

Literacies Supporting Learning and Enhancing Employability in a Diverse Undergraduate Population

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Final Report

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3. Executive summary

Aims/objectives

This two-year project explored how a framework of learning literacies can support learning and enhance employability in a diverse undergraduate population. Its aims and objectives were to:

- document what employers expect from graduates in terms of our framework of learning literacies;
- track and evaluate student confidence and proficiency in these literacies at their transition into HE and at key points through their first year in terms of the curriculum and learning process;
- investigate how changes in confidence and proficiency predict student retention, adjustment to university, and academic achievement;
- investigate how we support development of these literacies and whether what we do matches employers' and students' needs and expectations;
- discover the nature of relationships between these literacies, and between these literacies and students' reported employability upon exit from HE;
- investigate how students use and develop these literacies informally in their everyday lives;
- explore how deaf students develop these literacies and to what extent they impact upon their employability. Deaf students were included in this study because of the specific challenges they face with regard to all the learning literacies selected, but particularly with regard to communication literacy which is interpreted quite differently by deaf students and deaf employers.

Overall approach

A mixed-methods approach was adopted, resulting in the collection of both quantitative and qualitative data from three key stakeholder groups: (i) first-year undergraduate students from a number of academic disciplines at a post-1992 UK university, (ii) recent alumni from the same university, and (iii) employers. Online surveys were complemented with semi-structured interviews, providing undergraduates', graduates', and employers' perspectives on key issues. Mathematics and reading tests were used to provide an indication of undergraduates' levels of proficiency in mathematical and communication literacies.

Findings

Employers and alumni attach considerable importance to these learning literacies, but there exist gaps between the development of these literacies at university and employers' expectations, particularly with regard to written communication skills. Employers particularly value work experience and a good work ethic; attributes the undergraduates and alumni also recognised as important.

During their first year at university the students' confidence improved significantly with respect to their communication literacy, information literacy and aspects of emotional literacy, but not with respect to their mathematical literacy; results which highlight the importance of providing students with opportunities to practise and further develop these skills in order to enhance their levels of confidence and improve their academic performance. Of particular interest were the high correlations which existed between these literacies; for example, associations between mathematical and emotional literacies which may influence mathematical proficiency. Our finding, that students exhibit different trajectories of adjustment to university which are related to their emotional literacy skills, has implications with regard to student retention and academic achievement.

The specific challenges faced by deaf students, which included organising and receiving support, difficulties with the learning literacies and in particular communication literacy (which means something quite different for deaf students and deaf employers), and finding employment in a hearing world are cause for concern.

Achievements

The project generated a substantial quantity of quantitative and qualitative research data, which has been analysed and disseminated in a range of formats and via a variety of forums in the UK and overseas (see Appendix 2 of the report for a list of publications and other outputs).

Conclusions

The evidence presented supports the view that the four learning literacies included in our framework can influence both academic achievement and employability. All three stakeholder groups (undergraduates, employers and alumni) attach considerable importance to these four literacies, and recognise that in order to

enhance their graduate employment prospects students must be able to provide evidence of good communication and interpersonal skills, and work experience (including, but not exclusively via work placements), and be able to demonstrate a good work ethic.

In terms of individuals' transition into higher education and their retention, the assessment of first-year students' emotional literacy skills may help tutors identify students who are experiencing difficulties making the transition to university. Such students may be at risk of failing and require some intervention to help them develop their emotional skills.

There are specific barriers and challenges for deaf students which make their transition to university more difficult perhaps than for non-deaf students. Appropriate means of communication and good support structures are the key to their success.

4. Background

4.1. The employability agenda and higher education in the UK

4.1.1. Defining employability

Employability is a multi-dimensional concept which is difficult to define, and many different definitions have been proposed (Little, 2001; Lees, 2002). It is certainly the case that *employability* is distinct from *employment* which is dependent on a number of factors external to an individual, such as economic climate, geographical location and graduate supply. Dacre-Pool and Sewell (2007) define employability as “.....having a set of skills, knowledge, understandings and personal attributes that make a person more likely to choose and secure occupations in which they can be satisfied and successful”. In the definition of employability provided by the Confederation of British Industry (CBI), the link between individual employability and the well-being of the economy is more explicit:

“A set of attributes, skills and knowledge that all labour market participants should possess to ensure they have the capability of being effective in the workplace – to the benefit of themselves, their employer and the wider economy.” (CBI, 2009b, p.8)

Whilst different conceptualisations and models of *employability* exist, such as the USEM (Understanding, Skills, Efficacy beliefs, Metacognition) model (Knight & Yorke, 2004) and the CareerEDGE model (Dacre-Pool & Sewell, 2007), central to all are ‘employability skills’. These may be regarded as ‘skills’, ‘attributes’ or ‘competencies’ which are ‘generic’, ‘transferable’, ‘key’ or ‘core’. The United Kingdom Commission for Employment and Skills (UKCES) has defined employability skills as those needed by almost anybody to do almost any job (UKCES, 2009). A similar definition of generic employability skills has been provided by Greatbatch and Lewis (2007):

“... ‘transferable’ skills independent of the occupational sectors and organisations in which individuals work, and which contribute to an individual’s overall employability by enhancing their capacity to adapt, learn and work independently. Put simply, generic employability skills are those that apply across a variety of jobs, organisations and sectors.” (Greatbatch & Lewis, 2007, p.13)

4.1.2. The role of higher education

The role of Higher Education (HE) in supporting the UK economy through improving the employability of the student body was referred to overtly nearly half a century ago in the Robbins Report (Committee on Higher Education, 1963). This highlighted the objectives of providing “*instruction in skills suitable to play a part in the general division of labour*” (Committee on Higher Education, 1963, para. 25, cited in Lees, 2002, p.1). More recently, the Dearing Report on Higher Education (Dearing, 1997) emphasised the importance of HE in the enhancement of the UK’s global competitiveness. The report recommended the development of key skills and increased opportunities for work experience during undergraduate programmes. In 2009, UKCES claimed that the development of employability skills in educational settings is important to enable individuals to obtain and progress in satisfying employment and to enable the UK economy to achieve its productivity goals (UKCES, 2009). This is crucial in the current economic climate where the UK faces fierce competition from other established economies in the West as well as fast-developing economies in the East (HEFCE, 2011). Reforms to higher education in England are being implemented against this backdrop of an increasingly competitive global environment (HEFCE, 2011).

Since the Dearing Report, Higher Education Institutions (HEIs) have been expected to place a much greater emphasis on the development of employability skills in their undergraduates (e.g. DfES, 2002, cited in Lees, 2002; Hills *et al.*, 2003; Knight & Yorke, 2003; Universities UK, 2002). It is now widely accepted that HEIs need to provide students with more than just the content of their academic discipline (Green, Hammer & Star, 2009). The increasing importance of employability skills in the undergraduate experience is demonstrated by the fact that quality indicators used by the Higher Education Funding Council for England (HEFCE) include the proportion of graduates finding employment six months after graduating (Little, 2001; Mason *et al.*, 2009).

The increased emphasis on employability skills has arisen in the context of changes both within HE itself and within the labour market. The expansion of HE which, in recent years, has seen 42-45% of school leavers entering HEI’s (Rae, 2008), has brought with it concerns about the quality of the graduate labour market and

the ability of graduates to meet the needs of employers (AGR, 2008, cited in Rae, 2008; Elias & Purcell, 2004). Employers are keen to employ graduates who, in a rapidly changing and increasingly competitive job market, possess a range of generic, transferable or soft skills, alongside their subject knowledge, which will help them make the transition from HE into the workplace (Andrews & Higson, 2008; Bennett *et al.*, 2000; De La Harpe *et al.*, 2000). Furthermore, the nature of jobs and the skills required to do them are changing rapidly. This means that graduates need to have not only the skills necessary to do the job now but also the personal qualities necessary for dealing with future changes in the workplace (Little, 2001). Rae (2008) has argued that the importance of employability skills is even greater at a time of economic downturn when the labour market is particularly complex and unpredictable, a point also made by the CBI (CBI, 2009a). Furthermore, the emergence of small and medium enterprises (SMEs) as important employers of graduates has driven the skills agenda in HE (Holden *et al.*, 2007). For such organisations, the investment in training required to get the most out of a graduate is likely to be an investment that is not worth making (Woods & Dennis, 2009). Small and medium enterprises, therefore, expect graduate employees to be able to 'hit the ground running'.

The current emphasis on employability skills means that, for many employers, an applicant's degree is a threshold requirement only, a necessary but insufficient condition for employment (Tomlinson, 2008). Indeed Brown *et al.* (2003) report one employer as saying that they see qualifications as something taken for granted, the first tick in the box for an applicant. This is borne out by the fact that nearly two thirds of graduate vacancies are open to graduates from any discipline (Graduate Prospects, 2005, cited in Raybould & Sheedy, 2005). According to a CBI survey (CBI, 2009b), 78% of the responding 581 organisations reported that they recruit graduates on the basis of personal attributes and skills and 82% of the organisations wanted universities to do more to foster these skills. Graduates need to be able to show they possess the skills valued by employers and must be able to demonstrate how their experience of the undergraduate curriculum developed these skills (Washer, 2007). Students themselves are aware of the difficulties they face when entering the graduate labour market and know that they need to develop employability skills so that they stand apart from graduates with similar academic achievements (Tomlinson, 2007, 2008). In a relatively recent survey, 82% of undergraduates from 20 UK HEIs wanted universities to help them improve their employability skills (CBI, 2009b). The rise in tuition fees in 2012 is likely to increase this demand.

There is, however, some disagreement regarding the appropriateness of the employability agenda in HE. It has been argued that it is not possible to know what employers want (Atkins, 1999). The value of graduate skills depends, at least to some extent, on the context in which they are to be used, such as the business sector and size of the organisation (Greatbatch & Lewis, 2007). Furthermore, some research suggests that desirable graduate skills may vary between countries. For example, Brennan *et al.* (1996) found that UK graduates rated teamwork, working under pressure, oral communication skills and problem solving as important in the workplace. However, none of these appeared in the list of competencies rated highly by European graduates, who highlighted instead learning abilities, working independently and written communication skills. This finding supports the argument that, whilst discourse around employability tends to treat the construct as something possessed by individuals, it is better understood as a social construct (National Institute of Adult Continuing Education (NIACE), 1998). According to NIACE (1998), employability is a concept that is relative, rather than absolute, and a responsibility that is shared between individuals, businesses and public bodies. Yorke (2006) also notes that employability is a relative phenomenon, the importance of each element of employability varying for individuals depending on their relationship to the labour market.

It has been argued that expectations regarding the employability skills of new graduates with limited experience in the workplace have become unrealistic. Hinchcliffe (2005) states that employers want to employ graduates with the attributes of an expert without having to invest in training them. Furthermore, evidence suggests that there is a limit to the extent to which HEIs can actually impact on the performance of graduates in the workforce. An assessment of the impact of initiatives aimed at teaching and assessing employability skills in university departments found no evidence of a significant effect of these initiatives on employment prospects (Mason *et al.*, 2003). The study did, however, find that students' employment prospects were greatly improved if they had undertaken structured work experience during their undergraduate courses. These findings call into question the assumption, underpinning the employability agenda, "*that certain attributes and abilities are to be developed out of context (i.e. out of the context of employment)*" (Hinchcliffe, 2008, p.7, original emphasis). It is far from clear that it is possible to transfer learning from educational to workplace settings (Eraut, 2004).

Possibly the most contentious issue regarding the employability agenda in HE concerns the mismatch of ideologies between academics who seek to promote academic excellence and employers who are concerned with the development of skills relevant to the world of work (Bennett *et al.*, 1999). Washer (2007) asserts that skills provision, often equated with employability, is sometimes associated with a 'training model' rather than a 'real' academic education. Similarly, Gunn *et al.* (2010) argue that whilst it is accepted by those responsible for HE provision that universities should take into account students' employment needs, tensions arise because of academics' concerns that engaging with the employability agenda will lead to a lowering of academic standards and objectives (Gunn *et al.*, 2010). Academics can be reluctant to incorporate employability skills into their teaching and can see the employability agenda as an attack on their academic freedom. Furthermore, the motivation behind the employability agenda has been questioned and it has been argued that ensuring that all graduates possess the same skill set effectively homogenises workers, making them more docile and easy to govern (Morley, 2001).

However, it has also been argued that it is possible, and indeed desirable, for HE to provide both an academically rigorous education and a preparation for the world of work. Knight and Yorke (2004) suggest that the attributes needed for success in the workplace are the same as those needed for success as an undergraduate student, e.g. time management skills, showing initiative and working well under pressure. Similarly, Atkins (1999, p.269) states that *"It is difficult to maintain that academic progress is not enhanced by high standards of literacy and numeracy,.....by a repertoire of communication skills,..... by the skill to work in groups or teams, and by an understanding of how to learn effectively"*. The Association of Graduate Recruiters (1995, cited in Fallows & Steven, 2000) have argued that the skills possessed by the self-reliant graduate are the same as those possessed by the self-reliant learner, and Wingate (2006, p.459) believes that universities should focus on developing skills that are *"not only useful for academic study, but also for students' lifelong personal and professional development"*. Furthermore, it has been suggested that pedagogies for employability are compatible with learning in most, if not all, disciplines (Knight & Yorke, 2004). In other words, as far as educational practice is concerned, strategies which facilitate good learning also enhance graduate employability. This point is also made by Lees (2002) who claims that students who experience good teaching and learning are those who are given opportunities to develop understandings, skills and self-theories, all of which improve employability.

The overview provided has shown that, despite criticisms, the teaching of employability skills within HE is now expected by employers, students and policy makers. It has also presented the argument that a focus on employability skills should enhance teaching and learning and should lead to the development of attributes that support students' success at university. Now that graduates are contributing more towards their higher education through the increase in tuition fees, *"priority will be given to enhancing the student experience and ensuring that graduates are prepared with the necessary skills, understanding and personal attributes for employment, now and in the future. Embedding employability into the core of higher education will continue to be a key priority of Government, universities and colleges, and employers"* (HEFCE, 2011).

4.2. Learning literacies

This project explores the roles played by four types of skill or 'learning literacy' (mathematical literacy, communication literacy, emotional intelligence and information literacy), both in employability and in academic achievement and retention in HE.

4.2.1 Mathematical literacy

4.2.1.1 Mathematical literacy and graduate employability

A workable definition of numeracy needs to take into account the fact that it is culturally specific and related to a particular social context. Such a definition has been provided by Evans (2000, p.236):

"...the ability to process, interpret and communicate numerical, quantitative, spatial, statistical, even mathematical, information, in ways that are appropriate for a variety of contexts and that will enable a typical member of the culture or subculture to participate effectively in activities that they value."

Dearing (1997) identified numeracy as a key skill that should be taught in HEI's, and noted that only one in three graduates felt their numeracy skills had improved during their time in HE. Numeracy is listed as an employability skill by various authors (e.g. Dacre-Pool & Sewell, 2007; Hind & Moss, 2005; Knight & Yorke,

2004; UKCES, 2009). Over the last thirty years, a steady shift has occurred in the employment market away from manual and low skill jobs towards those requiring high levels of management expertise and problem-solving skills (Humphries, 2004). In its 2011 report, the Advisory Committee on Mathematics Education (ACME) argues that this means that individuals now need to cope with greater mathematical demands in the workplace (ACME, 2011).

Much research has been conducted which shows that employers value numeracy skills in their graduate employees. For example, the *Smith Report (2004)* observed that employers across a range of employment sectors demanded a mathematically skilled workforce. Similarly, *Hoyles et al. (2002)* found that, across seven sectors, demand from employers for mathematically literate graduate employees was growing, with many businesses regarding mathematical literacy as critical to their competitive strategy and drive for efficiency. In large-scale surveys numerical literacy is ranked highly in the skills demanded by employers. For example, numeracy skills were ranked as the sixth most important out of a list of 28 employability skills in a survey conducted by the Institute of Directors (IoD) (IoD, 2007), and the ninth most important in a survey carried out by the Council for Industry and Higher Education (CIHE) (Archer & Davison, 2008). In the latter survey, 68% of employers identified numeracy as an important graduate attribute. In a survey of student employability profiles, numeracy skills were included in 31 out of 51 career areas (Cameron, 2010). Furthermore, *Tariq et al. (2010)* found that 56% of the 165 employers in their sample would not have been satisfied if their employees merely demonstrated technical mathematical competence without understanding mathematical concepts.

Although numeracy skills are important to employers, employers continue to express concern about the level of competence demonstrated by graduate recruits. For example, in the IoD's 2007 survey, 21% of employers stated that numeracy skills are only 'occasionally' or 'never' demonstrated by graduates (IoD, 2007). Furthermore, surveys conducted by the CBI in 2010 and 2011 found that 9% of employers believed that graduates lacked the most basic numeracy skills, whilst only 17% (CBI, 2010) or 20% (CBI, 2011) were very satisfied with the numerical capabilities of their graduate recruits. The dissatisfaction with the numerical literacy skills of graduates is most pronounced in sectors where high levels of numeracy skills are required. For example, in the financial services sector an acute shortage of higher level numeracy skills has been reported (AGR, 2008, cited in Rae, 2008). Similarly, a skills gap in the higher level mathematics knowledge of graduates in the pharmaceutical industry has been reported (Association of the British Pharmaceutical Industry, 2008).

Research has also found that graduates themselves are aware of the importance of numeracy skills in the workplace. A survey of former hospitality students graduating from Oxford Brookes University between 1995 and 2002 found that 79% of graduates believed that their numeracy skills were important to their career success (Maher, 2004). Similarly, a survey of 545 graduates leaving university in 2005 showed that 51% were using numeracy skills in their current employment, (Chartered Institute of Personnel and Development [CIPD], 2006).

Although graduates identify numeracy skills as important to their employment success, research has found that many believe themselves to be poorly prepared for the numerical demands of their jobs. For example, in a survey of 880 graduates from 20 UK HEIs, 29% felt that they had not acquired adequate numeracy skills whilst at university (CBI, 2009b). This problem seems to be particularly acute for graduates in the arts, humanities and social sciences. *Edwards and McGoldrick (2004)* tracked the post-graduation experience of 46 graduates in social sciences and found that they claimed that numeracy, statistics and ICT skills were given insufficient emphasis in their undergraduate curricula which restricted their career opportunities. *Mason et al. (2003)* found that a much lower proportion of history students (15%) and design students (15%), compared with those in biological sciences (78%), computer studies (65%) and business studies (42%), expressed the view that their university education had prepared them well for handling numerical data. Similarly, *Tariq et al. (2010)* found that whilst a high percentage of undergraduate students in science and technology disciplines (87%) reported that they had the chance to practise and develop their numeracy skills, such opportunities were available to only 16% of the undergraduates studying arts, humanities and social sciences. Also, 31% of a sample of 96 history graduates from three UK institutions reported that more numeracy training in their history courses would have improved their career opportunities (Tariq et al., 2010).

4.2.1.2 Mathematical literacy and academic success

It has been argued that, as well as being linked to graduate employability, mathematical literacy is involved in student self-esteem, retention and progression at university (Croft et al., 2009). Numeracy skills are vital to

academic achievement in many undergraduate degree programmes including the physical sciences, biosciences, business studies, nursing, psychology and social science. In fact, in a recent report, ACME analysed the mathematical demands of a number of HE courses and argued that, in many disciplines, courses are becoming increasingly quantitative (ACME, 2011). The report estimated that, in a given year, 330,000 students are accepted onto courses in which they will encounter some mathematics, and argued that students on these courses would benefit from studying mathematics beyond GCSE level; however, fewer than 125,000 of them will have done so. The conclusion of the report was that many students simply do not have the numeracy skills they require to succeed in their chosen disciplines. In addition, academic staff believe that students accepted onto degree programmes are becoming increasingly less capable in mathematics (Wilde *et al.*, 2006), a perception that has some empirical support. For undergraduates studying biosciences, deficits in basic numerical dexterity, appreciation of number and basic algebraic reasoning have been identified (Phoenix, 1999), as well as specific problems such as deficits in estimation, scale conversion and visual interpretation of data (Tariq, 2002, 2003). Furthermore, Tariq (2002, 2003) identified a decline in the numeracy skills of first-year bioscience students between 1995 and 2000. Similarly, Mulhern and Wylie (2004) identified a decline in the mathematical abilities of psychology students between 1992 and 2002 and also found that female students had poorer mathematical skills than male students, a worrying finding given the preponderance of females studying this subject. These findings were replicated in a larger study involving a cross-section of UK universities (Mulhern & Wylie, 2006). The basic numeracy skills of pharmacy students were also found to have declined between 1999 and 2005 (Malcolm & McCoy, 2007), whilst inadequate mathematical abilities have been found in undergraduates taking courses in nursing (e.g. Jukes & Gilchrist, 2006; McMullan *et al.*, 2010), and in mathematics, physics and engineering (Engineering Council, 2000).

4.2.2 Communication literacy

4.2.2.1 Communication literacy and graduate employability

Oral and written communication skills are regarded as important skills for employability (e.g. Dacre-Pool & Sewell, 2007; Greatbatch & Lewis, 2007; UKCES, 2009). 'Communication' (including both oral and written forms) was highlighted as one of four key skills by Dearing (1997), and 'Communication and Literacy' (where 'communication' refers to oral skills and 'literacy' refers to written skills) is one of the employability skills listed by UKCES (2009) and used by the CBI in surveys of employers' views on graduate employability (e.g. CBI, 2010, 2011).

Much evidence suggests that oral and written communication skills are highly prized by employers, with the results from large-scale surveys showing that employers believe these skills to be important in the workplace. For example, in a survey carried out for the CIHE, 86% of employers identified oral communication skills as an important graduate attribute (Archer & Davison, 2008). In fact, across a variety of sizes of organisation, oral communication skills were identified as the most important graduate attribute. Furthermore, literacy skills (defined as the ability to write well) were considered essential by 70% of employers and ranked 8th in importance in a table of graduate attributes (Archer & Davison, 2008). Similarly, a survey conducted by the IoD (2007) found that basic literacy skills were ranked second in importance out of a list of 28 employability skills, whilst oral communication skills were the third most important graduate attribute. Using interview and survey data, Morley *et al.*, (2006) found that employers ranked communication skills second in importance after interpersonal/team-working skills. In the US, the National Commission on Writing (2004, cited in Kotzee & Johnston, 2008) found that employees had some writing responsibilities in two-thirds of the companies surveyed, whilst in half of the organisations, employers took writing ability into account when promoting. The authors concluded that employers regard writing as a 'threshold' skill, with graduates not being appointed or promoted without the ability to write well.

Research suggests that, as the nature of the workplace has changed, communication skills have become increasingly important in areas of employment which may traditionally have been more demanding of numeracy skills. For example, the International Federation of Accountants (IFAC) has argued that the role of the finance manager has shifted over time from that of transaction manager to communicator and strategist and, therefore, priority needs to be given to the development of oral and written communication skills in accounting students (IFAC, 2002, cited in Hassall *et al.*, 2005). Similarly, the case has been made that greater communication skills are now required in the workplace by graduates in engineering (Hassall *et al.*, 2005) and in information technology (IT) (Armarego, 2008).

Graduates themselves are aware of the importance of written and oral communication skills in the workplace. The CIPD (2006) survey of 545 graduates leaving university in 2005 showed that written communication skills were used by 54% of respondents in their current employment and oral communication skills were used by 78% (CIPD, 2006). Interviews with graduates have also highlighted their awareness of the need to be able to communicate in a range of ways in the workplace (Andrews & Higson, 2008; Yorke, 2004).

Although communication and literacy skills are important to employers, there is much evidence to suggest that employers are disappointed with graduates' competence in these skills. For example, the CIHE (Archer & Davison, 2008) survey found that, in terms of employer satisfaction, oral communication skills ranked 16th out of a variety of attributes, whilst literacy skills ranked 23rd. Similarly, the IoD (2007) survey reported that 18% of employers believed that graduates only occasionally or never demonstrated basic written communication skills, whilst 20% of employers believed that graduates only occasionally or never demonstrated basic oral communication skills. A series of surveys conducted by the CBI have also illustrated employers' on-going concerns with graduates' communication and literacy skills. These report that whilst some employers are very satisfied with graduates' literacy and communication skills (16% in 2010 and 18% in 2011), a sizeable proportion of employers indicate that they are not satisfied with graduates' abilities in these areas (14% in 2010 and 17% in 2011) (CBI, 2010, 2011).

The 'gap' between employers' expectations of graduate communication abilities and employers' satisfaction with graduate performance has been widely demonstrated. A study investigating the link between the writing skills of new graduate employees and their employability in the UK found that 71% of the responding employers believed that half or more of a new employee's daily work would involve writing (Kotzee & Johnston, 2008). However, the study also found that nearly half of employers reported that they had to correct most of the documents produced by new graduate employees for grammar and a sizeable proportion of employers (38%) reported that they had to correct graduate-produced documents for punctuation. In practice, this means that companies are less efficient than would otherwise be the case. Nair *et al.*, (2009) found that, out of a list of 23 attributes, employers of engineering graduates ranked oral communication skills as those with which they were least satisfied, whilst written communication skills were ranked as the third least satisfactory.

Whilst employers demand both written and oral communication skills, some studies suggest that graduates believe that their oral communication skills are less well developed than their written skills during degree courses (Andrews & Higson, 2008; HEA Economics Alumni Survey, 2008; Programme Improvement Through Alumni Research [PITAR] Project, 2004). Seventy percent of the graduates taking part in Mason *et al.*'s (2003) study reported that their degree courses had facilitated the development of their written communication skills, whilst only 58% of the graduates believed that their studies had led to an improvement in their oral communication skills. Furthermore, the finding that graduates believed that their written communication skills were more highly developed than their oral communication skills during their degree courses was consistent across disciplines. There was, however, a wide variation in the actual levels of improvement reported. For example, improvement in written communication skills was reported by 95% of history graduates but only by 38% of computing graduates, whilst development of oral communication skills was reported by 71% of business graduates but only by 29% of computing graduates. Mason *et al.*'s study of 2003, although nine years old, still has relevance today.

