple media on a computer.<br>Know their way around a computer; know about the booting software and the registry. | |
| B | Know how to fix a computer. | Do more creative things and designing;<br>Know how to fix a computer. |
| C | Fixing a computer error. | |
| D | If something isn't working on the computer they can make it work and know where to go on the computer to do it. | |
| E | If something is wrong with the computer they can fix it. | |
| F | Edit software. | |
| G | | How to make computers. |
| H | | Creative things would be better. |
| I | They can build a PC from scratch. | |
| J | | Programming. |
| K | They can understand dataflow of ARM binaries and work out modifications to alter the effect; can write programs. | Include a programming language or at least how to code in XHTML for making websites. |
| L | Photo-realistic design; Movie special effects; 3D modelling. | |
| M | Make a virus. | |
| N | Build; fix; maintain computers. | |
| O | They can use Sketch[y] Physics and really good designs;<br>Writing scripts. | |
| P | Make viruses; edit networks; hacking computers. | |

**Table 6.7**. Questions 8/9 – Creativity: being ‘good at ICT’ and assessment

In summary, the analysis of the questionnaire responses shows that 75% of students engaged in creative activity outside of school, 82% thought that they should be included in formal assessment and 36% saw them as being indicators of high achievers in the subject. Creativity is a phenomenon emerging from the questionnaire more clearly than it did in the initial constructs.

There is also a blurring of creativity with hard-edged computing topics of programming and building/fixing computers being specific examples of problem-solving. The ability to solve problems is a skill which is included in check lists of desirable attributes. These may be seen in the various iterations of key skills (RSAEB, 1993; QCA, 2002; 2004), in functional skills (QCA/e-skills, 2006) and in the Leitch Report (HM Treasury, 2006). Here, however, students are reporting on the ways in which they see problem-solving as important in the context of assessment of ICT at 16.

The connection between creativity and problem-solving was borne out even more strongly in the interviews. The semi-structured interview questions were developed from the responses in the questionnaire, in turn building on the constructs elicited at the beginning of the empirical phase. The prompts and questions used in the interviews, their derivation from previous phases of empirical data collection, justification for their inclusion and exposition of data collected from them are detailed in section 4.3 and, in particular, Table 4.11.

As discussed above 'creativity' can have a wide interpretation and includes here those aspects of ICT that are perhaps more naturally part of the computing curriculum – programming and building/fixing of computers. The former is a literal example of creativity in that there is a product (a program) that is created. The latter is an example of problem solving in which students have to show initiative and creativity to fashion a solution to a problem (Facer and Williamson, 2004). Both of these manifestations of creativity emerged in response to prompts in the semi-structured interviews and in the factors that students viewed positively about the subject and its assessment. These responses will now be discussed.

Analysis of the data from the interviews yielded creativity as a class of response in the 'Positive views of ICT' (see Figure 4.18 and Appendix 8). 17 instances of creativity were recorded with 11 different aspects being considered to be 'important' in the ICT curriculum:

- Creative uses (generically).
- Preference for doing the more creative (rather than using Office tools).
- Working with video displays: not just spreadsheets.
- Design (generically).
- Designing the layout and structure in design of websites.
- Designing screen layout.
- Creating websites.
- Creating videos.
- Editing videos.
- Editing audio.
- Programming.

Explicit in this list are elements of designing, creating and editing. These map onto the analysis/design, implement and testing stages of the traditional ICT, computing or design and technology project as exemplified in the specifications for GCSE ICT (Edexcel, 2000; OCR, 2000; AQA, 2009). Indeed the responses to the questions about what should be included in the specification of ICT and what could be left out often hinged around the overlap between it and other subjects. In respect of the creativity phenomenon there was some discussion by students of the place of design – whether it might not fit better in design & technology or art & design rather than ICT. This positioning of the subject ICT is discussed further in the conclusions (Chapter 8).

The 17 positive references to creative activities can be contrasted to only three negative ones, all of which were expressing the view that computer-aided design should be part of another subject, not ICT.

The responses above are those that explicitly refer to aspects of creativity. There were seven other responses in which students gave more generic responses with creativity left implicit. These identified problem-solving as being important in determining what indicates that someone is ‘good at ICT’. Considering the question of what is ‘important’ in ICT per se, there were 15 statements that were coded as indicating creativity. Here though all were expressed in generic terms with students attaching importance to ‘being creative’, ‘problem-solving’ and ‘making things’. They articulated this in different ways when asked what makes for someone being good at ICT:

> *If something isn't working on the computer they can make it work.*
>
> (Student response to Q8 in questionnaire)
>
> *Sorting things on the PC [that] I can't.*
>
> (Student response to Q8 in questionnaire)
>
> *They can… logically get round problems.*
>
> (Student F, School U, interview response, page 2).

This perception was also evident when discussing aspects of ICT that may not immediately have appeared to have been in this problem-solving domain. Here students had raised the topic of video conferencing as one that could be included in an ICT specification:

> *Researcher:* *What would someone who is really good at video conferencing have to do to get a grade A?*
>
> *Student 1:* *You’re able to fix [the hardware].*
>
> *Student 2:* *When a problem comes up.*
>
> (Interview with group, School E, transcript page 2)

Students place importance on problem-solving and it is this which crystallises the phenomenon of creativity (after Facer and Williamson, 2004). There is an implicit view that creativity is important. The ways in which this are demonstrated may, in the eyes of some, be best left to other subjects, however. For example, here students are talking about designing games, something they saw as a key component of ICT.

> *Researcher:* *So if you were designing a course… would you ask people to design games as part of this course?*

*Student:* *No.*

*Researcher:* *Why not?*

*Students:* *I don't think it's necessary... It's got so much to do with IT but it's not as, it's not that much linking to it, as it would be to a particular course in design.*

(Interview with group, School J, transcript page 4)

This is significant when one considers the scope that students are given for solving problems. In contrast to the stated aims of the specifications (QCA, 2001) which include problem solving is explicit, students often report that they are very directed as to what to do for coursework. Analysing the interviews for statements as to how students know what to do showed that, of 28 responses in this category, only five (18%) explicitly mentioned that the students worked out what do to for themselves (see Table 6.8).

| **How do you know what to do?** | **Number of statements** |
|---|---|
| Directed by teacher at all stages | 7 |
| From teacher by way of feedback | 7 |
| From others by way of feedback | 1 |
| From a booklet/worksheets | 5 |
| From awarding body | 3 |
| Our choice/work out for self | 5 |
| **Total** | **28** |

**Table 6.8**. Perceptions of students as to direction of choice (statements)

Each response in Table 6.8 represents the views of one student or group of students. There were 24 interviews, 13 of which gave responses for this aspect with some respondents having mentioned this more than once. Removing duplicate responses yields the data shown in Table 6.9. Only 13% (3/24) of those respondents explicitly identified that the choice of what to do in response to tasks was their own. This contrasts with the perception of both the importance of problem-solving and the need for it to be assessed, as reported above. This perception of direction coming from the teacher, school or awarding body contributes also to the phenomenon of enculturation discussed in the next chapter.

| **How do you know what to do?** | **Number of students** |
|---|---|
| Directed by teacher | 2 |
| Directed by booklet | 2 |
| Directed by booklet and teacher | 1 |
| Directed by awarding body, booklet and teacher | 1 |
| Directed by awarding body and teacher | 1 |
| Feedback from teacher | 2 |
| Feed back from other | 1 |
| Our choice | 3 |
| No response on aspect of direction | 11 |
| **Total** | **24** |

**Table 6.9**. Perceptions of students as to direction of choice (students)

The impression here was one of teacher and awarding body control. This can be seen in this snippet from one of the interviews:

*Researcher:* *So you'd give in what you've created?*

*Student:* *Yes [and] how and why [you did it]. Rather than a course telling you what you have to do.*

(Group interview, School L, transcript page 3)

Here the student is expressing a desire for more freedom in the task, rather than being directed by the course requirements.

## 6.2. Creativity and the literature

Creativity is a recurrent theme in the literature around both ICT and theories of assessment. In this section a combing of the literature review is presented for those aspects. As discussed at the end of chapter 4, creativity is understood here to mean either a process of exploration or a process of construction (Papert, 1980; NACCCE, 1999; Owers, 2004; Facer and Williamson, 2004; Robinson, 2011; Craft, 2011).

Society is placing greater value on creativity (and innovation) than in the past with the need for education systems to adapt (Johnson et al., 2010; Craft, op.cit.). Crucially for this study it is also explicit in the choice corollary to Kelly's PCP theory (1955) that, applied to the context of the study, suggests that students choose approaches that give them more freedom. This notion of freedom is at the heart of the creative response (NACCCE, op.cit.) but runs counter to the Foucaultian notion of the school as a disciplinary institution with teacher providing the order (Foucault, 1979; McNeil, 1986) and overt instruction (Cope and Kalantzis, 2000). Wiliam (2007) squares this circle by arguing for well-regulated systems of school and assessment that provide a robust framework for assessing the unexpected. Within this the teacher's role is one of facilitator or guide (Gillen and Barton, 2010) rather than instructor.

Students increasingly show independence and autonomy in their learning (Barnes et al., 2007; Craft, op.cit.) implying a creative approach as they explore ways to solve problems. This is in contrast to goal-orientation theory (Dweck, 1986) and alludes to a pre-eminence of self-efficacy (Bandura, 1997), supported by a belief that the affordances (Gibson, 1979; Pea, 1993) of the technology provide an assurance of success. As students become less reliant on teachers (Tapscott, 1998), personalising their learning of ICT (Underwood et al., 2008) they become creators and not just consumers of learning (Thompson, 2007; Craft, op.cit.). This enhancement of the creative response, however, may be at the expense of attainment in constrained assessments (Wiliam, 1996; Gulikers, 2006; Underwood et al., op.cit.; Mansell, 2007).

O'Rourke (2001) conceives this as assessment being done to students rather than with them and argues for the locus of control being given to them in the context of portfolio construction for presentation and assessment of authentic tasks. With students as creators, she argues, outcomes cannot be predefined and the onus is on students to bring forward a portfolio of appropriate evidence and artefacts and for the assessment system to be robust and flexible enough to be able to report on the capability demonstrated in the portfolio. A similar approach is seen in projects reported on by The Assessment Reform Group and others (Black and Wiliam, 1998; ARG, 2003; Harlen, 2007; Gardner et al., 2008) where learners are at the heart of the learning and creativity and authenticity are key features. The reports raise the concern, however, that awarding bodies are not engaged in these projects, reflecting the difficulties of experimenting with high take assessment given the regulatory frameworks being worked under. There are exceptions to this – for example the ADSAN awards (ASDAN, 2008) and the process of post hoc assessment in NotSchool (Duckworth, 2005).

Creativity, especially construed as freedom of choice and problem-solving, is often cited in the claims made for specifications. Thus the Diploma in IT (QCA/e-skills UK, 2006) is claimed by the Quality Improvement Agency, a government agency responsible for educational quality, to have an emphasis on abstract tasks situated in authentic contexts and the promotion of experiential learning and creativity (QIA, 2007). Similar claims are made for the Digital Applications suite of qualifications from Edexcel (2005a) that explicitly lists creativity as one of its aims, albeit combined with communication:

> *Edexcel qualifications in Digital Applications for IT Users aim to […] enhance students' creativity and communication skills.*
>
> (p.2)

Generally, however, ICT qualifications at 16 are criticised for the lack of creativity they provide (Frean, 2008; Welsh and Dunford, 2008; Morrison, 2009; Hough, 2009; Livingstone and Hope, 2011). The very diversity and choice of qualifications in ICT at 16 could provide opportunities for creative responses by students if it were they who had the choice. Usually, however, such choice is made for them by the school (see chapter 7).

Notwithstanding this constraint on choice between specifications, policy initiatives are beginning to allow students flexibility in the ways in which they create and present evidence of capability. These include the self-review framework (Becta, 2008b), which calls for schools to meet student expectations of the use of ICT, the use of e-portfolios (Edexcel, 2005b; Hartnell-Young et al., 2007) and the diverse set of tools available in the mandatory VLEs (Becta, 2008a). These initiatives and the increasing range of participative and technological tools used by students (Crook, 2008; Gillen and Barton, 2010) offer a challenge to education to match what is possible in learning to what is allowable in assessment (BESA, 2010; Johnson et al., 2010). This challenge is compounded by an economic imperative with millions of adults employed in the UK in roles for which the creative use of technology is a key component (BERR, 2009; Livingstone and Hope, 2011). The increase in the types of technological tools and the devices on which they run (BESA, 2010) does not necessarily mean that they are used for more creative purposes per se (Luckin et al., 2008; Dutton et al., 2009; Dailly and Price, 2010). Notwithstanding this, it does offer the possibility of a creative response due to the choice of tool available. Thus even if the task itself is not a creative one, the response can be. This is especially true of Web 2.0 tools for participation, creation and collaboration although use of such tools is biased towards non-school locations (Luckin et al., op.cit.) with school and assessment systems providing an inherent constraint on their use (Crook and Harrison, 2008; Gillen and Barton, op.cit.). That valid assessment decisions can be made on creative products is demonstrated by teenage students albeit that assessment is from peers and experts rather than awarding body (Heppell, 2006b).

Analysis of the subject criteria for GCSE ICT (QCA, 2001) shows that two of the assessment objectives map to the phenomenon of creativity. These are shown in Table 6.10.

| GCSE subject criteria assessment objectives | Phenomenon of creativity |
|---|---|
| AO1: Apply their knowledge, skills and understanding of ICT to a range of situations. | This carries an implicit suggestion of problem-solving and the definition of creativity of Facer and Williamson (2004). |
| AO2: Analyse, design, implement, test, (evaluate and document) information and communication systems (for use by others) and develop understanding of the wider applications and effects of ICT; reflect critically on the way they and others use ICT. | This requires students to design a system to meet the needs of a particular client or problem. This problem-solving and design and central to aspects of creativity. |

**Table 6.10**. Creativity as a phenomenon in GCSE ICT subject criteria

A similar mapping of the topics in the Principal Learning for the National Diploma in IT (QCA/e-skills UK, 2006) shows the centrality of creativity to that particular qualification. Four of the seven topics are seen to have an element of creativity inherent in their formulation:

- Skills for innovation.
- Technology systems.
- Multimedia.
- Managing projects.

These are shown in Table 6.11. In each of these topics students are required to understand the process of designing with technology or with technologically-supported systems and to carry out a project to meet a specific need. In any such project the phenomena of relevance and creativity both have plenty of opportunity to emerge.

| Diploma topic outline | Phenomenon of relevance |
|---|---|
| **Skills for innovation**. Learners will develop the ability to create proposals to address business challenges and opportunities. This includes the use of creative, investigative and numerical reasoning skills, and the interpersonal skills to negotiate agreements. | Innovation is closely allied to creativity. The topic explicitly requires use of 'creative' skills. |
| **Technology systems**. Learners will assemble business-relevant technology systems; design, develop and test simple programs; and understand the principles of systems availability. | The elements of design and assembly in this topic require a creative response. |
| **Multimedia**. Learners will develop their understanding of contemporary digital media and its application for communication and entertainment. They will design and produce a multimedia product that demonstrates an understanding of business requirements, technical competence, and awareness of audience needs. | The elements of design and production in this topic require a creative response. |
| **Managing projects**. Learners will understand the principles of planning and executing a project and how this process is used in business. This knowledge will be applied in the development of task-based project plans for technology-related solutions. | The principles of planning require a creative solution to be applied to a problem. |

**Table 6.11**. Creativity and IT Diploma criteria at level 2

## *6.3. Chapter summary*

The phenomenon of creativity in the student perceptions of ICT and its assessment was isolated from the analysis of data in the final phase of empirical data collection – the interviews. The process for this isolation was shown in chapter 4, and summarised in this chapter.

Two representations of creativity have been identified – that associated with making something and that associated with an open-ended or problem-solving approach. The common thread here is that the students themselves are creating: either an artefact or a means of solution. Central to the processes are construction or exploration (Papert, 1980; NACCCE, 1999; Owers, 2004; Facer and Williamson, 2004; Robinson, 2011; Craft, 2011). Implicit are the evaluations of whether what is made or explored is worthwhile (Facer and Williamson, op.cit.).

The repertory grid method requires students to start with a blank sheet of paper and the researcher to devise non-leading questions (Kelly, 1955; Fransella, 2003). In the absence of a set framework of closed questions, there is an element of creativity in all of the responses as students were given the freedom to respond however they wish. Here the creative response is accepted and encouraged resonating with the NACCCE view of creativity (1999). Whether the assessment system allows for the same open-ended response is a moot point (Wiliam, 2007). Given that the research was carried out in a school with students responding to an adult researcher the concomitant elements of system control (Foucault, 1979; McNeil, 1986) and power relationships of symbolic interactionism (Blumer, 1969; Lansheere, 1993) might militate against this. Rather responses may reflect the regimes (of school, curriculum and assessment) that the student is under. Here is distorting interpretation of the contextual lens of the multiple hermeneutic (Alvesson and Sköldberg, 2000 – see Figure 3.3).

A further suppression of the creative in favour of the regulated is in the way in which students report the importance of those things already in the specification compared to those that are not. For example the playing of games, that most creative of pursuits, is not considered as having value by the students as a valid part of the curriculum or assessment processes. Here is the phenomenon of enculturation – which is considered in the next chapter.

# 7. The enculturation of students

The third phenomenon emerging from the research is that of the enculturation of the students. This, more than the first two, is based on the researcher's interpreted analysis of the data describing students' perceptions. After Alvesson and Sköldberg (2000) there is a triple hermeneutic in that whatever lies at the heart of the data is distorted through the three lenses of respondent, researcher and context (see Figure 3.3 on page 88). Further distortion comes from the communication and reporting of the analysis. Looking at it in an active way – lenses of interpretation distort through observation, memory, response, record and report (ibid.). There can be no absolute truth here but merely interpretations, after the nominalist ontological approach (Cohen et al., 2007) of the study. Unlike relevance and creativity, enculturation was not reported on directly by students in that it did not emerge in the autonomous elicitation of constructs. Rather it came about from the sense made by the researcher of what students were saying. Here there is more emphasis on interpretive (ideographic) rather than descriptive (eidetic) hermeneutics (Langdridge, 2007; Finlay, 2009).

In addition to the primacy of its ideographic provenance, another difference between this third phenomenon and the other two is its location in a clearly defined methodological approach – that of symbolic interactionism (Blumer, 1969; Lansheere, 1993). Here students are part of the sub-culture of school with teachers defining the cultural norms (McNeil, 1986). A further culture/sub-culture system exists when considering high-stakes assessment in that the awarding bodies, acting as agents of governmental policy, set the cultural agenda in which school and teachers operate. Yet another cultural dynamic is in the relationship between families and students with parents in the symbolic power position. These interactions are shown in Figure 7.1.

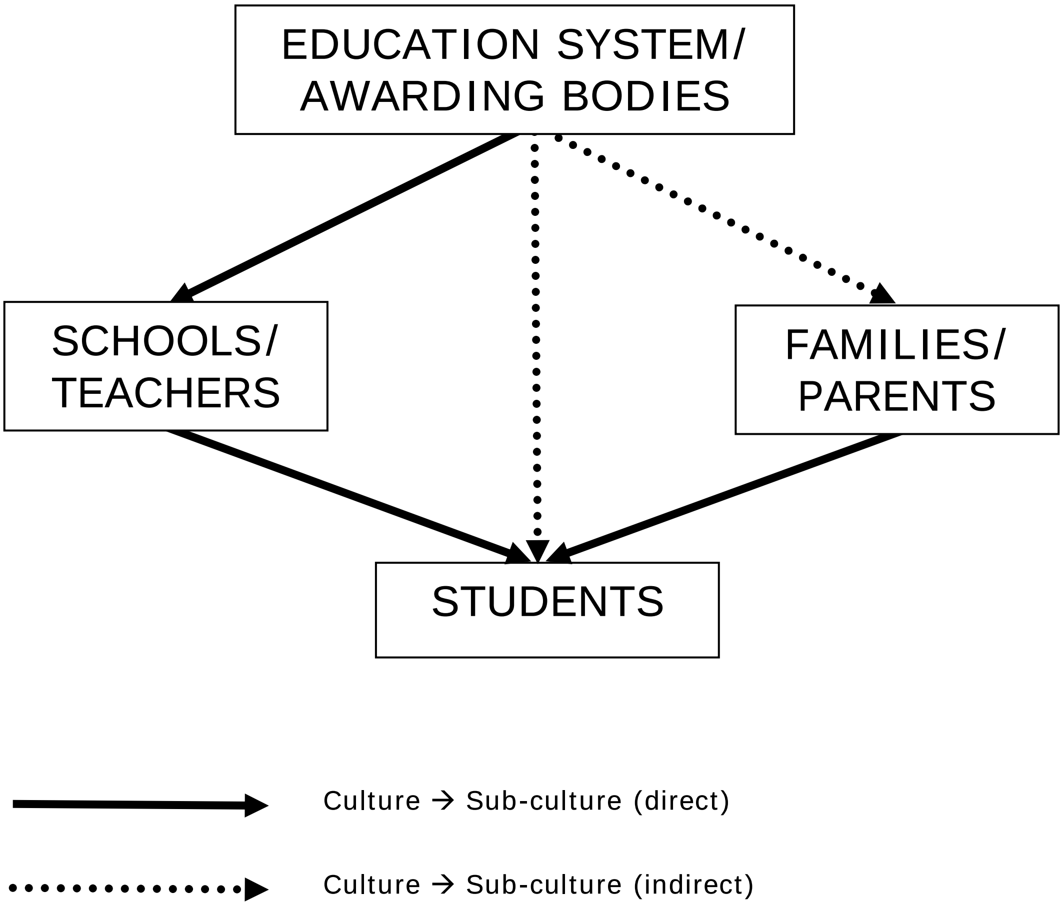



**Figure 7.1**. Symbolic interactionism and the phenomenon of enculturation

These symbolic interactions are emphasised by the nature of ICT and its place in the curriculum. Unlike most other subjects there is a wide range of different qualifications that may be taken at 16. The Register of Regulated Qualifications[117] lists 73[118] such qualifications for ICT compared to 42 for English and 13 for geography. There is a much wider choice of qualifications in ICT than in other subjects. The choice to take ICT, or otherwise, and which specification to follow is ostensibly in the hands of the students but they are influenced by their teachers and by their families and friends. The institutional habitus (Reay et al., 2001) influences that of the student. Moreover they are influenced by the system in place in the school which limits the choice available. Here are the direct cultural interactions on the students' perception as shown in Figure 7.1. The relevance of ICT, discussed

[117] http://register.ofqual.gov.uk/Qualification
[118] Only those qualifications at Level 1 and 2 (equivalent to GCSE) are included in these figures.

in chapter 5, was often couched in terms of what the students have heard and received from their teachers, parents or, implicitly, the education system.

A final dynamic is in the relationship between students – peer pressures or agreed intra-cultural norms. The habitus of students is influenced by the social context in which they are situated and the culture of that situation (Bourdieu, 1984). Reported perceptions in any one school will be coloured by the adopted perceptions of others (Brown, 1990). This contributes to the hermeneutic bias as reported in chapter 3.