Crosling and Ward (2002) found that most oral communication in the workplace is informal and argued that informal interactions are important as they are the means by which employees learn and acquire new skills which facilitate the solving of problems. The authors claim that graduates are ill-prepared for this type of interaction and correspondingly disadvantaged in the workplace by degree courses which tend to focus on the development of formal oral presentation skills.

4.2.2.2 Communication literacy and academic success

Writing ability is, arguably, the most important skill that undergraduate students need to develop in order to succeed at university. As Lillis (2001, p.20) argues, "*writing is a key assessment tool, with students passing or failing courses according to the ways in which they respond to, and engage in, academic writing tasks*" (cited by Wingate, 2007).

It is widely believed that undergraduates are entering university with inadequate written communication skills. [Ganobcsik-Williams \(2004\)](#) reports that, of the 137 members of academic staff responding to her survey, 90% believed it was necessary to teach writing in HE and 74% believed that it was more necessary at the time of the survey than it had been 15 years previously. Similarly, the experience of Royal Literary Fund Fellows, professional writers who had accepted placements at universities to help students with essay writing, was that large numbers of students lacked “*the basic ability to express themselves adequately in writing*” ([Davies et al., 2006, p. 7](#)). Students were found to lack not only the ability to structure a paragraph or an essay properly, but also the ability to use grammar and spelling correctly. [Davies et al. \(2006\)](#) argue that the implications of a failure to write properly should not be underestimated:

“Anxiety is at the heart of many of the problems students experience with their writing Unfamiliar with academic writing styles, they seek to emulate but without guidance, their writing often only worsens. The result is that many of them feel insecure and see that insecurity as evidence that they don’t belong in higher education. In short they feel stupid.” ([Davies et al., 2006, p.9](#))

The importance of the mastery of academic writing skills for undergraduates’ self-esteem and sense of belonging in HE has also been highlighted by [Gourlay \(2009\)](#) who, in a small-scale qualitative study, found much confusion around requirements for academic writing in students making the transition to university. Over the course of their first year of study, the students in the sample resolved confusion around academic writing requirements through engagement with the process and ultimately they achieved a sense of confidence and legitimacy/belonging as students. Gourlay hypothesises, however, that many students never achieve a positive outcome, never gain a sense of legitimacy and thus become disengaged. Similarly, [Davies et al. \(2006\)](#) argue that, in the experience of Royal Literary Fund Fellows, the lack of basic writing skills is one of the causes of student dropout.

4.2.3 Emotional intelligence

4.2.3.1 Emotional intelligence and graduate employability

Emotional intelligence (EI) has been conceptualised by [Mayer et al., \(2004\)](#) as an emotion-related cognitive ability which involves perceiving, using, understanding and regulating emotion. It is assessed by examining reasoning and problem-solving in the emotion domain. This ‘ability model’ of EI treats EI as an ability that develops in early childhood and continues to develop throughout life. Other researchers (e.g. [Petrides & Furnham, 2001](#)) support a ‘trait model’ of EI which assumes that EI is a constellation of emotion-related self-perceptions. It is assessed by examining self-perceptions in emotional capabilities. According to this viewpoint, EI is, like other personality traits, stable after a certain age.

It has been argued that emotional intelligence tends to be omitted in much of the discourse around graduate employability:

“An area that has been excluded from the discussion relates to the affective domain. In the employability discourse, the world of work is represented in a highly sanitised and rational way. Graduates are hardly thought to require emotional intelligence, political skills or self-care in the face of occupational stress.” ([Morley, 2001, p. 135](#))

However, even though theories of employability rarely mention EI directly, it is frequently alluded to. Many theories mention the importance of ‘personal qualities’. For example, [Yorke and Knight \(2007\)](#) state that ‘personal qualities’ are essential for successful interactions with others. [McQuaid and Lindsay \(2005\)](#) propose that a variety of factors, which could be regarded as being related to EI, are important in employability. These include basic social skills, self-motivation, a positive attitude to work, customer service skills and team-working ability. [Greatbatch and Lewis \(2007\)](#) also list ‘people-related’ skills, such as influencing skills, team-working skills, customer service skills and leadership skills, in their list of generic employability skills. [Dacre-Pool and Sewell \(2007\)](#) argue that many of these personal qualities are underpinned by EI. [Dacre-Pool \(2011\)](#) explains, for example, that effective communication is difficult without the ability to perceive emotions in others and that team-working requires that team members manage their own emotions appropriately. In the CareerEDGE model of employability ([Dacre-Pool & Sewell, 2007](#)), EI is explicitly included as a factor which is related to employability.

Research with employers suggests that skills which may be underpinned by EI are valued in the workplace. Yorke (2004) found that senior colleagues of recently-recruited graduates highlighted personal qualities as important graduate attributes, but believed degree courses to be poor at developing these characteristics. Large-scale graduate surveys suggest that personality is the most important factor in obtaining a first graduate job in the UK and across Europe (HEFCE, 1999, cited in Little, 2001). Similarly, 75% of employers responding to the 2008 CIHE survey expressed the view that character/personality was important in the workforce, this figure rising to 81% of employers when responses from only small organisations were considered (Archer & Davison, 2008). This reflects the importance of the ability to 'fit in' when working in a company with a small number of employees. The 2008 CIHE survey also revealed that team-working skills were identified as important in the workplace by 85% of employers across a range of different sized organisations. Similarly, Morley *et al.* (2006) found that employers ranked interpersonal/ team-working skills as the most important skills possessed by their graduate employees. Successive CBI surveys have found, however, that many employers (19% in 2010 and 20% in 2011) are dissatisfied with the level of team-working skills demonstrated by graduates (CBI, 2010, 2011).

There is good empirical evidence to suggest that EI can predict outcomes which could contribute to a graduate's employability. Emotional intelligence has been found to predict leadership (Daus & Harris, 2003) and supervisor-rated leadership potential (Lopes *et al.*, 2004). It has also been shown to predict workplace performance, especially in jobs which would appear to require a high level of emotional intelligence, for example amongst police officers (Daus *et al.*, 2004) and amongst customer service representatives (Cage *et al.*, 2004). These studies also showed that job satisfaction was higher for police officers and customer service representatives with high EI. Cote and Miners (2006) also found that EI was a predictor of performance in the workplace for university employees. Furthermore, EI was a stronger predictor of workplace performance for employees with lower levels of cognitive ability, suggesting that to some extent high EI can compensate for low cognitive intelligence. Emotional intelligence has also been shown to be related to team-working ability (Rice, 1999, cited in Daus & Ashkanasy, 2005), psychological well-being (Bastian *et al.*, 2005) and tolerance to stress as rated by peers (Lopes *et al.*, 2004).

4.2.3.2 Emotional intelligence and academic success

Studies have suggested that EI is related to student retention in HE. Parker *et al.* (2006) found that students who entered the second year of study at a Canadian university scored higher on a test of trait EI taken in the first week of their first year than those students who withdrew from their courses before the start of the second year. In the UK, Qualter *et al.* (2009) found that students who withdrew from their course during the first year at university had lower trait EI scores at the beginning of the year than students who completed the year. Furthermore, students who had low EI scores at the beginning of the year, but who took part in an intervention which improved their EI, were found to be more likely to persist with their studies than those students with similar baseline EI scores who had not taken part in the intervention. Qualter *et al.* (2009) suggest that lower EI may lead to withdrawal from HE because of the role played by EI in the ability to integrate socially. There is evidence that the ability to accurately perceive others' emotions is related to successful social adjustment to university (Engelberg & Sjoberg, 2004) and that EI can predict better social relationships in undergraduates (Lopes *et al.*, 2004). Furthermore, longitudinal research suggests that EI in first-year undergraduates predicts emotional well-being a year later (Ciarrochi & Scott, 2006). A further explanation of the role of EI in student retention is that EI is associated with the ability to seek help or support when necessary (Gohm *et al.*, 2005).

Several studies have shown that trait EI predicts academic achievement in HE. Parker *et al.* (2004) found that, when controlling for qualifications on entry into HE, students whose academic scores at the end of the first year were high had scored more highly on a measure of trait EI administered in their first week at university than students whose academic scores at the end of the first year were low. These findings were replicated by Parker *et al.* (2005) whilst Jaeger (2003) found a correlation between academic performance and trait EI in undergraduates.

4.2.4 Information literacy

4.2.4.1 Information literacy and employability

Information literacy is defined by the Chartered Institute of Librarians and Information Professionals (CILIP) as:

"... knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner." (CILIP, 2011)

Information literacy has been described as a 'meta-competency', as it involves a range of skills such as communication and problem-solving (Lloyd, 2003), and it has been observed that low levels of literacy and numeracy can create barriers to the effective use of information systems (Hull, 2000, cited in Hilliger & Roberts, 2001).

Due to the fact that many sources of information are now available electronically, information literacy skills depend, to some extent, on IT skills, i.e. the ability to operate the user interface (Wong *et al.*, 2009). It has been argued that the role of information literacy in the workplace has often been overlooked, whilst the role of IT skills has been emphasised (O'Sullivan, 2002; Webber, 2001). For example, one of the key employability skills recommended by Dearing (1997) was the use of IT. Some conceptualisations of employability do, however, make reference to information gathering and management skills as higher order conceptualising/thinking employability skills (Fallows & Steven, 2000; Greatbatch & Lewis, 2007; Hind & Moss, 2005), and information literacy is increasingly regarded as a graduate attribute (Bundy, 2004, cited in Johnston & Webber, 2006). The Joint Information Systems Committee (JISC) reported that many UK employers consider information literacy a key skill for staff within a knowledge-based economy (JISC, 2000 cited in Irving, 2006), as *"in a knowledge driven economy, employees who are able to develop information pathways and to create new corporate knowledge provide the strategic difference between a highly successful business and those that remain mediocre"* (Lloyd, 2003, p.90).

Crawford & Irving (2009) argue that whilst little has been written about information literacy in the workplace, complex tasks in information seeking are characteristic of this environment. Irving (2006) carried out an interview-based project with employees in a variety of work environments. She found that whilst all of the interviewees needed to use information in the workplace, there was no formal training at work in information literacy skills but that these were, instead, learnt informally from colleagues. Employees also reported that employers expected them to have pre-existing information skills but that this expectation was implicit rather than explicit.

The importance of information skills in the workplace and, therefore, in employability has also been demonstrated in a large-scale survey. Crawford (2006) administered questionnaires to both undergraduates and alumni and found that the alumni had a much stronger conception of information literacy as a consequence of being at work. Whilst only 63% of students believed that information literacy skills would be important in finding work, 81% of the alumni felt that an understanding of information literacy gave them an advantage in finding a job and in seeking promotion. Furthermore, 90% of alumni reported that information literacy skills were important in the workplace as they enabled employees to, for example, solve problems and distinguish between unreliable and reliable information.

Graduates appear to believe that their undergraduate studies prepare them well for the information literacy demands of the workplace. Mason *et al.* (2003) found that three-quarters of responding alumni reported that they had developed skills of information handling and processing during their degree courses. In Crawford's (2006) study, 67% of the alumni claimed that their university courses had improved their information literacy skills. A higher proportion (77%), however, believed that their information literacy skills had improved as a result of experiencing employment following graduation.

4.2.4.2 Information literacy and academic success

Successful independent learning as an undergraduate requires good information literacy skills and a low level of these skills impacts negatively on independent learning ability (Shanahan, 2007). In a large scale survey, 66% of responding undergraduates claimed that the use of electronic information services was essential for their programmes (Crawford, 2006). It has been argued, however, that whilst students arrive at university with a set of skills, information literacy skills are among the least developed of these (Crawford, 2006). Academic librarians have reported that entrants to university courses lack knowledge about different types of information and are unable to use search strategies effectively and to evaluate information (Irving, 2006). New technologies are rapidly changing the ways in which students find, assimilate and analyse data, redefining the way students learn (HEFCE, 2011).

There is much empirical evidence to suggest that students enter university with inadequate information skills. [Varga-Atkins and Ashcroft \(2004\)](#) found that only 25% of a sample of 141 first-year undergraduate business students had adequate information literacy skills as assessed by, for example, their ability to recognise salient information for their information search, their key-wording abilities and their ability to evaluate information. Very limited knowledge of library research processes (for example constructing a search strategy or finding a journal in the catalogue) were also identified in first-year undergraduate arts students ([Salisbury & Ellis, 2003](#)), whilst second-year radiography students were found to have limited experience of searching a database and low skill levels in identifying key search terms and constructing a search statement ([Shanahan, 2007](#)). In the User Behaviour in Resource Discovery (UBIRD) project participants were observed as they carried out information seeking tasks and were found to have problems assessing the usefulness of information, refining searches and integrating their findings into existing knowledge systems; students were unable to conduct even a basic search using electronic resources in a learning situation ([Wong et al., 2009](#)).

An improvement in information literacy skills can lead to higher levels of academic achievement. Various evaluation studies report that, when taught information literacy skills, students believe that they are able to use these skills to support their learning ([Hilliger & Roberts, 2001](#); [Johnston & Webber, 2000](#)). [Larkin & Pines \(2005\)](#) found that first-year psychology students who had some tuition on the online searching of academic databases performed very much better on a separate assignment involving information literacy skills than a control group.

It appears that a lack of information literacy skills may be related to student dropout. [Crawford et al. \(2004\)](#) conducted a longitudinal study of Glasgow Caledonian University students and found a relationship between progression and retention and the use of electronic information services (EIS). Those schools with the highest progression and retention rates were those with the highest rates of EIS usage. Schools with low usage of EIS reported high dropout rates. The authors caution however that more research in this area needs to be undertaken.

4.3. Extending the current research on learning literacies

The evidence presented here suggests that these four types of 'learning literacy' are related to both academic achievement and employability. It is noteworthy, however, that the studies which have investigated the role of these literacies in academic achievement in HE have each considered only one type of literacy. For example, [Qualter et al. \(2009\)](#) explored the role played by emotional intelligence in retention in HE whilst [Davies et al. \(2006\)](#) discussed the role of writing skills. It is probable, however, that the four learning literacies are themselves interconnected. For example, [Hull \(2000, cited in Hillinger & Roberts, 2001\)](#) points out that low levels of literacy and numeracy present barriers to the effective use of information systems. **To date, however, little research has explored the relationships between the literacies themselves or, indeed, their collective influence on student retention and academic achievement. Furthermore, whilst the importance of these literacies in employability has been well-documented, how they develop collectively within HE has not previously been investigated. The present work seeks to address the limitations of the existing evidence base by considering how a framework of these four learning literacies develops within HE and impacts on both student achievement and employability.**

5. Aims and objectives

5.1. Aims

The overall aim of the project was to explore how a framework of learning literacies can support learning and enhance employability in a diverse undergraduate population.

The **central pedagogic issue** explored concerned the development, inter-relationships between and application to employability of a framework of learning literacies, which included the use of mathematics (mathematical literacy), using reading, writing and speech (communication literacy), locating, accessing and using information (information literacy) and understanding our own and others' emotions (emotional literacy).

These literacies are essential not only to students' academic success but also to their future employability and their everyday lives. Part of the original aim of the project was to include a study of the unique challenges deaf students encounter.

5.2. Objectives

The objectives of the project were to:

1. document what employers expect from graduates in terms of our framework of learning literacies;
2. track and evaluate student confidence and proficiency in these literacies at their transition into HE and at key points through their 1st year in terms of the curriculum and learning process;
3. investigate how changes in confidence and proficiency predict student retention, adjustment to university, and academic achievement;
4. investigate how we support development of these literacies and whether what we do matches employers' and students' needs and expectations;
5. discover the nature of relationships between these literacies, and between these literacies and students' reported employability upon exit from HE;
6. investigate how students use and develop these literacies informally in their everyday lives;
7. explore how deaf students develop these literacies and to what extent they impact upon their employability.

6. Methodology

6.1. Overall approach

The project used a mixed-methods approach which resulted in the collection of both quantitative and qualitative data from three stakeholder groups: (i) first-year undergraduate students, (ii) alumni, and (iii) employers. By combining insights from both quantitative and qualitative research methodologies, a more thorough understanding of the issues under investigation could be obtained. Similarly, the collection of data from three different groups of participants meant that different perspectives could be explored, enabling a richer understanding of the role of the four 'learning literacies' in student achievement and in employability.

The project was carried out at the University of Central Lancashire (UCLan), which is a leader in the field of equality and diversity within HE and has a very large (approx. 25,000) diverse student population. Of particular note is the quality of its academic, pastoral and vocational support for deaf students. In 2008-09, 108 deaf and hard-of-hearing students were enrolled at the university, of whom 30 were British Sign Language (BSL) users. Evidence suggests that deaf individuals are more likely to be unemployed than hearing individuals (Bradshaw, 2002; RNID, 2006). The project provided an opportunity to investigate the particular set of challenges faced by deaf students and graduates. Deaf participants were therefore recruited from each of the three stakeholder groups.

The project comprised three 'strands': (i) the transition of students into HE and through their first undergraduate year, (ii) a study of the experiences of alumni, and (iii) a study of the expectations and experiences of employers.

Since all the undergraduates, alumni and employers participated on a voluntary basis and the groups of participants were self-selecting any conclusions and inferences drawn relate to these samples and caution is advised in generalising the outcomes to the wider target populations.

6.2. Strand 1: Transition of students into HE and through their first undergraduate year

6.2.1. Overview

The aim of this strand was to track the development of students' confidence and proficiency in numeracy, communication and emotional intelligence and to track the development of their confidence in information literacy. A longitudinal design was therefore implemented. Quantitative data was collected at various time-points throughout the students' first year through the administration of paper-based tests and online surveys. Semi-structured interviews conducted at the end of Semesters 1 and 2 explored in detail how students used and developed their literacies and how the university supported them to do this. Further details are described below.

6.2.2. Materials and data collection instruments

Reading and maths tests

A reading test and a maths test were used to assess first-year undergraduates' proficiency in elements of communication and mathematics. Both tests were adapted from materials used by the Organisation for Economic Co-operation and Development (OECD) in its Programme for International Student Assessment (PISA) (OECD, 2009). The OECD's PISA tests are administered internationally every three years and are designed to measure the communication, mathematical and scientific literacy of 15-year-olds. The tests assess students' ability to apply their knowledge and skills to everyday situations.

The materials chosen for the reading test were selected for the range of reading skills and contexts to be assessed (OECD, 2009) (Table 1). Participants were given 20 minutes to complete the test. Items were marked as correct or partially correct according to guidelines provided by PISA and a mark scheme was devised so that each 'reading unit' was worth 5 marks; the total possible score was therefore 20.

The maths test adopted was that used by Cleary *et al.* (2010). The test comprised 10 items released from PISA 2000 and 2003 (OECD, 2006) (Table 1).

Table 1. PISA items used in the reading and maths tests

PISA items in the reading test	PISA items in the maths test
1. Reading Unit 1: Lake Chad	1. Exchange rate 1
2. Reading Unit 4: Labour	2. Exchange rate 2
3. Reading Unit 11: New Rules	3. Exchange rate 3
4. Reading Unit 13: Warranty	4. Earthquake
	5. Walking 1
	6. Walking 2
	7. Apples 3
	8. Carpenter
	9. Test scores
	10. Continent area

Students had 20 minutes to complete the test and were permitted the use of calculators. Items were marked according to the guidelines provided by PISA. Some answers were awarded some credit if they were partially correct, as the PISA scoring system advises, and thus the total number of marks possible was 16.

Online survey

The online survey, created and delivered using Bristol Online Surveys (BOS) (www.survey.bris.ac.uk), comprised the following measures:

1. Adjustment to university

The following scales were administered to assess aspects of students' adjustment to university and their mental health:

- i. UCLA Loneliness Scale Revised ([Russell, 1996](#)): A 20-item measure which assessed the respondent's subjective experience of loneliness. Respondents rated their responses using a 4-point scale indicating whether they never, rarely, sometimes or always felt the way described. Some items were reverse coded. Higher scores indicated greater loneliness.
- ii. CES-D Depression Scale ([Radloff, 1977](#)): A 20-item measure which assessed the respondent's subjective experience of depression. Respondents indicated the frequency of occurrence of depressive symptoms in the past week on a 4-point scale ranging from 'rarely or none of the time' (0-1 day) to 'most or all of the time' (5-7 days). Some items were reverse coded. Higher scores indicated greater depression.
- iii. College Adjustment Questionnaire ([Crombag, 1968](#)): An 18-item measure which assessed the respondent's adjustment to university. Participants rated their responses on a scale of 1 to 5 indicating 'not true of me' to 'very true of me'. Some items were reverse coded. Higher scores indicated better adjustment.

2. Communication self-efficacy

A 10-item bespoke measure was developed to assess students' self-efficacy in both written and spoken communication skills. Respondents rated their responses using a 5-point Likert scale ranging from 'Not at all confident' to 'Very confident'. Higher scores indicated greater confidence. Factor analysis revealed that items loaded onto two factors: (i) self-efficacy in speaking and listening, and (ii) self-efficacy in reading and writing.

3. Mathematical self-efficacy and attitudes/beliefs regarding mathematics learning

The following scales were administered to assess aspects of mathematical self-efficacy and attitudes towards learning mathematics.

- i. Self-efficacy measure: This 9-item scale was developed by [Cleary et al. \(2010\)](#) to assess a respondent's self-efficacy with regard to the specific tasks covered by the maths test. Respondents rated their level of confidence using a 5-point Likert scale ranging from 'Not at all confident' to 'Very confident'. Higher scores indicated greater confidence. Factor analysis revealed that all items loaded onto one factor.

Scales ii-vii below were developed and validated by [Breen et al. \(2009\)](#) and discussed further by [O'Shea et al. \(2010\)](#). In each, participants rated their response to each item on a scale of 1 to 4 indicating 'Strongly disagree' to 'Strongly agree':

- ii. Confidence: A 6-item measure which assessed the respondent's confidence in maths. Some items were reverse coded. Higher scores indicated greater confidence.
- iii. Maths anxiety: A 5-item measure which assessed the respondent's anxiety about maths. One item was reverse coded. Higher scores indicated greater maths anxiety.
- iv. Theory of intelligence: A 6-item measure which assessed the respondent's beliefs about the nature of mathematical intelligence. Some items were reverse coded. Higher scores indicated a greater tendency to believe in an 'incremental' theory of intelligence rather than an 'entity' theory of intelligence (i.e. a greater tendency to believe that intelligence is malleable rather than a fixed trait).
- v. Persistence: A 7-item measure which assessed the respondent's tendency to seek out challenges and persist in the face of difficulty when doing mathematical problems. Some items were reverse coded. Higher scores indicated a greater tendency to persist when faced with mathematical challenges.
- vi. Learning goals: A 5-item measure which assessed the extent to which the respondent is learning goal oriented (i.e. the extent to which he/she wishes to increase their competence and acquire new understanding). Higher scores indicated a greater tendency to be learning goal oriented.
- vii. Performance goals: A 7-item measure which assessed the extent to which the respondent is performance goal oriented (i.e. the extent to which he/she wishes to receive positive feedback on their abilities and avoid demonstrating a lack of ability). Higher scores indicated a greater tendency to be performance goal oriented.

4. Emotional Intelligence

The following measures were administered to assess aspects of students' emotional intelligence:

- i. Emotional Self-Efficacy Scale ([Kirk et al., 2008](#)): A 32-item measure which assessed self-perception of emotion-related skills. Participants rated their responses using a 5-point Likert scale ranging from 'Not at all confident' to 'Very confident'. Higher scores indicated greater confidence. Previous analysis ([Dacre-Pool & Qualter, 2011](#)) has revealed that items load onto 4 factors: (i) using and managing your own emotions, (ii) identifying and understanding your own emotions, (iii) dealing with emotions in others and (iv) perceiving emotion through facial expressions and body language.
- ii. Situational Test of Emotion Management (STEM) ([MacCann & Roberts, 2008](#)): In this test of actual emotional intelligence skills, participants were presented with details of 30 emotional situations and, for each one, had to select the most effective course of action from four possible options.

5. Information literacy self-efficacy

A 50-item bespoke measure was developed to assess students' self-efficacy in information literacy skills. Respondents rated their responses using a 5-point Likert scale ranging from 'Not at all confident' to 'Very confident'. Higher scores indicated greater confidence. Factor analysis revealed that items loaded onto 4 factors which were labelled (i) locating, accessing and using information, (ii) critical evaluation of information, (iii) understanding procedures related to handling information, and (iv) specific search strategies.

Demographic information

Via the online survey students were asked to provide information regarding their gender, age, term-time residence, first language, ethnicity and disability. In addition, they were asked to specify whether they were home students or international students.

Information regarding the students' previous qualifications and their achievement and retention during their first year at university was extracted from the university's central database:

- (i) Previous qualifications: UCAS point scores were extracted for those students for whom this information was held. For those students entering university via non-traditional routes (e.g. via 'Access' courses) such information was unavailable.
- (ii) Retention: data were collected showing whether or not students had withdrawn during their first year of study.
- (iii) Achievement: data were collected showing whether or not those students who had completed their first year had passed their courses and been allowed to progress to the second year. The average mark achieved by students in the modules they had passed was also noted.
- (iv) Demographic information: data regarding gender, age, term-time residence, ethnicity and home/international status were collected for those students who had completed the paper-based tests but not the online survey and who, therefore, had been unable to provide the demographic information themselves. Data were collected showing whether students were studying full-time or part-time. Furthermore, any student's disability, as recorded by the university's Disability Services, was noted.