There are five contributory sources from which this phenomenon has been isolated. These five sources are the literature (referring back to chapter 2), the documents which encapsulate the ICT curriculum and its assessment at 16 and the sets of data from each of the three phases of empirical research. Enculturation is a phenomenon emergent from the three empirical sets of data and the methodological considerations discussed at the start of this chapter. It is not something that is explicit in the systems' views of the subject domain of ICT and its assessment. Rather it is a product of those views.

The rest of the chapter, therefore, is devoted to an analysis and discussion enculturation as it emerges from the empirical data collected in the three phases of construct elicitation, questionnaire and interview and as it emerges from the literature.

## *7.1. Enculturation and the empirical study*

The first phase of empirical data collection was the elicitation of key constructs. This process, and the raw findings from it, are explained and presented in section 4.1 (pp. 107 et.seq.). Crucial to this process is that the elicitation of constructs is designed so that they emerge directly from the students (Kelly, 1955; Fransella, 2003). There is no prompting by the researcher that leads to the constructs. Rather the prompts elicit the students own personal construct field based on the elements identified by them.

Figure 7.1 above identified three ways in which the students are in a sub-culture. These are in relation to the school, to the family and to the awarding body. The first two are embodied in teachers and parents; the third also has a dynamic with the wider governmental policy and the views of society and employers. In the analysis of the construct elicitation, enculturation appeared in the bias towards the provenance of the views of ICT and its assessment rather than in the perceptions themselves. It is not seen in what students say but in why they say it, or in the references they make.

For example a student might identify that what is important is the ability to manipulate spreadsheets. This response, which could be characterised as numeric modelling, may conceal an origin in the specification of the qualification being followed. The student reports the skill, technique or capability of numeric modelling as being something that is important, but the reason they do so might be because the awarding body and their teacher says it is important. Perception cannot be divorced from the cultural dynamic and context in which it is expressed (Heidegger, 1927/1962).

Enculturation is a phenomenon implicit in responses rather than one explicitly stated by students. The context of schooling colours the perceptions of students (McNeil, 1986) and so to analyse how it emerges from the data the complete set of constructs elicited from the four pairs of students, are considered. Table 7.1 shows this complete set (with duplicates removed). The first column is a shorthand ‘label’ for the construct, the second is a description. The technique of construct elicitation (Kelly 1955; Fransella, 2003; Cohen et al., 2007) yields constructs that are bipolar. Each construct has two poles which are used to align the elements identified by the respondents.

| | Construct labelled in bipolar form | Description applying the construct to student activity and/or elements |
|---|---|---|
| 1 | Numbers – Words | Being able to manipulate information/data in numeric or textual form. |
| 2 | Excel – Powerpoint | Having a propensity for data handling or presentation applications. |
| 3 | Needs knowledge of computers hi – lo[119] | Does something requires knowledge of computers, or is it ‘common sense’. |
| 4 | Relevance for later life hi – lo | Is something relevant for later life or not. |
| 5 | Fast changing – Stays the same | Is something likely to be out of date quickly or not? |
| 6 | Entertainment – Job | Is something more related to employment or to leisure? |
| 7 | To get point across hi – lo | Does this help make a point, i.e. presentation, or is it for manipulation of data. |
| 8 | Learning – Entertainment | Is something related to learning or to entertainment? |
| 9 | One off – edit | Is this something that you will return to and work on successive drafts? |
| 10 | Calculation – Information | Is this about numeric data or presentation of information? |
| 11 | Creativity - Working to a list | Is there a set of instructions to tell you what to do? |
| 12 | Wide audience – personal | Is this for you or for others? |
| 13 | Benign – Malicious | Is this something that is benign/helpful or malicious (students here offered the programming of viruses or hacking as ICT activities). |
| 14 | Online – Offline | Is this something that requires an Internet connection or not. |
| 15 | Exam board – Underground | Do you do this because the examination board says so or because it is in your own subculture? |
| 16 | Data handling – Messaging | Is this activity aligned more with data handling or with communication? |

[119] For an explanation of hi-lo constructs see page 112.

| | Construct labelled in bipolar form | Description applying the construct to student activity and/or elements |
|---|---|---|
| 17 | What PC does - What's in PC | Is this activity about using or understanding computers? |
| 18 | Making – Knowing | Is this activity about skills or understanding? |
| 19 | Problem solving hi – lo | Is this an open or closed activity? |
| 20 | Making easier lo – hi | Does being able to do this task in ICT make things easier or not? |
| 21 | Know what to do - Use program | Is this activity driven by a program or do you need to work out what to do? |
| 22 | Requirements – Processes | Is this activity about the examination board tasks or are there more generally applicable underlying processes. |
| 23 | Taught – Intuitive | Is this something you learn by being taught or work out for yourself? |

**Table 7.1**. The complete set of constructs elicited in phase 1

The set of elicited constructs were examined to look for influence of enculturation i.e. where constructs refer to an external culture or its influence. Table 7.2 shows the set of constructs that may possibly show this with a commentary as to the cultural effect identified.

| Construct labelled (in bipolar form) | Enculturation identified |
|---|---|
| Excel – Powerpoint (1) | Students mentioning specific applications, which are those they have to use in school for awarding body assessments. |
| To get point across hi – lo (7) | |
| Calculation – Information (10) | |
| Exam board – Underground (15) | Do you do this because the examination board says so or because it is in your own subculture? |
| Creativity – Working to a list (11) | |
| Requirements – Processes (22) | |
| Taught – Intuitive (23) | Do you do this because the teacher says so or because it is in your own control? |

**Table 7.2**. Enculturation combed from constructs(Numbers are used to cross-reference to Table 7.1)

Three effects were found – as shown in the right hand column of Table 7.2. Firstly students, typically in response to questions about what is important in ICT, made explicit mention of applications and/or related tasks from their coursework requirements. Thus being able to use Excel or Powerpoint is something that was seen as important by students and which influenced their perception of what ICT is. These were things that they are using in school and that they are being assessed on. This may be the reason they perceived them to be important – they were unable to detach the constructs from the culture.

The other two effects of enculturation – that of the awarding body (AB) and teacher respectively - were slightly more explicitly stated. Students' perception of ICT activity can be polarised into those things which the AB or teacher require (and for which there is a list of instructions) and those which are open to free or creative choice. Here the culture of the AB would appear to be reflected in the student perception. The AB requirements are transmitted through the teacher and school and so it is that latter culture which is really dominating. This is even in the case where students referred directly to AB websites and materials - for it is the school that has chosen a specific AB and specification for the students. Unsurprisingly no students were found who had had a free choice of which qualification to take – that choice was made by the school and, specifically, the ICT teachers.

The seven constructs identified in Table 7.2 as showing effects of enculturation came from three of the four pairs. The fourth pair did not produce constructs in which enculturation was evident, even implicitly. For each of the three pairs, however, the most significant construct in the repertory grid analysis is one in which the presence of enculturation has been interpreted by the researcher. These three most significant constructs represented use of specific applications (1), derivation from awarding body processes or peer/own culture (15) and doing tasks for the sake of the examination board or for more general purposes (22). This reinforces the tri-partite nature of the sub-cultures in which the student found themselves – peer/family, teacher/school, and system – and which influence their habitus (Bourdieu, 1984; McNeil, 1986; Reay et al., 2001).

The design of the questionnaire was based on the outcomes of the construct analysis and with the research aims in mind. At this stage enculturation had not really emerged as a phenomenon but had been noted as being a possibly cause of the significance of the constructs reported by the pairs of students. The prompts in question 5 were derived from the constructs, to test their wider applicability, and from the GCSE subject criteria (QCA, 2001). In these respects the students were had an opportunity to respond to prompts that had come from their own sub-culture (the constructs) and the culture in which they found themselves (the education system and its attendant awarding body and school realisations). The two sources of prompts enable a comparison to be made between those which emerge from the students and those which come from the subject specification. Table 7.3 lists the options for question 5 and their provenance. A full discussion of the questionnaire design can be found on in section 4.2 and, in particular, Table 4.7.

| Q5: How important do you think each of the following is? | Prov.* |
|---|---|
| 1 Explaining what the parts of a computer are. | G |
| 2 Explaining what ICT may be used for. | G |
| 3 Being creative. | G |
| 4 Demonstrating your knowledge of ICT. | G |
| 5 Explaining how computers make tasks easier. | G |
| 6 Being tested (in coursework/exams) on things that you are taught at school in ICT lessons. | G |
| 7 Being tested (in coursework/exams) on use of ICT in other subjects. | O |
| 8 Analysing, designing and testing ICT systems as part of coursework. | C |
| 9 Being tested (in coursework and exams) on things that you learn outside of school. | O |
| 10 Showing how good you are at using spreadsheets and databases. | G |
| 11 Showing how good you are at using presentation software. | G |
| 12 Relevance to your use of technology outside of school. | G |
| 13 Relevance of ICT to later life and for jobs. | G |
| 14 Applying your ICT knowledge, skills and understanding to a range of situations. | C |
| 15 Showing that you have developed understanding of the wider applications and effects of ICT. | C |
| 16 Thinking about the way you and others use ICT. | C |
| 17 Considering the impact of ICT applications in the wider world. | C |
| 18 Considering issues around ICT (e.g. social, economic, political, legal, ethical and moral issues). | C |
| 19 Considering security needs for data. | C |

* Grid analysis (G), GCSE subject criteria (C), other (O)

**Table 7.3**. Provenance of options in question 5 of the questionnaire

To examine for effects of enculturation the responses to those aspects which derived from the GCSE criteria were compared to the responses to those which derived from the students themselves. These are shown in Figures 7.2 and 7.3 respectively.

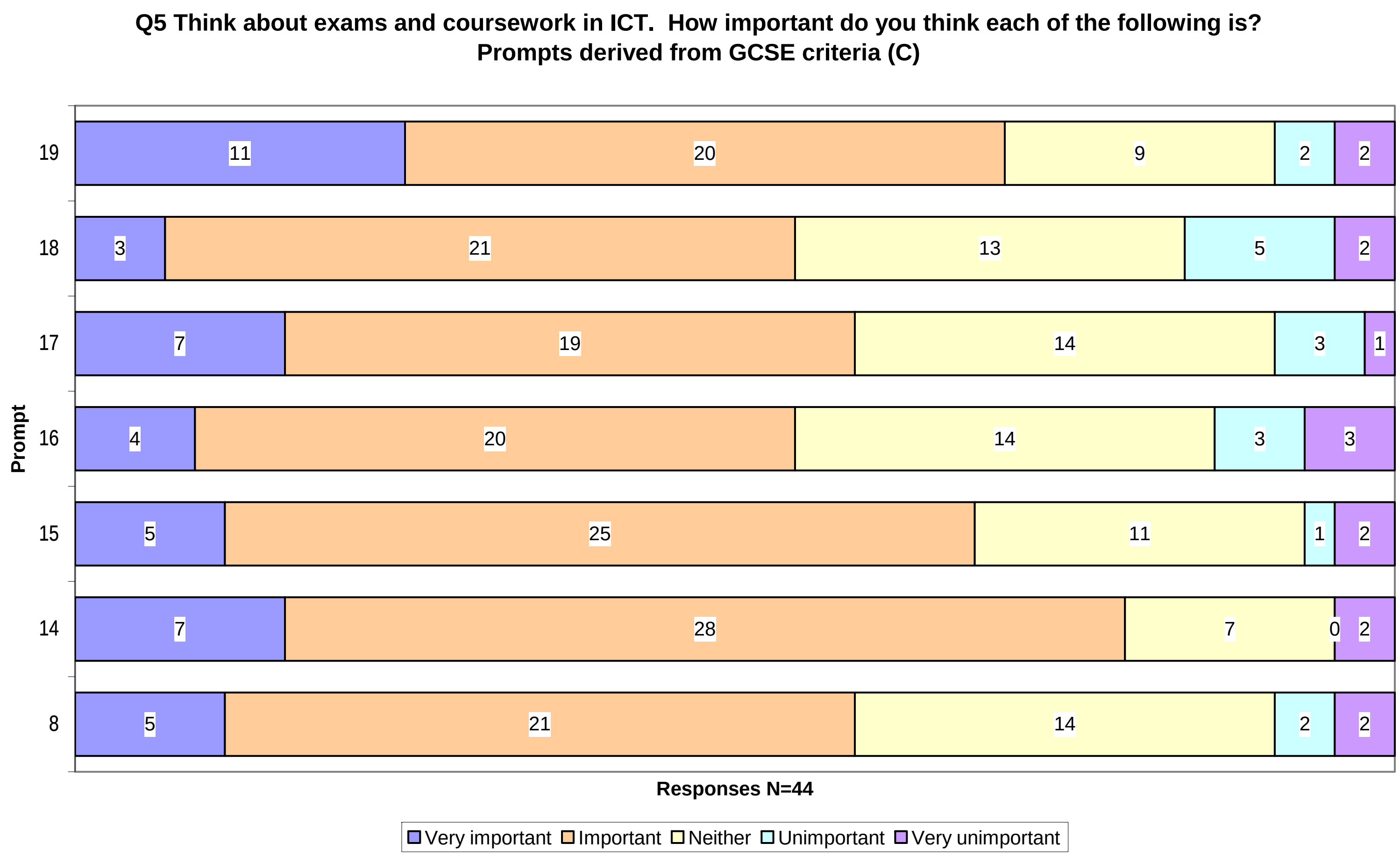



**Figure 7.2**. Question 5 –The importance of ICT (GCSE criteria aspects)

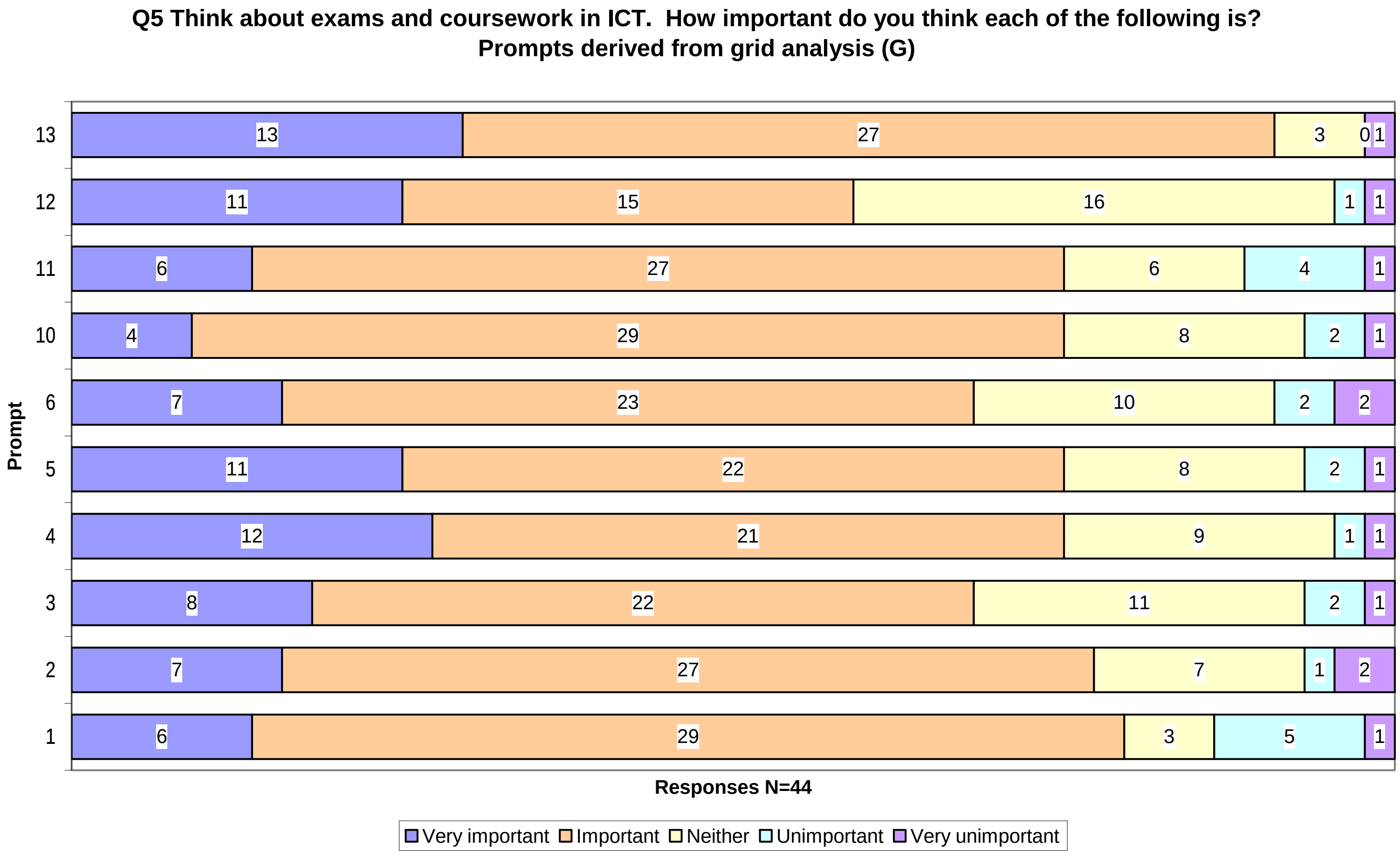



**Figure 7.3**. Question 5 –The importance of ICT (aspects from students)

Averaging the responses in each figure, the numbers of students (N=44) who responded at each point on the Likert scale are shown in Table 7.4.

| | **Student-derived prompts (from grids)** | **GCSE criteria derived prompts** |
|---|---|---|
| Very important | 8 | 6 |
| Important | 24 | 22 |
| Neither | 8 | 12 |
| Unimportant | 3 | 2 |
| Very unimportant | 1 | 2 |

**Table 7.4**. Importance of ICT provenance

There is no significant difference between the importance ascribed to the GCSE criteria and the student-derived constructs (N=44, p=0.79). Students thus place relatively the same importance on constructs elicited directly from their sub-culture as they do on aspects that derive directly from the education system. This is a difficult relationship however as the two groups are not strictly mutually exclusive. The elicited constructs themselves are influenced by the system's requirements and their teachers' presentation of them as shown in the previous section.

This phenomenon of enculturation partially came through in the first phase of repertory grid analysis and the constructs emerging from it. As shown above, the second-phase questionnaire did not add to the findings in respect of enculturation. It was in the interviews where enculturation became most evident and where the relationship between it and the other two phenomena of relevance and creativity were most apparent.

The semi-structured interview questions were developed from the responses in the questionnaire, in turn building on the constructs elicited at the beginning of the empirical phase. The prompts and questions used in the interviews, their derivation from previous phases of empirical data collection, justification for their inclusion and exposition of data collected from them are detailed in section 4.3 and, in particular, Table 4.11.

Enculturation emerged during the interviews as students were talking about what they saw as important in ICT and the motivations for taking or continuing with the subject. Much of the latter comes into the domain of perceived relevance, which has been discussed in chapter 5. In relation to the culture in which students find themselves they ascribe relevance to the subject in part because their views of the subject are formed in the context of the power relationship between their own sub-culture and that of school and family. They are told that ICT is important for jobs and future education and so they say this too. The subject also gains importance in those contexts where it is mandatory. If there is no option but to take the subject then it could be argued that it must be seen to be important, at least by the dominant sub-cultural influences of school and teachers.

Enculturation is also evident in relation to the phenomenon of creativity as discussed in chapter 6. In that chapter it has been shown that, for the majority of students, the answer to the question 'How do you know what to do?' comes from the teacher or from the AB specification thus stifling the opportunities for creative responses (see Tables 6.7 and 6.8). It was also encapsulated in responses in the interviews. When asked how she knew what to do one student said:

> *[The tasks] came from just the booklet. The AQA booklet and yes, so it had a conversation outlining what you had to - the deadlines you had to meet. And so the specification [marks]… for each - at the beginning it told you that there was a conclusion, an evaluation, and what you had to cover for each one, and how many marks.*
>
> (Student T, School H, transcript page 3)

It was also seen in the interview quoted in chapter 6:

> *Researcher:* *So you'd give in what you've created?*
>
> *Student:* *Yes [and] how and why [you did it]. Rather than a course telling you what you have to do.*
>
> (Group interview, School L, transcript page 3)

Students report that they know what to do because they are guided and directed by the external sub-cultures. This is ‘why’ they perceived that they did things in ICT. In the interviews, a follow-up semi-structured prompt ‘Tell me what you are doing in that course’ provided evidence of ‘what’ they actually did. This ‘what’ also emerged in their responses to other parts of the interview. 11 of the 24 interviews contained responses that were coded against this response as shown in Table 7.5.

| What do you do in ICT? | No of interviews (N=11) | No of comments |
|---|---|---|
| Generic descriptions of tasks | 9 | 13 |
| Meeting given set learning outcomes/criteria/deadlines | 6 | 9 |
| Research | 1 | 1 |

**Table 7.5**. What do you do have to in ICT?

Of the 11 interviews in which students expressed a view as to what they had to do, six students gave answers which reflected precisely on the constraint that what they had to do was laid out for them by the teacher or board. Although this represents only one quarter of the overall number of interviews it complements the data analysed in chapter 6 where it was seen that only three students reported that they could choose what to do in response to a set task.

Turning to aspects of ICT which students considered to be indicators of being ‘good at ICT’, 41 responses were identified. Combing them for evidence of enculturation only 15 were related to uses of ICT outside of school and the qualification structure. Students largely equated being good at ICT with being able to do well in the qualification. This was despite the question being asked after talking about uses of ICT outside of school. A typical response was that someone who is good at ICT would:

> *Have a wide knowledge of different software on the computer, so they can use it effectively to produce documents, presentations of their work.*

(Student J, School U, transcript page 3)

Although some students did mention things outside of school:

> *[Being good?] It's more gaming and that kind of technology wise. And then if they have a problem or they need to do something, they can fix that with ease.*
>
> (Student T, School H, transcript page 6)

Further evidence for this devaluing of non-school ICT is seen in the statements that fall into the categories 'not in the specification and shouldn't be' and 'in the specification and shouldn't be' (see Appendix 8). 43 statements were made hat described things that students thought should be in the specification. Of these 26 (60%) were aspects of ICT that were done outside of school by the students who made the statements. Several of these comments were around the use of games, for example:

> *[Being good at games] is not really that much to do with IT, it's just like for fun.*
>
> (Student P, School J, transcript page 5)

Despite this view, the student saw that his friends could be assessed as 'being good at games'. There was a value judgement here that games playing can be 'assessed'. Nevertheless it was not valued when considered for inclusion in a possible ICT course.

Another example of this comes in the transcript below. Here the student did not make the judgement that Twitter (and other communication tools) can be assessed, in the way Student P above did for games, but saw this as being something completely outside of the objectives of school curricula and assessment. Here value is placed on that which the school values.