6.2.3. Participants and method

Time-point 1 (T1) - October-November 2010:

Departments throughout UCLan were approached and access to their first-year students for an hour of teaching time was requested. Course tutors in the following subjects agreed to the request: computing, forensic science, police & criminal investigation, psychology and retail management. Tutors from courses in the School of Education & Social Science agreed to allow a member of the research team to advertise the project and recruit students in their classes. The recruited students were then invited to attend specially arranged test sessions.

At the beginning of the test session (whether 'in-class' or arranged separately) all students received information about the project and, if willing to participate, were asked to complete consent forms. Students choosing not to participate were allowed to leave the sessions. The paper-based reading and maths tests were then administered. In total, 353 students attempted these tests at T1.

All students completing the tests were then asked to complete the online survey. The link to this was sent via e-mail and reminder emails were sent as necessary. Students had to complete the online survey within three weeks of taking the tests. In total, 179 students completed the online survey as well as the paper-based tests.

When students completed their consent forms, they were asked to indicate if they would be prepared to take part in an interview with a member of the research team. Twenty students who completed the literacy and maths tests and the online survey were selected for interview. Male and female students across a wide age-range were interviewed and the sample included students from all of the courses involved in the study. Three of the interviewees were deaf. Interviews lasted between 35 and 60 minutes. Students were asked about their confidence in the four literacies and the support available at the university which facilitated further development of these literacies. They were also asked about the role that activities outside of university played in providing opportunities for the development of these literacies. Students' early thoughts regarding their future graduate employment were explored. The interviews were semi-structured in format and were recorded and transcribed.

Time-point 2 (T2) - January-February 2011:

Students who had completed the online survey as well as the literacy and maths tests at T1 were sent the link to a shortened version of the online survey which contained only the adjustment measures. Reminder e-mails were sent as necessary and, again, students had a three-week 'window' of time in which to complete the survey. In total, 140 students completed the survey at this time.

Time-point 3 (T3) - March-April 2011:

Students who had completed the online survey and the reading and maths tests at T1 were asked to take the tests for a second time. It was possible to access some of the students during their classes, but many had to attend special test sessions. As well as taking the tests, students were asked to complete a form detailing their highest levels of qualification in English, Maths and ICT (e.g. GCSE, AS level, A2 level etc.). Having taken the

tests for the second time, students were sent the link to the full-length online survey and were asked to complete it within three weeks.

In total, 106 students took part in the tests and surveys at all three time-points (i.e. T1, T2 and T3). These students each received a £10 Amazon voucher and were entered into a prize draw in which they had the chance to win one of two Apple i-Pads. A further ten students who took part in the tests and surveys at time-points T1 and T3, but not time-point T2, also received £10 Amazon vouchers.

The students who had been interviewed earlier in the academic year were contacted and invited for follow-up interviews after they had completed the tests and online survey at T3. Seventeen students took part in these second interviews, which were again recorded and transcribed. Students were asked about any changes in confidence in their 'literacy' skills and the factors that had brought about these changes.

October 2011:

At the end of Semester 3, when all re-sit examinations had been completed, the university database was interrogated for information regarding the participants' academic achievement and their retention status.

6.3. Strands 2 and 3: employers and alumni

6.3.1. Overview

The aim of these two strands of the project was the collection of data from two important stakeholder groups, namely graduates and employers, regarding (i) the importance of the various literacies to graduate employability, and (ii) the extent to which a university education facilitates the development of these literacies. Previous research has attempted to identify areas of 'mismatch' between the skills developed during undergraduate degree programmes and the skills valued by employers. Several studies have sought the views of employers on the importance of various competencies in the workplace and on the performance of new graduates in these competencies (e.g. [Archer & Davison, 2008](#); [Hodges & Burchell, 2003](#); [Nair et al., 2009](#)). Such research establishes the employer perspective on importance-satisfaction 'gaps' in the capabilities of new graduates. Alumni surveys have also been used to address the question of how effectively HE prepares graduates for the workplace. For example, the Programme Improvement Through Alumni Research ([PITAR, 2004](#)) project has carried out two large-scale surveys involving graduates from six subject areas to find out what skills graduates develop at university and what skills they use subsequently in the workplace.

The approach taken in the current study was one in which the perspectives of employers and alumni were triangulated with those of undergraduates in order to explore the extent to which HE leads to the development of literacies important in the workplace. There are some precedents for this approach. For example, [Mason et al. \(2003\)](#) investigated the perspectives of a selection of graduate employees and their line managers, whilst [Andrews and Higson \(2008\)](#) interviewed both graduates and employers to identify skills important in the workplace and the extent to which they were developed during undergraduate degrees. [Oliver \(2010\)](#) developed parallel surveys (Graduate Employability Indicators), for graduates and employers. Both groups were asked to rate 14 capabilities in terms of their importance to early professional success. Graduates were also asked to rate the extent to which their experience during their degree contributed to the development of each capability whilst employers were asked to rate the extent to which new graduates demonstrated each capability.

The current study adopted a similar approach to that taken by [Oliver \(2010\)](#), in that parallel surveys were administered to alumni and employers. Thirteen 'literacy' items were chosen and alumni and employers were asked to rate the importance of each in the workplace. Alumni were also asked to rate the extent to which their undergraduate experience had enabled them to develop each skill, whilst employers were asked to rate the competence in each skill demonstrated by recent graduates. Other questions addressed in the employer survey included the importance of work experience, whilst the alumni survey investigated the relationship between self-perceived employability and self-efficacy in the 'literacy' items. Further details of the surveys are provided below.

To explore the issues addressed in the surveys in more depth, semi-structured interviews were carried out with nine employers and nine alumni.

6.3.2. Strand 2: employers

Online survey

An online survey was created and delivered using Bristol Online Surveys. It was piloted with a small number of employers who were known to project team members. The aim of the survey was to identify the importance of the 'learning literacies' in graduate employability and to find out the extent to which employers' expectations regarding graduates' competence in these skills are currently being met.

The survey comprised the following sections:

1. **Demographics:**

Employers were asked about the type of organisation to which they belonged (SME/large private/public sector/ -third sector), their regional presence and their employment sector. The classification of the employment sector of organisations was the same as that used by [Tariq et al. \(2010\)](#). This was based on the system used by [Birchall \(2007\)](#) which [Tariq et al.](#) expanded in light of the Higher Education Statistics Agency's (HESA) Standard Occupational Classification for the Destination of Leavers from Higher Education Institutions (SOC[DLHE]) ([Davies et al., 2003](#)). The roles played by graduate employees were classified according to the Standard Occupational Classification (SOC) categories used by HESA ([HESA, 2000](#)).

2. **Literacies:**

For each learning literacy, three or four items were selected and employers were asked to rate their importance in graduate employability using a 5-point Likert scale (1 = Not at all important, 5 = Very important). They were also asked to use a 5-point Likert scale to rate the competence in each item demonstrated by recent graduates (1 = Not at all competent, 5 = Very competent). The 13 items were selected as follows:

i. *Communication literacy:*

The items 'Oral communication skills', and 'Writing effectively for a variety of audiences' were taken from the UCLan - CareerEDGE Employability Development Profile ([Sewell & Dacre-Pool, 2010](#)), a tool which allows students to assess their own employability by rating themselves on a range of factors related to employability. The third item, 'Writing accurately (good spelling and grammar)', was chosen to reflect the finding, evident in the literature, that employers place great value on basic literacy skills (e.g. [IoD, 2007](#); [Kotzee & Johnston, 2008](#)).

ii. *Emotional intelligence:*

The items 'Working out what other people are feeling', 'Identifying own emotions at a given time', and 'Managing own emotions effectively' were chosen to reflect aspects of EI related to the perception and management of emotions. These three items are used in the UCLan - CareerEDGE Employability Development Profile ([Sewell & Dacre-Pool, 2010](#)).

iii. *Mathematical literacy:*

The items 'Basic numeracy skills', 'Interpreting data', 'Numerical problem-solving' and 'Using spread-sheet software' were selected as previous research has demonstrated that these are skills in which employers expect graduates to be competent ([Durrani & Tariq, 2012](#)).

iv. *Information literacy:*

The items 'Locating relevant sources of information', 'Evaluating the quality and authority of information', and 'Making judgements based on the evidence contained in information' were chosen to reflect three aspects of information literacy: finding, evaluating and using information ([CILIP, 2011](#)).

3. **Selection and Training Issues**

To gain further information on the importance of these literacies in the workplace, employers were asked whether each literacy was assessed during recruitment and, if so, how. They were also asked whether or not they provided training opportunities in the literacies for graduate employees.

4. **Work experience**

Employers were asked to rate the importance of previous relevant work experience using a 5-point Likert scale. Work experience is often reported as being highly desired by employers (e.g. CBI, 2009b) and the inclusion of this question allowed the issue of the relative importance of work experience compared to the literacies to be addressed.

5. *Additional Comments*

Employers were invited to make any additional comments relating to the issues addressed in the survey. They were also asked to leave their contact details if they were willing to take part in a 30-minute interview.

Disseminating the survey

The online survey was disseminated in the following ways:

1. A database of employers with links to the Knowledge Transfer Service at UCLan was obtained and these employers were e-mailed.
2. Members of staff in Futures and the Lancashire Business School at UCLan notified their employer contacts of the survey.
3. Members of the project team notified their personal contacts of the survey.
4. The Chair of the Lancashire Branch of the Institute of Directors notified her personal contacts of the survey.
5. The East Lancashire Chamber of Commerce advertised the survey in a newsletter to members.
6. The CBI advertised the survey to members who had registered an interest in Education and Skills issues.
7. Employers listed on the TARGETjobs website (<http://targetjobs.co.uk/graduate-jobs/profiles>) were contacted by email or phone. Speaking to the member of staff responsible for graduate recruitment before sending the link to the survey proved to be a particularly effective strategy for recruiting employers.

In total, 50 employers completed the online survey. Eight employers who had completed the online survey took part in semi-structured interviews which lasted approximately 30 minutes. Seven of the interviews were conducted by telephone whilst one was conducted face-to-face. During the interviews, the issues addressed in the online survey were explored in more detail. Employers were asked about the skills they looked for in graduate employees, the importance of the literacies in the workplace and the levels of competence in the literacies demonstrated by new graduate recruits. All interviews were recorded and subsequently transcribed.

A deaf employer from a deaf organisation was also interviewed, using the same semi-structured prompts. As the interviewee was a BSL user, the interview was conducted face-to-face. The interviewer was proficient in BSL, so the interview took place wholly in BSL; an interpreter was not required. The interview lasted for 40 minutes and was digitally video-recorded. The recording was subsequently transcribed by a qualified BSL/English interpreter. The transcript was then checked against the video-recording by the interviewer for accuracy.

6.3.3. Strand 3: alumni

Online survey

An online survey was created and delivered using Bristol Online Surveys. It was piloted with a small number of alumni who were contacted through personal contacts of the project team members. The aim of the survey was to identify the importance of the 'learning literacies' in graduate employability and to find out the extent to which graduates believed their literacies had improved during their time at university. Furthermore, the survey aimed to ascertain whether or not self-perceived employability was related to self-efficacy in the learning literacies. This provided another means of investigating the relative importance of the various literacies in the workplace.

The survey comprised the following sections:

1. *Skills development at university:*

Respondents were asked to use a 5-point Likert scale (1 = Not at all, 5 = A great deal) to rate the extent to which they believed that the 13 'literacy' items used in the employer survey had been developed during their time at university.

2. First full-time job:

Respondents were asked whether or not they had managed to secure any full-time employment since leaving university and, if so, the same demographic information required in the employer survey (regarding organisation type, classification of employment sector and the role played by the graduate employee) was requested. Respondents then had to rate the importance of each of the 13 literacy items in their first full-time job using a 5-point Likert scale (1 = not at all important; 5 = very important).

3. Current employment situation:

Respondents were asked about their current employment situation and again gave demographic details of their organisation and rated the importance of the 13 literacy items in the workplace.

4. Self-perceived employability and self-efficacy in 'literacies':

Respondents in employment were asked to complete a self-perceived employability scale (Rothwell & Arnold, 2007). In this questionnaire, respondents were asked to respond to statements related to their employability, using a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). The scale can be used either as a unitary construct or as one comprised of two related components – internal employability (related to the organisation) and external employability.

All respondents were asked to rate their self-efficacy (i.e. confidence) in the 13 literacy items, using a 5-point Likert scale (1 = Not at all confident, 5 = Very confident).

5. Demographic information and additional comments:

Demographic information was collected relating to gender, age, disability, year of graduation and subject studied at university. Alumni were invited to make any additional comments related to the issues addressed in the survey. They were also asked to leave their contact details if they were willing to take part in a 30-minute interview.

Method

The online survey was distributed, via the university's Alumni Office, to alumni graduating in 2008, 2009 and 2010 from courses in computing, forensic science, police & criminal investigation, psychology, and retail management, and from courses delivered by the School of Education and Social Science. The survey was distributed in two 'batches', with some alumni being contacted in July 2011 and others in October 2011. Since response rates from these mail-outs were very low, in November 2011 the survey was advertised via the UCLan alumni Facebook group.

Deaf alumni were contacted directly and invited to participate. Forty-two online surveys were sent out, using the last known e-mail address for each graduate. Five alumni completed the survey, although it is difficult to know how many addresses were current. However, the low response rate is typical for deaf people engaging with a written survey, when English is not their first or preferred language.

In total, 58 alumni completed the online survey. Eight alumni who had completed the online survey took part in semi-structured interviews which lasted approximately 30 minutes. Seven of the interviews were conducted by telephone whilst one was conducted face-to-face. During the interviews, the alumni were asked about their employment history since leaving university, the literacy skills they used in their work and the extent to which their university experience had enabled them to develop skills which had subsequently been useful to them. All but one of the interviews was recorded and subsequently transcribed. The remaining interview could not be recorded for practical reasons so notes were taken during this interview.

Two deaf alumni were also interviewed. Both the interviewees were BSL users, so the interviews were conducted face-to-face in BSL. The interviews lasted for approximately an hour each; sign language dialogue often taking a longer time to conduct than spoken discourse. The interviews were digitally video-recorded and subsequently transcribed by a qualified BSL/English interpreter. The transcripts were then checked against the video-recording by the interviewer for accuracy.

7. Implementation

7.1. Overall

The overall aim of the project was to explore how a framework of four learning literacies supports learning and enhances employability within an undergraduate population. The project possessed three strands reflecting the participation of three groups of key stakeholders, namely the undergraduates themselves, graduates (alumni) and employers. The project also provided an opportunity to explore the particular challenges faced by deaf undergraduates and graduates, since evidence suggests that deaf individuals are more likely to be unemployed than hearing individuals. Deaf participants were therefore recruited from each of the three stakeholder groups.

From the outset the three strands were linked, with the perspectives of employers and alumni triangulated with those of undergraduates in order to explore the extent to which HE facilitates the development of literacies important in the workplace.

Completion of the project involved implementing various methods of enquiry that reflected the strengths of individual members of the project team. A mixed-methods approach was adopted, with both quantitative and qualitative data collected and analysed, to provide a better understanding of the issues under investigation. The late appointment of the postdoctoral research assistant meant that other members of the team had to commence work on selecting and designing the quantitative data collection instruments (i.e. the reading and numeracy tests and the online survey) in August - September 2010.

7.2. Project management

Throughout the two-year term of the project, the project team held regular, minuted meetings. In addition, a project Steering Group was established, which included colleagues from other HEIs with expert knowledge of the literacies being explored within the project. The Steering Group met in December 2010 and again in June 2011 to review progress and offer advice and support to the team.

7.3. Strand 1: transition of students into HE and through their first undergraduate year

The aim of this strand was to track first-year students' confidence and proficiency in numeracy, communication and emotional intelligence and to track their confidence in information literacy. Items for the reading and maths tests were selected from the OECD's PISA tests, since the latter provide international benchmarks and PISA items have been used in previous research. Scales used in the extensive online survey were selected from the research literature since their validity and reliability had been previously tested and reported; the only exceptions were the self-efficacy scales for communication literacy and information literacy.

Although departments throughout UCLan were approached to request access to their first-year students, course tutors in only the following subjects agreed to the request: computing, forensic science, police & criminal investigation, psychology and retail management. Students were also recruited from courses in the School of Education & Social Science.

Originally, it was envisaged that the undergraduate participants would be monitored at four time-points throughout their first year at university. However, the late appointment of the postdoctoral research assistant meant that data collection at time-point 1 (T1) could not begin until the end of October 2010 and continued into November 2010. This left insufficient time to collect additional data from the students at three further time-points before their semester 2 examinations. Thus, the decision was taken to collect data at only two additional time-points, T2 (January/February 2011) and T3 (March/April 2011).

Longitudinal studies are notoriously susceptible to attrition effects, i.e. the loss of participants over time. This is illustrated by the fact that, although 353 students attempted the reading and numeracy tests at T1, only 179 also completed the survey at T1, and by T2 the number of participating students had fallen to 140. By T3, only 116 students were still prepared to participate. When planning the project the decision had been taken to attempt to minimise the effects of attrition by offering attractive incentives to encourage students to participate at all time-points. The 106 students who participated at all three time-points were each given a £10

Amazon voucher and were entered into a prize draw in which they had the chance to win one of two Apple iPads. A further ten students who took part in the tests and surveys at time-points T1 and T3, but not time-point T2, also received £10 Amazon vouchers. In addition, participating students were sent emails to remind them to complete the online survey.

The number of participating deaf individuals was disappointing since it was much smaller than originally anticipated, reflecting the fact that the number of deaf students admitted to the university in the academic year 2010/11 was much smaller ($N = 2$) than in previous years ($N > 11$). The team discussed the possibility of accessing deaf undergraduates at another HEI, but felt that this would introduce a new dimension to the project, as well as additional uncontrolled variables; the decision was taken not to proceed with this particular suggestion but to make greater use of qualitative research methods and data with this particular sample of undergraduates. In addition, the one deaf student who entered the university in 2011/12 was also interviewed using the same methodology and interview prompts.

7.4. Strand 2: employers

It proved very difficult to recruit employers to take part in the survey. This presumably reflects the difficult economic times and the fact that, with the current emphasis on graduate employability, employers may be inundated with surveys investigating employability and skills issues. Employers were targeted using a variety of strategies in an attempt to maximise the number of returns:

1. Employers with links to the Knowledge Transfer Service at UCLan were emailed
2. Members of staff in Futures and the Lancashire Business School at UCLan were asked to notify their employer contacts of the survey
3. Individual members of the project team notified their personal contacts of the survey
4. The Chair of the Lancashire Branch of the Institute of Directors notified her personal contacts of the survey
5. The East Lancashire Chamber of Commerce advertised the survey in a newsletter to their members
6. The CBI advertised the survey to members who had registered an interest in Education and Skills issues.
7. Employers listed on the TARGETjobs website (<http://targetjobs.co.uk/graduate-jobs/profiles>) were contacted by email or phone. Speaking to the member of staff responsible for graduate recruitment before sending the link to the survey proved to be a particularly effective strategy for recruiting employers.

Despite all these efforts only 50 employers completed the online survey; although nine employers did subsequently participate in the interviews.

7.5. Strand 3: alumni

Our aim was to distribute the online alumni survey with the help of the university's Alumni Office. The target sample included alumni graduating from UCLan between 2008 – 2010 from degree programmes in computing, forensic science, police & criminal investigation, psychology, retail management and various undergraduate programmes delivered by the School of Education and Social Science (i.e. those subjects reflected in the sample of participating undergraduates).

Some alumni were contacted in July 2011 and others in October 2011. It was originally anticipated that the alumni being targeted would be sent reminder emails to improve the response rate. However, this proved impossible to implement. In summer 2011, the university invested in new software to facilitate the sending of global emails. Unfortunately, technical problems with the new software meant that a huge back-log of work built up. This effect was exacerbated by the fact that the demand for the sending of global emails was particularly high as the university embarked on an intensive recruitment drive to encourage applications for 2012. Furthermore, the departure of the postdoctoral research assistant from the team at the beginning of December 2011 meant that the alumni survey could not be kept open beyond the end of November, the point at which it might have been possible for the Alumni Office to send out reminders. The final attempt to recruit alumni involved advertising the survey via the UCLan alumni Facebook group.

In the end, only 58 alumni completed the online survey, although nine alumni did subsequently participate in the interviews.

7.6. Project publicity and dissemination of project findings

Throughout the project, the project team capitalised on any opportunities to publicise the project's aims and objectives, and results, both within the lead institution (UCLan), and more widely across the higher education sector, in the UK and internationally. Project findings were disseminated as they emerged, through conference presentations and papers, and journal articles (see Appendix 3).

A project website (http://www.uclan.ac.uk/schools/education_social_sciences/education/project_ntfs.php), established at the start of the project, was regularly updated to keep stakeholders informed of developments. The final project report will be made available via the project website and via UCLan's institutional research repository, Central Lancashire online Knowledge (CLOK (<http://clock.uclan.ac.uk/>)), powered by EPrints and supported by the Joint Information Systems Committee (JISC).

Outputs and findings

Demographic information for employers and alumni participating in the online surveys is presented in sub-sections 8.1.3 and 8.4.1 respectively. Demographic information for the undergraduates participating in the tests and survey at T1 and T3 is presented in Tables A and B respectively in Appendix 1.

8.1. Objective 1: to document what employers expect from graduates in terms of our framework of learning literacies

To gain insight into what employers expect from graduates in terms of our framework of learning literacies we used an online survey to gather quantitative data and conducted interviews with a small sample of eight employers who completed the survey; the views of the deaf employer from a deaf organisation are presented in section 8.7.

8.1.1. Demographics of the eight employers participating in interviews

1. Employer 1 (EMP1): Partner (male) in a large Law firm in the NW, specialising in injury claims
2. Employer 2 (EMP 2): Head (male) of a materials technology firm in the NW, employing 250 people
3. Employer 3 (EMP3): Owner (male) of a strategic marketing network in the NW, employing a small team
4. Employer 4 (EMP4): Head (male) of a strategic investment planning team in the NW, employing 12 people
5. Employer 5 (EMP5): Graduate and Recruitment Officer (female) in a national accountancy firm, responsible for 650 people
6. Employer 6 (EMP6): Systems Technical Recruitment and Training Manager (male) for a large international company
7. Employer 7 (EMP7): HR Manager (female) in a risk assessment firm based in Scotland, employing 100 people
8. Employer 8 (EMP8): Manager (female) in the County Council Leisure Department in the NW, managing a small local team

8.1.2. Main findings from the interviews with employers

We asked the employers what skills they looked for and expected in a graduate employee, the significance of literacy, numeracy and IT skills in recruits and whether they offered additional training to increase proficiency if required, the significance of work experience and, lastly whether studying for a degree prepared individuals for work. The interviews were conducted by telephone, recorded and transcribed, with the exception of one where this was not possible and where notes were taken instead. The interviewees, who had received information about the project and had previously completed the survey, were given the questions prior to the interview. The interviews lasted for 30 minutes on average, providing the opportunity to gather more detail and comment from the employers' perspective. Although not in any way representative of all employers the eight employers do provide valuable insights to add to our understanding of employers' expectations of graduates' capabilities and preparedness for work.

In general, the interviewees reported what they perceived as a decline in standards of writing and numeracy but overall proficiency in the use of technology in graduate applicants and employees. This was most apparent at the application stage where many grammatical and information errors, such as getting the firm's name wrong, meant that a large proportion of applicants were rejected immediately. There was an acceptance that at a time of national high unemployment, with large numbers of graduates coming into the labour market, it was a daunting task for students to complete numerous job applications without success. However, the employers also commented that such a competitive environment required greater effort not less.

The employers generally expected to recruit students with a 2:1 degree from what they described as a reasonably good or 'quality' university. None selected primarily on the status of the university or even specifically on the degree subject. This was described in the interviews as accepting graduates from related subject areas, including for some wider technical or engineering subjects that contained mathematics and

science. For example the head of the material technology firm (EMP2) said that even in a highly competitive and specialist area he would look for a recruit that had a “*technical degree, a broad based degree [as] we accept that he is not going to have the precise knowledge that we are looking for*”. The majority of the employers indicated they were looking for “raw material” to train within their own business. In manufacturing or industrial processes this was described as relevant understanding, rather than specific subject knowledge.

Communication skills were highly regarded by all the employers we spoke to, being described by some as “*crucial*” and something you have got to “*be able to do*”. Communication skills were important both within an organisation, especially when working in teams, as well as externally (or outward facing) with the public and the wider business and commercial environment. The graduate recruitment officer in an accountancy firm described the interlinking of several communication areas which are needed to provide an adequate communication repertoire for work:

Yes, we are looking for the communication skills, and by communication we are talking written, verbal and interpersonal as well...we have been talking to some of our partners and managers and when you speak to them about what are commercial skills they do tend to talk a lot more about things such as communication and team work, we haven't thought of a definition but being able to get along with clients, to be positive about the environment and sensitive to their needs. (EMP5)

Many employers looked for these skills at different points in the recruitment and selection process, particularly in the interview. Graduates without good verbal and interpersonal skills were considered to be non-appointable as they presented a significant risk, potentially either upsetting the balance in a small team, something considered important for a successful and efficient working environment, in offending members of the public or not working effectively and responsively with clients. This appeared to be of key significance to employers when making recruitment and selection decisions, and one they were not prepared to take a risk with, or accept what they considered to be second best. [Lowen et al. \(2011\)](#) in their interviews with employers also found that employers were looking for generic skills such as communication and problem-solving skills and team working.