> *Researcher:* *Outside of the school and the DiDA [course] are there things that you and your friends do with technology, ICT?*
>
> *Student:* *Communication across the Internet, websites like Facebook, Twitter, I use to communicate. And then email as well.*

*Researcher: So taking one of those things, taking Twitter… Is that something you think that should be in the course?*

*Student: Not really. That's more of a hobby and day to day life after school.*

*Researcher: But it is ICT?*

*Student: Yes.*

*Researcher: […] Why can't hobby things be in the course?*

*Student: I see the course as being more professional … not communication…*

(Student J, School U, transcript page 3)

At the end of each school visit a group interview was held to discuss what the students saw as their ideal ICT course and assessment. This was an opportunity for the student respondents to discuss together and to reflect a little on their own and others comments. Five such interviews were held, one in each school. The responses from the groups were combed in the same way as the individual interviews and have been included, where appropriate, above. They do, however, provide the richest evidence of enculturation with students, in general, being unable or unwilling to accept that things that they do at home, but which are not currently in the specifications, should be included in any new qualification. The combing of the group interviews is shown in table 7.6, which can be used to compare what the groups thought should be included in the specification of any new ICT qualification with what should not be included. There is significantly more that the students think should be retained than should be brought in (columns 1 and 3). There approximately the same amount of content that they feel should be included as should be omitted (columns 3 and 4). Overall students feel that what is in the course should stay. This is particularly noticed when one considers the use of Office software compared other types of software. Every group mentioned this as being something that should be in. This is in contrast to the clamour for a revamp of ICT in schools that explicitly states this is not what should be in specifications (see for example the anecdotes that started this research in the Prologue and, more recently, Henshaw et al., 2010; Royal Society, 2010; Livingstone and Hope, 2011; Lomas, 2011; Selwyn, 2011).

| **Things that are already included and should be retained** | **Things that should be removed** | **Things that should be added** | **Things that are not already included and should not be** |
| --- | --- | --- | --- |
| School E (the group explicitly made the point that ICT should be a core subject) | | | |
| Choice of units<br>Problem-solving<br>Spreadsheets and other MS Office programs<br>Search engine use | E-mail simulation (not real)<br>Word processing (should be English)<br>Search engine use (everyone knows how to do it) | Video conferencing – technical skills<br>Marks for accuracy in data entry<br>Choosing between software<br>Virus scanning<br>Animation | MSN/chat ("just a leisure thing – not education")<br>Assessment of practical skills (too difficult)<br>Typing<br>Ethics and moral of online use |
| School U | | | |
| Spreadsheets<br>Databases<br>HTML for marketing<br>Coursework but not exams<br>Design of websites<br>Peer evaluation<br>PowerPoint<br>Publisher<br>Research on the Internet<br>Copyright | Word processing | Variety of software<br>Accessibility: testing on different platforms<br>Programming<br>Games design<br>Photoshop | Games playing<br>Video editing<br>E-safety (whole school issue) |

| Things that are already included and should be retained | Things that should be removed | Things that should be added | Things that are not already included and should not be |
|---|---|---|---|
| School H | | | |
| Exams<br>Scenario-based coursework<br>More implementation.<br>Spreadsheet<br>Database<br>Presentations<br>Paper based explanation of implementation<br>Copyright | Reduce Planning and justifying<br>e-safety (should be in PSHE) | Practical demonstrations but only if there was an option to do it this way or on paper | |
| | | | Viruses |
| School J (the group explicitly made the point that ICT should be a separate subject and not left to functional skills) | | | |
| Networking<br>Office<br>E-mail<br>Design of advertising<br>Internet research<br>Implementation of project related to the real world | | Explaining choice of software | MSN<br>Games<br>Games design |
| School L | | | |

| Things that are already included and should be retained | Things that should be removed | Things that should be added | Things that are not already included and should not be |
|---|---|---|---|
| Coursework.<br>Using standard (Office) software<br>Excel<br>Product plus explanation of how you have created it | Graphics | How the computer works<br>Diagnostics and repairs<br>Problem-solving | MSN<br>Games playing |

**Table 7.6**. Design of a new ICT course

## 7.2. Enculturation and the literature

The literature relating to aspects of enculturation is found throughout the concepts used to structure the literature review in chapter 2 – learning, assessment, perceptions and policy. The locus of this study in the period leading external up to external assessment at 16 and the high-stakes nature of that assessment means that the education system, school and teacher have significant influence on students' perception of their learning (Kozulin and Rand, 2000; Rawlins, 2006; Chedzoy and Burdon, 2007). Indeed the very term 'high stakes' has meaning here beyond what might ordinarily be expected. While the vernacular meaning ascribes importance to the assessment as far as the student is concerned, the system of measurement of school performance in England means that results of assessments at 16 are also a key indicator for schools, and by aggregation, of the education system as a whole (Ecclestone and Pryor, 2003; Mansell and James, 2009; Kirkland and Sutch, 2009; Gove, 2010). Brown and Hirschfield (2008) take this one step further in stating that one of the fundamental reasons for assessment is to make schools' accountable (see also Mansell, 2007).

This high-stakes nature of assessment influences the attitude of the school towards the teaching and learning of students in Year 11 (Mansell and James, op.cit.; Gove, op.cit.). It also influences the perceptions of students as to what is valid (Rawlins; op.cit.). There is a bias towards what is in the assessment specification and coursework criteria (Tate, 2001; Sutherland et al. 2001; Gulikers, 2006; Gardner et al., 2008; Hargreaves, 2009). This in turn influences the view of students as to what is of value – promoting those things that will lead to successful qualification (Gronlund, 2005; Watts, 2008) and those things which can be assessed in the means specified by the awarding body. Other ways of presenting evidence (City and Guilds, 2010) are concomitantly less well represented. In this demotion of non-specified evidence comes the danger that the assessment becomes divorced from the reality of the informal use of ICT and detached from real learning in the minds of the student (Dochy and Moerkerke, 1997).

Eraut's typology (1994) identifies three domains of learning – formal, informal and non-formal (see also EC, 2001). Here is a distinction between learning which takes place in an institution that is set up for that purpose, in the case of this study – a school - and learning that takes place outside of it. 'Institution' here means both the buildings and the structures and processes transacted by the systems resident in, and emanating, from the buildings. Thus formal learning takes place in timetabled lessons; informal learning takes place in situations and contexts resulting from a student being at school. On the other hand non-formal learning is that which takes place beyond the influence of the school (ibid.). Eraut's typology and those which imply distinguish formal and informal (Knowles, 1975; Schön, 1983; Ellis, 1990) all separate learning that is done in, and for, school and learning that is done 'outside'. The learning is sometimes achieved accidentally or vicariously (Rogers, 2003; Sefton-Green, 2004), it is often unstructured and influenced by peers. It is unsurprising, therefore, that the strictures of formal learning, and assessment at 16, constrain the student perception of what it is that makes up a course of study in ICT and what should be included in end of KS4 examinations and coursework. The specification for GCSE and other qualifications imposes a structure on the learning which influences the perception. Non-formal learning may also be structured (Downes, 2006) but this is outside the scope of this study. Formal learning in school is increasingly complemented by formal learning outside of existing structures (Papert, 1993; Engeström et al., 1999; Gatto, 2005; Crook and Harrison, 2008; Facer, 2009; Johnson et al., 2010).

The culture of the education system also has an effect in constraining and shaping the bounds of the 'subject' being learnt. While this is true for all subjects (Lings and Desforges, 1999), it is perhaps more pronounced for ICT with its multiple manifestations of tool for life, tool to support learning and National Curriculum subject (QCA, 1999; 2002; 2004; 2007a; HM Treasury, 2006).

Student perceptions of the subject ICT are coloured by these different aspects and the access they have to technology at home and in the community as well as the culture and influence of the school (Lewin, 2004; Underwood and Banyard, 2008). More generally, given that the "*first lesson a young person needs to do when they attend school is to learn how to be a [student]*[120]" (Woods, 1990:145), peer-influence on perceptions of learning

[120] Woods uses 'pupil' but student is substituted here for understanding.

in school may be expected to be different to the influences out of school. Social learning (Vygotsky, 1978; Bruner, 1996; Wenger, 1998; Craft, 2011) depends on the contexts in which those others are situated. Perceptions are coloured not just by fellow learners but the system in which the learning is taking place (Underwood and Banyard, op.cit.), with dimensions of institutional and social capital (Bourdieu, 1977; 1984; Reay et al., 2001). Learners construct their view on their learning through a lens that is coloured by the culture in which they learn – school, home, society – and those with whom they learn (ibid.; Croninger and Lee, 2001; Somekh and Mavers, 2003). Perceptions of school, and hence of learning, are significantly affected by relationships with peers and teachers (Croninger and Lee, op.cit.; Somekh and Mavers, op.cit.). This distorts what is authentic, however. The needs of the assessment regime become the authentic ones as it is these that have ‘currency’ (Watts, 2008). The dominating culture is that of the school, and it is in the contexts created, and referenced, by the school that learning is situated (Brown et al., 1989).

School contexts are not static, however, with changes in ICT curriculum and qualifications at 16 being driven by changes in the uses of technology in society (Lankshear et al., 2000; McCormick, 2004; Williamson et al., 2005; Johnson et al., 2010) although inevitably lagging behind them (Gillen and Barton, 2010). Such changes also have implications for the nature of schools, which are often too rigid to change. For Underwood et al. (2008) this ability, and agility, of a school to change is a key measure of its ‘e-maturity’. This term, in the narrative of Underwood et al., links the learning of students in ICT to that of the institution and is dynamic. Critical for this study, however, was that perceptions were researched into at a particular moment in the school, and learning, journey of particular students in particular schools. The effects of enculturation may not be static but what is reported here is the analysis of that ‘snap shot’ enquiry.

A further dimension to the potential for enculturation is the way in which the school provides, de facto, a limited set of tools for students to use. As learning and tools are intrinsically linked (Papert, 1980; Brown et al., 1989; Owers, 2004) the set of tools provided by the system, and the culture of their use[121], will influence how the students perceive the learning that depends on them (Damasio, 1999; Bransford et al., 2000; Boettcher, 2007). One of these tools is the assessment framework itself as encapsulated in the specification of the course being followed. There is a diverse set of ICT qualifications (DfES, 2005; QCA, 2006b; Vidal Rodeiro, 2010) and one followed by any particular group of students will have been selected by the school on their behalf. This top level decision provides the context for the two years of study in years 10 and 11 and will provide a landscape in which perceptions are developed. While Cochrane and Straker (2005) report that students do not perceive teacher influence as significant in making choices, ICT is often a mandatory subject as shown in the sample of schools visited (see Table 3.4 on page 102).

Underwood and Banyard's findings (2008) of the importance of positive attitudes of the school towards student participation combined with those of Rudduck et al. (1994) linking such participation with motivation suggest that a participative culture in the school will influence student attitudes significantly. Here, then, is a positive potential for enculturation. This is supported by Barnes et al. (2007) and Craft (2011) who found an increasing independence and autonomy in student approaches to learning reflecting an earlier study by Tapscott (1998). Barnes et al. (2007) found that schools are increasingly allowing students greater freedom in determining how to solve a particular problem. However their study did not consider high-stakes testing at 16. For Selwyn (2011) changing attitudes at this juncture is problematic. Wiliam's pedagogy of contingency (2007) requires systems that provide scope for assessing unexpected outcomes. With coursework specifications determining the outcomes this need is negated leading to the school as a disciplinary institution (Foucault, 1979) with teachers prioritising the need for order over the need for deep learning (McNeil, 1986) and the GCSE results becoming the imperative measure and target (Mansell, 2007).

This order and structure is reinforced by the system of testing that provides key moments on a students' learning journey (Ecclestone and Pryor, 2003; Somekh and Mavers, 2003). These have significant influence on the leaner

[121] The mere presence of ICT tools does not imply that they are used at all or, if they are, indeed that they are used in a uniform way (Underwood et al., 2008; Underwood and Banyard, 2008; Crook et al., 2008).

and distort the habitus of the learner (Bourdieu, 1977) contributing systemically to the institutionalised development of social and cultural capital at the expense of suppressing influences from home and other non-formal contexts for learning (Ecclestone and Pryor, op.cit.). In Bourdieu's terms (1984) it is the institutionalised dimension of cultural capital that is being given pre-eminence over the embodied. It is precisely at this point of high-stakes assessment that student voice is limited (Bullock and Wikely, 2001) undermining the benefits seen in other aspects of school life where students are actively participating in their own learning and assessment design (Rudduck et al., 2006; Walker and Logan, 2008)

Finally perceptions of students are coloured by those imposed by the school and by teachers (Kozulin and Rand, 2000; Rawlins, 2006; Chedzoy and Burdon, 2007). This is seen in student attribution of success and failure (Weiner, 1986) and hence is critical to their motivation (Tombari and Borich, 1999).

## *7.3. Chapter summary*

Enculturation is a phenomenon that has been interpolated from the responses of students at each phase of empirical research. It is also a direct consequence of the methodological considerations – of symbolic interactionism (Blumer, 1969; Lansheere, 1993) and of interpretive phenomenology (Conroy, 2003; Smith and Osborn, 2003; Finlay, 2009; Langdridge, 2007). The analysis of the responses yields the phenomenon by way of the distortion that the hermeneutic lens (Alvesson and Sköldberg, 2000) puts on the students perceptions of the system in which they are situated. Their learning, and their view of it, is coloured by the school and examination system that circumscribes it. Thus when asked what should be in an ICT qualification and its assessment, students frequently mentioned specific applications. These were the ones which they had to use in school and for awarding body assessments. Often it was the ones they had most recently used. So where coursework tasks required the use of a spreadsheet this tool was something that was mentioned as important. This effect, of an axiology which ascribed importance to the things laid down in specifications, should not be surprising. Such tools are of de facto importance if the subject and qualification is seen as important. This latter importance is manifested in the phenomenon of relevance (see chapter 5). Figure 7.4 shows this relationship.

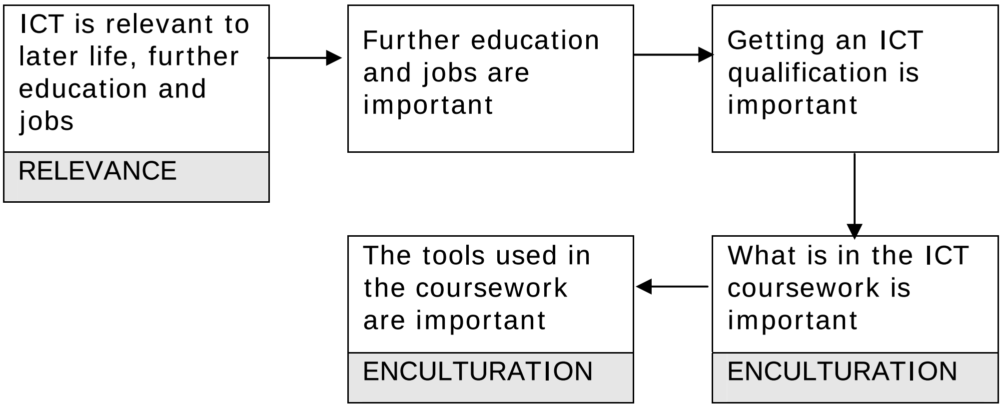



**Figure 7.4**. Relationship between relevance and enculturation

While this relationship is, perhaps, not surprising it is amplified by what students did not value. Thus things that were done entirely outside of school were not valued. These included playing games, using many forms of social network and communication and creative uses of editing and production tools. For the majority of students they were not seen as things which should be assessed or included in any new ICT curricula. This is represented by extending Figure 7.4 to give Figure 7.5.

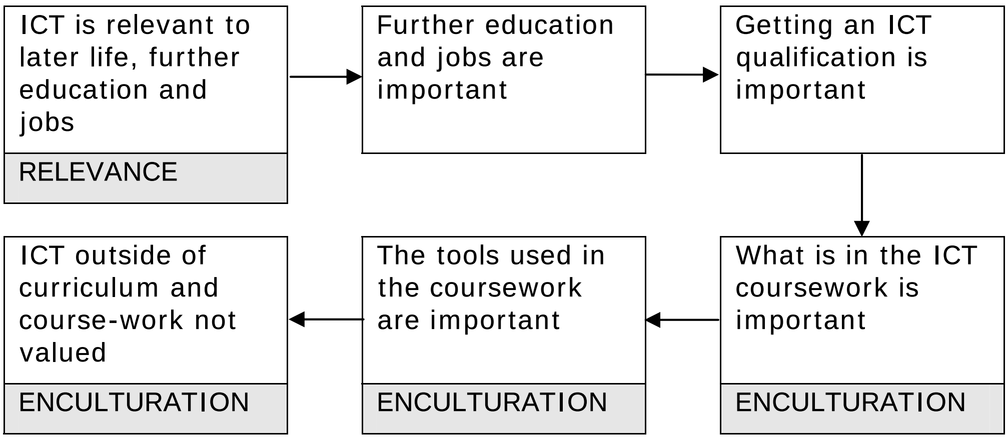



**Figure 7.5**. Enculturation results in some things not being valued.

The student responses represented those of the dominant cultures – those of school and examination system – that were situated in. The exception to this was for the minority of students who wanted to see programming and fixing of computers included in ICT courses.

Having, in the last three chapters, analysed and discussed the phenomena isolated from the research, the next chapter concludes the thesis by relating these findings to the initial research aims.

# 8. Conclusion

The previous three chapters isolated and discussed the phenomena emerging from the empirical study and related them to the literature. In this chapter the discussion returns to the original aims of the research:

1. To critically analyse the ways in which students aged 16 construct their ICT capability at 16.
2. To critically analyse the student perceptions of assessment of ICT at 16.
3. To develop a theoretical base to evaluate the construct validity of assessment of ICT at 16.

These aims are now considered in turn and responses to each formulated based on the findings. A thesis is postulated and implications and issues for consequent research articulated.

## *8.1. Research aim 1: Student construct of ICT*

**Research aim:** To critically analyse the ways in which students aged 16 construct their learning of ICT capability in formal and informal contexts.

From the empirical study it is clear that students view ICT as being primarily a subject that leads onto future utility. This may be manifested either in the use of an ICT qualification as a passport to future success or as being something that develops life skills. The passport, a qualification, is to the next stage of their education but or something that is required by employers or universities. This view of the utilitarian nature of ICT could lead to an interpretation that students perceive the subject solely as one in which learning is restricted to skills. This is not the case. Students report, for example, on creative aspects of their learning as discussed in chapter 6. This includes both skills and knowledge and understanding of creative processes and their application.

Students construct the content of the ICT curriculum to be that determined by the school they attend and the course they are following. Their perception of their learning of ICT is enculturated by the formal context of the curriculum and assessment criteria of the specification of the ICT qualification they are taking (see chapter 7). When considering which aspects of ICT they regard as important students are more likely to prioritise topics that form part of their formal education than uses of ICT that are part of their informal, or non-formal, learning. It is entirely possible for students to have a detailed view of a topic and see it as important for later life (i.e. one of the aspects of utility) but not to regard it as something that should be in the curriculum. Here there are conflicts with authenticity. Archbald and Newman (1988, cited in Cumming and Maxwell, 1999) argue that for a task to be authentic it must go beyond the utility of assessment. Students hold this latter as the more important. This tendency to dismiss or undervalue informal or out of-school use is even more emphasised when considering assessment (see section 8.2 below). An example of such of topic is the use of a diverse set of communication tools. Where students do value informal uses of ICT, suggesting they could be assessed, they tend to be creative e.g. video editing.

There are also elements here of a different perception of tacit knowledge (Schön, 1983; Eraut, 2000) outside of formal contexts, and practical application. Those aspects of ICT capability learnt in the home or through informal contact with peers and others do not feature as noticeably in the constructs of ICT learning reported by students. Neither do they feature in those aspects of ICT which students consider important. On the other hand the learning of particular skills, and the understanding that goes with them to use software tool effectively, are prominent in what students consider to be important. Thus in the first phase of data collection (see section 4.1) knowledge and skills are explicitly part of the construct elicited from the repertory grids. These are complemented and contextualised by the particular pieces of software that feature in the coursework of the qualifications being taken. ICT-based activities that students undertake outside of school – e.g. games, social networking – do not feature despite their significance in surveys that report on use of ICT tools for learning (Crook, 2008; Logicalis, 2009; Ofcom, 2011).  From this mismatch it could be concluded that as this is how students construct their learning of ICT and this is what is in the specifications, then the specifications are fit for purpose. This would fly in the face of claims by educationalists for the fundamental revision of ICT course specifications – claims that have persisted throughout the period of this research (e.g. Heppell, 2007b; Henshaw et al., 2010; Royal Society, 2010; Lomas, 2011; Livingstone and Hope, 2011; Selwyn, 2011).

Such a conclusion would be false however. One of the phenomena emerging from the study is that of enculturation. Students report that what is in the specifications is what is important to them (see chapter 7). This does not negate the claims made for curriculum and assessment revision. Rather it suggests that students are unable to see beyond the course they are taking and construct their learning, and the subject of ICT, around whatever is presented. Similarly it would tend to indicate that they are unable to see the transformative nature of ICT (Williamson, 2005), working instead to the list of exam board requirements. Both 'Working to a list' and '[Following] exam board requirements' were explicit poles of the constructs elicited in the first phase of data collection. Educational commentators and researchers, in contrast to students, are outside of the experience of actually following a course to assessment at 16 and are not constrained by this enculturated view. Further evidence of this came in the group interviews where students, when asked what they would include in a new ICT course if they could design one, said they would not make radical changes.

Student perceptions of their own learning in ICT were found to be dominated by the requirements of the course they are following but the same is not true of what constitutes 'being good at ICT'. This is discussed more fully below, as it is more germane to the other aims, but it does inform aim 1 and so is touched on here. When asked to think of someone (which may have been themselves) who was 'good at ICT' and what made them 'good', students sometimes referred to things that were drawn the formal learning done in school but they also referred to other aspects of ICT use. These centred particularly on problem-solving and the ability to fix hardware or, in a few cases, to programming (see, particularly, chapter 6). Here students appear to have equated 'good' with open-ended learning and constructionism (Papert, 1980). Often this was phrased in the context of helping others from which one can infer that students had a constructivist, or at least social, view of learning (Piaget, 1973; Vygotsky, 1978; Bruner, 1996; Wenger, 1998; Craft, 2011).

The perceptions of students on learning also have a range of provenances. Thus they are influenced by what others do, as illustrated in the comments above, and by the direction they are given by their schools, teachers and examination specifications. It is noticeable that students do not tend to refer to these influences explicitly. Thus it is not ‘doing what is required by the coursework specification/teacher/school’ that is reported a being important but “*produc[ing] presentation[s], word documents, [and] spreadsheets”* (Student response to Q8 in questionnaire). There is resonance in these provenances with the duality of Bourdieu’s notion of social habitus (1984) and Reay et al.’s institutional habitus (2001).

## 8.2. Research aim 2: Student view of assessment

| |
|---|
| **Research aim:** To critically analyse the student view of assessment of ICT at 16. |

In considering this aim the pertinent empirical data is that which emerged from responses to questions about the assessment of ICT specifically, as opposed to those which deal with the wider perceptions of ICT as a subject.

Students who take ICT do so primarily for its utility, as reported above. Critical to this is the provision of a qualification which they see as a passport for future study and employment (see chapter 5). Thus their views of assessment of ICT are entwined with their views of the need to get a qualification in ICT. There is a diversity of qualifications available in ICT at 16 (see Table 1.1 on page 11) but the perceptions of students of assessment of ICT at 16 is constrained by the subset of the range offered by their school. In many cases this is not even a range with a school entering all students for the same qualification. Where a choice does exist it may be a simple option of taking ICT or not with no choice of course or qualification. Another example of this lack of choice is seen when schools offer more than one route but select students on some ‘admission’ criteria denying any choice. All of these models were seen in the schools sampled although the research does not claim to compare the perceptions of students who had different experiences by virtue of the school they attended and the curriculum model for ICT therein. In some schools students have an option to take ICT or not, in others it is mandatory. In some schools there is a choice of different ICT qualifications, in others there is only the one available. In all cases the students' choice (if any) is governed by the school. For these reasons, student views on assessment cannot easily be generalised from one school to another as the contextual factors are very different. Students' perceptions of the way in which the assessment process works, and crucially for research aim 3 its validity, are heavily influenced on the experience they have been guided to by the school and the system of options in place.

With three exceptions things that were done outside of school were not seen to be important for assessment purposes. These were 'multimedia editing', 'building/fixing computers' and 'programming'. These two were mentioned by a minority of students and, in the case of the latter two, reflected some frustration that their course did not include such activities. That they had no choice in the qualification and assessment route they were on is, to the students themselves, an unseen barrier to studying such topics in ICT. They are, in fact, available in other courses such as Computing and BTEC National but, as these courses were not of offer to them, the students assumed that ICT does not include them. It can be argued that these topics are specific examples of 'problem solving/fixing things'. These are generally highly regarded by students although they specify them into areas such as spreadsheets and databases more often than programming or hardware construction.

When asked about those things done outside of school, in non-formal learning contexts, students were able to differentiate between levels of performance. When talking about games they were able, without difficulty, to articulate characteristics that indicated that someone was 'good'. Similarly they identified those peers who were not very capable, expert, or sophisticated, in their use of social networking or synchronous chat. Thus the students were able to state assessment criteria for ICT capability in these contexts. When asked if such things should be part of the formal assessment, however, they said that they should not be. Students could, therefore, identify aspects of ICT which were done outside of school for which a measure, an assessment, could be applied but such aspects were not valued. The social conditioning of the school system (Foucault, 1979; McNeil, 1986; Giddens, 2006), the views of the authority teacher and the need to gain qualifications for future education and employment were reflected in student responses which focused on those things which they had been told were on the specification. These were the drivers of their perceptions as to what is important in term of assessment in ICT. This pre-eminence of the school in the conditioning of perceptions is compounded by the resistance of schools to embrace digital technologies (Selwyn, 2011). As students work together, with technology, in different ways there needs to be concomitant changes in the models of schooling and assessment (Facer, 2011; Craft, 2011).

Two more general points relating to this aim emerged from the empirical study. Firstly, students were fairly unanimous in their preference for the coursework model of assessment. As well as the views that end-of-course examinations were harder they also expressed the linkage between coursework and problem-solving which they saw as a key indicator of ICT capability. There was also the view that things done in coursework were practical and provided hard evidence that they could do things. This would be useful, they believed, for future college or employment applications.

Secondly, students did not raise any issues with the direction given to their coursework by the awarding body or, as they reported it, by teachers. A typical task, across all qualifications, would be very largely pre-determined leaving little room or creativity in scoping out the problem. Despite valuing problem-solving and the creative aspects of technology use, students were accepting of this as being the way things were done. This acceptance of the needs of the examination board tended to lend uniformity to the responses in any one school – both in the interviews and in the coursework submitted. The latter is not a new issue being noted by Scott (1991) in an evaluation of the first two years of GCSE. It is typified in the interviews by responses that suggest they have booklets of detailed guidance (see Tables 6.8 and 6.9) as to what do to ‘pass the test’ (Gulikers, 2006; Mansell, 2007).

The assessment is high-stakes for all concerned. To protect their performance table measures it is unsurprising that schools may take the route of standardising responses to maximise reliability (Scott, op.cit.) by teaching to the test (Wiliam, 1998; Gulikers, op.cit.; Mansell, op.cit.). Similarly students do not criticise this as they hope to ensure that they pass the assessment and gain the badge, the qualification that they perceive as being fundamental to future education and employment. This also explains the low status they place on activity which is outside of the course specification. It may be that problem-solving in a games context is seen to be an informal measure of ICT capability but, as it does not contribute to the attainment of the highly desired qualification, it is not rated highly in student perceptions.

The perception that the assessment in ICT is a means to an end – the achievement of a qualification – indicates that the internal motivation for students is the task-orientation of goal theory (Dweck, 1986; Tombari and Borich, 1999). Students focus on the activities needed to score well in coursework rather than to demonstrate other attributes which they deem to be indicators of ICT capability. This may be why the boredom mentioned in the initial vignette ('addonai', 2007 - see Prologue) and by professional commentators (Mackinnon, 2008; Royal Society, 2010; Livingstone and Hope, 2011) was not something that was reported by students. The tasks do not need to be authentic (Tombari and Borich, op.cit.) they merely need to be clearly defined. A student's view of their self-efficacy (Bandura, 1997) is not determined by what others think but by the marks achieved in the coursework.

Finally, it would seem that student perceptions of the design of assessment of ICT match that of Williamson et al. (2005) with its four facets of purpose, proficiencies, evidence and tasks. Students report that there are clearly defined tasks for which evidence is required. They tend to assume that proficiencies which are tested meet the purpose for which the assessment is being put – that being primarily for future use in entrance to further or higher education or to gain employment. As one student put it:

> *I think it is important to have a qualification in ICT… Well it's good to have a qualification and be able to do it from that qualification. Not*

> *just that you've done it the once and now you can't remember. It's good to have it. It's important because employers can have something written down that says that you can do it.*
>
> (Student L, School E, transcript page 1)

It is noticeable here that, despite prompting, the student did not define the 'it' which the qualification assessed. For him it was simply sufficient to have the piece of paper. This, in itself, should demonstrate to employers the ability to do tasks using ICT.

## *8.3. Research aim 3: Construct validity of assessment*

| |
|---|
| **Research aim:** To develop a theoretical base to evaluate the construct validity of assessment of ICT at 16. |

Construct validity is the notion that assessments need to measure that which they purport to measure and not something else (Cronbach and Meehl, 1955; Messick, 1989). Moreover, it assumes that the assessment is free from bias (Gipps and Murphy, 1994). In the case of the assessment of ICT at 16 it is the ICT capability of a student that is being measured. This is defined in each of the specifications for each of the courses available to schools. There were 65 of these courses at the time of the empirical research was carried out, as shown in Table 1.1 on page 11. These courses could be divided into seven types. Even restricting any evaluation to these seven would result in a complex model. It is very difficult, therefore, to make general statements about validity from an objective viewpoint. Much depends on the course being considered and students' experience of it. Underpinning all of these qualifications, though, is the KS4 National Curriculum (NC) for ICT, which is mandatory for all 14-16 year olds. It is a requirement of approval for all qualifications that the requirements of this curriculum are subsumed into the specifications. This provides a unified benchmark for looking at the construct validity of assessment. The programme of study for the KS4 NC ICT is presented in Appendix with the assessment criteria are presented in the 'Attainment Target' in Table A1.2. At the start of KS4 it is expected that student will be, on average, at level 5 or 6 and so the level 6 attainment criteria will now be considered as a basis to compare with the perceptions of students. These criteria are shown in Table 8.1.

| |
|---|
| **Level 6.** Pupils develop and refine their work to enhance its quality, using information from a range of sources. Where necessary, they use complex lines of enquiry to test hypotheses. They present their ideas in a variety of ways and show a clear sense of audience. *They develop, try out and refine sequences of instructions to monitor, measure and control events, and show efficiency in framing these instructions.* They use ICT-based models to make predictions and vary the rules within the models. They assess the validity of these models by comparing their behaviour with information from other sources. They discuss the impact of ICT on society. |

**Table 8.1**. Attainment target for level 6 NC ICT
(from QCA, 1999:42, emphasis added)

Although the ICT curriculum, along with other subjects in secondary schools, was revised from 2008 (QCA, 2007a) the 1999 attainment target is being used as it was in force when the assessments taken by students in this study were first designed and introduced. The text in italics in the Table refers to aspects of ICT that are to do with control technology and represents the most significant difference between the two versions of the curricula as this aspect was moved from ICT to the Design and Technology curriculum. To address the research aim, the task is to evaluate the set of criteria in Table 8.1 against that which the students put forward and that which emerged from the literature. Students were asked, in the interview and questionnaire phases, to suggest changes to the content and assessment of ICT at 16. They tended to reiterate, as important, things that they were experiencing in their courses. A few students suggested changes in the domain of open-ended problem solving, fixing and building computers and programming. An additional topic from one group was to include video conferencing. Although students were conservative in their suggested changes, they were able to discern ICT capability. This was especially true when considering problem-solving activity. To be good at ICT was often equated with being good at solving problems, or fixing computers. Students saw problem-solving activity as authentic and realistic, being something that they might encounter in contexts out of school. Tombari and Borich (1999) hold that this would increase motivation amplified by the fact that such problem-solving activity is within their control (Weiner, 1986). Students also saw the application of practical skills as to be a key measure of the validity of the qualification.

Returning to the phenomena isolated from the study, problem-solving has been shown to be part of creativity (chapter 6) and the real world contexts are part of the phenomenon of relevance (chapter 5). The students valued this type of activity and the assessment criteria can be analysed to see whether they provide opportunity for it. There would seem to be little in the text of the level 6 statement of attainment that would rule out such an approach. Table 8.2 shows this analysis.

| **Level 6 statement** | **Aspect of problem solving** |
|---|---|
| Pupils develop and refine their work to enhance its quality, using information from a range of sources. | Evaluation of what it is to enhance quality. |
| Where necessary, they use complex lines of enquiry to test hypotheses. | Formulation of hypotheses and lines of enquiry. |
| They present their ideas in a variety of ways and show a clear sense of audience. | Analysis of needs of audience. |
| They develop, try out and refine sequences of instructions to monitor, measure and control events, and show efficiency in framing these instructions. | Making instructions more efficient. |
| They use ICT-based models to make predictions and vary the rules within the models. | Designing models and rules. |
| They assess the validity of these models by comparing their behaviour with information from other sources. | Identifying appropriate other sources. |
| They discuss the impact of ICT on society. | Considering a range of possible futures. |

**Table 8.2**. Problem solving in the NC ICT Level 6 Attainment Target

Thus in evaluating the construct validity of ICT assessment through the eyes of the student there is consonance with the NC attainment target above.

Students value activities which allow for problem-solving and see students who are good at these activities as being the ones who are good at ICT. They also see that these types of activities are ones which are beneficial to life beyond school chiming with employer's calls for students who are able to demonstrate such ability. This also matches with the relationship between construct validity and face validity discussed by Watts (2008) and Gronlund (2005).

With problem-solving comes a shift of emphasis from externally imposed task to internally designed ones. Assessment regimes would need to be more open-ended but could be precisely defined as per the NC statements in Appendix 1.

A further dimension to this framework for validity of assessment, however, is the impossibility of framing what students might learn in any prescribed specification. The students interviewed, and from whom data was collected, were, generally, only able to see importance and value in what the school was presenting them with. This contrasts this with the findings of Mitra (2003) on the untutored use of a computer in the street by children in India (see also Mitra and Dangwal, 2010). For Mitra the students organised themselves into a 'self-regulating learning system'. He mooted that there may also be self-regulating assessment systems (ibid.). These would seem to resonate with this research as students can describe scales of attainment for informal and non-formal uses of technology even if they do not value them. This peer evaluation of what is good is tied up in notions of learner voice but is not used for high-stakes external assessment at 16[122]. It also resonates with Heppell (2006a, 2007b) when he argues for the learner to be placed at the centre of assessment processes, surrounded by a learning community of peers, experts and others.

## *8.4. Thesis and contribution to knowledge*

The literature review identified and analysed the field of knowledge in the domains of learning assessment and technology as it appertains to ICT in

[122] The eVIVA project (Ultralab, 2005) reports on peer evaluation being used at KS3.

England at 16. There has been much research into the use of ICT *for* assessment but not of the assessment *of* ICT and student perceptions of it. Studies carried out by Somekh and Mavers (2003), Jarvis et al. (2005) and Brown and Hirschfeld (2008) considered students who were younger than 16 or who were not taking high-stakes assessment.

Three phenomena emerged from the research. Student perceptions of ICT were largely focused on its utility and relevance for later life, for further education or for employment. This end justified almost any means of obtaining a qualification in ICT. They saw that creative aspects of ICT use could be assessed although, when asked what should be added to a course, did not value things that were solely done at home. Their perceptions were dominated by the school and course they were following.

The prevailing orthodoxy as expressed anecdotally in the vignettes that initiated the study was that the ICT curriculum and its assessment are not fit for purpose in that they do not take account of the impact of technologies on young peoples' lives and learning. This is especially true in the informal contexts where significant amount of technological use, and learning, takes place (Crook, 2008; Logicalis, 2009; Ofcom, 2011). Further is it is argued that the assessment process is too conservative to take into account this wide-ranging and often creative understanding of ICT (Heppell, 2007b; Selwyn, 2011). There is a relationship between structural, institutional, social and personal factors and assessment systems, which affect motivation and autonomy. It is in motivation and autonomy that perception may be most visibly manifested (after Ecclestone and Pryor, 2003). The assessment system itself is both subject to concerns of validity and reliability (Wiliam, 2001). It relationship to the agendas of learner voice (Ruddock et al., 2006; Walker and Logan, 2008) and personalisation is unclear (Underwood et al., 2008). In respect of this underlying knowledge landscape, this research has added to the field in three areas.

Firstly, and relating back to the vignettes in the Prologue, students taking ICT qualifications at 16 do not share the orthodox view of the assessment systems being unfit for purpose. They have high regard for their utility and for the skills they learn. They accept that what is in the specifications is of value and, in particular, cite its relevance for future life, employment or study. They do not talk explicitly about the underlying knowledge and understanding, however, focusing instead on the production of artefacts or solving problems. That is not to say that these are without cognitive endeavour, simply that students do not articulate this in anything other than the vaguest terms. Tapscott's model (1998) of a system in which the learner is at the centre and the teacher as a facilitator to learning, supported by technology, is not one which is seen in KS4 ICT classes. The demands of the qualification are paramount leading to 'working from a list'. This demand comes from the multiple high-stakes ways that the education system uses performance measures for. Success in qualifications at 16 is the prime indicator of secondary school success. This overrides any needs of students who, nevertheless, are accepting of what is and cannot see what might be. Their perceptions are heavily influenced by the school (as for Reay et al., 2001 in looking at choice at 18) and they devalue ICT learnt outside of the course they are following.

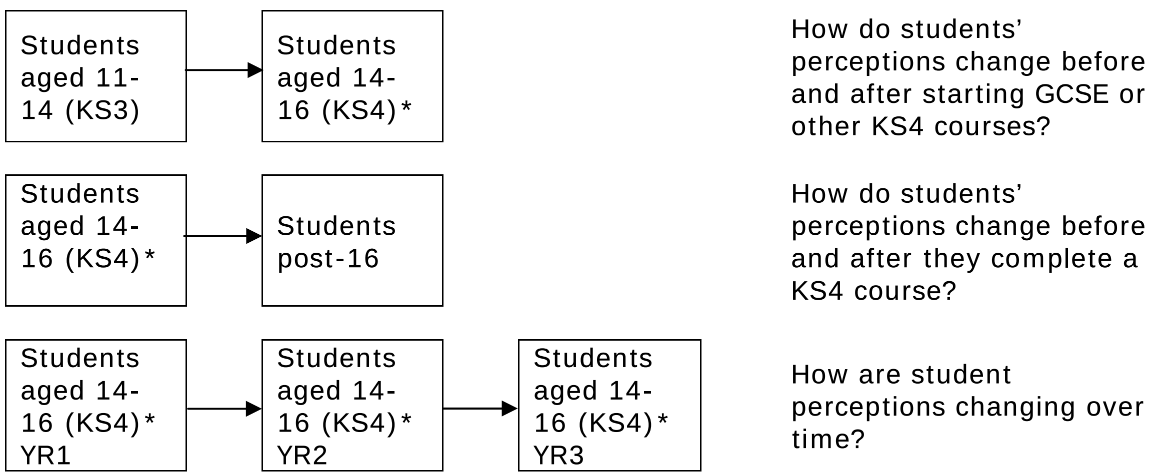
Secondly, students see technology very much as it is now, especially with relation to the content of an ICT course. Some technologies, such as games and mobile devices, are central to their outside of school but have not been adopted by the education system. Students cannot articulate how these technologies might be included in assessment systems. They see little value in the learning they do with, and about, technology outside of school in so far as a qualification in ICT is concerned. This may be compounded by policies which restrict their use in schools. Johnson et al. (2010) predict this to change in the next two to three years but when one considers the lack of use of Web 2.0 tools reported by Crook (2008) this would seem unlikely. Such participative and collaborative tools have been available to schools and students for at least six years but have yet to be widely adopted for learning, let alone for assessment. Technological changes should provide opportunities and imperatives for ICT curricula to change (Balanskat et al., 2006). Assessment needs to follow suit but students in this study are not cogniscent of this need.

Thirdly, learner voice is a key issue in education but has not entered the realm of engagement of students in high-stakes assessments. Learners are involved and consulted at many stages in the learning process and in the life of the institution. They are not, however, involved in the design of assessment processes and qualifications at 16. While they see that such assessment is germane for future education and employment they do not see any scope for changes to curriculum, except for the desirability of more open-ended tasks. Projects have shown that students are able to judge the work of others (Ultralab, 2005; Mitra and Dangwal, 2010) and this process of peer assessment was embedded in policy (DCSF 2008a; 2009) but it has not been applied to summative assessment. Mitra's self-regulating learning systems (2003) are entering the mainstream, but the analogous self-regulating assessment systems, if they exist, are not. Such a system would have activity and not specification as its starting point. Churches' digital taxonomy (2008) could be a tool for developing rigour in such a system with activities being judged according to such a framework. This would go some way to applying responses to socio-technological needs to the context of assessment (Facer, 2009), meeting calls for learner-centric assessment (Johnson et al., 2010) and promote internal motivations for success in students (Greenberg, cited in Gatto, 2005). It would also allow informal and non-formal learning to be considered alongside formal learning addressing the debate outline by the OECD (undated). Such an approach is seen in the CoPE awards (ASDAN, 2008) but is not part of the mainstream. With the increased focus on 'tradition' and 'rigour' in GCSEs (Gove, 2011; Paige, 2011), however, this would seem unlikely to happen with current government policies.

## *8.5. Limitations of the study and opportunities for further research*

The nature of the study has some inherent limitations. These are acknowledged here but are inevitable part of the methodological approach of interpretative phenomenology. The section on bias (section 3.2, page 93) discusses some of these issues, particular those around the personal standpoint of both the respondents and the researcher. In such subjectivity come pre-existing values which bias the study. The qualitative methodology also focuses on rich understanding of a small number of responses and so any claims for generalisability are tenuous. This is compounded by the wide diversity of contexts both in terms of types of school and of qualifications being taken. There were a number of problems with access to students during the course of the study (see Epilogue and Cohen et al., 2011:81-4). A possible strategy for future research would be to seek to interview students outside of the school context.

The fast pace of change of technology and, to a lesser extent, the changes in qualifications over the period of the study mean that views and attitudes taken at a moment in time cannot be said to be persistent. If the study was repeated even one year later it may be that different phenomena would emerge. Similarly the views of students may change, especially when comparing before and after the main examination period at 16. This, longitudinal, aspect could have been included in the methodology but for reasons of access it was left out of scope. It was not possible to return to interview students at age 17 as they would have moved on from the schools. Such a longitudinal study would provide opportunity for further research. There are three possible configurations of such research as shown in Figure 8.1.




* students in the study for this thesis were aged 15 or 16

**Figure 8.1**. Possibilities for longitudinal research

Other opportunities for further research come from the different contexts and sub-groups in this study. For example, comparisons could be made of any differences in perceptions of students taking different courses, between those of boys and girls, between those in schools that allow choice in ICT courses and those that do not, or between those in schools that make ICT compulsory and those that do not. Combining this comparative approach with a longitudinal study one could look at changes over time of students in the same context as new qualifications come on stream. For example new GCSE specifications ICT have been launched for first teaching in 2010 as has the first GCSE specification for computing. Research could be undertaken into the perceptions of students in schools where this change had been implemented. The comparisons between boys and girls or between those who opt for ICT and those that do not would still be possible within this longitudinal aspect. The existence of the computing specification would also allow research into differences in perception between those who opted for it compare to those who opted for ICT.

## *8.6. Implications*

The study was, by virtue of the methodological approach, limited to small number of schools and a small number of students. The epistemological stance was one of interpreting viewpoints through iterations of data collection, giving an ever-richer picture. Nevertheless the findings carry a number of implications for the education system in general, for schools and for students.

It is clear that a main driver behind students' appreciation of, and motivation with, ICT is their perception that it is something that is relevant for future study, employment and life. They value the badge that the qualification brings. Changes to the education system, to curriculum and assessment regimes, will always have an eye as what is deemed to be important by a range of stakeholders. Here ICT is seen to be important to students. This balances the needs expressed by universities, the specialist IT industry and employers in general for a greater number IT and computing graduates and technologically skilled young people. Any changes to curriculum and assessment can be confidently made, therefore, in the knowledge that there is support for the inclusion of ICT, in some form, in any new system. At the time of submission of this thesis, the UK Government is deliberating on curriculum reform. Changes to qualification structures at 16 are part of the landscape for this reform. Any new curriculum and awards in ICT or related subjects will have a ready market as students see intrinsic value in a certificate that accredits their capability in use of technology.

There is a need for qualifications in the general field of ICT, therefore. Whether ICT is the right title, as opposed to computing, digital literacy, new technologies, of some other label is a moot point. There has been much criticism of existing ICT qualifications. It may be that this has tarnished the subject and that a new approach is needed. On the other hand it may be that it is simpler to modify what already exists rather than to start again with a blank piece of paper. There is less political risk in that strategy. What has been clearly seen in this study, however, is that whatever is introduced will have a dominant effect on the values students place on aspects of ICT. Given that they also value creative, open-ended, problem-solving tasks, any new curriculum should include such aspects. There is an irony here though. A reading of the 1999 National Curriculum for ICT (QCA, 1999, see Appendix 1) reveals these types of activities and understandings having prominence. Students are required to analyse the "*requirements of tasks… explore, develop and interpret information… solve problems in a variety of subjects and contexts… tackle demanding problems… [and to be] independent…*" (ibid.). Here is a very good definition of creativity but the constraints of awarding body assessment requirements would seem to work against this.