On the other hand the employers observed what they perceived to be a decline in written communication standards, but appeared to accept this as a national problem. Several employers mentioned that they have had to adjust their own standards or procedures to accommodate what they felt to be a general reduction in writing standards. In one case, where previously up to four spelling mistakes were allowed on an application form, this had been changed to ten as so many people were being rejected at this stage. Interviewees listed poor written communication skills on application forms as misuse of lower case first person, text speak, spelling errors, apostrophes placed randomly, no paragraphs, poor sentence formation and no capital at the beginning of a sentence. In one case an interviewee (EMP5) described how what once would have shocked her now ceased to be horrifying as she and her colleagues had become “*used to it now*”. In a similar comment the owner of a strategic marketing network explained:

We have a test and the response of some graduates has been abysmal in spelling issues, sentence structure is poor...ask them to produce a paragraph of something it is a nightmare. It is almost like the reduction in standards has been accepted because that's how things are currently. (EMP3)

The head of a strategic investment planning team (EMP4) stated “*...half of them can't write English, which I think is a general problem industry-wide*” he continued by saying “*I think it's getting worse because of emailing and texting*”, a point made in several other interviews. For working in material and technology this was not a problem as most written communications were “*shorter and sharper*” (EMP2) with 90% carried out via emails, texting and emailing to smart phones. However, for other more text-based occupations the lack of writing skills was an issue, as this was seen to reflect badly on the firm:

I am at times troubled by the literacy issue, I'm conscious of sounding like an old fogey, but I get quite exasperated at times that people with that level of educational attainment [law degree] seem to have quite poor grammar, just not good at writing a coherent, succinct logical sentence, how to use apostrophes...it's generally not as good as it should be, on balance it is probably getting worse as kids are growing up in a culture where they are texting and not necessarily reading books in the same way. [It is a concern] as the quality of written material is seen by people outside the firm as an index of our professionalism. (EMP1)

There was an expectation that graduates came with information literacy and data handling skills, as one employer observed that young people have IT skills in “spades”, whilst another working in material technology commented “If you ask them for information they can rustle up something pretty damn quick, off their phone or their laptop” (EMP6). One employer commented that students wouldn’t be able to complete a degree now without being literate in spread-sheets, presentation and Word documents; the expectation was that they were as competent in these as they were in writing a sentence twenty years ago. Several interviewees, representing different employment sectors, responded by explaining that they needed not just proficient IT skills, described above, but also the ability to search, understand and manipulate data; what we have termed information literacy. This requires critical thinking and analysis in manipulating a range of technological tools. This skill set was described as being able to “find the information they need, be able to ascertain the point of it and what they need to get from it” (EMP7). The head of a strategic investment planning team also described how such skills needed to be applied within a fast moving commercial environment where they needed graduates:

[To be] literate in terms of organising a spread-sheet in a sensible way and they can manipulate the data. We are also looking for some level of innovation as well, looking at different ways of analysing the data, how you can prove what you’ve done and how you got there, manipulation and articulation (EMP4).

In a similar way to viewing communication literacy (both oral and written) as essential skills the employers also indicated that numeracy or mathematical understanding were important underpinning skills they looked for in graduate employees. Numeracy was described as essential by our interviewees for working in law, risk management or leisure, and critical for those working in science and technology: “Numeracy is critical; you’ve got to understand numbers at a reasonable level so you can avoid mistakes and issues that will crop up” (EMP3). Some employers felt that a relevant degree would provide an adequate level of numerical skills, as without this they would not get the degree. For them the degree provided a quality assurance. Others, however, questioned the level of skills that graduates actually left with as one employer felt that there were many gaps in understanding in the graduates he interviewed. He described a recent interview, “It might be a lapse but to ask ‘how do I find a when I’ve got b and c?’ you are thinking ‘come on you are supposed to be a graduate.’” (EMP4). As with communication literacy several employers questioned the level of knowledge, skills and competency graduates acquired at school, college and university. There was a concern that there had been a slippage of standards, with graduates being unable to perform simple mathematical tasks, or requiring additional support or training.

The interviews suggest that employers expect a basic level of communication, mathematical and information literacy in graduate applicants and employees; a level that was not always felt to be adequate. The gap between employers’ expectations and graduates’ writing skills appears to be the most significant, with general concerns about the adequacy of graduates’ numeracy skills. Employers expressed least concern about graduates’ information literacy skills, with applicants and employees considered to be information natives, often more so than their employers. Almost all of the employers stressed the need for good oral and interpersonal communication skills and most indicated that they expected to support the development of this within their own setting. Generally, people skills and the ability to work in teams was not referred to as emotional intelligence, rather as maturity, showing independence and being able to adjust to new situations. Most of our interviewees felt that they were looking for raw material which they could shape and develop within their own workplace and in line with company ethos.

8.1.3. Demographics of employers responding to the survey

Fifty employers responded to the online survey. Over 90% of respondents represented small to medium enterprises (SMEs; 52%) or the large private sector (40%), with the public sector and third sector or voluntary organisations accounting for 6% and 2% of the sample respectively. Almost a third (32%) of the 50 respondents represented accountancy or professional services firms or engineering or industrial companies, while law firms, marketing, IT or telecoms companies, consulting firms and fast-moving consumer goods companies accounted for 38% of the sample (Table 2).

Table 2. Frequency distribution with regard to employment sectors (N = 50)

Employment sector	No.
Accountancy or Professional Services Firm	7
Bank or Financial Institution	2
Charity or Voluntary Sector or special interest organisation	2
Consulting Firm	3
Electricity, Gas or Water Supply	2
Engineering or Industrial Company	9
Fast-moving Consumer Goods Company	3
IT or Telecoms Company	4
Law Firm	5
Local Government	2
Logistics	2
Marketing	4
Media Company	1
Property Development, Renting, Business or Research	1
Research and Development	2
Teaching	1

All regions of the UK were represented by one or more companies or organisations within the sample, with 48% and 58% of the sample having a presence in London and/or North West England respectively (Fig. 1).

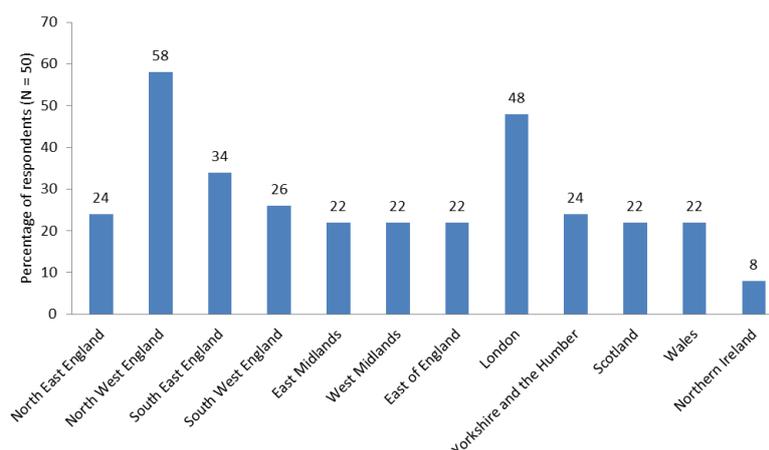


Fig. 1 Regional distribution of respondents

Graduates were employed in a variety of roles. Although 70% of responding companies/ organisations employed graduates in professional occupations, 10 - 22% of the companies/ organisations employed them in associate professional and technical occupations (22%), as managers and senior officials (20%), in sales and customer service occupations (14%), in skilled trades occupations (12%), and as administrative staff (10%) (Fig. 2).

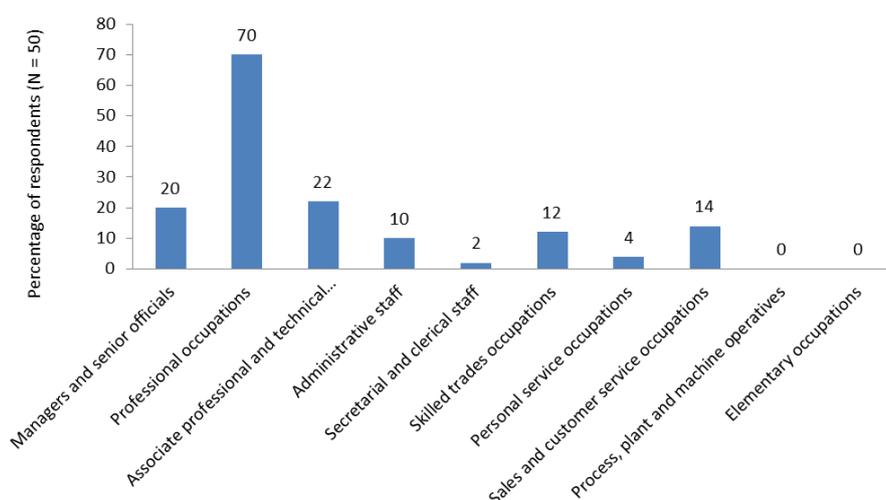


Fig. 2 Frequency distribution of capacity in which graduates are employed

8.1.4. Literacies and work experience

Although employers within the sample attached a high level of importance to all the skills listed, they attached the greatest importance to graduates’ oral communication skills and the least importance to their emotional intelligence and their ability to use spread-sheet software (Table 3). The employers also considered their recent graduate recruits to be moderately to quite competent in all 13 skills listed. However, a comparison of the level of importance employers attached to the various skills and their perception of graduate recruits’ competence in each skill reveals that for 10 of the 13 skills there existed a significant mismatch, with the level of perceived competence significantly lower than the level of importance attached to the skill (Table 3).

Table 3. Importance of skills in graduate workforce and perceived competence of graduate recruits

Skill	Mean score on Likert scale (1 = not at all; 5 = very)		p value (Wilcoxon signed rank test)
	Level of importance	Perception of graduate competence	
<i>Communication literacy:</i>			
Oral communication skills	4.8	4.0	< 0.001***
Writing effectively for a variety of audiences	4.4	3.6	< 0.001***
Writing accurately (good spelling and grammar)	4.5	3.4	< 0.001***
<i>Emotional intelligence:</i>			
Working out what other people are feeling	3.7	3.4	0.038*
Identifying own emotions at a given time	3.4	3.2	0.101
Managing own emotions effectively	3.9	3.3	0.001**
<i>Mathematical literacy:</i>			
Basic numeracy skills (e.g. calculating percentages, converting units of measurements)	4.5	3.9	< 0.001***
Interpreting data (e.g. understanding information in tables, charts and graphs)	4.4	4.0	0.010*
Numerical problem-solving	4.1	3.9	0.136
Using spread-sheet software	3.9	4.0	0.368
<i>Information literacy:</i>			
Locating relevant sources of information	4.4	3.9	0.001**

Literacies Supporting Learning and Enhancing Employability

Evaluating the quality and authority of information	4.3	3.7	0.002**
Making judgements based on the evidence contained in information	4.5	3.7	< 0.001***

Significant differences between importance and perception of competence are highlighted in blue; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Employers use a variety of methods to assess applicants' skills as part of their recruitment procedures. The interview and/or tests/assessment centres are the primary means of assessing applicants' numeracy, oral communication, emotional intelligence and information literacy skills, while applicants written communication skills are assessed via their completed application form and/or *curriculum vitae* (CV) (Fig. 3).

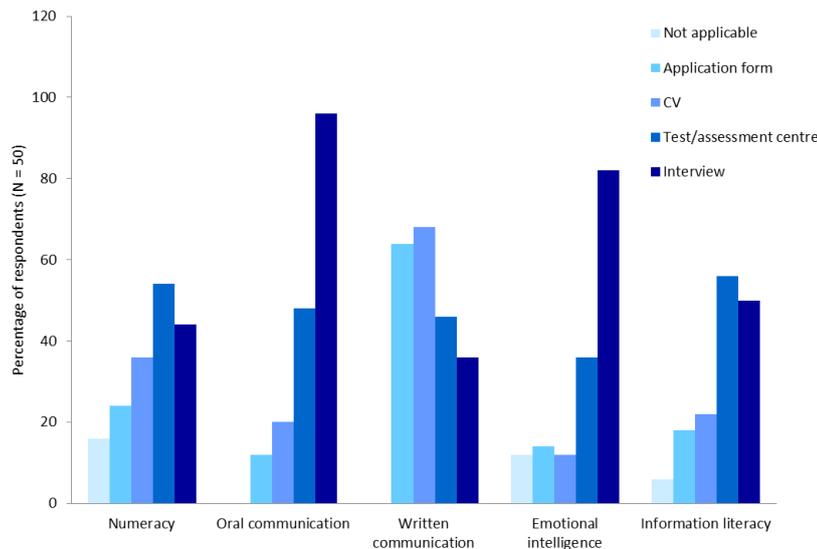


Fig. 3 Methods use to assess skills during graduate recruitment

Between 46% and 70% of respondents claimed to provide their graduate recruits with opportunities to develop one or more of the four literacies, with the greatest number providing training in oral and written communication skills (76% and 66% respectively). This was expanded upon in the interview data where the interviewee from the law firm reported his firm running a refresher grammar course which graduate entrants could attend. The managers within both the accountancy firm and the risk management firms reported in-house skills workshops as part of induction and initial training programmes. Both expected that this was the role of the employer and not just the university. The graduate recruitment officer explained:

When they do come in we do have effective writing sessions in there as well as report writing, although we do expect them to have that skill before they turn up. Are they ready to work when they come out [of university]? No, but I don't think that is the job of the university anyway. (EMP5)

This was echoed by the head of the strategic investment planning team who reiterated that employers expect to train and re-train new employees:

Most people have been through some form of graduate training scheme and they are with me for placement, but as you know as a graduate there has to be some re-training. I don't think any graduate is absolutely 100% ready to come in and do the role and they are going to need some level of training, but you expect them to progress up the learning curve quickly. (EMP4)

According to the survey data training in information literacy was offered by 70% of employers. Only 56% of companies/organisations provided training in numeracy skills, and only 46% assisted their recruits to develop their emotional intelligence.

Over a third (38%) of respondents considered previous relevant work experience to be 'very important', while 50% of respondents regarded such work experience to be 'moderately' or 'quite' important. Only 12% of employers considered such experience to be of 'little' importance (Fig. 4).

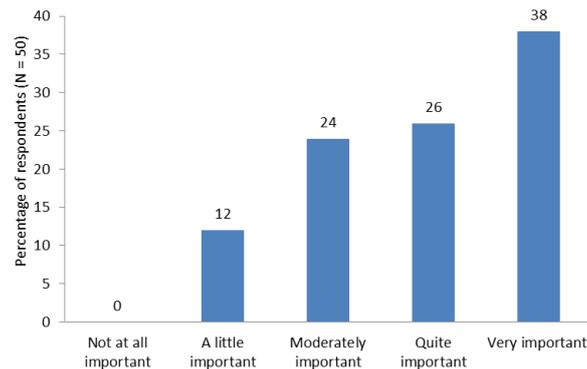


Fig. 4 Importance of previous relevant work experience when recruiting graduates

The significance of work experience was also picked up in the interviews with the employers. All considered that work experience gave the graduates an opportunity to take responsibility for themselves and for others, to work with people and to show maturity and initiative. Most were happy with a wide range of experience of work, including voluntary work, even if it did not specifically relate to the type of employment the graduate was applying for. Only one employer, working in technology, wanted previous work experience such as laboratory work that was related to the industry and the specific working environment. For the others general work experience, including working in cafés, bars and in the Students' Union, was considered to indicate the "character of the person, if they have used their initiative to go and do something different" (EMP2). Work experience was seen as developing a work ethic which was one of the most important attributes employers in our interviews looked for. This was frequently described in the interviews as having maturity; which meant being able to turn up on time, being able to work with a range of people, dressing appropriately, being able to work in a team and developing confidence. For some employers work experience was so significant they would not interview or appoint if the graduate did not have some form of experience of work:

I probably wouldn't even interview people who didn't have some kind of evidence of work experience, it doesn't have to be specific to law...actually it is very useful from our point of view to have people who have an understanding of the way other businesses operate and particularly service businesses. Sometimes it is preferable if they have seen other kinds of working environments, you've worked at the same time or worked afterwards, it's that ability to multitask and deal with a number of pressures at once that is so crucial. [Over] the years I've seen a greater awareness from kids that age of the need to have work experience and for universities giving people the opportunity to do some legal work. (EMP1)

However, this interviewee makes the distinction between work placement whilst at university and what several referred to as experience of 'real' work. This interviewee qualified his view of this difference:

It's not the same as having experience of the world of work because the pressure's not the same as in an ordinary job and the service culture isn't the same, and you have to get up to be at work at nine o'clock day after day, which is a difficult transition everyone has to make, to emotional maturity. (EMP1)

The notion of transitioning from being a student, which was seen by some as carefree, to being responsible at work was expressed as developing a work ethic, something valued by all the employers we spoke to.

8.2. Objective 2: to track and evaluate student confidence and proficiency in these literacies at their transition into HE and at key points through their 1st year in terms of the curriculum and learning process

8.2.1. Communication literacy

Reading test

The reading test, comprising four PISA ‘reading units’ (OECD, 2009), was administered to students in semester 1 (T1) and again in semester 2 (T3). Since each ‘reading unit’ was worth five marks, the total score possible was 20. Scores at T1 ranged from 4 to 20 (N = 179), while at T3 they ranged from 8.5 to 20 (N = 117). However, for those students who completed the test at T1 and again at T3 there was no significant difference between the mean score at T1 (mean = 15.3, SD = 2.8, median = 16) and that at T3 (mean = 15.4, SD = 2.4, median = 16, N = 117; $z = 0.25$, $p = 0.80$), although both mean scores are relatively high.

Communication self-efficacy

The students were ‘moderately’ to ‘quite’ confident in eight of the ten items, and between ‘quite’ and ‘very’ confident in the remaining two items (‘talking [signing] socially to friends or work colleagues’, and ‘reading instructions on equipment or assembly packs’) (Table 4). At both T1 and T3 the students appeared least confident when it came to ‘speaking (signing) in a group’, ‘structuring essays or assignments’ or ‘filling in complicated forms such as tax returns or social security applications’, even though there were significant increases in the mean scores for these three items at T3. There were significant increases in the students’ confidence at T3 for eight of the ten items, the exceptions being ‘talking (signing) socially to friends or work colleagues’ (item 1) and ‘communicating own ideas in writing’ (item 6).

Table 4. Scores for individual items on the communication literacy self-efficacy scale at T1 and T3

Survey items	T1		T3		Standardized test statistic z	p value
	Mean	Median	Mean	Median		
1. Talking (signing) socially to friends or work colleagues	4.1	4.0	4.1	4.0	0.291	0.771
2. Reading instructions on equipment or assembly packs	4.0	4.0	4.2	4.0	2.334	0.020*
3. Using correct spelling and grammar	3.7	4.0	3.9	4.0	2.593	0.010*
4. Reading articles or books in your subject area	3.7	4.0	3.9	4.0	2.191	0.028*
5. Talking (signing) about your subject area	3.3	3.0	3.6	4.0	3.499	<0.001***
6. Communicating your own ideas in writing	3.3	3.0	3.5	4.0	1.847	0.065
7. Understanding what is expected for university level writing	3.2	3.0	3.6	4.0	3.499	<0.001***
8. Speaking (signing) in a group	3.2	3.0	3.4	4.0	2.402	0.016*
9. Structuring essays or assignments	3.2	3.0	3.5	4.0	3.114	0.002**
10. Filling in complicated forms such as tax returns or social security applications	3.0	3.0	3.3	3.0	2.463	0.014*

Wilcoxon signed-rank tests used to compare scores at T1 and at T3; N = 116

Significant differences between score at T1 and T3 are highlighted in blue; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Factor analysis revealed that the 10 items on the communication self-efficacy scale loaded onto two factors: (i) self-efficacy in speaking and listening (items 1, 5 and 8; max. possible score 15), and (ii) self-efficacy in reading and writing (the remaining 7 items; max. possible score 35). There were significant increases in the mean scores for both factors at T3 (Table 5), suggesting that the students’ confidence in their communication literacy increased during their first year at university; although this contrasts with the lack of any significant increase in ‘reading’ proficiency between T1 and T3, the mean test scores were relatively high (see discussion of the reading test results above).

Table 5. Scores for the two factors for communication literacy at T1 and T3

Factors	T1		T3		Standardized test statistic z	p value
	Mean	Median	Mean	Median		
Self-efficacy in speaking and listening	10.6	11.0	11.2	12.0	2.369	0.018*

Self-efficacy in reading and writing	24.1	25.0	25.9	27.0	4.496	< 0.001***
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Wilcoxon signed-rank tests used to compare scores at T1 and at T3; N = 116

Significant differences between score at T1 and T3 are highlighted in blue; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The transition to university required the students to learn and develop new skills, particularly in the area of academic writing. In terms of their written communication skills many described being spoon-fed by school teachers or college tutors who gave them pre-digested information and did not require material to be referenced. Many students in the first interviews described struggling, being challenged and being annoyed with themselves when they realised that their skills and knowledge were not adequate:

I was annoyed because I made referencing errors in the first piece of work I did. I don't mind writing as such, it is just trying to put it in English. I can do sentences normally, it's quoting things which is something difficult, trying to remember how to quote correctly whilst referencing. (John)

Pauline explained that to make this adjustment she, like the other students, would need to “take more responsibility for my work, so in that way it is a big leap, I think especially the reference side of it”. Simon referred to this process as adapting to what was required by working at this level. To improve these skills the students relied upon feedback from tutors and several used the university student support systems including WISER where students can access individual academic support. Even where not actually accessed many of the students mentioned this as a significant resource they were aware of and would use if necessary. It was considered an important safety net. Another significant area where students developed support in academic writing was through informal networks and peer support.

Whilst referencing was clearly a challenge at the point of transition, the students valued written assignments; rather than being something to be avoided most saw these as providing structure to help them develop what they saw as necessary skills to succeed at university and to be able to graduate into employment. For example, Patrick, as a mature student from a land-based occupation, described coming back into education where he wanted to develop essay writing and study skills to improve his overall writing skills to enhance new employment opportunities. Natalie described learning through practise provided by writing essays which helped her improve. In the first interview she described her difficulties:

My English isn't particularly strong, so I've always struggled with exams...I need to work on sentence structure and stuff because that is one of the biggies that I keep getting pulled up on. I've been pulled up for years because I did tapeworm sentences. I am aware of it which is a good point, I identified the problem but I can't do anything about it as I'm missing some of the basic underlying things, I couldn't tell you the difference between a verb and a noun or adjective. (Natalie)

By the second interview at the end of the first year Natalie felt that she had made progress stating “I have got so much better, I think it is the amount of essays and I am utilising the tutors”. Rachel also described gaining confidence both generally and specifically in quoting and referencing correctly. Daniel, a Computing student, also recorded progress and independently used a variety of web resources to help him learn and practise these skills. Both Helen and Martin acknowledged their progress and the significance of practise over time in their second interviews. Two interviewees, Ben and John (quoted above being annoyed at his lack of referencing skills) recorded less progress in writing, although both were considerably more confident in their general writing skills at the start of their undergraduate careers.

Oral communication and group work skills were also felt to have improved from the point of transition to university to finishing the first year. Most reported having good listening skills, apart from Peter a Computing student, who described himself as “naturally not a good listener”. This however was the exception within the student interviewees. Speaking within groups and presenting work for assignments was seen as developing communications skills:

I actually spoke in three presentations, they were quite good...with the last one I was really proud because in the first two I'd got my notes in my hand and for the last one I thought I'm not going to have my notes, it was easier. (Pauline)

John remarked that practising these skills improved his confidence and made him more sociable. Patrick, who has a hearing impairment, felt that he had become more confident in small groups, although larger groups

were still challenging because of his hearing difficulty. Suleman linked improvements in his writing, supported by WISER, to his increased confidence in presenting orally at university which was different to what he did outside:

It's definitely improved my writing standard, especially for the presentation as well. I think that has had a big impact and improved my speaking. I was confident before because I do the [religious] singing, but that is just singing and speaking to large group and presenting something that is totally different. (Suleman)

Lucy described learning to develop her oral communication in her interaction with tutors, being able to talk to them and discuss her work. This was observed as different to the relationship that was possible with teachers at school and tutors at college or sixth form. Development of these skills was supported through group work and working with others. In the first interviews John also picked up on the different methods of teaching and learning before university, at school or college, and what he experienced as an undergraduate:

It's quite different here because they split you into groups now and again, in the second year there is more group work. At school it was classes then individual learning, then individual homework and presentations. I don't speak well to a huge group of people very well unless have some sort of structure. (John)

By the second interview he reported that he worked well in his small group and that it was “*getting easier as I think I am better at working in a group*”. Bradley reported that his confidence had increased and that he worked better with his group as he got to know them over the year. Several interviewees explained that working in groups provided them with the opportunity to learn how to work with others, to develop wider communication and group work skills outside of, and in addition to, their subject knowledge. Trevor who felt that he was quite good at writing did not feel confident in speaking in front of people, something he wanted to develop as part of his oral delivery skill. For some it was a baptism of fire as Peter commented, “*I was terribly nervous and went bright red as I was talking. I did do well and didn't bring my notes with me and I didn't stutter or forget anything. After doing that I am much more confident now of doing it again.*”

8.2.2. Mathematical literacy

Mathematical literacy test

The mathematical literacy test, comprising ten PISA items (Cleary *et al.*, 2010), was administered to students in semester 1 (T1) and again in semester 2 (T3). Since marks were awarded for partially correct answers in five of the ten items, the maximum score possible was 16.