There is a tension here between the needs of validity in assessment and meeting the needs of a society in which uses of technology changes rapidly. Young people have a wide exposure to aspects of ICT in their out-of-school lives that is not reflected by the qualifications. These cannot change at the same pace if the current production systems are maintained. What would seem to be needed is a system which allows students greater flexibility in producing evidence for assessment rather than prescribed tasks. The assessment process needs to reflect the needs of employers, further and higher education but needs to do so in way that allows students to bring their uses of technology to the fore. If this is not done then there will be a widening of the divide seen in this research between what is done outside of school and what is done in it. Worse there could be a hardening of student value systems that says things done outside of school are not of value for assessment. Projects like Be Very Afraid[123], Sodarace[124], Computer Science for Fun[125] and CC4G[126]promote student creativity and innovation with

[123] http://www.heppell.net/bvax/
[124] http://sodarace.net/
[125] http://www.cs4fn.org/competition/
[126] http://www.cc4g.net/For-students/

technology but they are outside of the formal framework of assessment. What is learnt by students in such projects, and what is learnt in other informal contexts needs to be included in the assessment system if it is to be fully valued by students. Those in this study, when asked to think about what might be in an ICT specification, were constrained by the specification they were following. This was all they knew of assessment. They might have a developed understanding of what makes someone good at ICT outside of school but cannot see how that can be brought into their portfolio of school work and evidence for assessment. They rely on the school and their teacher to guide them. Assessment regimes are needed that provide space for schools and teachers to encourage students to bring in their own uses of technology to such a portfolio and assessment criteria that are flexible enough to reward them appropriately. The latter are in the 1999 National Curriculum specification and thus should have been able to have been used for these purposes. Supposedly underpinning all that is done in schools there is little correlation, however, between the open-ended statements of assessment in ICT contained therein and the closed tasks that awarding bodies and schools present to students.

As an example, under the National Curriculum a level 6 would be awarded for students who

> "*Develop and refine their work to enhance its quality, using information from a range of sources; they use complex lines of enquiry to test hypotheses*; *they present their ideas in a variety of ways and show a clear sense of audience; they use ICT-based models to make predictions and vary the rules within the models and they assess the validity of these models by comparing their behaviour with information from other sources.*"

(QCA, 1999:42).

Here, then is a framework that is rich in possibilities for students to present their achievements with, and understanding of, ICT in way which are relevant and motivating to them. This can be compared to the statement of a student in this study who, when asked what they had to do, replied:

> *We had a scenario and proposal and had to build a website on ... A made up water park... [We] had to include images, hyperlinks, navigation buttons and bars and some text.*
>
> (Student G, School E, transcript page 2)

Here there was complete uniformity in the task given to each student. The task came from the awarding body and was 'handed down' by the teacher. The school gets good results for its students but there is a stifling of opportunity for students to demonstrate a personal response to the assessment objectives. Some awards, such as the CoPE (ASDAN, 2008 - see page 45) allow for a more individual response but these are not in the mainstream of awards by numbers of entries (Vidal Rodeiro, 2010). If personalisation is to mean anything, if student motivation for taking ICT post 16 is to be enhanced and if the subject is to shake off the stigma shown in the vignettes that opened this study then such assessment processes need to be learnt from.

# Epilogue: reflections on the learning journey

At the start of this thesis a journey was alluded to. This had elements which were the precursor to undertaking the study. As I started out I was very much a 'teacher'. The elements of my journey prior to that date came from my career as school and further education teacher, advisory teacher and higher education teacher. I was, however, now working in a university. A university in which research played a part in defining what it was to be an academic. The contract of employment spelt it out. My very identity was configured by the way I acted and the things I did (Gibson, 2001) but it was also influenced by the institution in which I was working (Reay et al, 2001). 'Teacher' was the name I was known by and it consequently encapsulated my identity (Hall, 1990) but it was insufficient to meet the espoused requirements of my role. I needed to research, and be seen to be 'researcher'. Figure 9.1 illustrates my self-concept of my identity at this stage.

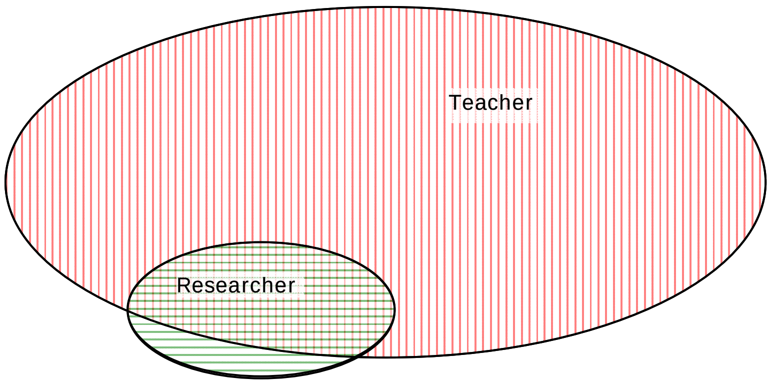



**Figure 9.1**. Identity map prior to commencement of study

I was a teacher who had undertaken some research and development activities but I did not see that these constituted a significant part of the name by which I was known (ibid.). These activities were merely part of my everyday teaching. Healey's model of research-informed teaching (2005) would locate this as teaching which is 'research-led'. By this he means teaching in which the "*curriculum is structured around teaching content*" (ibid.:70).

In September 2005, having moved to Nottingham Trent University I had moved into an institution where undertaking a research degree had become possible. While the School of Education had decided that it was not going enter for the 2008 Research Assessment Exercise (RAE)[127], it still had elements of research in its portfolio of activities - see NTU (2009) for an updated description of this position. I had discussions with the Professor of Research and set out on the journey. There were two drivers – the aforementioned requirements of the role and my own desire to obtain the qualification.

> *Why did I want to register for a PhD?" the Professor of Research asked. We conclude that the main reason is 'because I do'. It is the proverbial mountain to be climbed because it is there.*

(PRLJ, 07/09/05)[128]

Learning is essentially a social activity in which one learns with others be they peers, teachers or mentors (Vygotsky, 1978; Bruner, 1996; Wenger, 1998; Craft, 2011). Research is similarly improved by being part of a community (Booth et al., 2003) that provides knowledge sharing and companionship and support and enhances opportunities for dissemination of findings (Loan-Clarke and Preston, 2002). Certain aspects of the research approach can only be learned by belonging to such a community. It is especially beneficial for beginning researchers to be in close networks with others (Booth et al., op.cit.).

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[127] The RAE took place approximately every five years from 1986. It was a process by which UK higher education institutions submitted a case for funding to higher education funding councils. This case reported on the quality and quantity of research, and its impact, broken down by academic disciplines. It was replaced after 2008 by the Research Excellence Framework.

[128] PRLJ = Personal research and learning journal. This chapter contains dated extracts from my journal. The journal itself was not a single artefact but rather a portfolio of notes, e-mails, electronic documents and mind maps - see Moon (1999) for a discussion of multi-media learning journals in professional reflective practice.

Throughout my journey, there were numerous opportunities for such 'community' and interactions with 'others'. At the start, however, I identified two – the relationship with other students taking NTU research degrees provided by membership of the 'Research Practice course' (RPC) and the formal arrangements for supervision. The former was merely a matter of enrolment, the latter required some discussion.

> *Several names have been mentioned as supervisors but there was a concern expressed to me, one that I shared, that no one had the specific ICT domain expertise. If they were not experts in the field would they be able to sustain working with me?*
>
> (PRLJ, 13/10/05)

Being able to enjoy the topic of the research is a key pre-requisite for successful supervision according to Delamont et al. (2004). It is also desirable, however, to balance knowledge of the field with expertise in the methodological approach and understanding of the requirements of the university (ibid.). A balanced supervision team was needed and one was appointed, although the specific ICT knowledge on the team was, perhaps, still in need of supplementary input.

> *A couple of days later an e-mail comes to me through one of the mailing lists I belong to… It strikes me that a solution would be to supplement my supervisory team with an external adviser and that the sender of the e-mail might be a good choice.*
>
> (PRLJ, 02/11/05)

I was now a registered student of the university and my identity had changed. My research was no longer confined to informing my teaching but was part of my role as a student. Being a student of the university also influenced the way I acted as a teacher – I saw some systems from the student perspective for the first time. My research was confined to that which was needed for the two roles. Figure 9.2 shows this change in my self-perception of my identity.

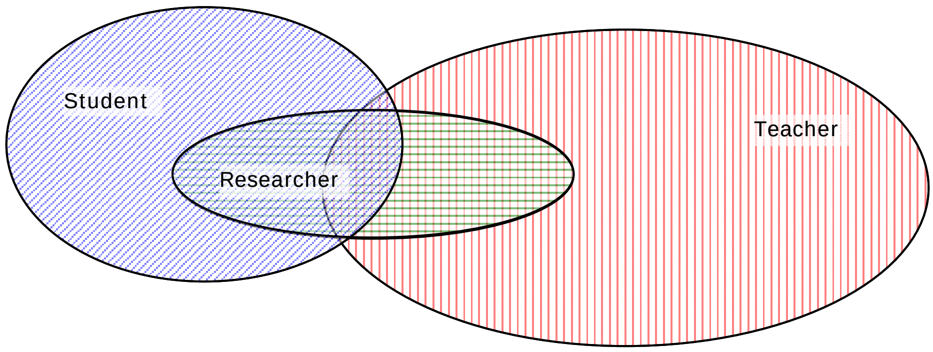


**Figure 9.2**. Changing identities – student/researcher

I perceived myself to be in a different identity space and had begun to relate to other people and events in this new light. In Heideggerian terms (1927/1962) my perceptions and interpretations of the world were now influenced by the externally-provided lens of 'researcher' and 'student'. Here then were the beginnings of the multiple hermeneutic (Alvesson and Sköldberg, 2000) that were to influence my methodological approach. One of the problems of undertaking doctoral research as a part-time student, however, is that there is still the full-time job to do (Oliver, 2004; Flint and Carbayo-Abengózar, 2009). I had not found time and space to really embody being a student by way of attendance at the RPC and had not become part of the research community.

I looked for other ways to engender that sense of community. Two strategies emerged – the giving of presentations and the use of an online weblog (blog). The former was self-evidently an academic activity which would also help with motivation (see Delamont et al.:93 et seq. for a discussion of motivation in PhD students). The second was perhaps less so. There were also issues of ethics around the public nature of the blog. I discussed this with my external advisor.

> *Interesting question about the role of a public blog in a PhD - something that lots of folk in [my university] are exploring - particularly when you get to the data collection/analysis stage - and in relation to confidentiality/ethics.*

(Advisor, 2006).

The use of an online blog to help with the research journey is something which has developed in universities during the period of my study (Walker, 2006; Murthy, 2008; Ferguson et al., 2010). Later stages seem potentially less amenable to public discussion, given ethical considerations. I subsequently decided to only keep the blog for this formative stage of the review of literature, although it is still live[129].

I found that this discipline and enthusiasm for contributing to it did not last. Nevertheless, as a manifestation of my ideas and emerging conceptual framework it proved an invaluable resource. I found it especially interestingly to note the recurring theme of student voice scattered throughout my writing there. It developed my identity as a researcher as configured it through telling tales of my studies - see Gibson (2001) for an account of the importance of stories on identity. Perhaps most crucially it joined me to a community of others – readers of my blog – and provided the beginnings of interactions and discussions about my research. This aspect of interaction is a key benefit derived from the academic use of blogs (Murthy, op.cit.) mirroring the use of Web 2.0 tools in the school classroom (Crook, 2008).

The other tactic to become 'researcher' and part of the 'research community' was to arrange presentations. One was mandatory – that for project approval. Two significant things happened at this. Firstly, the independent assessor was genuinely enthused by my intended research. This authenticated my role as 'researcher' although I was reacting more as a student to a teacher – symbolic interactionism was at work here (Blumer, 1969; Lansheere, 1993). Secondly, in being asked to make the presentation in a room with no ICT facilities I realised that 'Presentation' does not equal 'Powerpoint' – I was subsequently to find that this was a lesson that many of the schools students, and their teachers, had not learnt.

Perhaps as a result of these efforts to engender community, I felt more motivated to try and find space to attend the RPC and meet with peers at NTU.

[129] http://petebradshaw.wordpress.com

*I make the decision to attend the RPC during this 'second' year as often as I can to help overcome the barriers between me and other researchers and that are preventing me for conceiving myself as research student. Indeed the very first session is to visualise, through drawing, one's perception of the research journey and one's place on it. Mine is very much a path up a mountain.*

(PLRJ, 15/2/07)

As a result of moving into the research community at NTU I was asked if I would like to join a supervisory team as a third supervisor to 'learn the ropes'. This would maybe not have normally happened until after completion of a doctorate as an academic member of staff it was an opportunity open to me. It changed once again my perception of my identity with 'supervisor' straddling the 'teacher' and 'researcher' roles as shown in Figure 9.3. That my identity was able to change to accommodate research reflected the gaps that were provided by the institutions I worked in (Flint and Carbayo-Abengózar, 2009).

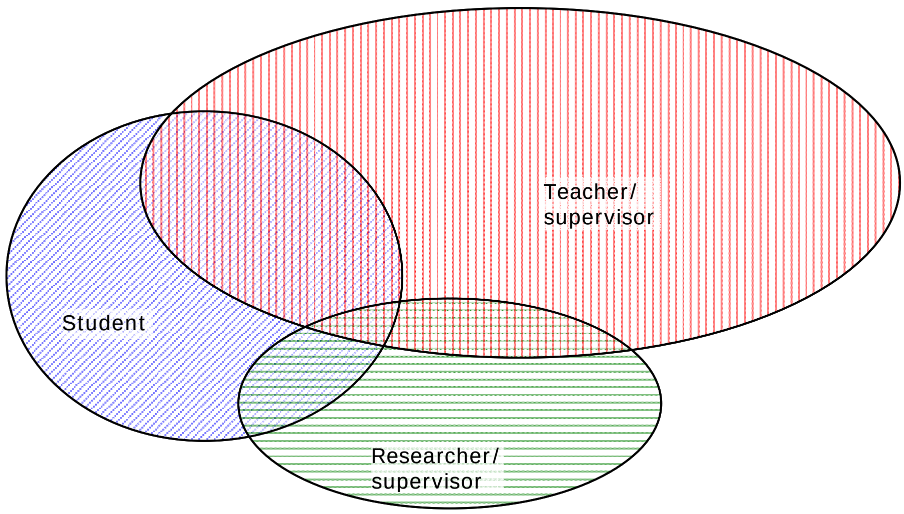


**Figure 9.3**. Multiple identities – becoming a supervisor

Being on other students' supervisory teams meant that I was now involved in research that was not to do with my own teaching or work as a student. I was beginning to have a separate 'researcher' identity. It also helped to see the pathway through the eyes of another student.

> *This [supervision] has re-energised me as a student as I now have a much clearer idea of the NTU research degree landscape and the journey to PhD through it.*
>
> (PLRJ, 05/03/07)

Having made the first presentation I realised that this had provided a deadline and had motivated me to become serious about my study. I am a member of the IT in Teacher Education association (ITTE) and they hold a research seminar every 18 months. I put my name forward to present my initial ideas for the February 2007 seminar. This gave me the opportunity to test out the ideas for research on a critical, but supportive, external audience and to share some of the emerging writing on my blog. I present again at the Association's summer conference in July 2007.

> *It is interesting to compare the two presentations – the one in February and the one in July. The former has much more of a formal, theoretical structure. Clean slides littered with references and initial ideas – lifted straight from my proposal. An academic treatise on what I was interested in. The latter is much more visual. The blog is used as a background and a metaphor of a journey used through a map device. Initial ideas have become blended with uncertainties and changes of direction. The final slide concludes that there are "Many different routes – the most obvious may not be the best".*
>
> (PRLJ, 15/7/07)

The blog and presentations helped me considerably in collating and organising my thoughts on the literature. They also helped to generate writing and ideas and to build the conceptual framework. At this point, 18 months into my journey, I began to feel a tension between the direction I wanted for my research and the interests of my supervisors. This, not uncommon, tension (Delamont et al., 2004) led to intense discussions; the conclusion of which resulted in my greater ownership of the study. One of the manifestations of the tension was the initial inclusion of a question on gender in the second phase of data collection. This was my supervisor's suggestion and did not fit well with my aims. It did not reveal significant data either and so was left from the study.

There was a hiatus ahead however.

> *At the start of this academic year I was asked to stand in as a team leader to cover a secondment. This I accepted. It has meant that my workload has become dominated by management and leadership issues, rather than teaching and time to research. My supervisors suggested that I should seek an intercalation of my studies. This would give me time once the secondment had been completed (it lasted 12 months). We have applied to the graduate school but have been told that 'pressure of work' is not a permissible reason for intercalation. This is very frustrating but I can see the argument. The fear behind this regulation is that it could become a get-out clause for all part-time PhD candidates. The inference is, of course, that work should not impact on study. Maybe this points to a professional doctorate (EdD) being a better approach*[130] *but this had not been an option for me at the time of registering.*

(PRLJ 31/10/07)

My new role meant that I did not continue with the doctoral studies for much of that academic year. The roles of manager and researcher were incompatible. I continued to read and post to the blog but there was little concerted writing. I also continued to supervise. My identity was now very different, both as perceived by me and by the university management, of which I was now part. This is shown in Figure 9.4.

[130] Delamont et al., 2004.

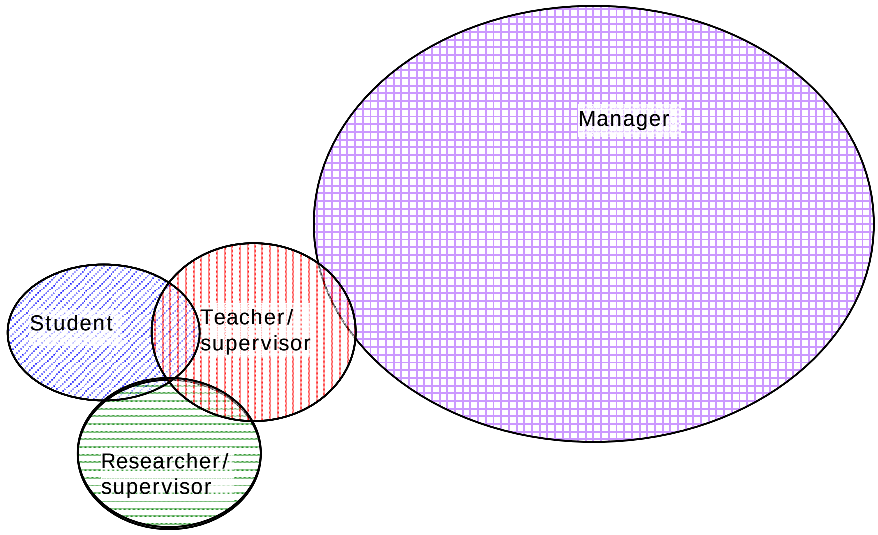


**Figure 9.4**. Incompatibility of management and research

At the end of the academic year I left the role of manager behind and re-engaged with my study. As before, I sought out community and deadlines to motivate my research. The School of Education had also developed a sense of communities of practice (Lave and Wenger, 1991; Wenger, 1998) through the establishment of research clusters. Here, in the spirit of legitimate peripheral participation (Wenger, op.cit.) and Vygotskian notions of the zone of proximal development (1978), those new to research could work with and learn from more experienced colleagues and invited speakers. As well as serving to motivate and provide deadlines, this presentation also gave an impetus to the research by providing opportunities to access students – one of the potential difficulties of any educational research (Cohen et al., 2007).

> *[There] is resurgence in research activity within the School of Education… A clusters [have been] formed with staff joining whichever they are interested in. One of the requirements for clusters was to present a series of research seminars featuring speakers from inside and outside of the university. Under these auspices I agreed to present my PhD work based on the chapters I have submitted. This is to be to the vocational learning cluster. At the end of the session I invite the usual comments and questions and am pleasantly surprised*

*to have teachers offer to help me by allowing me to interview their students. The next stage – data collection was now very real.*

(PLRJ 28/11/08)

Problems of access persisted throughout the data collection stage. Despite the offers at the presentation, and from schools in university's teacher education partnership, scheduling visits became problematic. I was conscious of the need to maintain goodwill with schools and teachers (Cohen et al., op.cit.) but also that I had deadlines to meet in terms of students taking their final examinations. I was also conscious of my role vis a vis these schools. I was moving more to being a researcher than a teacher. This, perhaps, resulted in a diminishing empathy from those who I needed to work. It became more acute when I moved to a new role away from the partnership.

*I am in the middle of visiting schools to interview pupils. I have a sample of five schools across the country giving a spread of school types and specifications being followed. The problems of access that I reported on for the questionnaires have been no less acute in securing the interview sites. Over twice as many leads were offered in response to my e-mails than actually materialised. Various reasons have been put forward for this but, as before, they can be summarised as resulting from the difficulties of taking year 11 students out of classes because of the pressure on results and performance tables. While understandable from the school's perspective it is far more pronounced than I had expected.*

*The constraints on data collection have not stopped at the refusal to allow me to visit schools. During the visits I have had sessions curtailed because of lesson changeover (where ICT teachers facilitated the interviews they could not impinge on other subjects' lesson time) and students withdrawn at the last minute or rendered unable to attend the one of the two interviews (group or individual). There does not seem to be any pattern in what provides the best strategies for overcoming these constraints although the best school for access has been one in which the headteacher was directly*

> *involved in arrangements. Conversely this has been the school in which access negotiations were the most protracted with initial contact being made through a governor.*
>
> (PLRJ, 18/11/09)

Despite the problems, however, once in school I was seen by the students as ‘researcher’. Although I had been introduced to them through their teachers I was not a teacher in their eyes.

Having collected all of the data the interviews had to be transcribed. I had intended to do the transcription myself as immersion in the data is something I needed do to so as to isolate the phenomena (Cohen et al., 2007). Transcribing one school’s interviews gave me a good ‘feel’ for the data but it the mechanics of transcription were very laborious and so a specialist transcription agency was contracted. This again enhanced my self-perception as researcher as here, again, I was working with a third party who knew me in no other role. My identity had made its penultimate change as shown in Figure 9.5.

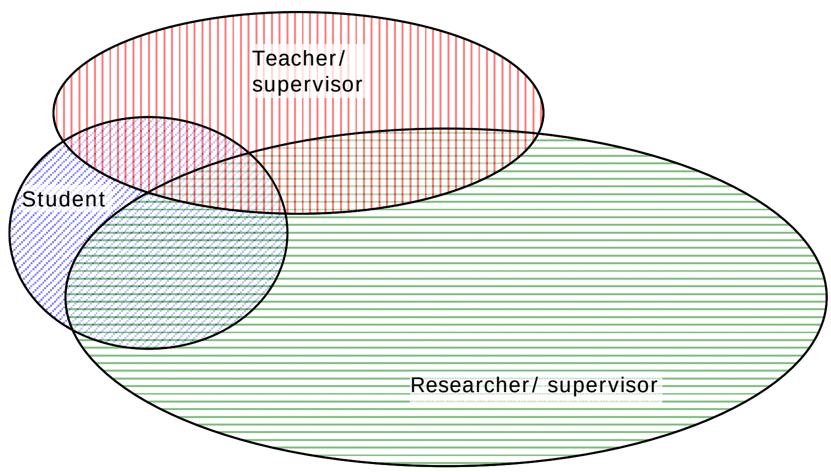


**Figure 9.5**. The dominance of research over teaching

At this point, June 2010, I began the process of ‘writing up’ (Delamont et al., 2004). I had collected, electronically, a very large quantity of notes, reviews and data which had to be organised into the monolithic whole of the thesis. On sitting down to analyse, review and write up the content of this electronic store, and the links therein, I found that I had 102,000 words to go through. Two weeks of distillation has taken this down to around 14,000 of my own.

> *I did not initially recognise writing up as a distinct stage of the PhD journey. For me the writing emerges as the journey progresses. To separate out a ‘writing up’ phase denies the need to write up anything in earlier stages I feel. Or at least, I felt. Having reached a stage where I had produced a large number of words, piecemeal, I have now collated them into one coherent whole. Some research students work very much a chapter at a time but for me the very notion of thesis is monolith. Here is my ‘oeuvre’. It is a single entity, a single thesis. I find it easier to comprehend it as a single whole, and so have set about compiling it as such.*
>
> (PRLJ, 15/7/10)

The original 102,000 words represented over 500 artefacts – some long, some very short. I gained considerable momentum from systematically reading and synthesising them and incorporating them into my writing. Many were discarded, others were amplified, but this proved a very good way of building up my writing. The process is similar, in some respects, the patchwork writing method of Winter (2003) where undergraduate students, new to academic writing, are scaffolded (Bruner, 1996) to produce longer pieces of writing by stitching together shorter ones.

In distilling the artefacts I was struck by three ‘eureka’ moments - insights that leapt off of the page in the redrafting of the literature review. Their significance is the way in which they relate to my emergent findings. Although the literature review conceptually precedes the findings I was now at a point where I was redrafting the former having established the latter. Here is writing as iteration (Murray, 2004). The first insight was around the relationship between structural, institutional, social and personal factors and assessment systems that affect motivation and autonomy. It is in the motivation and autonomy that perception may be most visibly manifested (after Ecclestone and Pryor, 2003). Here was a connection between the importance of habitus (Bourdieu, 1984), symbolic interactionism (Blumer, 1969; Lansheere, 1993) and the emergence of findings around enculturation. The second was about the way in which informal use of technology moves ahead of formal use but that students do not necessarily value that use for learning until it assimilated into the formal context. The third insight was around the importance of learner voice.

These three Eureka moments actually served more as a motivation than as eventual key findings. In July 2010 the thesis was beginning to take its final shape yet there was much still to do by way of reorganising and isolation of the phenomena. The enculturation forming the first moment described here has persisted through to the end as a key object; the other two less so. The unwieldy nature of the monolithic tome had been broken up by the discovery of three nuggets. It spurred me onto continue to restructure and rewrite in the knowledge that I had found something.

As I moved towards summer 2011, with a viva date long set and examiners appointed, the process had became much more enjoyable as the path was now clear. Even if it were the wrong path it was too late to turn back. I had been able to keep the PhD on track throughout 2010/11 despite taking on new responsibilities at work. It had developed a momentum of its own and I understood where I was going and where I had been. More importantly, perhaps, I kept on learning. Each redraft, each restructure revealed something new. ‘Researcher’ and ‘teacher’ now had equal importance but are embodied in the learning represented by ‘student’ – see Figure 9.6.

As I come to the end of the journey, and will no longer be registered as such, perhaps the final change is that ‘student’ should be replaced by ‘learner’.

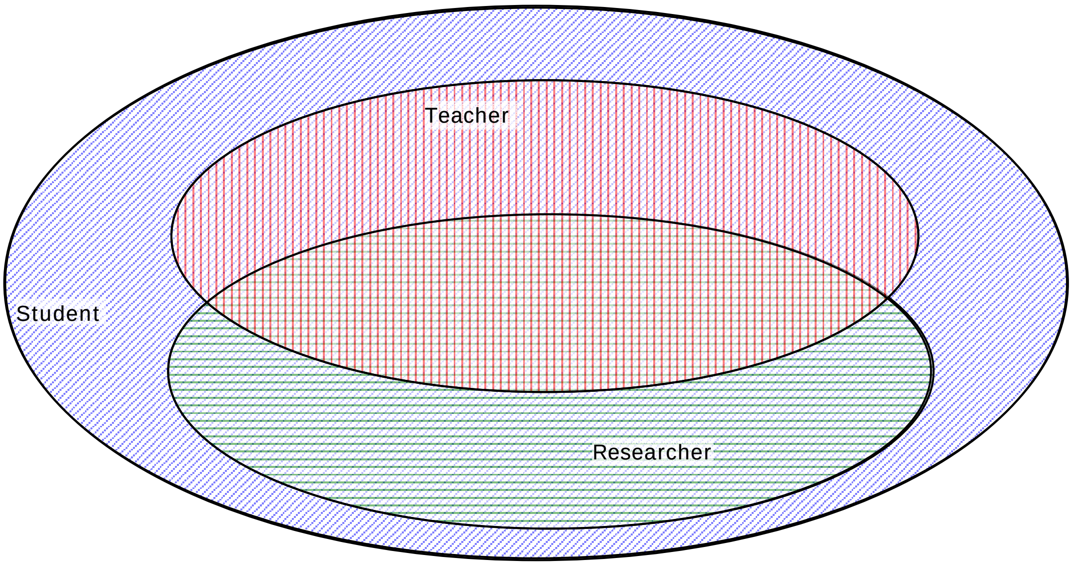


**Figure 9.6**. Researcher/teacher/student

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# Appendices

## Appendix 1. The National Curriculum for ICT

Table A1.1 shows the programme of study for the National Curriculum for ICT (QCA,1999) that students in this study were following.

| |
|---|
| Pupils should be taught the knowledge, skills and understanding to:<br>• Analyse the requirements of tasks, taking into account the information they need and the ways they will use it.<br>• Be discriminating in their use of information sources and ICT tools.<br>• Use ICT to enhance their learning and the quality of their work.<br>• Use ICT effectively to explore, develop and interpret information and solve problems in a variety of subjects and contexts.<br>• Apply, as appropriate, the concepts and techniques of using ICT to measure, record, respond to, control and automate events.<br>• Apply, as appropriate, the concepts and techniques of ICT-based modelling, considering their advantages and limitations against other methods..<br>• Use information sources and ICT tools effectively to share, exchange and present information in a variety of subjects and contexts.<br>• Consider how the information found and developed using ICT should be interpreted and presented in forms that are sensitive to the needs of particular audiences, fit for purpose and suit the information content..<br>• Evaluate the effectiveness of their own and others' uses of information sources and ICT tools, using the results to improve the quality of their work and to inform future judgements.<br>• Reflect critically on the impact of ICT on their own and others' lives, considering the social, economic, political, legal, ethical and moral issues. |
| Pupils should be taught the knowledge, skills and understanding through:<br>• Tackling demanding problems in a wide variety of contexts, including work in other subjects.<br>• Using a range of information sources and ICT tools to improve efficiency and extend capability.<br>• Working with others to explore, develop and pass on information. |

| |
|---|
| • Designing information systems and evaluating and suggesting improvements to existing systems, with use by others in mind.<br>• Comparing their use of ICT with its use in the wider world. |
| Pupils should be taught to be independent, responsible, effective and reflective in their selection, development and use of information sources and ICT tools to support their work, including application in other areas of their study and in other contexts. |

**Table A1.1**. The National Curriculum for ICT (QCA, 1999)

Box B shows the attainment target for ICT at level 6 - the expected level that students will be at aged 14 when they start the courses that they were following during the course of the empirical part of this study – and above.

| |
|---|
| **Level 6.** Pupils develop and refine their work to enhance its quality, using information from a range of sources. Where necessary, they use complex lines of enquiry to test hypotheses. They present their ideas in a variety of ways and show a clear sense of audience. They develop, try out and refine sequences of instructions to monitor, measure and control events, and show efficiency in framing these instructions. They use ICT-based models to make predictions and vary the rules within the models. They assess the validity of these models by comparing their behaviour with information from other sources. They discuss the impact of ICT on society. |
| **Level 7.** Pupils combine information from a variety of ICT-based and other sources for presentation to different audiences. They identify the advantages and limitations of different information-handling applications. They select and use information systems suited to their work in a variety of contexts, translating enquiries expressed in ordinary language into the form required by the system. They use ICT to measure, record and analyse physical variables and control events. They design ICT-based models and procedures with variables to meet particular needs. They consider the benefits and limitations of ICT tools and information sources and of the results they produce, and they use these results to inform future judgements about the quality of their work. They take part in informed discussions about the use of ICT and its impact on society. |

| |
|---|
| **Level 8.** Pupils independently select appropriate information sources and ICT tools for specific tasks, taking into account ease of use and suitability. They design successful ways to collect and prepare information for processing. They design and implement systems for others to use. When developing systems that respond to events, they make appropriate use of feedback. They take part in informed discussions about the social, economic, ethical and moral issues raised by ICT. |
| **Exceptional performance.** Pupils evaluate software packages and ICT-based models, analysing the situations for which they were developed and assessing their efficiency, ease of use and appropriateness. They suggest refinements to existing systems and design, implement and document systems for others to use, predicting some of the consequences that could arise from the use of such systems. When discussing their own and others' use of ICT, they use their knowledge and experience of information systems to inform their views on the social, economic, political, legal, ethical and moral issues raised by ICT. |

**Table A1.2**. National Curriculum for ICT, attainment target extract (QCA, 1999)

# *Appendix 2: Consent letters - phases 1 and 2*

**CONSENT FORM – For Institutions/Organisations**
***(to be completed by the person legally responsible)***

---

On behalf of ____________________ School

**I hereby give permission for** (list names of students here).

to be involved in a research study being undertaken by Pete Bradshaw of Nottingham Trent University and I understand that the purpose of the research is, as part of a PhD thesis, to ascertain students' perceptions of ICT and its assessment at 16.

Involvement for the institution means that during Feb-May 2009

- four students in year 11 will be interviewed for half an hour each
- follow up questionnaires will be circulated for completion by the whole year group (approx 20 minutes to complete)
- possible further follow up interviews (maximum four) would be conducted (after the examination period)

**I confirm that**

1. The aims, methods of the research study, have been explained to me.

2. I voluntarily and freely give my consent for the institution to participate in the above research study.

3. I am free to withdraw my consent at any time during the study, in which event participation in the research study will immediately cease and any information obtained through this institution/organisation will not be used if I so request.

4. I understand that aggregated results will be used for research purposes and may be reported in academic journals.

5. I understand that the school, and the individual students concerned, will not be identifiable in any way in the thesis or any papers resulting from it.

6. I understand that copies of the findings will be made available to the school.

Signature: Date:

Position:

The contact details of the researcher are: Pete Bradshaw, 07833 344178, pete.bradshaw@ntu.ac.uk

## CONSENT ON BEHALF OF A MINOR OR DEPENDENT PERSON

I, of

**Hereby give consent** for my son / daughter / dependent

to be a participant in the study to be undertaken by Pete Bradshaw of Nottingham Trent University and carried out at ______________________ School

I understand that the purpose of the research is to ascertain students' perceptions of ICT and its assessment at 16.

Involvement for the school means that during Feb-May 2009

- four students in year 11 will be interviewed for half an hour each
- follow up questionnaires will be circulated for completion by the whole year group (approx 20 minutes to complete)
- possible further follow up interviews (maximum four) would be conducted (after the examination period)

**I understand that**

1. The aims, methods of the research study, have been explained to me.
2. I voluntarily and freely give my consent to my child's/dependent's participation in such research study.
3. I am free to withdraw my consent at any time during the study, in which event participation in the research study will immediately cease and any information obtained through this institution/organisation will not be used if I so request.
4. I understand that aggregated results will be used for research purposes and may be reported in academic journals.
5. I understand that the school, and the individual students concerned, will not be identifiable in any way in the thesis or any papers resulting from it.
6. I understand that copies of the findings will be made available to the school.

Signature: Date:

The contact details of the researcher are: Pete Bradshaw, 07833 344178, pete.bradshaw@ntu.ac.uk

**NOTE:** The parent or parents, or person(s) having guardianship of the child must sign the consent form.

# *Appendix 3: Consent letters - phase 3*

**CONSENT ON BEHALF OF A MINOR OR DEPENDENT PERSON**

I, of

**Hereby give consent** for my son / daughter / dependent

to be a participant in the study to be undertaken by Pete Bradshaw of The Open University and carried out at ______________________ School

I understand that the purpose of the research is to ascertain students' perceptions of ICT and its assessment at 16.

Involvement for the school means that during October 2009

- four students in year 11 will be interviewed for 30-45 minutes each
- a group interview with the four for another 30-45 minutes

**I understand that**

1. The aims of the research study have been explained to me above. These are to find out the views of year 11 students on the assessment of ICT and to analyse them in relation to the examination system. It is not to look at students' views of schools.

2. I voluntarily and freely give my consent to my child's/dependent's participation in such research study.

3. The interviews will be recorded for the purposes of data collection. The recordings will be deleted once the research has been completed.

4. I am free to withdraw my consent at any time during the study, in which event participation in the research study will immediately cease and any information obtained through this institution/organisation will not be used if I so request.

5. I understand that aggregated results will be used for research purposes and may be reported in academic journals.

6. I understand that the school, and the individual students concerned, will not be identifiable in any way in the thesis or any papers resulting from it.

7. I understand that copies of the findings will be made available to the school.

Signature: Date:

The contact details of the researcher are: Pete Bradshaw, 07833 344178, p.r.bradshaw@open.ac.uk

**NOTE:** The parent or parents, or person(s) having guardianship of the child must sign the consent form.

## *Appendix 4: Questionnaire*

NOTTINGHAM TRENT UNIVERSITY

**Research project**
**Assessment of ICT**

Thank you for completing this questionnaire. This is to help me find out about your perceptions (what you think) about ICT.

The research is for the purposes of my PhD and the results will be available to anyone interested, copies will be sent to the school.

You do not need to answer every question.

**Please do NOT put your name on these sheets. Choose a password here that you can use if you want to remove your data from the results. If you wish to remove your results please contact me as below or through your ICT teacher, sending me your password.**

| |
|---|
| **Password (choose four letters and four numbers):** |

You should keep this sheet.

Pete Bradshaw

**Pete Bradshaw**
pete@iw2.co.uk
Researcher, Nottingham Trent University, April 2009

**Please repeat your password from the front page here:**

| |
|---|
| |

**Q1 Are you**

☐ Female
☐ Male

**Q2 Which ICT assessment are you taking? (tick one box only)**

☐ GCSE Full course (Higher)
☐ GCSE Full course (Foundation)
☐ GCSE Short course
☐ Key Skills
☐ Other
☐ None

**Q3 Tick one box in each row to show the extent to which you agree or disagree with each of these statements.**

| | Strongly agree | Agree | Neither agree nr disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| The subject ICT is relevant to later life and jobs | ☐ | ☐ | ☐ | ☐ | ☐ |
| The tasks and questions in ICT coursework and exams are relevant to later life and jobs | ☐ | ☐ | ☐ | ☐ | ☐ |

**Q4 List three things that are you really good at, or enjoy, doing with ICT/Technology. Where do you do these things?**

| **Thing I do with ICT/Technology** | **I do this only outside school** | **I do this in and outside school** | **I do this only in school** |
|---|---|---|---|
| | ☑ | ☑ | ☑ |
| **A** | | | |
| **B** | | | |
| **C** | | | |

**Q5 Think about exams and coursework in ICT. How important do you think each of the following is? (tick one box in each row)**

| | Very important | Important | Neither important nor unimportant | Unimportant | Very unimportant |
|---|---|---|---|---|---|
| Explaining what the parts of a computer are | ☐ | ☐ | ☐ | ☐ | ☐ |
| Explaining what ICT may be used for | ☐ | ☐ | ☐ | ☐ | ☐ |
| Being creative | ☐ | ☐ | ☐ | ☐ | ☐ |
| Demonstrating your knowledge of ICT | ☐ | ☐ | ☐ | ☐ | ☐ |
| Explaining how computers make tasks easier | ☐ | ☐ | ☐ | ☐ | ☐ |
| Being tested (in coursework and exams) on things that you are taught at school in ICT lessons | ☐ | ☐ | ☐ | ☐ | ☐ |
| Being tested (in coursework and exams) on your use of ICT in other subjects | ☐ | ☐ | ☐ | ☐ | ☐ |
| Analysing, designing and testing ICT systems as part of coursework | ☐ | ☐ | ☐ | ☐ | ☐ |
| Being tested (in coursework and exams) on things that you learn outside of school | ☐ | ☐ | ☐ | ☐ | ☐ |
| Showing how good you are at using spreadsheets and databases | ☐ | ☐ | ☐ | ☐ | ☐ |
| Showing how good you are at using presentation software (like Powerpoint) | ☐ | ☐ | ☐ | ☐ | ☐ |
| Relevance to your use of technology outside of school | ☐ | ☐ | ☐ | ☐ | ☐ |
| Relevance to ICT to later life and for jobs | ☐ | ☐ | ☐ | ☐ | ☐ |
| Applying your ICT knowledge, skills and understanding to a range of situations | ☐ | ☐ | ☐ | ☐ | ☐ |
| Showing that you have developed understanding of the wider applications and effects of ICT | ☐ | ☐ | ☐ | ☐ | ☐ |
| Thinking about the way you and others use ICT | ☐ | ☐ | ☐ | ☐ | ☐ |
| Considering the impact of ICT applications in the wider world | ☐ | ☐ | ☐ | ☐ | ☐ |
| Considering issues around ICT (e.g. social, economic, political, legal, ethical and moral issues) | ☐ | ☐ | ☐ | ☐ | ☐ |
| Considering security needs for data | ☐ | ☐ | ☐ | ☐ | ☐ |

**Q6 Outside of school, which of these do you do? (tick as many or as few as you wish, or tick none)**

☐ Keep in touch by e-mail

☐ Keep in touch by social networking sites e.g. Bebo, Facebook, MySpace
☐ Upload things (e.g. images, videos) to social networking sites
☐ Write a blog
☐ Upload images to a website like Flickr
☐ Edit images on a computer
☐ Upload videos to a website like YouTube
☐ Edit videos on a computer
☐ Record and edit audio/music
☐ Computer gaming
☐ Look things up on Wikipedia
☐ Edit Wikipedia or other wikis
☐ Use social bookmarking sites such as del.icio.us, Digg, Reddit

**Do you do any other things with ICT/technology outside of school?**

**Q7 Which of these do you think should be part of ICT assessment? (tick as many or as few as you wish, or tick none)**

☐ Keep in touch by e-mail
☐ Keep in touch by social networking sites e.g. Bebo, Facebook, MySpace
☐ Upload things (e.g. images, videos) to social networking sites
☐ Write a blog
☐ Upload images to a website like Flickr
☐ Edit images on a computer
☐ Upload videos to a website like YouTube
☐ Edit videos on a computer
☐ Record and edit audio/music
☐ Computer gaming
☐ Look things up on Wikipedia
☐ Edit Wikipedia or other wikis
☐ Use social bookmarking sites such as del.icio.us, Digg, Reddit

**Are there other things that you do with ICT/technology outside of school that should be included in ICT assessments?**

**Q8 Think of someone who you think is 'good' at ICT and using technology (both at school and outside).**

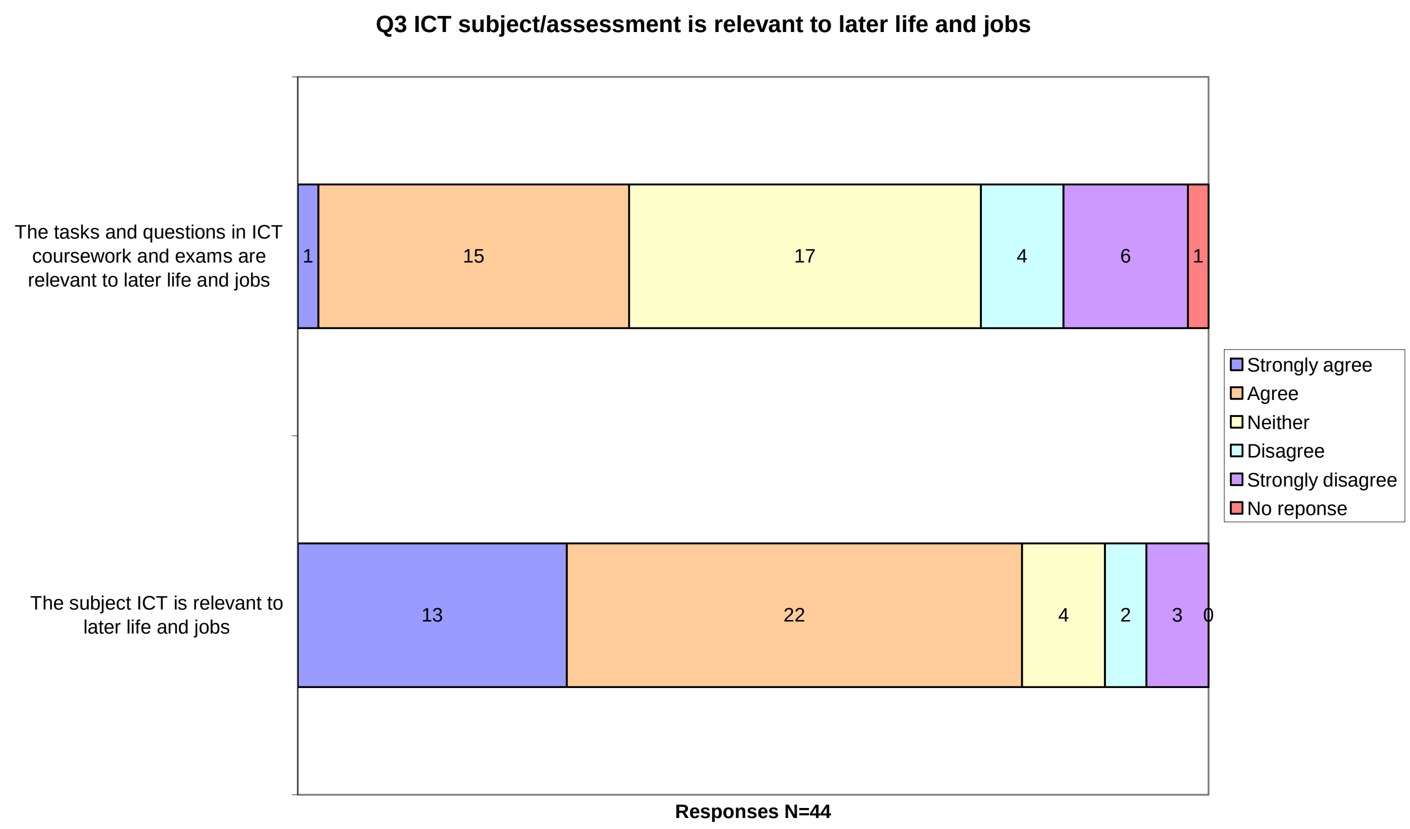
**What things can they do that makes you think they are 'good' at ICT? (list up to THREE things)**