Scores at T1 ranged from 0 to 16 (mean = 8.1, SD = 3.1, N = 179), and at T3 from 2 to 16 (mean = 9.6, SD = 3.4, N = 117). For those students who completed the test at T1 and again at T3 there was a significant increase in the mean score from 8.7 (SD = 3.1, median = 9) at T1 to 9.6 (SD = 3.4, median = 10, N = 117; $z = 3.75$, $p < 0.001$) at T3. It is surprising that the students did not perform better in the test at T1 and at T3, since the test items were designed for 15-year olds, all the students possessed a pre-university mathematics or numeracy qualification, and some (27%) possessed an AS or A2 (or equivalent) qualification in mathematics (see Tables A and B in Appendix 1). However, factors other than mathematical proficiency may have played a role, e.g. pressure of time, lack of confidence, maths anxiety.

Mathematical self-efficacy and attitude towards and beliefs about mathematics

There were no significant changes in mean scores at T3 for any of the scales (Table 6). It is perhaps not surprising that students had not changed their views about the nature of intelligence, and had not altered in terms of being either learning- or performance goal oriented. But the results suggest that the undergraduates' first year experience had done little, if anything, to increase their confidence and persistence in mathematics and reduce their levels of anxiety. Although the results appear disappointing, given that 77% of students participating at T1 and 78% of students participating at T3 were enrolled in Psychology, Forensics or Computing, students within the sample had been moderately confident and persistent from the outset (see following discussion) and so little statistically significant change might have been anticipated in the six months between T1 and T3.

Table 6. Scores for the mathematical self-efficacy and attitude/belief scales at T1 and T3

Scales	T1		T3		Standardized test statistic z	p value
	Mean	Median	Mean	Median		
Mathematical self-efficacy	32.6	33.0	33.4	35.0	1.763	0.078
Confidence in maths	18.0	18.0	17.8	19.0	-0.947	0.343
Maths anxiety	10.0	10.0	10.1	10.0	0.384	0.701
Theory of intelligence	18.0	18.0	18.4	19.0	1.070	0.285
Persistence	19.8	20.0	20.2	20.0	1.798	0.072
Learning goals	14.1	14.0	14.2	15.0	0.533	0.594
Performance goals	15.4	15.5	15.7	15.0	0.333	0.739

Wilcoxon signed-rank tests used to compare scores at T1 and at T3; N = 116

Mathematical self-efficacy:

The self-efficacy scale asked students to indicate their level of confidence with regard to the nine specific mathematical tasks covered by the mathematical literacy test. The students appeared ‘moderately’ to ‘quite’ confident they could complete all nine mathematical tasks, although at both T1 and T3 they were least confident about ‘making use of quadratic functions’ (Table 7). There were significant increases in the students’ confidence at T3 for three of the nine items, namely ‘understanding graphs and charts presented in newspapers’ ‘converting money from one currency to another’ and ‘making use of quadratic equations’.

Confidence in maths and maths anxiety:

Scores for items in the confidence scale suggest that the participating undergraduates were moderately confident about their mathematical skills. Scores for items in the anxiety scale reinforced that participating undergraduates were moderately confident about their mathematical skills and not particularly anxious when it came to maths classes or maths problems. It is, therefore, perhaps not too surprising that there were no significant differences in any of the mean scores between T1 and T3 (Table 7).

Theory of intelligence:

The students’ responses indicate that, overall, they considered intelligence to be a malleable rather than fixed entity; perhaps not surprisingly their view did not change at T3 (Table 7).

Persistence:

The students’ responses to six of the seven items suggested that they were moderately persistent when it came to completing mathematical tasks. However, their response to item 33 indicated an avoidance of challenging mathematical tasks; this decreased slightly but significantly at T3 (Table 7).

Learning and performance goal orientation:

Although the participants appeared to be slightly more learning goal than performance goal orientated, there is clearly room for improvement.

Table 7. Scores for individual items on the mathematical self-efficacy and attitude/belief scales at T1 and T3

Survey items	T1		T3		Standardized test stat z	P value
	Mean	Median	Mean	Median		
Mathematical self-efficacy:						
1. Solving an equation like $3/x=9$	3.8	4.0	4.0	4.0	1.601	0.109
2. Understanding graphs and charts presented in newspapers	4.0	4.0	4.2	4.0	2.978	0.003**
3. Converting money from one currency to another	3.7	4.0	3.9	4.0	2.793	0.005**
4. Estimating the area of a 2-dimensional shape	3.8	4.0	3.6	4.0	-1.662	0.096
5. Computing the perimeter of simple 2-dimensional shapes	3.8	4.0	3.7	4.0	-0.950	0.342
6. Making use of quadratic functions	3.0	3.0	3.2	3.0	2.775	0.006**
7. Converting units of measurement from	3.6	4.0	3.6	4.0	-0.190	0.849

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	metres to kilometres						
8.	Explaining in writing a simple mathematical concept you understand	3.5	3.5	3.6	4.0	1.472	0.141
9.	Interpreting the likelihood of an event as reported by the media	3.5	3.5	3.6	4.0	1.203	0.229
Confidence in maths							
10.	I learn mathematics quickly	2.9	3.0	2.8	3.0	-0.986	0.324
11.	I feel confident in approaching mathematics	2.9	3.0	2.8	3.0	-1.205	0.228
12.	I can get good marks in mathematics	3.0	3.0	3.0	3.0	-1.808	0.071
13.	I have trouble understanding anything with mathematics in it	1.9	2.0	1.9	2.0	0.299	0.765
14.	Mathematics is one of my worst subjects	2.1	2.0	2.1	2.0	-0.262	0.793
15.	I am just not good at mathematics	1.9	2.0	1.9	2.0	-0.598	0.550
Maths anxiety							
16.	I get very nervous during maths classes	1.8	2.0	1.9	2.0	1.433	0.152
17.	I often worry that it will be difficult for me in maths classes	2.0	2.0	2.0	2.0	-0.312	0.755
18.	I often feel helpless when doing a maths problem	1.9	2.0	1.9	2.0	-0.118	0.906
19.	Mathematics makes me feel uneasy and confused	1.9	2.0	1.9	2.0	0.141	0.888
20.	I usually feel at ease doing mathematics problems	2.7	3.0	2.6	3.0	-0.568	0.570
Theory of intelligence							
21.	You have to be smart to do well in maths	2.3	2.0	2.2	2.0	-1.884	0.060
22.	People are either good at maths or they are not	2.5	3.0	2.5	3.0	-0.395	0.693
23.	Some people will never do well in maths no matter how hard they try	1.9	2.0	1.9	2.0	0.505	0.614
24.	You can succeed at anything if you put your mind to it	3.3	3.0	3.4	3.0	1.616	0.106
25.	You can succeed at maths if you put your mind to it	3.3	3.0	3.3	3.0	1.336	0.182
26.	Everyone can do well in maths if they work at it	3.1	3.0	3.2	3.0	0.747	0.455
Persistence							
27.	I will risk showing that I don't know something in order to acquire new mathematical knowledge	3.0	3.0	3.0	3	0.297	0.766
28.	I am most proud of my mathematical performance when I feel I have done my best	3.2	3.0	3.3	3	2.096	0.036*
29.	When presented with a choice of mathematical tasks, my preference is for a challenging task	2.5	3.0	2.6	3	0.832	0.406
30.	When presented with a mathematical task I cannot immediately complete, I increase my efforts	3.1	3.0	3.0	3	-0.837	0.403
31.	When presented with a mathematical task I cannot immediately complete, I persist by changing strategy	2.9	3.0	3.0	3	1.107	0.268
32.	When presented with a mathematical task I	1.7	2.0	1.7	2	0.000	1.000

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	cannot immediately complete, I give up						
33.	When presented with a choice of tasks, my preference is for one I know I can complete	3.1	3.0	3.0	3	-2.424	0.015*
Learning goals							
34.	I work at maths because I like finding new ways of doing things	2.6	3.0	2.6	3.0	0.006	0.995
35.	I work at maths because I like learning new things	2.8	3.0	2.8	3.0	0.851	0.395
36.	I work at maths because I like figuring things out	3.0	3.0	2.9	3.0	-0.867	0.386
37.	I work at maths because I want to learn as much as possible	2.8	3.0	2.9	3.0	0.430	0.667
38.	I work at maths because it is important for me that I understand the ideas	2.9	3.0	3.0	3.0	0.518	0.604
Performance goals							
39.	I work at maths because I want other people to think I'm clever	1.9	2.0	2.1	2.0	1.518	0.129
40.	I work at maths because it is important to me that the lecturer/tutor thinks I do a good job	2.4	2.5	2.4	2.0	0.027	0.978
41.	I work at maths because I don't want people to think I'm stupid	2.2	2.0	2.1	2.0	-0.090	0.928
42.	I work at maths because it is important for me to do better than the other students	2.1	2.0	2.2	2.0	0.898	0.369
43.	I work at maths because I don't want to do worse than the other students in the class	2.5	3.0	2.5	3.0	0.314	0.753
44.	I will sacrifice acquiring new mathematical knowledge in order to avoid looking stupid	2.0	2.0	1.8	2.0	-1.291	0.197
45.	I am most proud of my mathematical performance when I feel my performance made me look good	2.5	3.0	2.6	3.0	1.185	0.236

Wilcoxon signed-rank tests used to compare scores at T1 and at T3; N = 116

Significant differences between score at T1 and T3 are highlighted in blue; * $p < 0.05$; ** $p < 0.01$

In the first interview the students described their confidence and proficiency in maths as they left school or college and entered university as an undergraduate student. Overall, the students in our sample of twenty (from subjects including Psychology, Police Studies, Education, Computing, Forensic Science, Deaf Studies, Retail, and Geography) described being confident at maths, something that may relate to the subjects being studied rather than the student population at the university more generally. Their positive attitude and confidence related strongly to their prior experience and success whilst at school or college, as indicated by Trevor who reported, *"I don't have a problem with maths, I used to enjoy it at school, so it's not really bothering me that much"*, and also Natalie who said *"I'm quite confident with maths, I enjoy it"*. Most had studied mathematics to GCSE level, with several gaining A Level maths, two at A*. However, some questioned its relevance to them now, for example Ben, who had gained an A level in mathematics said *"I don't think maths is ever useful"*. Simon, who gained a B at GCSE, felt more negative *"I think it's more in my head because I just don't like maths. I hate maths and I love English, how do you love maths? It's horrible"*. Patrick who indicated it wasn't his favourite subject nevertheless felt confident at having a go at it.

In the second interview, shortly before they completed their first year, they described their progress, or lack of it. Several of the students indicated that their confidence and proficiency in maths was affected by the amount of practise they had. Daniel reported that his maths had improved as he was using it on a daily basis rather than several times a week as previously at college. On the other hand, many felt that their skills had deteriorated through lack of use. Jenifer, for example, felt that *"It's changed; it has probably got worse if it has changed because I don't use it all now. I've gone from using it every day to not using it at all, it's like anything if you don't use it you lose it"*. John also noted that his numeracy might have deteriorated between interviews as

he wasn't using maths much on his Police Studies course, but he remained confident that this was sufficient for what he needed. Several of the students we interviewed realised that lack of practise was impacting on their confidence and proficiency and took action themselves rather than expecting this to be done for them. Peter developed a system to improve his maths proficiency and confidence in his first year:

I actually brought an A level revision guide for maths. I brought a white board for my house and I got post-it notes all over my walls so I could learn the equations, sin, cos and tan and something called Atan. So I'd say my confidence has gone through the roof after that project. (Peter)

Pauline also planned self-directed learning over the summer holidays and before the second year. She explained that "through the summer holidays that's what I'm going to be working on, just making sure I've got all the different tests and everything so I've got it clear in my head".

8.2.3. Information literacy

Self-efficacy:

Factor analysis revealed that the 50 items on the self-efficacy scale loaded onto four factors: (i) locating, accessing and using information (items 1 – 19, 23, 45; max. possible score 105), (ii) critical evaluation of information (items 25 – 37, 41, 42, 46,47 ; max. possible score 85), (iii) understanding procedures related to handling information (items 38 – 40, 43, 44, 48 - 50; max. possible score 40), and (iv) specific search strategies (items 20 – 22, 24; max. possible score 20). There were significant increases in the mean scores at T3 for all four factors (Table 8), suggesting that the students' confidence in their information literacy increased significantly during their first year at university. A conclusion reinforced by a comparison of the students' scores for the individual scale items at T1 and T3, which reveals that for 49 of the 50 items the students' confidence had increased significantly by T3 (Table 9).

We examined whether or not participants possessed a pre-university ICT qualification. Of the 117 students who completed the survey at T1 and T3, 68% possessed an ICT qualification up to GCSE level and 21% had attained a qualification at a higher level (e.g. AS or A2 or equivalent); 2% possessed overseas qualifications. Only 9% of participants did not possess an ICT qualification (see Table B in Appendix 1).

Table 8. Scores for the four factors for information literacy at T1 and T3

Factors	T1		T3		Standardized test statistic z	p value
	Mean	Median	Mean	Median		
Locating, accessing and using information	67.5	68.5	75.3	80.0	6.730	<0.001***
Critical evaluation of information	33.0	33.0	36.7	37.0	5.973	<0.001***
Understanding procedures related to handling information	30.2	32.0	32.5	64.0	6.520	<0.001***
Specific search strategies	9.8	10.0	11.3	12.0	5.253	<0.001***

Wilcoxon signed-rank tests used to compare scores at T1 and at T3; N = 116

Significant differences between score at T1 and T3 are highlighted in blue; ***p < 0 .001

Table 9. Scores for individual items on the information literacy self-efficacy scale at T1 and T3

Survey items	T1		T3		Standardized test stat z	P value
	Mean	Median	Mean	Median		
Using library catalogues:						
1. Can access the UCLan library catalogue	4.4	5.0	4.7	5.0	3.918	< 0.001***
2. Can locate books and journals using the catalogue	4.1	4.0	4.4	5.0	3.111	0.002**
3. Know what the Dewey Decimal Classification (DDC) system is	3.0	3.0	3.5	4.0	3.833	< 0.001***
4. Can identify DDC classmarks on the catalogue and on books	3.0	3.0	3.6	4.0	3.904	< 0.001***

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5.	Can limit your search to just look for journal titles	3.9	4.0	4.2	5.0	2.260	0.024*
6.	Can limit your catalogue search by date range	3.9	4.0	4.1	5.0	1.992	0.046*
7.	Can limit your catalogue search by format (DVD, audio, Braille, etc)	3.8	4.0	4.1	5.0	3.098	0.002**
8.	Can locate and access full-text e-books and e-journals via the catalogue	3.8	4.0	4.3	5.0	5.128	< 0.001***

Locating and using academic journals

9.	Understand the purpose of academic journals	3.9	4.0	4.3	5.0	4.990	< 0.001***
10.	Understand what peer review is	3.6	4.0	4.1	4.0	4.705	< 0.001***
11.	Understand what an abstract is	3.7	4.0	4.2	5.0	4.290	< 0.001***
12.	Understand the purpose of a literature review	3.4	3.5	4.1	4.0	5.043	< 0.001***
13.	Can find resources listed in a bibliography or list of references	4.0	4.0	4.5	5.0	5.539	< 0.001***
14.	Can differentiate a book from a journal on a reading list	3.7	4.0	4.2	5.0	4.590	< 0.001***
15.	Can locate and use printed journals in the library	3.6	4.0	4.0	4.0	3.023	0.003**
16.	Can locate and use electronic journals via Library Online	3.8	4.0	4.3	5.0	4.567	< 0.001***
17.	Can use references in articles to identify further relevant articles	3.8	4.00	4.4	5.0	5.650	< 0.001***
18.	Can identify sources of information relevant to your course	4.0	4.0	4.4	4.5	4.406	< 0.001***
19.	Can identify keywords and key concepts contained in an essay question when you start an assignment	3.9	4.0	4.3	4.0	4.968	< 0.001***
20.	Can combine keywords using Boolean operators	2.9	3.0	3.4	4.0	3.604	< 0.001***
21.	Understand the difference in function between the Boolean operators AND and OR	3.2	3.0	3.7	4.0	4.188	< 0.001***
22.	Can broaden your search using alternative terms and synonyms	3.6	4.0	4.2	4.0	4.823	< 0.001***
23.	Can narrow your search using date limiters	3.6	4.0	4.1	4.0	4.721	< 0.001***
24.	Can narrow your search by looking for phrases in parentheses	3.6	4.0	3.9	4.0	3.471	0.001**
25.	Can reflect on your search strategy and think how it can be improved	3.6	4.0	4.0	4.0	4.679	< 0.001***

Evaluation and critical thinking

26.	Can make judgements based on evidence	3.9	4.0	4.2	4.0	3.880	< 0.001***
27.	Understand how the quality of academic information is maintained by the peer-review process	3.6	4.0	4.1	4.0	4.983	< 0.001***
28.	Can evaluate the authority and quality of the information you find	3.6	4.0	4.1	4.0	4.776	< 0.001***
29.	Can evaluate information for bias	3.6	4.0	4.1	4.0	5.082	< 0.001***
30.	Can evaluate information for currency (how up to date it is)	3.7	4.0	4.1	4.0	4.440	< 0.001***
31.	Can make relevance judgements about the information you find.	3.8	4.0	4.3	4.0	5.030	< 0.001***
32.	Can evaluate the accuracy of the information you find.	3.6	4.0	4.0	4.0	3.646	< 0.001***

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33. Can detect a lack of reasoned argument	3.5	3.0	4.0	4.0	4.945	< 0.001***
34. Can tell when inferences are not supported by evidence or argument	3.5	3.0	3.9	4.0	3.856	< 0.001***
35. Can evaluate the quality and authority of information on the Internet	3.7	4.0	4.0	4.0	3.289	0.001**
36. Can identify if a Webpage has been produced by a university	3.9	4.0	4.3	4.0	3.974	< 0.001***

Ethical and legal use of information

37. Know how much you can legally photocopy from a book for study and research purposes	2.8	3.0	3.2	3.0	2.596	0.009**
38. Are able to cite/reference your sources using a recognised referencing style	3.9	4.0	4.5	5.0	6.563	< 0.001***
39. Know which referencing style your School recommends	4.3	5.0	4.7	5.0	4.268	< 0.001***
40. Understand what plagiarism is	4.5	5.0	4.8	5.0	3.381	0.001**
41. Can protect your personal data online	3.8	4.0	4.2	4.0	3.581	0.001**
42. Are aware of the limitations on copying, using and re-publishing content found on the Internet	3.7	4.0	4.0	4.0	2.572	0.010*

Managing and communicating information

43. Are able to store and organise the information you create and find, using the network and folders	4.2	4.0	4.5	5	3.354	0.001**
44. Can use Microsoft Word effectively	4.6	5.0	4.8	5	1.901	0.057
45. Can compile a bibliography	4.1	4.0	4.6	5	5.694	< 0.001***
46. Understand that academic writing is structured, requiring certain elements.	4.0	4.0	4.3	5	3.828	< 0.001***
47. Can compile a literature review	3.0	3.0	3.5	4	4.069	< 0.001***
48. Can write essays	3.9	4.0	4.2	4	3.646	< 0.001***
49. Know what a URL is	4.4	5.0	4.6	5	3.346	0.001**
50. Know what a pdf is	4.2	5.0	4.6	5	3.943	< 0.001***

Wilcoxon signed-rank tests used to compare scores at T1 and at T3; N = 116

Significant differences between score at T1 and T3 are highlighted in blue; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Most of the students said they were reasonably confident with general IT skills as they had developed these at school, college or in previous employment. They were familiar with using software such as Word, Windows applications, including PowerPoint, and described learning new tools such as Excel and SPSS with a mixture of success, some finding it straightforward and others getting upset or hating it. Nearly all the students described searching for material on databases as difficult to start with as this was way out of their experience before coming to university. The shift to higher expectations for academic writing and referencing was experienced as hard, Flora described how *“finding e-journals and things like that are more difficult”* she thought these were skills that would develop as *“the more I do the easier it will get”*. The idea of learning through practise and independent learning was echoed by several other students in their early interviews. For example Pauline explained *“it’s like trial and error, [you] just keep going until you’ve got it right”* and Simon said *“I think that’s how you learn, you have a go and see what you can find. I think that’s how I found out a lot of stuff, just having a bit of a browse and seeing what you can find”*. They were also developing a wider understanding of what was available and how this added to their understanding and learning. This was in contrast to experiences of what was described by several students as being spoon-fed whilst at school or college:

When you find the articles they are so much more interesting, it’s the genuine thing. Sometimes I do find that they differ a bit from the books once I know what I’m looking for. That is something I want to improve upon. (Pauline)

By the second interviews the students described, with one exception, becoming more confident and more proficient:

I'm using the library more especially now when it comes to finding books and going online, using the online library journals and books, yes that is fine now. (Helen)

Most of the students felt supported by university staff, both academic and technical, in developing these skills. Many, as discussed later, also developed informal and peer support to share knowledge and at times access to software and equipment. Whilst in the first interviews there was considerable anxiety about searching and referencing information correctly, as this had not been done at school and college, by the second interview the majority had become proficient with some describing themselves as enjoying the new knowledge and skills and, even as Daniel remarked, becoming a “fan” of electronic journals.

8.2.4. Emotional literacy

Students completed the Situational Test of Emotion Management (STEM; MacCann & Roberts, 2008) and the Emotional Self-Efficacy Scale (ESES; Kirk et al., 2008) at the beginning of semester 1 (T1) and again in semester 2 (T3). Students in Psychology at UCLan test their emotional intelligence (EI) and are given opportunities to work to improve these skills in discussion with their personal tutor; students enrolled in other disciplines who completed the STEM and ESES were not given these opportunities on their courses; these non-psychology students had also not taken advantage of an EI module which is available to all students from any discipline at UCLan. Thus, what follows is an examination of changes on the STEM and ESES for both sets of students (i.e. those enrolled in Psychology and those enrolled in other subjects).

Emotional Intelligence Test

In the STEM, students were presented with details of 30 emotional situations, requiring the management of emotions in the self and/or others, and asked to select the most effective way of managing the situation from a list of four alternatives. Scoring for the STEM is based on expert ratings. STEM scores are associated with the person’s ability to manage their own emotions effectively. For Psychology students and for those from other disciplines completing the STEM, there was no significant change in scores between at T1 and T3 (Table 10).

Table 10. Scores for emotional intelligence (STEM) at T1 and T3

Student Group	T1		T3		t statistic	p value
	Mean	Median	Mean	Median		
Psychology students (n = 36)	191.8	200.0	198.8	200.0	0.86	0.39
Students from other subjects (n = 80)	187.8	195.2	188.0	198.9	0.02	0.98

Paired samples t-tests used to compare scores at T1 and T3

Emotional Self-Efficacy

The Emotional Self-Efficacy Scale (ESES) comprises 32 items, which assess self-perception of emotion-related skills. Students rated their responses using a 5-point Likert scale ranging from “Not at all confident” to “Very confident”. Previous analysis (Dacre-Pool & Qualter, 2011) has revealed that items on the ESES load onto four factors: (1) using and managing your own emotions, (2) identifying and understanding your own emotions, (3) dealing with emotions in others, and (4) perceiving emotion through facial expressions and body language. We examined changes in these sub-scale scores for Psychology students and students enrolled in other disciplines. Results reveal that Psychology students scored higher on three of the four sub-scales of the ESES at T3 compared with T1, whilst students studying other subjects scored higher on only the factor associated with using and managing emotions (i.e. ESE factor 1) (Table 11).

Table 11. Scores for sub-scales of the Emotional Self-Efficacy Scale at T1 and T3

Student group	T1		T3		t statistic	p value
	Mean	Median	Mean	Median		
Psychology students:						
ESE Factor 1 – Using and Managing	30.2	29.6	34.9	34.0	3.81	0.001**

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Emotions						
ESE Factor 2 – Identifying and Understanding Own Emotions	22.4	22.9	26.8	24.7	4.43	0.001**
ESE Factor 3 – Dealing with Emotions in Others	30.2	20.7	36.7	32.2	3.68	0.001**
ESE Factor 4 – Perceiving Emotion through Body Language	11.5	11.8	12.2	12.5	1.60	0.12
Students from other subjects:						
ESE Factor 1 – Using and Managing Emotions	30.5	30.3	32.6	32.8	2.60	0.01*
ESE Factor 2 – Identifying and Understanding Emotions	22.3	22.6	23.4	23.9	0.44	0.66
ESE Factor 3 – Dealing with Emotions in Others	29.1	29.6	30.1	30.3	0.65	0.51
ESE Factor 4 – Perceiving Emotion through Body Language	10.9	11.2	10.9	11.2	1.28	0.20

Paired samples *t*-tests used to compare scores at T1 and T3. N = 116

Significant differences between score at T1 and T3 are highlighted in blue; * $p < 0.05$; ** $p < 0.01$

The term emotional literacy was not used by the students in the interviews where we asked about their transition from school and college and adjustment to university life. Most described a positive experience which was about making friends, finding their way around the university systems and expectations of them as students. Several students such as Simon had prepared by finding out information about their course, the university environment and university services:

I think I was quite prepared for what it was going to be like because I did a lot of research about it. I was on a lot of websites looking at what it is going to be like, things like Fresher's week. (Simon)

Others, such as Ben and Pauline, joined the Flying Start programme run by the university prior to starting, as an induction course (www.uclan.ac.uk/study/flying_start/index.php). Whilst Patrick investigated university websites for particular information about supporting students like himself who had hearing loss. He reported that UCLan was the university that showed what he described as the most enthusiasm for his application and his experience had been excellent, "so everything has been excellent, if anything it has exceeded my expectations". For a minority university life was a shock to start with as Stuart described:

I was a bit of a fish out of water at the start, I wasn't sure what I would be doing or where I was going to go because of my grades, they weren't as good as they should have been because I was having psychological issues...being an impoverished student was quite a shock and I feel I didn't have the best start [with bad time keeping] but from my bad start I might have learned quite a lot. (Stuart).