**Q9 What do you think of the assessment of ICT? Would you make any changes to the content of the coursework or exams?**

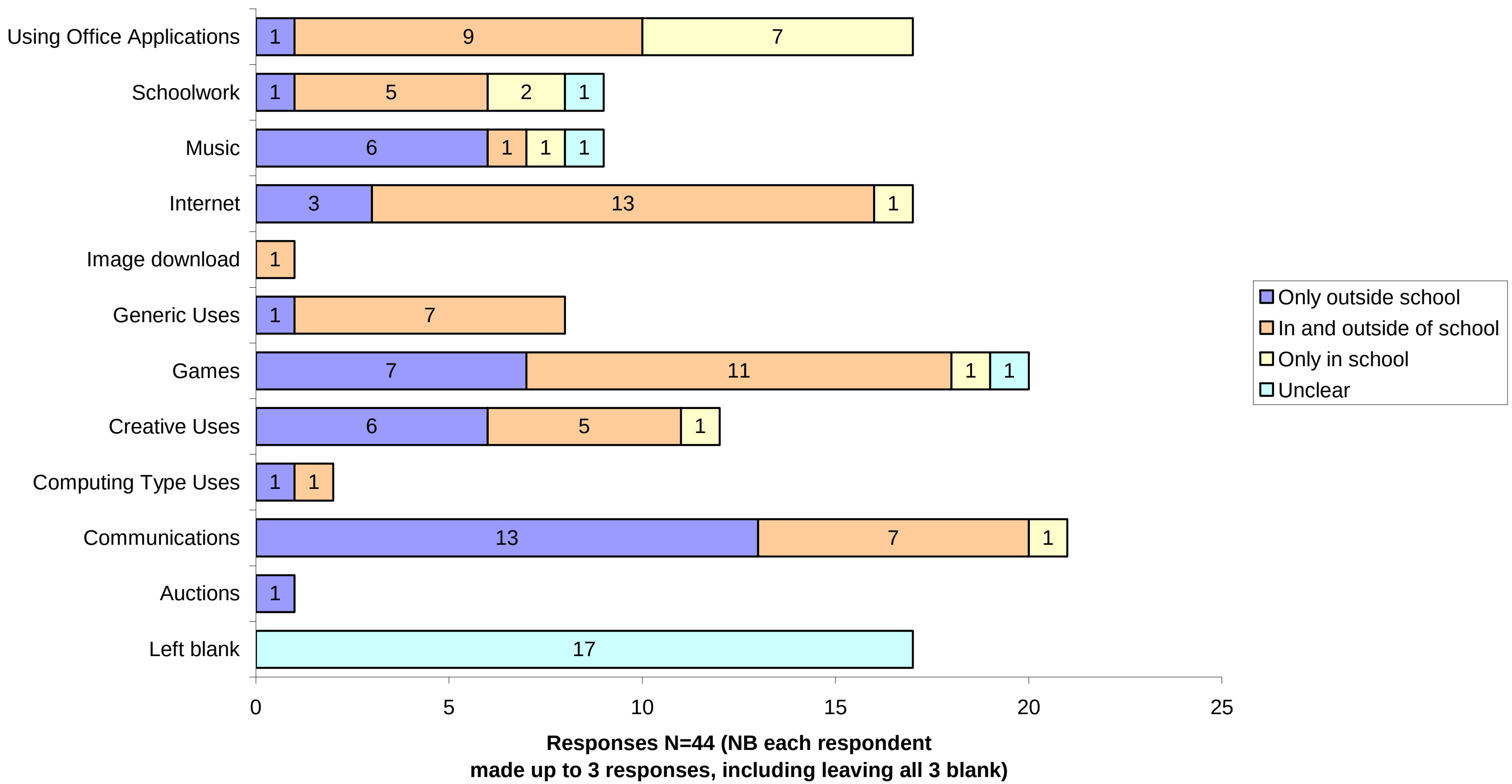
Thank you for your responses and your time. Good luck in your GCSEs and other assessments.

Pete Bradshaw, Researcher, Nottingham Trent University, April 2009
pete@iw2.co.uk 07833 344178

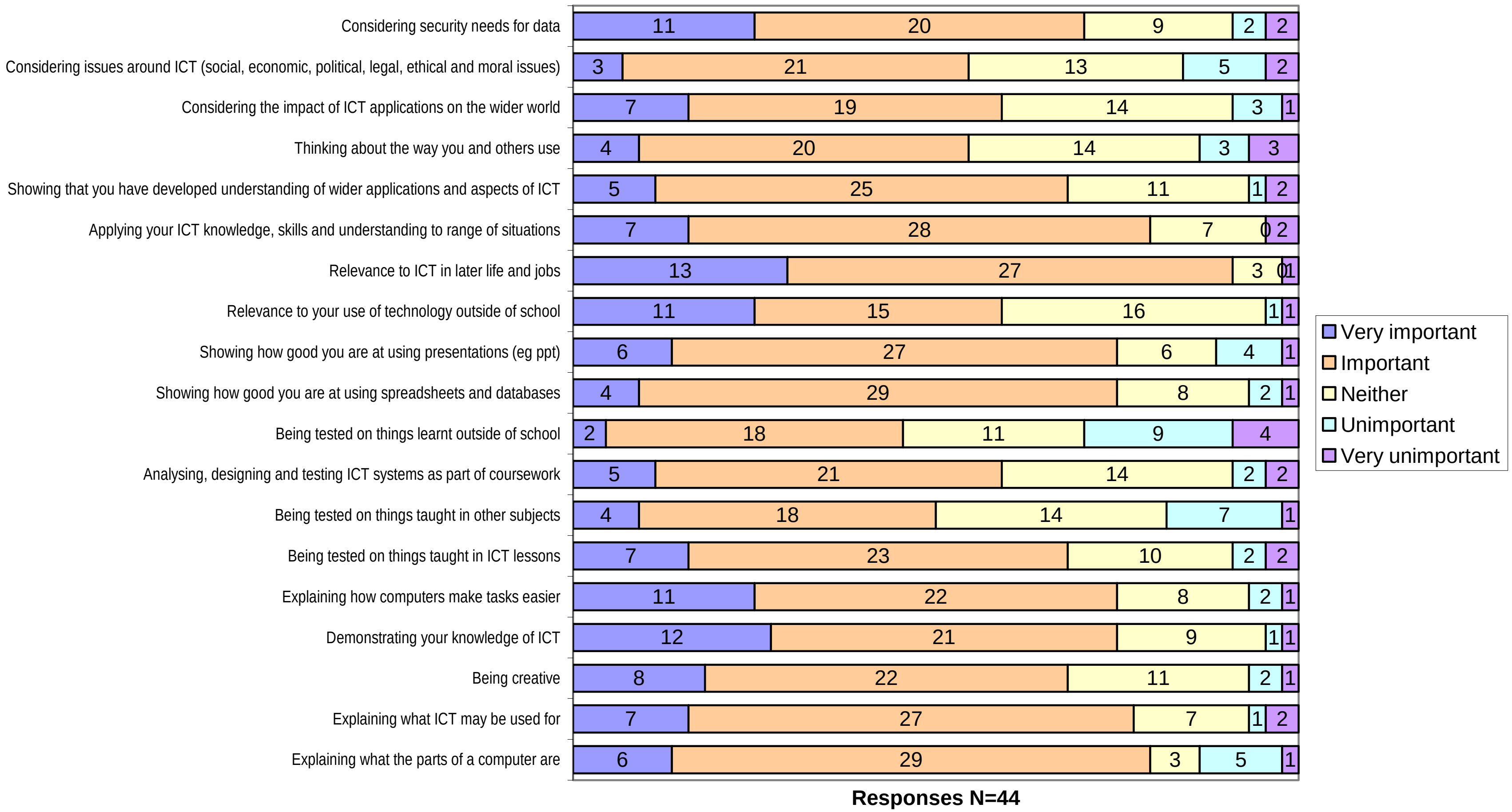
## *Appendix 5: Questionnaire results*



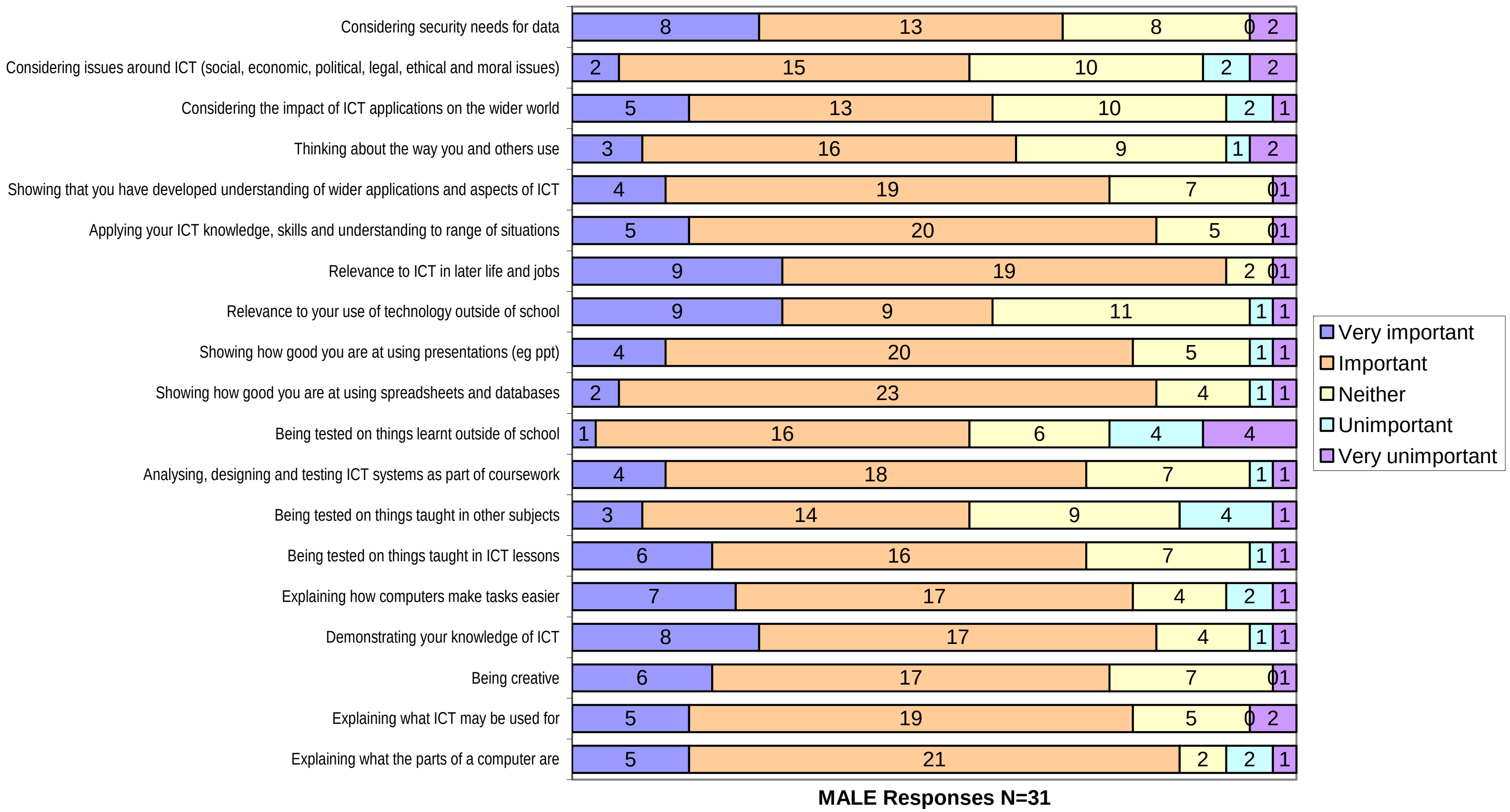
**Q4 List three things that you are really good at, or enjoy doing, with ICT/technology. Where do you do those things?**



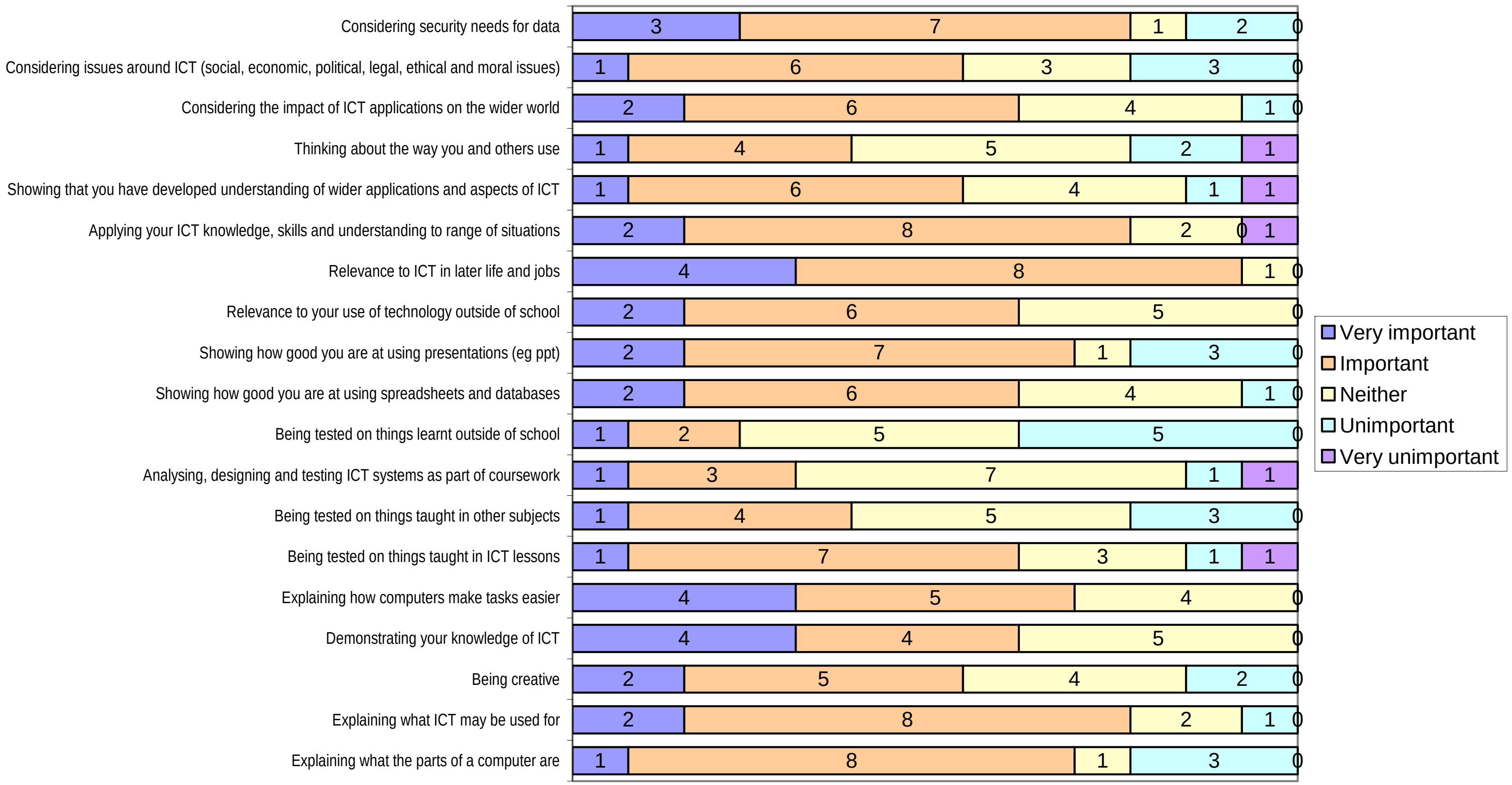
**Q5 Think about exams and coursework in ICT.  How important do you think each of the following is?**



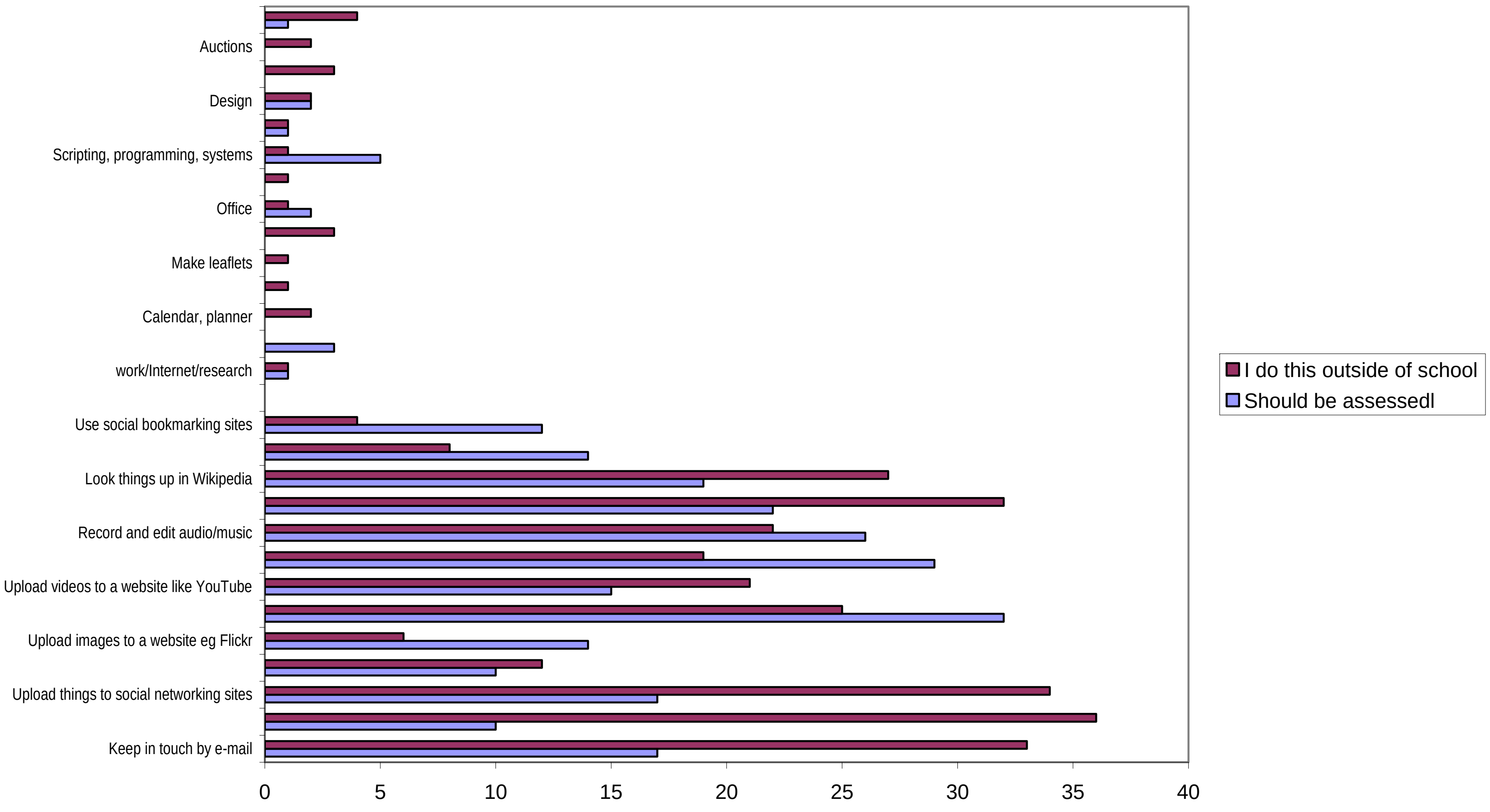
**Think about exams and coursework in ICT.  How important do you think each of the following is?**



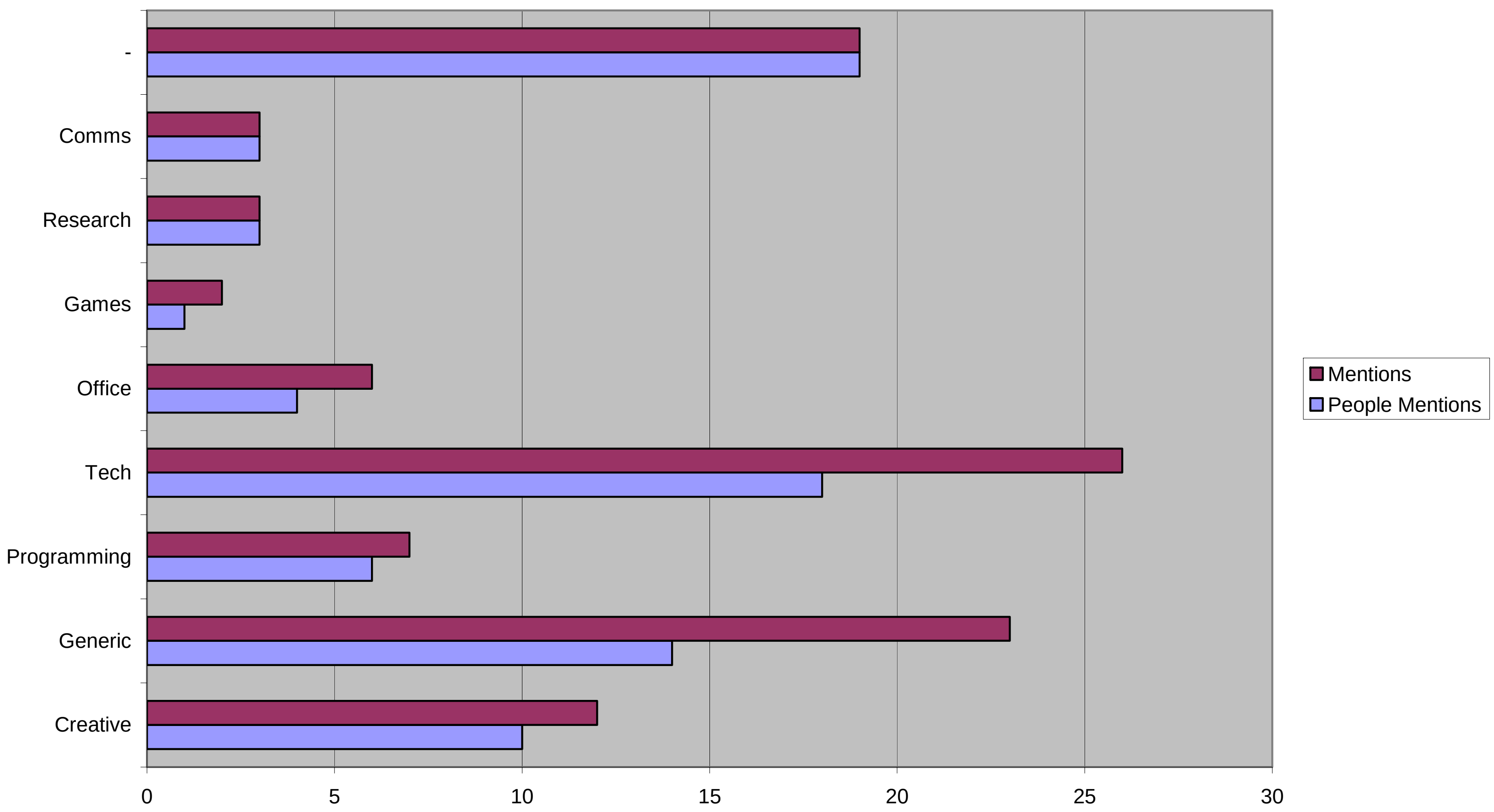
## Think about exams and coursework in ICT. How important do you think each of the following is?