For the majority, coming to university provided the opportunity to develop new skills and new friends. After finding their feet in the first few days the students described settling in well, meeting different people and forming friendship groups, often around shared accommodation or subject groups. These friendship groups were given great significance, with one student describing this as a new family and another as an intimate support group. Some, like Flora gravitated to people they saw as similar to them, "I come from a council estate so I would probably gravitate towards ones who I think are more like me" whilst others although concerned about differences had wider friendship groups. Mature students like Jennifer and Stuart were concerned in the first interview about the differences in age, by the second interview this was not experienced as a problem:

We are all close, we came close straight away, we always meet each other before or after [class] to talk about it...my main issue was how I was going to adapt because I felt like I was much older. (Jennifer)

For Stuart living in residential halls provided the structure to develop friendships with a wider group than he anticipated prior to coming to university:

Living in halls is the best experience I have ever had, I've got brilliant flatmates, I don't think I would have met half as many people if I was in independent living or on my own. Now that lectures have finished I'm taking time to put myself in the middle of it, just to cement friendships. (Stuart)

There were occasional disputes and challenges with shared living arrangements reported in the second interview although generally people described staying within the same friendship groups and developing connections to others either through mutual friends or in social network spaces such as Facebook. Adjusting to new people and new living arrangements was seen as part of growing up and becoming independent, for some an important aspect of coming away to university:

It is interesting living with people that you have never meet before, I suppose it could be a challenge, you are just in with a mixed bunch which I suppose is a good thing, if you are with people exactly like you you're never going to meet anyone a bit different are you? (Simon)

Part time students and those living at home found it more difficult to develop friendship groups as quickly, negotiating these in a different way to sharing accommodation or 'nights on the town'. This different process did not prevent most feeling like a student as the lack of socialising hadn't detracted from the overall university experience. Single parent Rachel said although she didn't go out socialising she felt like a "real student", or for living-at-home student Ben who described thoroughly enjoying university life but outside university was where his social life existed.

As well as expecting to learn about their subject area and more general academic skills, there was awareness that university life provided the opportunity to develop social skills, independence and maturity. Trevor remarked that "*it makes you more mature*" whilst John outlined in more detail what this maturity and personal growth entailed:

It's personal development in the learning sense, but it's also quite a lot in the social sense getting to know yourself, learning how to cook. But it's very educational, it's your own personal development that university will try to teach you stuff, but you have got to add to it, which is not quite how I expected it to be. (John)

Where students had researched what university life was going to be like socially, economically and academically, either through web searching or asking family and friends, they seemed more prepared and were positive at the transition stage. Those who used the Flying Start initiative to 'try out' university life before they enrolled felt more prepared and were even more positive about starting their university career.

Across all the interviews the students described a similar pattern; being faced with unfamiliar knowledge, situations and expectations which they had to adjust to. In most cases the adjustments, and learning involved, were experienced as positive and relevant to success at university and in securing employment afterwards. In the interviews the students described using facilities at the university, including student support and technical assistance, tutor and lecturer support and the support of their friendship groups and networks. Most identified areas, across all the literacies, in which they were not proficient enough as they entered university and with very minor exceptions identified strategies for learning and improvement.

8.2.5. Summary

A summary of scores at T1 and T3 for all the learning literacy scales (Table 12) reveals that for the sample of 116 students who completed the survey at both time-points statistically significant improvements were observed in communication literacy, information literacy and aspects of emotional literacy, but not in mathematical literacy.

Table 12. Summary of scores for the learning literacy scales at T1 and T3

Scales	T1		T3		Standardized test statistic z	p value
	Mean	Median	Mean	Median		
Communication literacy:						
Self-efficacy in speaking and listening	10.6	11.0	11.2	12.0	2.369	0.018*
Self-efficacy in reading and writing	24.1	25.0	25.9	27.0	4.496	< 0.001***
Mathematical literacy:						
Mathematical self-efficacy	32.6	33.0	33.4	35.0	1.763	0.078

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Confidence in maths	18.0	18.0	17.8	19.0	-0.947	0.343
Maths anxiety	10.0	10.0	10.1	10.0	0.384	0.701
Theory of intelligence	18.0	18.0	18.4	19.0	1.070	0.285
Persistence	19.8	20.0	20.2	20.0	1.798	0.072
Learning goals	14.1	14.0	14.2	15.0	0.533	0.594
Performance goals	15.4	15.5	15.7	15.0	0.333	0.739
Information literacy:						
Accessing and using information	67.5	68.5	75.3	80.0	6.730	< 0.001***
Evaluating information	33.0	33.0	36.7	37.0	5.973	< 0.001***
Knowledge about handling information	30.2	32.0	32.5	64.0	6.520	< 0.001***
Specific search strategies	9.8	10.0	11.3	12.0	5.253	< 0.001***
Emotional literacy:						
Emotional intelligence proficiency	195.0	200.0	189.0	200.0	-1.337	0.181
ESE 1: using and managing own emotions	30.4	30.0	32.6	33.0	3.869	< 0.001***
ESE 2: identifying and understanding own emotions	22.4	23.0	23.3	24.0	2.431	0.015*
ESE 3: dealing with emotions in others	29.0	29.0	30.1	30.0	2.414	0.016*
ESE 4: perceiving emotion through facial expression and body language	11.0	11.0	10.9	11.0	0.223	0.823

Wilcoxon signed-rank tests; N = 116

Significant differences between score at T1 and T3 are highlighted in blue; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

8.3. Objective 3: to investigate how changes in confidence and proficiency predict student retention, adjustment to university, and academic achievement

Some studies on adjustment to university yield important information about trends in adjustment, but they examine only mean adjustment scores. This assumes that everyone within that population is responding and behaving in the same way, but this assumption is not realistic. For example, work on mental health suggests that there is great variability in people's ability to cope over time (Galatzer-Levy *et al.*, 2012). Studies that assume homogeneity of adjustment claim to offer information about the normative developmental patterns of adjustment, but the mean may be an artefact of averaging across subgroups of individuals who follow different courses of development. By not considering differences in the time course of adjustment, we may have inadequate information regarding processes that occur within distinct subgroups. This means that interventions may have been developed for an 'average' person that does not exist: understanding the different patterns of adjustment across the first year would enable HE to develop better and more informed interventions that address the specific needs of individual students. As part of this project, we examined (i) whether there are different groups of students who follow different trajectories of adjustment in their first year at university, and (ii) how these different patterns of adjustment might predict academic success and retention. We also investigated whether the learning literacies could explain some of the difference in these patterns, thus, offering us a possible starting point for intervention.

8.3.1. Trajectories of Adjustment

A total of 331¹ students completed the College Adaptation Questionnaire (CAQ; Crombag, 1968; van Rooijen, 1986) within 3-6 weeks of entry into the university. Students completed the CAQ again at two further points

¹ 152 students completed the adjustment measures as part of another study being conducted within Psychology at UCLan. Their data were combined with those of students in the current study so that a clearer picture of adjustment over time could be obtained.

during their first year at university (3 months, and 6 months after entry); 65% of the students were retained at these two additional time-points. Analyses revealed that those participants who were retained were no different to those that had dropped out at the subsequent time-points on adjustment scores at Time 1 and Time 2 ($F \geq 0.32, p \geq 0.37$), suggesting that our final sample is representative of the original sample of 179 students. Of the 179 participants from the current cohort who completed the CAQ during the first 6 weeks of their first year, 27 participants (15%) declared a disability. Of the additional 151 students who completed the CAQ, only five declared a disability.

The CAQ measures adjustment to university, and comprises 18 statements scored on a 7-point scale; the items measure individuals’ psychological, social and interpersonal adaptation to university life. Ten of the items reflect poor adjustment (e.g. “I find it hard to get used to life here”) and 18 items reflect good adjustment (e.g. “I am glad that I came to study here”). The score for the CAQ is the sum of the item scores after the reverse coding of the 10 items indicating poor adjustment. Thus, high scores on the CAQ are indicative of higher adjustment at university. The CAQ was highly reliable at each time point (alpha was 0.88, 0.85, and 0.82, which is comparable to that found in previous research ($\alpha = 0.83$ – see van Rooijen, 1986).

Using sophisticated latent growth mixture modeling (LGMM) of the CAQ scores, we established that there were four patterns of adjustment to university as detailed in Figure 5. We found that there was a group of students whose reported adjustment remained low over the course of the study (group 1), a group who reported average levels of adjustment over time (group 2), and a group whose adjustment levels were very high and stable over the six months (group 3). The final group (group 4) included students whose adjustment was low at the start of the year, but increased to above average levels by Time 3 (Table 13).

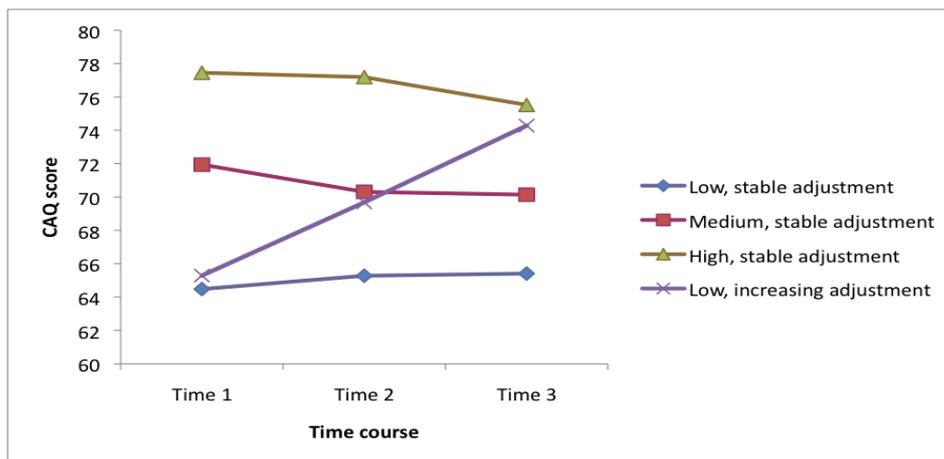


Fig. 5 Different patterns of adjustment across Year 1.

Notes: Time 1 = three weeks after initial entry into university; Time 2 = 3 months after entry into Year 1; Time 3 = 6 months after entry into Year 1. low, stable adjustment N = 102; medium, stable adjustment N = 128; high adjustment N = 73; low, increasing adjustment N = 28.

Table 13. University adjustment scores (standard deviations) over time by adjustment group

Time point	University adjustment score (standard deviation)				Whole sample
	Adjustment group 1	Adjustment group 2	Adjustment group 3	Adjustment group 4	
Time 1 (week 3)	64.5 (2.9)	71.9 (2.7)	77.5 (4.3)	65.3 (3.4)	70.7 (5.6)
Time 2 (3 months)	65.3 (2.9)	70.3 (2.9)	77.2 (3.5)	69.7 (3.6)	70.5 (5.0)
Time 3 (6 months)	65.4 (2.7)	70.1 (2.1)	75.5 (3.1)	74.3 (3.7)	70.5 (4.4)

Notes: Time 1 = three weeks after initial entry into university; Time 2 = 3 months after entry into Year 1; Time 3 = 6 months after entry into Year 1. Group 1 = low, stable adjustment (N = 102); Group 2 = medium, stable adjustment (N = 128); Group 3 = high adjustment (N = 73); Group 4 = low, increasing adjustment (N = 28). Scores are adjusted for missing data via EM (expectation maximization) algorithm-adjusted means and covariances. Scores are also adjusted for age at entry into university.

To validate these groups, we examined whether the groups were significantly different on two other measures of adjustment, mainly depressive symptoms and loneliness (Table 14). First, we found that at each time point, higher scores on the CAQ were significantly correlated with loneliness ($r_s > 0.23$, $p_s > 0.001$) and depressive symptoms ($r_s > 0.26$, $p_s > 0.001$). Results showed that the groups differed on loneliness at each time point ($F_s > 3.70$, $p_s < 0.01$) and on their reported depressive symptoms ($F_s > 24.8$, $p_s < 0.001$). Post-hoc tests showed that students in the high stable adjustment group (Group 3) reported the lowest levels of loneliness and depressive symptoms; students in the low, stable adjustment group (Group 1) reported the highest levels of loneliness and depressive symptoms. In the group where there was an increase in adjustment scores (Group 4), we saw an accompanying reduction in loneliness and depression, although these continued to remain higher than the medium and high adjustment groups.

Table 14. Loneliness and Depressive Symptoms (and standard deviations) over time by adjustment group

Time point	Loneliness scores (and standard deviation)				
	Adjustment group 1	Adjustment group 2	Adjustment group 3	Adjustment group 4	Whole sample
Time 1 (week 3)	51.1 (8.6)	38.7 (7.2)	37.6 (8.6)	42.6 (7.8)	42.4 (9.9)
Time 2 (3 months)	51.3 (9.1)	38.6 (8.1)	35.3 (8.9)	41.8 (9.7)	41.0 (10.4)
Time 3 (6 months)	50.8 (7.5)	38.1 (9.1)	32.2 (7.9)	39.6 (10.1)	39.8 (10.8)

Time point	Depressive Symptoms (and standard deviation)				
	Adjustment group 1	Adjustment group 2	Adjustment group 3	Adjustment group 4	Whole sample
Time 1 (week 3)	35.9 (12.6)	20.8 (7.2)	27.3 (7.1)	35.6 (10.6)	29.6 (11.7)
Time 2 (3 months)	36.2 (12.9)	21.7 (6.2)	27.5 (7.0)	34.3 (11.8)	30.2 (11.5)
Time 3 (6 months)	35.4 (12.1)	21.4 (7.4)	25.4 (6.3)	32.4 (10.7)	29.0 (10.9)

Notes: Time 1 = three weeks after initial entry into university; Time 2 = 3 months after entry into Year 1; Time 3 = 6 months after entry into Year 1. Group 1 = low, stable adjustment (N = 102); Group 2 = medium, stable adjustment (N = 128); Group 3 = high adjustment (N = 73); Group 4 = low, increasing adjustment (N = 28). Scores are adjusted for missing data via EM (expectation maximization) algorithm-adjusted means and covariances. Scores are also adjusted for age at entry into university.

8.3.2. Can we predict academic achievement from the adjustment group?

We were interested in whether we could predict end-of-year academic grade from group membership. Analyses, using Wald’s Chi Square tests of significance, showed that being a member of the low adjusted group (adjustment group 1) was predictive of low academic performance even when entry qualifications were controlled ($\chi^2 = 26.64$ $p < 0.001$). Table 15 summarizes the average module marks for students in the different adjustment groups.

Table 15. Academic achievement (mean module mark and standard error [SE]) by first-year adjustment group

	Adjustment group 1		Adjustment group 2		Adjustment group 3		Adjustment group 4	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
	Academic achievement	51.7	1.4	60.0	1.2	56.8	1.9	63.3

Notes: Group 1 = low, stable adjustment (N = 102); Group 2 = medium, stable adjustment (N = 128); Group 3 = high adjustment (N = 73); Group 4 = low, increasing adjustment (N = 28). Scores are adjusted for missing data via EM (expectation maximization) algorithm-adjusted means and co-variances.

8.3.3. Can we predict retention from the adjustment group?

It was impossible to examine whether membership of a particular adjustment group predicted retention. This was because students who were not retained in the current study dropped out of university within the first three months of study and had only provided adjustment data for Time 1. Examination of whether scores on the CAQ at Time 1 predicted withdrawal from the course was examined using a Wald’s Chi-square test of

significance. Analysis showed poor adjustment scores at Time 1 did indeed predict withdrawal from the course ($\chi^2 = 3.89$ $p = 0.05$); poor scores at Time 1 did not predict failure on the course ($\chi^2 = .38$ $p = .54$).

8.3.4. Do the learning literacies predict membership of the adjustment group?

An examination of risk factors revealed that only the low, stable adjustment group (adjustment group 1) could be differentiated from the others by some of the literacies data collected at Time 1 (Table 16). We found that students who had lower emotional intelligence test scores (STEM) and lower emotional self-efficacy scores were at increased odds of belonging to the low, stable adjustment group. In addition, membership of the high adjustment group (adjustment group 3) was determined by high scores on the emotional intelligence test. No other literacies predicted membership of the adjustment groups.

Table 16. University adjustment groups predicted by learning literacies

Variable	University adjustment class comparison											
	Medium, stable adjustment vs. low, stable adjustment		High, stable adjustment vs. low, stable adjustment		Low, increasing adjustment vs. low, stable adjustment		High, stable adjustment vs. medium, stable adjustment		High, stable adjustment vs. low, increasing adjustment		Medium, stable adjustment vs. low, increasing adjustment	
	OR	<i>p</i> value	OR	<i>p</i> value	OR	<i>p</i> value	OR	<i>p</i> value	OR	<i>p</i> value	OR	<i>p</i> value
Communication (reading) test	1.01	0.878	0.98	0.779	0.90	0.414	0.96	0.370	1.08	0.554	1.12	0.370
Communication self-efficacy	0.94	0.519	0.99	0.932	0.91	0.516	1.05	0.777	1.09	0.564	1.04	0.777
Mathematics test	1.15	0.132	1.02	0.854	0.87	0.399	0.86	0.094	1.18	0.363	1.13	0.084
Mathematics self-efficacy	0.95	0.111	0.97	0.352	1.10	0.174	1.08	0.085	0.88	0.073	0.96	0.352
Information literacy	1.02	0.053	1.00	0.630	1.04	0.059	0.99	0.331	0.97	0.257	0.98	0.331
Emotional intelligence	0.96	0.419	1.17	0.006 **	1.18	0.019 **	1.17	0.043 *	1.24	0.028 *	1.00	0.975
ESES factor 1	1.12	0.041 *	1.21	0.008 **	0.99	0.439	1.03	0.569	1.08	0.420	0.96	0.620
ESES factor 2	1.16	0.036 *	1.39	0.035 *	1.72	<0.001 ***	1.06	0.490	1.03	0.173	0.86	0.292
ESES factor 3	1.38	<0.001 ***	1.17	0.020 *	1.29	0.032 *	1.13	0.013 *	1.38	0.009 **	1.34	0.013 *
ESES factor 4	1.79	<0.001 ***	1.00	0.730	1.02	0.394	1.29	<0.001 ***	1.28	0.014 *	0.98	0.936

Notes: OR = odds ratio. Significant differences are highlighted in blue, **p* < 0.05; ***p* < 0.01; ****p* < 0.001

8.4. Objective 4: to investigate how we support development of these literacies and whether what we do matches employers' and students' needs and expectations

We carried out interviews with eight alumni to understand their experience of the transition into employment focussing on the literacies in our study. The eight were drawn from the subject areas that we used for the student data. The sample is not representative of all alumni nor our student sample as it is heavily weighted in terms of science and technology. The alumni interviewees were:

1. Army officer (male), at time of interview working as volunteer in German Cultural Centre, Police and Criminal Investigation Degree (ALM1)
2. Manager Adult Education programme, Sixth Form College (Male), Forensic Science Degree (ALM2)
3. Manager Educational Needs, High School (Female) Psychology Degree (ALM3)
4. Aerospace technician (Female) Forensic Science Degree (ALM4)
5. Postgraduates Research Assistant, University (Male) Psychology Degree (ALM5)
6. IT Consultant, Isles of Man Technology Company (Male) Forensic Science Degree (ALM6)
7. Forensic Road Collision Investigator, Self Employed Consultant (Male) Police and Criminal Investigation Degree (ALM7)
8. Education Facilitator, Historic Trust (Female) History Degree (ALM8)

As indicated in section 8.1, the employers identified gaps in several areas of our learning literacies, most notably in written communication literacy and in what we have termed emotional intelligence, but what employers described as maturity and a work ethic. The lack of these skills was not wholly attributed to the graduates learning at university, as several employers commented on the wide-scale reduction in standards of written communication across the education system from school onwards. Many expressed the concern that generally there was an increasing unrealistic expectation from students that obtaining a degree earned them the right to a job, whereas the employers saw the degree as a starting point in training and continual professional development. It was felt that the students may have anticipated that their learning had finished on leaving university, whereas the employers felt it was just starting. As mentioned in section 8.1 many of the employers had lowered their expectations, particularly with regard to written communication skills, to fit more realistically with the standards they were encountering. Whilst there might be a common misassumption by undergraduates that a degree equals a job there also appears for some employers, in their experience, a pervasive misassumption that a degree equals a high standard of written communication.

The employers looked for graduates who had a base line of these literacies developed whilst at university but were more concerned with what they considered to be the essential skills and qualities of maturity, being able to communicate and work with others, to show independence and have a work ethic. There was a difference in those who thought the university should support the development of these skills and attributes and those who thought that if these were taught this acted to undermine the independence of the student. Talking about work placement one employer, working in risk management, felt that "*university should encourage students to do it themselves, take their own initiative, get involved in their own time, if you are giving it to students on a plate, just handing it to them, that's not good learning*". (EMP7). Another employer working in graduate recruitment also pointed to the student taking responsibility for their own learning, work experience and development, something she felt would contribute to an overall growth in maturity. She described the lack of responsibility in some graduate recruits where they had not had many experiences of either work or failure:

We are the first ones telling them you can't go to the pub at 3.00 in the afternoon, no you have just failed the exam and you re-take it when we tell you....it's not the university's job to teach them these skills, it's their own job to learn these skills. They have got to get these skills from somewhere and it's their responsibility to find out. (EMP5)

In this comment there is clearly a tension with regard to whose responsibility it is to support this growth in skills and maturity; how the university should provide support and resources to enable this to happen and when and how the student should take the responsibility themselves and show their independence. This is a central theme that was present across several of the interviews with employers and was echoed by the alumni, some of whom have become employers themselves.

The employers also talked about their concerns with raised, and what they saw as unrealistic, expectations from students and with the growth of numbers of graduates and degree courses. The employer working in strategic investment planning felt that graduates' expectations were too high coupled with degrees themselves being devalued:

Somewhere along the line expectations are extremely high and I think they [universities] need to manage people's expectations better, they get a degree and think they've got a job and will progress very quickly to be MD in three years, their expectations are set very high...I think there are far, far too many degrees, you can get a degree in bloody everything and now lots of those people can't get jobs, it devalues the whole thing. (EMP5)

The employer working in HR also questioned whether university was the right route for everyone and was concerned about the amount of graduates coming out competing in what she saw as a tough marketplace. This concern with what has been termed an 'oversupply of graduates' has been reported in other studies (Purcell, et al., 2002).

This was echoed by the employer working in leisure who felt that, whilst it was important to have good links between employers and the university, at the end of the day there weren't enough graduate jobs available. She felt that whilst individuals expected that a degree meant that *"you're automatically going to get a job of a certain level"* (EMP8) the reality she experienced was over-qualified applicants chasing jobs.

The gap between expectations from employers and graduates is illustrated by a recruitment manager in a large international technical company who commented that graduates need to *"appreciate that educationally they are probably in excess of what we need. Yes we need them to have an engineering related degree but they probably won't use 90% of that degree"*. This may be in contrast to graduates' expectations that employers are looking for specific subject knowledge whereas the employer explains he is looking for *"can they grasp things quickly and make a decision and stick with that decision and see it through to completion"* (EMP6). Employers did not expect 'oven ready' graduates in terms of subject knowledge skills and competences but they did expect good 'raw material' and value for money. For the employers this was maturity: *"If you are paying a graduate an awful lot of money you don't want to be putting effort in to making them grow up, you expect a high level of maturity"* (EMP2) and passion *"when you are sitting there and looking into a graduate's eyes and you don't see any fire there is not a lot of chance really"* (EMP3). Generally gaps in employers' expectations were how prepared the graduates were for the world of work in terms of previous experience, maturity, adaptability and engagement in their area of work. This in many cases did not match what they felt as graduates' unrealistic expectations of a degree automatically conferring the right to a job.

As discussed in previous sections the students overwhelmingly reported increases in learning, skills, competencies and confidence in their first year between the first and second interview. It must be acknowledged that as a self-selecting sample, their experiences may be more positive than those of students who did not participate or who discontinued their study. Although the interviews captured different individual preferences for learning and assessment, for example dislike of group work, presentation or essays, generally there was an acceptance that this provided important and structured learning opportunities which were valued for graduating successfully and for gaining employment. Some students reported a steep learning curve, having unrealistic expectations of life at university, particularly becoming an independent learner, whilst others felt it was as they expected. Many felt it had exceeded their expectations both educationally and socially.

In the interviews the students described their aspirations in both concrete plans such as *"I want to be in the Police Force"* (John) or, *"I want to become a neuro-psychologist"* (Rachel), with several expressing a desire to start their own business particularly in the area of web design and gaming. Others expressed their aspiration in more general terms such as *"I want to branch out"* (Flora), or as something they wanted to avoid *"I don't want to be on the shop floor any more"* (Simon). When we asked what they thought the employers were looking for in graduate employees the students were surprisingly accurate in identifying what the employers told us in their interviews. The students understood the significance of excellent communication skills, work experience, gaining wider life experiences and showing independence. Most were realistic that their degree did not automatically provide them with a graduate job but they had to show the employers that what they learned at university was more than subject knowledge and that what they had learned, educationally and socially, could be applied in a work environment. This relationship between aspiration, expectation and the literacies for learning is expressed well by Stuart:

[It's] the report writing and the ability to sit down, write and not get distracted. If you have got a degree it shows that it is implied, even if not explicit, at some point you will have to work in a group. I think it is the general work ethic that shows. It's the argument between whether you have someone without a degree but a lot of experience, or someone who has got a degree but not a lot of

experience. It kind of shows the argument is slightly in weight of the people with a degree because people with experience have been at it a long time, if it was just a matter of the time put in, I think if someone's got three years' work experience and a three year degree it might tip in their favour. In my mind that's what employers really look for because most jobs will have some on the job training at least, so it's not the expertise they're after in a lot of situations but rather the fundamental basics behind it. (Stuart)

What Stuart identifies as the “*fundamental basics behind it*” were identified by several other students as being organised, hard-working, juggling responsibilities, as employers were seen to be, “*mainly looking for people skills and experience. You have to be a well-rounded person; you can't just have excellent academic skills*” (Simon). The majority of the students we interviewed had work experience in either paid employment or voluntary work, recognising that extra-curricular activities and responsibilities, such as mentoring or being a course rep to learning sign language, were valued by employers. Trevor explained this as showing that you have character, you are a “*round character and are independent*”, what Rachel described as having the “*whole package*”. Peter, a Computing student, stressed the need to develop and show good communication and group work skills as he thought employers valued this above “*getting straight A's in the first year*”. Most felt that a wide range of academic and social skills would be attractive to employers, particularly when they were unsure what particular skills employers might look for when recruiting. This was endorsed for some students where alumni had returned to share their experiences of graduating and entering employment.

Generally the students we interviewed in their first year had realistic aspirations and expectations about the skills they were learning whilst at university, both educational and social, and how these related to employment. To explore this further we asked would it be worth coming to university if they didn't manage to get a graduate job when they left. Overwhelmingly the response was that it would be worth it describing the intrinsic value of the opportunity to learn about something that mattered, to become more confident, to gain proficiency in skills including technical and analytic skills, to model aspiration for family members, to learn how to live independently, often in a new location, to make new friends and increase social networks. Most of the interviews revealed a more nuanced relationship between the experience and investment of coming to university and the outcomes expected from this. This could be described as intellectual and social fulfilment supporting personal development, areas that were more intrinsic and less instrumental than might have been anticipated. Lucy explained, “*Even if you don't get a graduate job you've learned a lot of skills, even how to complete a degree. I have studied what I wanted to study and even if I don't get a job I did what I really wanted to do for three years and loved it*”. Rachel felt it was easier to list the ways that she hadn't changed rather than those where she had, as well as the writing and IT skills she described changing her outlooks and views, “*I wouldn't recognise the way that I viewed the world in September, once you are given information you view things differently, so I would never be the person I was then, I've moved too far forward*”. Both Simon and John felt the opportunity to live independently, learning to cook, budget and share with others, was hugely important in enabling them to mature and develop confidence to take new decisions in their lives. Peter captures the added value that university is providing whatever the employment outcome:

I feel like my head has re-opened, all the things that I want to do I can now learn and I feel smarter just for being here. There's a fulfilment for me, right now I feel like I am really enjoying learning the things that I am doing and regardless of what I end up doing in the future as long as it has an aspect of what I'm learning now I'd be happy with it. If I don't get a graduate job I'll still be happy, just being at university is a big factor it's changed the whole outlook I have on my entire future. (Peter)

The interviews with the students suggest that at the end of their first year their aspirations and expectations were in alignment; the literacies for learning were supporting development of the skills, knowledge and competencies they anticipated being important for employment. Whilst important for future employment they attributed intrinsic value to developing as more rounded people who were engaged in learning and with each other.

The interviews with the alumni showed a mixed response to whether they felt that they had been supported to develop these literacies whilst at university and if they were ones significant for employment. Some felt the opportunities were there, taking advantage of academic staff including tutors and professors and support resources such as WISER (www.uclan.ac.uk/students/wiser/index.php) and the Students' Union. Others acknowledged that opportunities were there but reflected that they did not take them at the time, wishing

with hindsight they had. Several felt this was because they did not fully appreciate the significance of the opportunities at the time as they had not developed enough as independent learners:

There were opportunities for extra bolt on courses like a Chartered Certificate in IT, I wish I had taken up that opportunity which was practically handed to me on a plate. I'm not sure they could do anything that they don't already do, people aren't always prepared to do more, it is definitely down to them at the end of the day. (ALM7)

Some of the alumni took the opportunities provided by the university's mentoring scheme M&M, internships and work experience to increase their skills and future employability; others felt that not enough was done to explain the significance of work experience *"I'm not sure that we were told to get work experience"* (ALM6) or informed of schemes such as the Gilberston Award which provides the opportunity for graduates with a first class degree to have fees waived to study for a Masters qualification. The School Manager thought the timing was not helpful as she was asked to think halfway through her Psychology degree what job she might be interested in when graduated. She commented that, *"At not one point was there anybody there who could sit down and have that conversation, it was a question of just get on with it yourself and see what options are open for you"* (ALM4)

Some had practical suggestions for improving the skills learned whilst on a degree course which might support and improve their chances of future employment. Several mentioned work placements and work experience with stronger links to employers. One interviewee (ALM2) compared European models of links between industry and university, which they had experienced in Germany and felt to be very effective in providing work experience and a real connection to future employers. To do this effectively he felt that UK universities should require a good level in a second language to enable students to participate in international exchange. Other practical suggestions included outlining more clearly what type of employment opportunities particular courses or subjects could lead to, with specific employers named and examples given of recent employment data. One alumni interviewee thought this should be displayed on the university websites to be accessed prior to enrolment.

There was a sense that graduate employment was affected by wider national and international external economic factors, *"With these times I can't see what else universities can do, if the opportunities aren't out there after university they are not."*(ALM8) Echoing the employers many of the alumni described a tension between 'supply and demand' within what was described as a saturated market. To stand any chance of employment graduates needed to exhibit a base line of skills and competencies acquired at university, including communication, numeracy and information literacies, but these needed to be supplemented with the additional work experience, personal attributes and social skills employers looked for.

8.4.1. Demographics of alumni responding to the survey

Fifty-eight of UCLan's alumni responded to the online survey, of which 66% were female. Only eight alumni (14% of respondents) reported a disability, of which four were deaf; the remaining four reported a variety of chronic conditions. Seventy-one percent of respondents were under 30 years of age, with the remaining 29% aged between 30 and 59 years. Ninety-eight percent of respondents had graduated from UCLan between 2008 and 2010 (Fig. 6). Within the sample of alumni, 78% of respondents had obtained their first degree in Computing, Forensics, Policing, Deaf Studies, History or Psychology (Table 17).

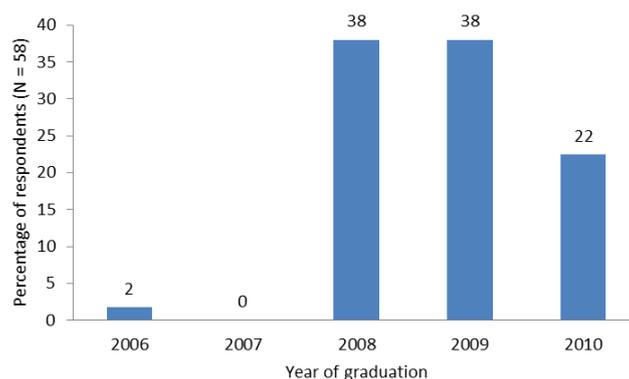


Fig. 6 Percentage distribution for year of graduation of alumni

Table 17. Degree subjects of alumni (N = 58)

Degree	No. of respondents
Advertising and marketing communication	1
Children, schools and families	1
Computing	6
Deaf studies	6
English literature and creative writing	1
Exercise, nutrition and health	1
Film and media	1
Forensic science	16
Games design	1
History	4
Hospitality management	1
Journalism	1
Music and media art	1
Music practice	1
Neuroscience	1
Police and criminal investigation	4
Psychology	9
Religion, culture and society	1
Sociology	1

8.4.2. Alumni's undergraduate experience

Responding alumni felt that their undergraduate experience had enabled them to develop their communication and information literacy skills 'quite a lot', but their emotional intelligence to 'a moderate amount' (Table 18). Their experience had developed their mathematical literacy skills 'a little' to 'a moderate amount', with numerical problem-solving and using spread-sheet software attaining the lowest scores; this may reflect the fact that only 55% of respondents had been enrolled on science programmes (see Table 17).

Table 18. Extent to which undergraduate experience enabled development of skills (not at all = 1; a great deal = 5)

Learning literacy/skill	Mean	SD	Median	N
Communication literacy:				
Oral communication skills (or signing skills if appropriate)	3.8	1.0	4.0	58
Writing effectively for a variety of audiences	3.8	1.1	4.0	58
Writing accurately (good spelling and grammar)	3.6	1.0	4.0	58
Emotional intelligence:				

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Working out what other people are feeling	2.9	1.1	3.0	58
Identifying your own emotions at a given time	2.7	1.1	3.0	58
Managing your own emotions effectively	2.9	1.1	3.0	58
Mathematical literacy:				
Basic numeracy skills (e.g. calculating percentages, converting units of measurement)	2.8	1.2	3.0	58
Interpreting data (e.g. understanding information in tables, charts and graphs)	3.3	1.4	3.0	58
Numerical problem-solving	2.7	1.3	2.5	58
Using spread-sheet software	2.5	1.4	2.0	58
Information literacy:				
Locating relevant sources of information	4.2	1.0	4.0	58
Evaluating the quality and authority of information	4.2	1.0	4.0	58
Making judgements based on the evidence contained in information	4.2	0.9	4.0	58

8.4.3. Alumni's current level of confidence

Overall, the 58 respondents were 'very confident' (median 4.5) with respect to their ability to write effectively for a variety of audiences, and 'quite confident' (median 4.0) with respect to all the remaining skills (Table 19). For the whole 13-item confidence scale, the mean score (total score divided by 13) was 4.05 (SD = 0.59; N = 59), reinforcing that, overall, the alumni were 'quite confident' with regard to this particular skill set.

Table 19. Confidence of alumni (not at all confident = 1; very confident = 5)

Learning literacy/skill	Mean	SD	Median	N
<i>Communication literacy:</i>				
Oral communication skills (or signing skills if appropriate)	4.0	1.0	4.0	58
Writing effectively for a variety of audiences	4.3	0.8	4.5	58
Writing accurately (good spelling and grammar)	4.2	0.9	4.0	58
<i>Emotional intelligence:</i>				
Working out what other people are feeling	3.9	0.9	4.0	58
Identifying your own emotions at a given time	4.1	1.0	4.0	58
Managing your own emotions effectively	3.8	1.0	4.0	58
<i>Mathematical literacy:</i>				
Basic numeracy skills (e.g. calculating percentages, converting units of measurement)	3.8	1.0	4.0	58
Interpreting data (e.g. understanding information in tables, charts and graphs)	4.1	0.9	4.0	58
Numerical problem-solving	3.7	1.1	4.0	58
Using spread-sheet software	3.7	1.1	4.0	58
<i>Information literacy:</i>				
Locating relevant sources of information	4.4	0.6	4.0	58
Evaluating the quality and authority of information	4.2	0.8	4.0	58
Making judgements based on the evidence contained in information	4.3	0.7	4.0	58

8.5. Objective 5: to discover the nature of relationships between these literacies, and between these literacies and students' reported employability upon exit from HE

8.5.1. Relationships between the literacies

Correlational analyses showed relationships between the different literacies and proficiencies at T1 and T3 when data were collected for all domains (see Tables 20 and 21). At both time points, we found significant associations between self-efficacies, particularly with communication and mathematics literacies correlating well with one another and with emotional self-efficacy sub-scores.

Table 20. Correlations between the literacies at T1

	2	3	4	5	6	7	8	9	10
1. Communication (reading) test	.23**	.49***	.32***	.23**	.25**	.03	.11	.10	.03

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2. Communication self-efficacy	.19**	.31***	.34***	.21**	.33***	.26***	.18*	.16*
3. Mathematics test		.60***	.18*	.16*	.002	.08	.02	.05
4. Mathematics self-efficacy			.33***	.07	.19**	.19**	.19**	.15*
5. Information literacy				.14	.47***	.43***	.49***	.38***
6. Emotional intelligence					.07	.15*	.07	.03
7. ESES factor 1						.72***	.64***	.67***
8. ESES factor 2							.64***	.65**
9. ESES factor 3								.72***
10. ESES factor 4								

Notes: Mathematics self-efficacy is the total of the mathematics self-efficacy, confidence in mathematics, and persistence scores; ESES = Emotional self-efficacy scale. Significant differences are highlighted in blue, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 21. Correlations between the literacies at T3

	2	3	4	5	6	7	8	9	10
1. Communication (reading) test	.05	.50***	.36***	.36***	.01	-.08	.04	-.02	-.10
2. Communication self-efficacy		.08	.33***	.21*	.10	.35***	.22*	.29***	.22*
3. Mathematics test			.57***	.08	.06	.02	.11	.01	.12
4. Mathematics self-efficacy				.34***	.16	.32***	.21*	.28**	.19*
5. Information literacy					.10	.36***	.37***	.42***	.46***
6. Emotional intelligence						.08	.11	.08	.09
7. ESES factor 1							.81***	.64***	.58***
8. ESES factor 2								.68***	.56***
9. ESES factor 3									.67***
10. ESES factor 4									

Notes: Mathematics self-efficacy is the total of the mathematics self-efficacy, confidence in mathematics, and persistence scores; ESES = Emotional self-efficacy scale. Significant differences are highlighted in blue, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Correlational analyses examining the associations between the literacies across time showed that students' self-efficacy related to the different domains remained stable over time; scores on proficiency tests also remained stable (Table 22). In addition, we found that (i) information literacy scores were associated with all other literacy scores over time, and (ii) emotional self-efficacy scores were associated prospectively with mathematics self-efficacy scores.

Table 22. Correlations between the Time 1 (T1) literacy scores and Time 3 (T3) literacy scores

	T3 literacies									
	Communication test	Communication self-efficacy	Mathematics test	Mathematics self-efficacy	Information literacy	Emotional Intelligence	ESES Factor 1	ESES Factor 2	ESES Factor 3	ESES Factor 4
T1 literacies:										
Communication (reading) test		.25**	.41***	.31***	.23*	.02	-.01	.07	.13	-.07
Communication self-efficacy	.16	.58***	.18*	.25**	.34**	.20*	.19*	.09	.17	.03
Mathematics test	.50***	.13	.70***	.59***	.04	-.06	.12	.08	.10	-.09
Mathematics self-efficacy	.32***	.24**	.60***	.88***	.26**	.24**	.21**	.10	.17	.11
Information literacy	.36***	.22**	.20*	.38***	.62***	.20*	.25**	.26**	.29**	.28**
Emotional intelligence	.06	.18*	-.06	.20*	.20*	.53***	.09	.04	.11	.10
ESES factor 1	.07	.20*	.01	.23**	.21*	.15	.61***	.44***	.31***	.31***
ESES factor 2	.07	.12	.08	.20*	.20*	.02	.51***	.59***	.35***	.29***
ESES factor 3	.10	.09	.02	.19*	.27**	.20*	.41***	.39**	.52***	.37***

ESES factor 4	.03	.14	.05	.16	.28**	.25*	.45***	.42***	.42***	.57***
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Notes: Mathematics self-efficacy is the total of the mathematics self-efficacy, confidence in mathematics, and persistence scores; ESES = Emotional self-efficacy scale. Significant differences are highlighted in blue, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

8.5.2. Relationships between the literacies and alumni’s reported employability upon exit from HE

For some, but not all, of the alumni interviewed gaining a degree was an essential requirement in obtaining professional/graduate employment. For those who worked in an education setting, including school, college and university, a degree was an essential prerequisite for gaining employment or accessing professional training and qualifications. For several others, including those working in the army and commerce, a degree was seen as useful, an advantage or “commendable” but was not perceived to be as significant as work experience, commercial understanding or having contacts. Where experience was significant it took one alumnus four years to acquire this after gaining her History degree (ALM8). The interviewees felt that work experience was becoming more important for those coming behind them who were trying to enter a more competitive graduate labour market. For those who studied as mature students, often with industry or commercial experience, they knew first-hand how significant this had been to their own success in gaining employment, or training followed by employment. Some were concerned that students currently studying lacked the experience which would be essential to gain employment on graduation:

I worked in industry for a long time. I was a steel worker, so you develop skills on how to deal with people over the years [which is useful for teaching]. Many young graduates go from school to college to uni. and they have got no experience of the outside world whatsoever...it is the things that this person has done outside of education. The biggest thing that students lack is life skills and people skills as students only mix with themselves. (ALM1)

Several interviewees described their own strategies for gaining work experience before, during or after graduation which included: a gap year after college and before university “for the general life and life experiences that came with it” (ALM6); voluntary work on a mental health helpline, working in a shop and working as a teaching assistant to gain experience of working with children.

Generally, the alumni reported that the degree subject was not the most significant factor in them gaining employment. As well as the significance of work and life experience, they spoke of having general skills, including some technical and people skills, which were highly valued when applying for employment. For example, although working in a technical area of employment, the aerospace technician felt that, “It doesn’t matter what your degree is, what matters is the skills that you learn.” (ALM4) She also added that it was therefore important not to limit searches to specific jobs but to look more widely in related areas. The interviewees talked of learning critical thinking skills, organisation of material, working with others, presenting information and becoming more professional. Subject knowledge was rarely mentioned as highly important to them, now in employment, and to the employer when applying for the job. The ability to transfer these wider skills was explained by the alumnus working as a self-employed consultant Road Collision Investigator:

I am more professional [now]. It’s the transfer of skills if you have got a degree. I don’t think a degree is the be all and end all because I know some people with degrees that are completely and utterly useless in the job. It’s how you take the knowledge from that degree. (ALM7)

Many of the interviewees connected the literacies developed at university with the skills required for and used in their employment. With regard to communication skills all said these were essential skills they used every day as part of their daily working practices. The alumnus employed by the army reported that both writing and speaking were equally important for his role. He made the connection between having to write three essays each semester and acquiring these skills through practise, “If I hadn’t had to write three or four essays every semester I wouldn’t know how to comprehensively structure something” (ALM1). This was echoed by the alumnus working in IT who described his skills developing through:

Aspects of report writing, definitely in the final year. Dissertation writing has given me a lot of insights into how to structure larger reports of about 200, 300 pages, just the layout and backbone of them as I had never done anything that size before going to university. (ALM6)

Others mentioned learning through writing the dissertation which required finding and referencing academic research and journal articles. For others, report writing, including completing research projects, provided the necessary support and structure to learn and practise these writing skills.

The importance of oral communication was also commented on by the alumni interviewees. Whilst some described hating acquiring the skill, it was invaluable to them in their jobs. The aerospace technician explained that the skills provided her with credibility and confidence:

At university I hated presentations. I hated them. Every subject had a presentation as part of its assessment, but it's been fantastic because now I can go to a meeting and I'll be far the youngest person and I'm usually the only girl and I feel so much more confident. I can hold my own, I can chair the meeting as well without getting stressed. (ALM4)

Several described presentation of information, often using PowerPoint, as a skill they used almost daily in their work particularly when meeting clients or presenting information to colleagues and team members. Several mentioned using IT in their work, often for recording data for tracking and analysis, communicating with others especially at what was described as different levels, for example on the shop floor and with management or, with both students and awarding bodies. Only one person, the aerospace technician, mentioned numeracy in their work with chemical analysis. This was not mentioned in a significant way by the other interviewees. Another interviewee (ALM7) commented that his literacy (writing) was still weak, although he had gained some skills whilst at university he was aware that he used these skills for writing formal letters, reports and in dealing with solicitors, and questioned if graduates would have sufficient training in these areas.

When we asked the alumni what they thought the employers wanted from graduates they referred to the wider issues of graduate saturation which sometimes they felt worked to the benefit of the employers. The first point is explained by the manager providing support for children in school. She felt that graduates were “*ten a penny at the minute*” and echoing early concerns about readiness of work she continued that employers want:

Work experience because at the end of the day it's working, the work ethic's being there on time, doing your job, following your manager's instructions, very basic. It can be a culture shock if you are not used to it. I think that employers want to see, they want to know they are reliable and hardworking and trustworthy. (ALM3)

The second point was that competition, supported by graduate inflation, was an advantage for employers. The example given below describes where, whilst not requiring a degree applying for employment in the area of Forensics, without one was seen as pointless. However, as it was not described as a graduate job it did not pay well, or as one expected at a graduate rate. This ‘Catch 22’ situation was described by the programme manager now working in a Sixth Form college as he was unable to afford to follow a career in Forensics:

It is a graduate job because they won't take you unless you've got a degree because people are applying with degrees. If you didn't have a degree you probably wouldn't get the job in the first place. They are reaping the benefit of not paying huge wages (£16,000) because they say you don't have to have a degree, but they are pretty much only taking people with degrees. They have a win, win situation. (ALM2)

The alumni, in a similar way to the employers, emphasised from their own experiences the wider skills and attributes looked for by employers. These were more about showing a work ethic which meant the graduate could be relied upon to turn up to work on time, work with others and show some independence and maturity. They commented from both their own experiences of finding graduate employment and observations from within the workplace that being able to demonstrate these qualities through work experience was one of the most significant factors in graduate employability.

Many referred to developing thinking, writing and people skills, which they used in their everyday work practices whilst at university and as they made the transition into work. Overwhelmingly they described these not in terms of separate literacies as we described them but in wider critical intellectual development achieved through tasks such as giving presentations, writing essays and a dissertation. The interconnection between developing the skills through these learning processes is described by the alumnus working in IT:

[It's] your communication skills, your oral communication and reasoning, justification, they might ask you to justify an opinion. A degree by itself without any other practical skills that I learned from previous employment would have effectively been worthless because without the ability to communicate and manage your time appropriately and look at things from different angles and question things, all those skills and the knowledge itself would have been useless without those. (ALM6)

The alumni interviews in many ways confirmed what the employers were looking for which was the significance of work experience, maturity and a good work ethic. Whilst a degree provided subject knowledge and learning skills these were not always easily transferable to the work environment whilst general communication skills were considered essential across most types of employment. Sustained or formal writing and presentation were seen as valuable skills for the workplace as well as the ability to work with others and be able to contribute to teams.

8.5.3. Alumni's reported employment since university

Over two-thirds (71%) of the responding alumni had experienced employment in a full-time job since leaving university. Of the remaining 17 respondents who reported having had no full-time job since graduating, 11 reported being employed part-time, five were unemployed and one was a full-time student. Six of the eight respondents who reported being disabled were unemployed and three of these reported being profoundly deaf.

8.5.4. Alumni's current employment status

At the time of completing the survey, 85% of respondents were in either full- (59%) or part-time (24%) employment, or were self-employed (2%), while 7% had returned to education, and 8% were unemployed. Twenty-two percent of the 50 respondents had been in their current organisation for less than 6 months, while 54% had been in their current job for between 6 months and 3 years. Only 24% claimed to have been employed by their organisation for more than 3 years, and of these 12 individuals, one had graduated in 2006, 4 had graduated in 2008, 5 had graduated in 2009, and 2 had graduated in 2010; presumably, some had been part-time undergraduates. Only 46% of respondents (N = 50) reported that their current job was the same as their first full-time graduate job.

8.5.5. Employment sector

Forty-five percent of responding alumni had obtained their first full-time job within the public sector, while for 27% of respondents their first full-time job had been within SMEs (Fig. 7). Twenty percent of respondents had been employed in large companies or organisations within the private sector, while only 8% had been employed in the third/voluntary sector. There was a similar distribution pattern for respondents' current jobs, although Fig. 7 reveals a slight decrease in employment within the public sector and a comparable increase in employment in the third/voluntary sector.

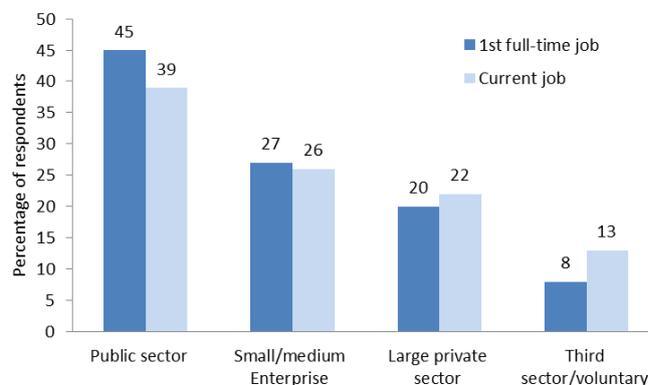


Fig. 7 Percentage distribution of first full-time jobs (N = 40) and current jobs (N = 31) in various employment sectors

Almost half (46%) of the alumni had found their first job within healthcare, IT/telecommunications, local government or teaching (Table 23), although current jobs were primarily within the charity/voluntary sector, healthcare, sales or teaching.

Table 23. Frequency distributions of first full-time job (N = 41) and current job (N = 31) of alumni

Employment sector	1st full-time job	Current job
Accountancy or Professional Services Firm	1	1
Armed Forces	1	0
Automotive	1	0
Bank or Financial Institution	1	1
Charity or Voluntary Sector or special interest organisation	2	3
Chemical or Pharmaceutical Company	1	1
Childcare	0	2
Engineering or Industrial Company	1	1
Healthcare	5	3
Hotel and Accommodation	1	1
IT or Telecoms Company	3	1
Leisure	1	0
Local Government	5	0
Logistics	0	1
Marketing	1	0
Media Company	2	1
National Government	1	0
Police	1	0
Property Development, Renting, Business or Research	1	0
Research and Development	2	0
Sales (Retailer or Wholesaler)	2	6
Self-employed	1	0
Social Welfare	1	2
Teaching	6	4
Other	0	3

8.5.6. Role within the organisation

In their first full-time jobs, alumni had been employed in a variety of roles, although 27 (69%) were employed in managerial, professional or associate professional/technical occupations (Fig. 8). In their current full-time jobs, alumni were employed in similar roles, but only 15 (50%) were employed in managerial, professional or associate professional/technical occupations (Fig. 8), a reduction from the 27 (69%) reported for respondents' first full-time jobs; however, a reduction in the overall number of respondents may have contributed to the discrepancy.