**Q6/7 Which of these do you do outside of school and which should be assessed N=44**



**Question 8 responses by category**



## *Appendix 6: E-mail to seek sample for interviews*

The e-mail shown here was sent to four mailing lists:

- Becta Research: a community of people involved in ICT research
- ITTE: The Association for IT in Initial Teacher Education
- Naace advisory: The ICT Association's membership in advisory and support roles
- Mirandanet: an e-community for those involved in ICT practice and research

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From: P.R.Bradshaw [P.R.Bradshaw@open.ac.uk]
Sent: 08 September 2009 11:47
Bcc: research@lists.becta.org.uk; itte@nottingham.ac.uk;
advisory-admin@talk.naace.org; mirandalink@mirandanet.ac.uk
Subject: Year 11 interviewees sought

Hello and apologies for cross posting

I am undertaking some research towards a PhD into student
perceptions of assessment of ICT at 16.

I would like to interview students who are just starting year 11
and who are following a range of courses - eg GCSE, DiDA, OCR
National, Diploma - or none[131]. If you are in, or know of, any
schools that may be able to help and are within reach of Milton
Keynes I would be very grateful. I am probably looking to
interview up to four students in each school for about 45 minutes
each and 45 minutes together as a group. I will, of course,
provide full details and consent forms etc to any school that I
work with.

Thanks
Pete

Pete Bradshaw
Dept of Education | The Open University
Walton Hall | Milton Keynes | MK7 6AA
p.r.bradshaw@open.ac.uk
01908 655149 | 07833 344178

  ______
The Open University is incorporated by Royal Charter (RC 000391),
an exempt charity in England & Wales and a charity registered in
Scotland (SC 038302).
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[131] The sample chosen did not include students who were not taking an ICT qualification

# *Appendix 7: Interview questions*

**PhD research: Student perceptions of assessment of ICT at 16.**

**Semi-structured interviews Oct 2009**
**Guidance for schools**

These interviews are the third phase of data collection in a PhD research study. They follow on from individual 'scoping' interviews and questionnaires in a single school in spring 2009.

The interviews are to be carried out in around eight schools across the country with students following a range of different ICT courses (and those following none).

The interviews are designed to ascertain student perceptions of the assessment process and not their perceptions of a school or a school's implementation of the process.

The format will be four semi-structured individual interviews of 30-45 minutes followed by a group interview.

**Prompts for questions in individual interviews**

What ICT course are you following?
How is the course assessed (prompt – coursework, exams)?

Have you taken any tests or submitted any coursework for this course yet?

Did you opt for the course (or was there no choice)?
If so, what made you choose the course?
If not, would you have done had there been a choice?
Why?

Is ICT important? Why/not?

Are ICT qualifications important? Why/not?

If someone is good at ICT – what does that mean to you?
What would they be good at?
Is this something that is assessed in the course?

Are there things you do at home with ICT that are not part of the course?

What are these? Should they be included? Why/not?

What other comments do you have about the content of the ICT course you are on? (prompt this is not about the teaching it is about the content)

What other comments do you have about the assessment process in the ICT course you are on? (prompt this is not about the teaching it is about the assessment)

**Prompts for group interviews**

Imagine you are designing a new ICT course.

What things would you include in it? What should people be learning about? Why?

How would the assessment work? What sort of things would people have to do? Why?

What would characterise a good pass? In other words, what would someone have to do to get an A in this course? Why?

*Pete Bradshaw, September 2009*
*p.r.bradshaw@open.ac.uk 07833 344178*

# *Appendix 8: Examples of the combing of interview data*

Positive views of ICT content

Things that are not in the ICT courses and that should or could be considered for inclusion… or things that are in he courses and are considered important…or things that indicate that someone is good at ICT (and hence could be seen to be indicators for assessment)….

| | Considered to be important | Should be in | Could be in | Show that someone is good at ICT |
|---|---|---|---|---|
| Office tools | Masterslide in Powerpoint CS4<br>Mail merge CS6<br>Presentations CA5/6, CG3<br>Basic Excel and Word (for jobs) GN24<br>Excel, powerpoint (functional skills more important than ICT) GN2 GG<br>Standard software GG Spreadsheets, databases, RG<br>Powerpoint, Publisher maybe RG<br>Office inc data entry accuracy LG<br>Office tools in because needed for jobs LL2 | | | Fix formulas in spreadsheets C3<br>Make graphs, do formulas GM5/6<br>Use of spreadsheets - data entry, formulas, formatting LG2<br>Presentations LG2<br>Databases LG2 |
| Social networking/chat | | A lot about computers/media CT4<br>Using video conference for comms LG | Facebook navigation CS5<br>Chat - not hard, not important (but could be) LL4 | |
| Business | Google analytics DT3 making presentations and entering data LG2 | How to use sites like eBay RT | Marketing could be in Computing RT | Knowing how to get product high Google rank DT3 |
| Technical (the engineering of computers) | Understanding viruses CG7<br>Component of computers DR7<br>Systems software and hardware DR7/10<br>Networking DG, DT3<br>Cables DT3<br>Knowing the content of computer DT4 | Understanding graphics properties CT5<br>Fixing computers - this is a life skill, and a form of problem solving RT<br>How do social networking sites work: looking at the components RR4<br>Hardware e.g. phones USB LS23<br>Technical aspects of video conference LG | Understanding cookies CT4/5<br>*How computer works, how to fix it: maybe separate subject LS3* | Setting up router CT6<br>Install software, remove viruses, putting together computers, cables DR7<br>Connect cables, connect to Internet etc DI5<br>Understanding |

| | Considered to be important | Should be in | Could be in | Show that someone is good at ICT |
|---|---|---|---|---|
| | | | | technical use of services such as MSN LG3 |
| Computing | HTML RG<br>Programming is creative, creativity is important RT | Programming GN3<br>Programming games RG | Programming GN24 | |
| Games | strategy (and relate to games) DR5 | Designing, programming games RG<br>Use of game consoles: explaining what you'd done Lg3 | Strategy games DR6 | Wireless connection for gaming CT6 |
| Creative things | Creative uses CA6<br>Create websites DP2<br>Layout and structure in design of websites DP6<br>Create stuff - videos DI4<br>Video editing DI6<br>Audio/Video editing DG<br>Screen layout design RG<br>Good to be doing video displays not just spreadsheets GM7<br>Designing is important GM8<br>Programming is creative, creativity is important RT<br>Prefer doing the more creative (rather than Office tools) LL2 | Photoshop CT4<br>iTunes etc - although does not relate to many jobs CA5<br>Designing games RG | Photoshop DI5/6<br>Animation LG<br>*Photoshop, media editing but maybe specialist subject RG* | Making software GM6 |
| Moral, social and ethical | | How do social networking sites work: issue of privacy RR4 | Bullying/e-safety but not sure which subject RT | Understanding pitfalls with downloads e.g. viruses /e-safety LG |
| Generic/Study skills | *e-safety CG5 (but could be PSHE)*<br>Copyright CG6<br>All ICT course content is important LL5<br>How to search/knowing where to look DG5, LG | Things to help careers GN3<br>Research skills, copyright RG<br>e-safety LG3<br>More advanced aspects of e.g. search engines LG<br>Focus on ability to use range of software | General problem solving CT5<br>Multi tasking LL5 | (see next table) |

| | Considered to be important | Should be in | Could be in | Show that someone is good at ICT |
|---|---|---|---|---|
| | Communications RJ1<br>Use of computers for communications, understanding people RF3<br>Working things out (and being observed doing so) is important GG<br>Working out more important than following steps GG<br>IT side of computers and not writing up DR2<br>problem solving DR7 | not just one e.g. email client and discriminating between them LG<br>Using initiative Lg3 | | |
| Assessment processes | Evidence more important than doing DI6<br>Getting feedback for improvements to website DT2<br>Deadline, use of e-portfolio RJ2<br>Product (website) accessible and flexible RG<br>Try product on different platforms test for accessibility RG | Options for things you're good at CT8<br>Marks for demonstrating that you can help people GN5 | *Speaking skills CG4*<br>Choice of methods of explaining (writing, speaking) CG5 but choice is not fair | (see next table) |
| Things that could be in other subjects (shown above in italics) | e-safety CG5 (but could be PSHE) | | Speaking skills are not ICT they're English CG4<br>Photoshop, media editing but maybe specialist subject RG<br>How computer works, how to fix it: maybe separate subject LS3 | |

| Generic skills that indicate someone is good at ICT | |
|---|---|
| Run programmes DI5, GM5<br>Finding tutorial and teaching self DI7<br>Computer literate = can work things out for themselves GN24<br>Can fix/solve problems CT6, CS3, RT, LG<br>Problem solving, doing long calculation for a long time RF2<br>Hard work CT6<br>Present things well GN5 Help others to use computers GN5<br>Use things at work GN5<br>Using ICT in clubs outside school e.g.- slideshows GM6<br>Present data well and without errors RR3<br>Deeper understanding more important than skills RR3<br>Wide knowledge of software RJ3<br>Use software effectively, consistently to produce documents, present their work RJ3<br>Knowing how to find things and what pitfalls are LS3<br>Know their way around a program LS1<br>Pick up new programs LS1<br>Meeting deadlines LS1<br>Can figure stuff out for themselves LS22<br>Good knowledge LS22<br>Use of advanced features in tools LG | Do well at coursework CS3<br>Meet assessment requirements GM5/6<br>Explaining choices LG |

Negative views of ICT content

| | Not in and shouldn't be (i.e. not important) | In and shouldn't be |
|---|---|---|
| Office tools | e-mail - its too basic DG<br>Access (database) CT4<br>Publisher CT4 | Websites maybe of that's not your job LG2<br>Simulated e-mail program LG<br>Spreadsheets - it's all we do sometimes GM?<br>Wasn't expecting it to revolve round spreadsheet/PowerPoint RR1/2 |
| Social networking/chat | Facebook CS5<br>MSN - too distracting / not used now DG<br>MSN GG<br>Facebook RT<br>Chat GN27<br>Twitter - more of a hobby RJ3 | |
| Business | Structure of businesses DT5 | |
| Technical (the engineering of computers) | How to fix computers - this is a job CS7<br>What makes a computer GG | |
| Computing | Programming CS6 | |
| Games | Games, because of behavioural issues DR5<br>Games because they're just fun not IT DP5<br>Games DG<br>Games - not learning, 'take advantage of it', waste time GG Playing games to see how they work RG<br>*Designing games - should be in design DG* | |
| Creative things | *What's in should be more about IT than (Art) DI6* | Drawing, DTP only if its for a particular job GN24<br>Graphics - not well explained and needs better software GG<br>Computer art is a bit rubbish - you cant express much on a computer RF3<br>*Things that aren't realistic (design) aren't relevant*<br>*Fireworks, graphics - it is in another subject LG4* |
| Moral, social and ethical | *Moral issues e.g. of filtering -> Sociology LG7*<br>*Exploration of moral issues is maybe another subject LG7* | We have safety days that cover e-safety RG<br>Thing we don't use (outside of school) CS4<br>Too much planning and not doing CG3<br>*is e-safety PSHE? Or even common sense? CG6* |
| Generic/Study skills | Basic skills as already done CA2 | Communications skills not important GM6<br>Too much planning RF2 |
| Assessment processes | Self taught things - not fair CT7 | doesn't like writing or evaluations GM4 |
| Things that should be in other subjects *(in italics above)* | Designing games - should be in design DG<br>Moral issues e.g. of filtering -> Sociology LG7<br>What's in should be more about IT than (Art) DI6<br>Exploration of moral issues is maybe another subject LG7 | is e-safety PSHE? Or even common sense? CG6<br>Fireworks, graphics - it is in another subject LG4 |

Indicates things done outside school – see next table…. Emerging theme here is of enculturation.

| Things done outside of school with ICT | |
|---|---|
| Facebook CS5<br>Research CS5<br>Internet news sports CA4<br>Music CA4<br>iTunes.iPod CA5 | Audio.video (in church tech) DT4<br>Internet, Word (for coursework), e-mail<br>Chat GN27<br>Internet, MSN GM7 |

Views of learning and assessment processes - 1
Statements of what is important to, or what is mentioned about the course by, students with reference to the assessment/learning processes (*repeated)

| | | |
|---|---|---|
| Coursework v exams | | |
| Some things you just can't do in an exam DR10<br>can retake units DP3<br>Good to have coursework assessment - different aspects CA/CT?<br>Coursework more attractive than exams - spreads load over two years, and opportunity to improve RJ4<br>Would prefer coursework or exams not both DI7<br>Prefer coursework to test - test puts you under pressure LS3<br>F skills important and exam structure of this important GN4 *<br>Tests could be a fallback (option) RG | Exam=reinforcing what I learnt from coursework CS7<br>Coursework more developmental, exam just regurgitate CA7<br>Lots of paperwork in coursework - repetitive and depressing Rf2<br>Exam covers basics, coursework goes further CT3 *<br>Exams = understanding, coursework=implementation CS7<br>exams in Diploma DI1<br>Practical exams quicker than coursework to demonstrate skills DI8 * | Coursework important CG1<br>Exams important too but all coursework is an option CG1<br>Lots of coursework form some but less from others CG1<br>Coursework based on real life problems CG2<br>Take exams for just last 5 weeks (Diploma model) DR9<br>Assessment of practical and coursework better DT5 *<br>Do not like coursework so happy to do exam based course RF2<br>Prefer not to have exams DT5<br>Tests not a good idea in DiDA - enough stress in year 11 already RG |
| Authenticity/validity | | |
| Assessment of understanding through contribution to business projects DT3<br>Assessment of external evidence DT4<br>Assess through getting people's opinions, evaluations, feedback RG<br>Assessment is of tasks not of their presentation RR2<br>Not about good or bad - its about if you enjoy it because you get itLL3<br>e-portfolio as important as task GM2 * | Peer assessment used – good thing RG<br>3rd party client evaluation RG<br>Compulsory nature means ICT must be fair for all CT8<br>Assessment based on outcomes - what we've produced not how we we've got there GN25<br>Rather have educational&fun than just fun GG<br>Assessment of capability to help others should be assessed by observation GN6<br>assessment of helping others included RR4 | Common sense things are fine to include if related to ICT CG6 but issues of fairness CG7<br>Assessment methods considered valid and suitable CT2/3<br>Need to also be assessed on how and why rather than being told GG<br>Computing require more life experience which may be an issue at 16 RT |
| Creativity/doing/problem solving | | |
| Marks for doing rather than explaining LG3, GM4<br>Marks for working things out LS22<br>Explaining software (in terms of functional skills), but in Diploma it is about implementing DG<br>Doing things and practical tests are preferred DP4 | Practical exams quicker than coursework to demonstrate skills DI8 *<br>Choice not rewarded just final product GM7<br>Marks for not asking for help: i.e. creative response LS22/3 | Practical tests preferred DP3<br>Should be assessed (give in) what you have created GG<br>Practical assessment good DG6<br>Assessment of practical and coursework better DT5 *<br>Less paperwork, more practical (than Business) DI4 |
| Basics/functionality | | |
| functional/key skills DP3<br>F skills important and exam structure of this important GN4 * | Comms - e-mail, Wp etc in English GN26<br>Fskills have tests GN27 | OK to have tests for basic things GN28<br>Exam covers basics, coursework goes further CT3 * |
| Use of (e-)portfolios | | |
| e-portfolio like web page GN1<br>e-portfolio presentation could be better GN2 | e-portfolio has made task harder GM2<br>Assessment through folders of evidence DG6 | use of e-portfolio does not affect tasks but not helpful and should not be used for |

| | | |
|---|---|---|
| Assessment is of e-portfolios GN1<br>e-portfolio=> own pace => less pressure GM8<br>e-portfolio as important as task GM2 * | e-portfolio assessment is easier/better form of submission: for me and for examiner RR2 | other subjects GN1<br>Easier than expected a I thought it would be about HTML and e-portfolio RR2 |
| Other | | |
| Units in Diploma DT1<br>Should not have qualifications earlier as need time to develop skills RG | Text book badly written - assumes you already know things, sentences too long RF4<br>Merit v pass = more detail LL5 | New things make it hard LS24<br>Ongoing assessment good - can see straight away what to do to progress LL5 |

Views of learning and assessment processes – 2

| Statements about personalisation in learning/assessment | |
|---|---|
| Response to task CT2<br>Options needed for naturally gifted CT8<br>Coursework allows working at own pace L23<br>Level playing field needed (choice is not fair) CG5 | Not about finding something you enjoy CA6<br>Assessment on what I did (first person) DT2<br>Good idea to all work on same thing a can ask others to help you LL1/2<br>Use of self evaluation RR5 |
| **How do I learn ICT?** | |
| Self taught CT5<br>It's our background CS4<br>Thinking skills from puzzle games DR6 | Prefer practical tests DP4<br>Internet video tutorials DI6 |
| **Statements describing what students need to do** | |
| Descriptions of tasks CT1/2 CS1 CA2<br>Breaking task down CT1, CS1, GM1, LG1, LS1, LS21, LL1<br>Manifesting learning outcome CT1<br>Criteria described CT2<br>Marking scheme described CT2<br>Deadlines described CT2<br>Weighting of tasks CT3<br>ICT coursework is about doing a set task but you have to find your way (cf Maths) LS4<br>Described in terms of units LL1<br>Description of DIDA tasks RR1, RJ1<br>Gone much further than in year 9 learned how to create database which didn't know before CA3 | Theory is covered in exams CT3, CS1<br>Relationship to key skills CT5<br>Exam comes after coursework CT3, CA2<br>Mock exam is used as diagnostic CT6 CA7<br>Big bit of coursework CA2<br>All assessed CA2<br>Exam not relevant as hadn't done anything CA6<br>Description of Diploma DI1<br>Research DI6<br>Event organisation GN22<br>Syllabus of ICT is 'thin' CT3<br>Should be a full course not short CT4, CS1/2 |
| **Statements describing how students know what to do** | |
| Directed CT1 CS1 CA6<br>Booklet CT2, LL5<br>Feedback on drafts CA2, GN1, LL5<br>Can ask as go along in coursework CA7<br>Third party feedback DT2<br>Edexcel DiDA website<br>We have to fulfill criteria GN25<br>Do what we're set GM6<br>Board set task GN23<br>Can choose which software to use GM7<br>Following structure (of coursework) CT7 | He (teacher) chooses what we do GN23<br>Checkpoints to prompt to talk to teacher RR5<br>Use of booklet (recent innovation and it helps) RR5<br>feedback from early assessments RJ4, LS1<br>Teach myself RF4<br>Sheets RF4<br>Booklet: rough guide, set tasks LS21<br>Get told which units to do LL1<br>Teacher hadn't explained anything else (except one programme) to us GN25<br>Schools in which the students are spoon fed may be better, but it may take longer GN26<br>Need to work out for self, not told GG |

Indicates locus of control is not with student… emerging theme of power relationship

The importance of ICT in the eyes of students

| Its importance as a subject | Its importance as a qualification | Its importance to me – motivations for study |
|---|---|---|
| Creative aspects CT4<br>Software CT4<br>Stuff you come across at home on computers CT4<br>Things for future life CT4, put into real life CG2, face in real life CG3<br>Things are taught rather than self-learn CT5<br>Concepts behind technology CS3<br>Knowing what and knowing how CS6<br>Basic Skills CS7<br>Broad range of skills that you can use for a range of things CA5<br>Implementation (doing helps with understanding, learn by doing ) CG3/4<br>e-safety CG5 (but is it PSHE)<br>downloading safety CG5<br>IT knowledge - software, hardware DG<br>Relate to real world/ real life DR1 DG, DT5<br>Using computers more and more, part of everyday life GN23<br>ICT more important than maths, English GM5<br>ICT used all over world RJ2<br>ICT used to produce work in other subjects RJ2<br>General concepts Rf2<br>Understanding lots of different programme RG<br>Create things LS1<br>ICT important because we're growing up in tech world GN<br>ICT important for other subjects LG1<br>Only subject that's 'good to have' beyond enjoyment LS1 | Might as well get qual if spend 2 years getting understanding CA3<br>Not necessary for all jobs but need to be able to do IT DR8<br>Bringing all thing together DG<br>Important to have subjects DG<br>IT broader than business DT1<br>College entrance DI3 to get into college GM5<br>Badge for the future RT<br>subject important for jobs, qualification brings validity to claim of being good RR3<br>ICT important - used all over the world, qualification important for jobs RJ2 Important to be competent in ICT as jobs involve it RF<br>…qual give veracity to claim CA4<br>CV and university entrance RJ2<br>AS qualification more important than DIDA as 'worth more' RF2<br>Qualification not important as 'computing moves on' RF .<br>Qualifications important for jobs LG1<br>Qualification implies that you can do it and remember, not just do it once LS1<br>Understanding more important that qualification but…CA4<br>Functional skills more relevant than ICT GN26<br>F skills important and exam structure of this important GN4<br>ICT course should contain things that are 'professional' not hobby RJ4 | Good to get qualifications in ICT CS2/8<br>Understanding concepts behind technology CS2<br>Useful to know CS4<br>Do things quicker CS4<br>Learn Basic Skills CS7<br>(school motivation): part of job CA3 so important everyone does it<br>Part of people's lives so need understanding CA3<br>not like sitting in normal classroom DR1<br>like your own business, think on your feet DR1<br>compared to Business - the name of the subject DR2<br>being able to edit writing DR2<br>good at being able to use different programmes DR3<br>qualification o do apprenticeship DR6<br>Jobs DR7<br>Interest in subject, I like Excel, databases DP2<br>Good at it DP2<br>School's specialism DP6<br>Something new DI2<br>More practical than Business DI3<br>Job - IT technician DI3<br>IT becoming core DT5<br>(chose particular course as It had 3 lessons a week) GN21<br>Like ICT, good at it, but may not want a job in it GN22<br>Find computers easy to use GN22<br>Assessment not motivation GN23<br>Functional skills level 2 as college entry GN24<br>like ICT, computers GN3<br>Computers will be main technology (but not aiming for job in computers) GM3<br>Chose Computing rather than ICT (DIDA) as it contains logic RT<br>Working to own strengths RR3<br>Based on communication, production of products RJ1<br>Guided by teacher RF1, LG5<br>I was good at it and it was an easy qualification LG1<br>Although it was boring at KS3, repeating primary school stuff LG1<br>Mode of assessment - prefer |

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| | | coursework - and can get good mark LG4<br>Good thing to have, things getting more technological LS1<br>It's the technology and it's a good subject to have LS21/ Computers are 'in things' GN23<br>Jobs need ICT L21<br>More GCSEs in ICT qualification LL2<br>Good at ICT so easier for me than other subjects LL2<br>Know quite a bit about computers LL3<br>Choice of courses appreciated RJ4 |

ICT's intrinsic importance located outside of school

Other

Can get access unblocked DR4
Graphics has lots of programs Ict has a few LS22
Filtering is an issue LG6