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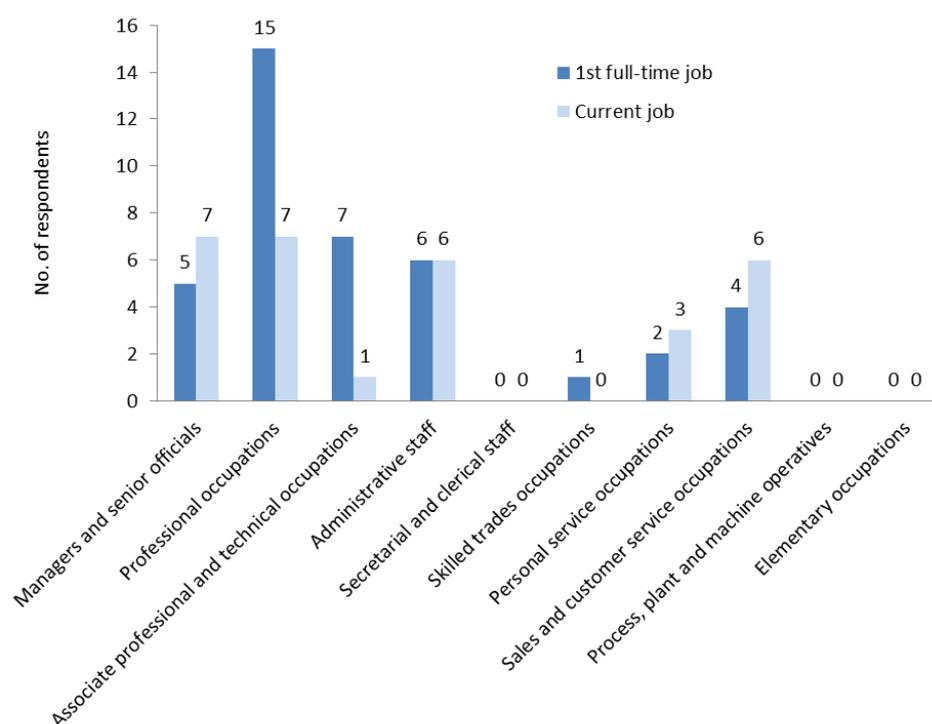


Fig. 8 Frequency distributions of role within organisation in first full-time job (N= 40) and current job (N = 30)

8.5.7. Alumni's perceptions of the relative importance of skills associated with the learning literacies

The skills identified by the alumni as being of greatest importance in their first full-time jobs included the three associated with communication literacy, and the three linked to information literacy (Table 24 below). Mathematical literacy skills, with the exception of 'interpreting data', although still considered important, were regarded as the least important of the skill set.

A comparison of the data with that recorded for respondents' current jobs (Table 24) suggests that mathematical literacy skills had increased in importance in respondents' current jobs compared with their first full-time jobs, with little change in the relative importance of the other literacy skills. However, the results and their interpretation should be treated with caution since the number of respondents had fallen from 39 or 40 (first full-time job) to just 26 or 27 (current job).

Table 24. Importance of skill in first and current full-time job (not at all important = 1; very important = 5)

Skill	1 st full-time job			Current job		
	Mean	Mode*	N	Mean	Mode*	N
Communication literacy:						
Oral communication skills (or signing skills if appropriate)	4.6	5.0	39	4.4	5.0	27
Writing effectively for a variety of audiences	4.2	5.0	40	3.5	5.0	27
Writing accurately (good spelling and grammar)	4.4	5.0	40	3.7	5.0	27
Emotional intelligence:						
Working out what other people are feeling	3.7	5.0	40	3.9	5.0	27
Identifying your own emotions at a given time	3.1	4.0	40	3.4	5.0	26
Managing your own emotions effectively	3.5	5.0	40	3.7	5.0	26
Mathematical literacy:						
Basic numeracy skills (e.g. calculating percentages, converting units of measurement)	3.5	3.0	40	3.4	4.0	26
Interpreting data (e.g. understanding information in tables, charts and graphs)	3.7	5.0	40	3.3	5.0	27
Numerical problem-solving	3.1	2.0	40	3.4	4.0	27
Using spread-sheet software	3.5	3.0	40	3.2	5.0	27
Information literacy:						

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Locating relevant sources of information	3.9	5.0	40	3.6	4.0	27
Evaluating the quality and authority of information	4.0	5.0	40	3.5	4.0	27
Making judgements based on the evidence contained in information	4.3	5.0	39	3.6	5.0	27

*Mode = the most frequently occurring score in the set of data

8.5.8. Self-perceived employability

Table 25 summarises the alumni's responses to the 11 items used to measure self-perceptions of employability (Rothwell & Arnold, 2007). For the whole 11-item employability scale, the mean score (total score divided by 11) was 3.68 (SD = 0.61; N = 47), suggesting that, overall, respondents considered themselves employable. Mean scores on 7 of the 11 items were between 3.6 and 4.4 (SD 0.7 – 1.0) (Table 25). Respondents expressed a strong belief that the skills they'd gained in their present job were transferable to other occupations outside their organisation, that they were well respected by their peers in the organisation, and that they could easily retrain to make themselves more employable elsewhere. However, they were less confident that they could easily get a similar job in almost any organisation. Further analysis revealed a positive correlation between the alumni's scores for employability and their confidence scores for the thirteen literacy skills in Table 19 ($r = 0.33$; $p = 0.024$; N = 47).

Table 25. Self-perceived employability (strongly disagree = 1; strongly agree = 5)

	Mean	SD	Median	N
1. Even if there was downsizing in this organisation, I am confident that I would be retained. *	3.6	1.1	4.0	49
2. My personal networks in this organisation help me in my career. *	3.4	1.2	4.0	49
3. I am aware of the opportunities arising in this organisation even if they are different to what I do now. *	3.7	1.1	4.0	49
4. The skills I have gained in my present job are transferable to other occupations outside this organisation.	4.4	0.7	5.0	49
5. I could easily retrain to make myself more employable elsewhere. **	4.0	0.9	4.0	49
6. I have a good knowledge of opportunities for me outside of this organisation even if they are quite different to what I do now. **	3.8	1.0	4.0	49
7. Amongst the people who do the same job as me, I am well respected in this organisation. *	4.2	0.7	4.0	49
8. If I needed to, I could easily get another job like mine in a similar organisation. **	3.6	1.0	4.0	48
9. I could easily get a similar job to mine in almost any organisation. **	3.0	1.1	3.0	49
10. Anyone with my level of skills and knowledge, and similar job and organisational experience, will be highly sought after by employers. **	3.3	1.0	3.0	49
11. I could get any job, anywhere, so long as my skills and experience were reasonably relevant. **	3.3	1.2	3.5	48

* Four items reflecting internal employability

** Six items reflecting external employability

There was no significant difference between the mean scores for males and females on the 11-item scale (overall), or on the internal or external employability sub-scales (Table 26). But, for males and females taken collectively the mean of 3.73 (SD = 0.71; N = 49) for the four-item internal employability sub-scale was significantly higher than the mean of 3.51 (SD = 0.72; N = 47) for the six-item external employability sub-scale ($t = 2.32$, $df = 46$, $p = 0.025$), suggesting that the alumni were more confident when it came to their internal employability compared to their external employability. Although there was no significant difference between the internal employability and external employability mean scores for males, for females the mean score on the external employability scale was significantly lower than the score on the internal scale, suggesting that it was the females in the sample who were more confident about their internal compared with their external employability.

Table 26. Gender differences in employability scores

Gender or sub-scale	Gender or sub-scale	N	Mean	SD	t statistic	df	p value
Overall self-perceived employability	Male	14	3.82	0.61	1.057	45	0.30

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score	Female	33	3.62	0.61			
Internal employability score	Male	15	3.78	0.71	0.348	47	0.73
	Female	34	3.71	0.72			
External employability score	Male	14	3.71	0.68	1.301	45	0.20
	Female	33	3.42	0.72			
Males	Internal	14	3.82	0.72	0.650	13	0.53
	External	14	3.71	0.68			
Females	Internal	33	3.71	0.73	2.281	32	0.03*
	External	33	3.42	0.72			

Significant difference is highlighted in blue, * $p < 0.05$

The higher in their current organisation a respondent was, the more he or she tended to feel employable; the correlation between organisational level in current job and overall employability was 0.62 ($p = 0.001$). There was no significant correlation between organisational level in respondents' first job and overall employability ($r = 0.09$, $p = 0.59$).

8.6. Objective 6: to investigate how students use and develop these literacies informally in their everyday lives

The students described using and developing these literacies informally outside of university as part of paid and voluntary work, in leisure and recreation activities and within the family. In both paid and voluntary work they used numeracy for record-keeping, stock-taking, managing the till and budgeting their personal or shared household finances. One student described using his numeracy skills for keeping a weather station and recording weather patterns. For some these informal uses meant acquiring new skills whilst for others, as in the weather station, it meant developing or transferring existing skills. For most this was described as generally improving confidence and numerical dexterity, for example in being able to calculate sharing a bill after a night out, but little connection was made with using these skills within their course.

In a similar way the students described using communication literacy as part of work, social life and family life. Some students described writing for pleasure which included keeping a journal, writing poetry, editing a church magazine and supporting the writing of family members. At work, either paid or voluntary, writing was used mainly for record-keeping; there was little connection to using these inside university. Most described the importance of oral communication for work and their social life. Work, particularly bar work, was seen as developing confidence in verbal communication skills, particularly with people from different backgrounds or ages. Ben, a Computing student, explained that, "*Working in a pub is definitely improving my social skills. When I came here I didn't really want to talk to anybody because I just sat there quietly and if people talked to me I would talk back, but working at the pub I talk to people a bit more*". The students did connect developing these skills with what, and how, they were learning on their degree programme, commenting on improving their ability to speak in a group, to work with others and to share their opinions.

Most students described using computers and mobile technology socially for texts and emails to friends and family. Several Computing and Gaming students described spending time outside of their course developing ideas and skills with friends or family members. Most who used technology at work, either paid or voluntary, described using computers for stock-taking, record-keeping or invoicing. This was a similar use to the written communication above. There was a cross-over from use at university and home, or leisure, as some students, particularly the mature students, talked of an increase in confidence which encouraged them to explore new uses and to purchase or upgrade home equipment. This was seen as beneficial in supporting their proficiency in this area, supporting success at university and in obtaining future employment.

What was surprising was how much informal learning and peer support was occurring within the university but outside of formal study activities. This was the case for several of the Computing students, who Ben described as 'geeks', who often like to work on their own but actively chose to form informal study and support groups. This independent and collaborative learning activity, established quite quickly, was very different to their previous mainly teacher-pupil focussed experience of learning. This independent informal learning included

online support, individual coaching sessions, extended collaboration of ideas and editing. Peter, a Computing student, described his informal writing network:

Everyone's got a good work ethic and they all start their essays early...We spend all day together, we'll be chatting for particular assignments on how we approached it, we'll even share notes...it's been fantastic for all of us working at this level, we've just collected the best of our knowledge and applied it to the things we have done.

Ben explained that he would see if someone had a problem even if he didn't need help himself. Whilst Bradley, studying Forensic Science, described his informal writing support network:

I've shown it to a couple of people on my course, like a kind of peer review thing and they were fine...I mean we all tend to proof-read and stuff for each other...it's like 'I'm not sure how to do this' so pop around and show someone, it's very informal.

Lucy, studying Forensic Science, developed a more one-to-one coaching arrangement in Chemistry with another student who lived at some distance from the university: "[It is great] she will just stay that extra hour just to explain something to me". As well as one-to-one and informal meetings several students decided themselves to set up Facebook pages to swap information and help each other. They were aware this helped their digital learning as well as their writing:

One of my friends actually showed me, now I find it easier. We set up a Facebook page actually that was like support for BSL and deaf students. We are all on that, second and third years too, we are posting questions and other people are answering them, and it's a really good support network. It's just a really good idea, everyone uses it and everyone helps each other. (Jenifer)

Flora mentioned that someone who was good at IT helped her and she then reciprocated by giving emotional support to them and others. Others like John, a police studies student, described the range of informal networks using online and face-to-face communication to improve writing and critical thinking skills:

And having written it and read a few other people's as well, we go bouncing ideas off each other working through it that way, we have got a Facebook group and discussions will be over questions - are we meant to put this in or that in? A couple of us, [name] who is also on my course, we will discuss things at length in her flat and we will discuss what sort of points are in the question and then as we are discussing it we will think of different things and more will come from that...We have got about 40 members of the group, so most people on our part of the course. (John)

John described that he and his flatmate would look over one another's work pointing out small grammatical errors but not major errors or missing parts, showing a clear sense of working together but not as he put it 'cheating'.

These informal and social networks relied upon and developed the things that the employers valued as they were collaborative, independent, supported good group work skills and maturity. Many of these skills were also gained from work experience but often this occurred in a structured or formal environment. What is of interest here is how the students were developing skills which the employers valued but that were also enabling them to succeed academically.

8.7. Objective 7: to explore how deaf students develop these literacies and to what extent they impact upon their employability

Whilst it is hoped that deaf graduates enter the wider employment market on a par with their hearing peers, data regarding the first destination of deaf graduates in 2008/9 show an increase in unemployment levels of over 100% in just two years, compared with 25% in the general population (AGCAS, 2011, p17). Whilst deaf undergraduates and graduates have the same intellectual capacity as their non-hearing peers, study the same courses and achieve the same degree classifications, it appears that they are not competing on a level playing field in the transition from university to employment.

It had been hoped that this research study would shed light on this situation and pinpoint whether or not employers' expectations and deaf students' acquisition of the literacies impacted upon their employment opportunities. Unfortunately, the research sample was very small, as only a total of three deaf students

entered university during the academic years 2010 and 2011. These three deaf students were interviewed at the beginning of their study; one student again at the end of their first year. In addition, five alumni completed a questionnaire, two of whom were interviewed. A deaf employer from a deaf organisation was also interviewed. Given these small numbers, it is difficult to find large-scale patterns and themes; however, the data do provide an insight into deaf student transition and their acquisition of key literacies and employability skills. Significant differences in deaf and non-deaf student experiences are also evident and worth exploring.

Of the five deaf alumni who completed the questionnaire, two were in full-time employment, two were still unemployed and one was in part-time work. The unemployed graduate was doing voluntary work on a part-time basis. Only one respondent had a 'graduate' post, as Fundraising, Events and Donors Manager within a deaf organisation. Interestingly, all those employed were working within the deaf community or working with deaf people. This is not unusual. In a separate interview with eight third-year students, all but three of them wanted to work with deaf people, for example as a cricket coach for deaf people, in deaf theatre, teaching BSL and so forth. However, it is also apparent that others wish to enter mainstream employment and yet still find themselves working in a deaf environment after graduation.

Yes I have a job, but the job isn't connected to my degree, it's very different. The course I took was 'Exercise, Health and Nutrition' focussing on food science, whereas the job I have is family support worker for [...] Deaf Society. [...] I am happy to still carry on with the position because it's better to be in a job than to have finished my degree and have no work at all, however I wish I could find a job that was linked to my degree (George).

The prevalence of deaf graduates working within the deaf community may be because deaf employers are more pro-active in employing deaf graduates but also because they are looking for different employability skills. One deaf employer from a deaf organisation was interviewed. The interviewee had direct experience of interviewing and recruiting deaf people. Rather than attaching the greatest importance to oral communication skills, as reported in the major part of this study, unsurprisingly, they did not rate oral communication as important at all. They did, however, expect written English to be at least 'basic' level. This comment needs to be understood in the context of literacy for people who have no auditory means of understanding English, and whose first language is visual-gestural and consists of a completely different syntax to that of English.

I expect them to have a good level of English for a deaf person. By that, I don't mean them to have an advanced level of English, but, if they've been through 3 years of University then I do expect them to have basic English at least.

Equally, maths and IT were not considered an important issue:

'I expect people to be able to do basic adding up but nothing more than that [...] and they need to have basic IT skills, be able to find their way around a computer and use packages such as Word to enable them to keep records and that's enough. I don't expect them to have high level skills in this area.'

Clearly the nature of the employment will affect these responses; this was a deaf organisation and social enterprise providing welfare and social support to deaf people. One could argue that other organisations would rate maths and IT more highly.

Whilst mathematical and communication literacy (oral and written English) did not figure highly, this employer placed a great deal of value on emotional literacy, in particular, interpersonal skills.

It's more important that they have interpersonal skills with which they can interact with others and team members. [...] I've found some graduates are lacking in social skills. There's a gap between their academic skills and their interpersonal and social skills, often the two things aren't equally balanced.

There was concern that graduates did not actually know how to apply the knowledge they had learned at university and that they had unrealistic expectations about the type of job they would get when they first started work. This employer clearly felt that undergraduates were not being fully prepared for the workplace. Comments about the 'real world' illustrated the lack of practical application taught at university. There was also concern about the lack of leadership skills being taught. The employer did not want to have to train the graduate all over again; they expected graduates to know what to do and to be able to take the lead. This was not always their experience.

Linked to the lack of 'real world' experience was the prominence given to work placement and volunteering. As with the other employer responses within this study, students' willingness to gain work experience was rated extremely highly when recruiting employees.

Volunteering is good because it shows commitment, the potential to work with other people, a keenness to improve their CVs and we get to know they are capable of working with people. Work experience is very important because it gives students a taste of what's to come; [...] students gain experience, and they get to compare and contrast academic knowledge with real life situations.

This employer felt that graduates lacked employability skills in general, and that work experience, rather than emphasis on maths and communication literacies would provide them with many of the skills they needed, including problem-solving, another indication that they rated emotional intelligence highly.

I think they need to focus more on work experience, get out there and mix more with the hearing world, pick up interpersonal skills, get used to working conditions, risks and so on, so that when they get to work they know what to expect.

In contrast, the alumni interviewed for this study, felt that university helped them to develop employability skills, mentioning organisational skills, time management, critical thinking, project planning and an ability to think objectively as the most useful. Significantly, they also mentioned confidence building and assertiveness:

I've learnt a lot through university. I'm happy and it's given me confidence (Carmen).

I've built up my confidence through doing presentations at University in front of an audience. That has given me the confidence in my work to meet with people and families, give talks and visit schools (George).

Emotional intelligence was also alluded to. Both alumni felt they had a greater respect for and awareness of people's ethnic backgrounds and ensuing cultural issues since studying at university. They felt that they had learnt how to empathise with others, which was something they were able to take into the workplace.

I never really knew what empathy was until I came here. I think empathy is important for students. I use empathy a lot in my team [...] it's important for each other to know how the other feels (Carmen).

One of the alumni started university on a Foundation course specifically designed for deaf students. This graduate felt they had benefited greatly from this preparatory course, which had taught them Maths and English, adding that Maths wasn't taught at all on their actual degree course. However, they acknowledged that the university had provided them with useful skills such as presentation skills and guidance on how to reference, use IT, research and use PowerPoint.

Both alumni also praised *Futures*, the university careers service, which delivered career and employability sessions specifically for deaf students, delivered in BSL. *Deaf Futures* held a number of workshops over two academic years, providing information and guidance on CVs, completing application forms and undertaking interviews. Deaf guest speakers delivered presentations on finding employment, setting up in business, Access to Work and so forth. A *Deaf Futures* network, bringing together careers and disability advisers from HEIs across the UK has shown that this kind of support is rare in universities, however, its value is considerable, especially as information about employment and employment opportunities is often not easily accessible for sign language users.

I found out on my first day. [Futures] told us about how to work with interpreters and [...] they told us that having a degree on its own isn't good enough, but that it was good to do voluntary work and get some work experience and [...] develop other skills, which was useful (George).

The importance of work placement experiences was a common theme from all respondents in the study. This suggests that messages from employers are being picked up in university and passed onto students who welcome the opportunities and skills it affords them.

I think studying and working at the same time helped to develop me a little bit. If I had just concentrated on my studies and done no voluntary work or work experience I think it would have been harder to develop my skills. I think that studying and working in parallel can improve your skills (George).

However, for some alumni, work placement opportunities were not related to their course, or not compulsory. They had found voluntary work or a work placement on their own, outside of their study programme but felt that the university had let them down by not alerting them to companies which offered work placements.

I think it would be good if the university could inform students about the various companies that do offer work placements for students. [...] on their website it said there were opportunities for students to apply for work placements. I didn't know about that (George).

In summary, the alumni were positive about their experience at university. One of the alumni was disappointed that he was not using his degree within his place of work, but he did acknowledge the armoury of transferable skills he had accumulated both formally and informally whilst at university. Both alumni felt they had benefited from doing work placements and being involved in extra-curricular activities, in both cases working with the BSL and Deaf Students Society. They felt this was critical to them securing a job.

The themes raised by the alumni were common to those discussed by the first-year students, however, the interviews with the latter very clearly emphasised the difficulty of transition, not least because of considerable barriers in communication and in acquiring communication literacies and skills. Communication, in its widest sense, is of utmost importance to a deaf student. Having people being able to sign figured very highly in their motivation to come to this university:

It was such a relief to find that there were people here who could sign [...] So, to come here where there is signing is like 'WoW', amazing (James)

For a deaf student, the availability of sign language and in particular, the availability of support for deaf students is critical. For most hearing students, the reason they choose a particular university is because they like the subject or particular course on offer. For deaf students, the choice of course is secondary. Two out of the three students interviewed said that they chose UCLan because of the support it offered deaf students. In a separate interview with third-year students, 62% cited support as the main reason for choosing to study at UCLan.

I chose this university because I'd heard it was the best in the North West for providing access to interpreters, good note-takers and language support. Plus, they are deaf aware.

There are obvious dangers in doing this. In fact, both alumni said that in hindsight, they wished they had looked more closely at the course, rather than considering support issues as their priority. George had chosen the university because of its support for deaf students, but realised too late that the degree he had chosen did not give him the extra qualification he needed as an entry route to employment in his field:

'If I had known I wouldn't have come to this university.'

Communication and mathematical literacies are keys to success at university, yet deaf students enter universities under-prepared in terms of their literacy, numeracy and general study skills, and in particular, their ability to access and produce written English at HE level. In short, deaf students face a considerable language barrier, often struggling to understand textual material and complete course assignments. This is not so much a reflection on their intellectual ability as an acknowledgement that they are expected to function with a high degree of fluency in a second language they do not have the natural ability to acquire (Barnes & Doe, 2007).

Not surprisingly, the students interviewed for this study found English (and therefore course assessment) difficult.

All the students were worried about the level of English expected from them at university. It was apparent from all interviewees that practices in college were quite different from those in university. College was seen as more 'laid back', where they had been 'spoon-fed' and where tutors had told them where to find everything they needed. James admitted that he didn't know how to write an essay before coming to university; he had come from a college for the deaf, where grammar and academic English was not insisted upon.

At college, assignment work was quite brief, here it's more in depth, you have to explain things properly and use the correct words [...] but at college it didn't matter (James)

Independence and independent study were also new experiences, but something that the students wanted to achieve:

I want to improve and do it myself. Do it myself, I need it and learn quick. (Lucinda)

Here you are on your own, an independent learner. I don't know how to do that, I don't have the experience. (James)

All the students were in receipt of Disabled Students' Allowance which enabled them to receive support from a Language Tutor for Deaf Students. The language tutor works on a one-to-one basis with the student, checking their understanding of written text, simplifying and modifying written English, re-ordering and restructuring what the student has written, amending grammar, in short, supporting their communication literacy development. All students benefited greatly from this support, and also from the personal feedback they received about their English. This boosted their confidence but also enabled them to reflect on their progress in developing English skills. Mike was interviewed at the end of his first year:

Working with [my language tutor] is brilliant! It's progression through the year and it's like I hand in an essay and [my language tutor] says it is good, it was a good essay except for the structure. Then as the years gone on, especially the last few essays, the structure has been there, it's been better than it was before. So, I know there's a difference, but yeah, it just takes time.

This type of support is critical for a deaf student to be successful at university, yet all three interviewees felt that they did not receive enough of this type of support.

We only have an hour, which really isn't enough. I'm really disappointed. (James)

We got assessed and they only gave us 20 hours [...] so I have to apply for more which is another stress really; I don't need it! (Mike)

Deaf students who are BSL users generally rely on interpreter, notetaker and language tutor support in order to access their curriculum on a par with non-deaf students. However, all three students discussed at length the stress associated with applying for and receiving support. They complained about support not being in place during the first weeks of semester one, receiving inadequate levels and quality of support, constantly changing support workers which led to inconsistency and uncertainty, having to be reassessed for additional support requirements. This is something that they had to deal with at an already stressful time of change, transition and relocation. All three interviewees felt that their ability to cope at university was hampered by support arrangements and issues. These are real issues and challenges that hearing students do not need to face.

Mathematics was also highlighted as a problem area. For a deaf student, it is difficult to separate mathematical literacy from English or communication literacy. The English language of mathematics is so complex that deaf students struggle to understand how to even get to the mathematical problem. This is complicated by the fact that there is little or no standardisation for mathematical signs in British Sign Language. Dependent upon who is signing, the sign for 'capacity' could easily be signed the same as the sign for 'weight' or 'volume'. The potential for confusion is obvious.

At college, and previously at school, I wasn't good at maths. Partly due to lack of communication being in a mainstream school my maths went downhill. I didn't get a good grade. (James)

The interviewees who undertook the maths tests in this study expressed their dismay, and felt that their maths ability had diminished since leaving school and college due to a lack of mathematical input. Not one of the students felt they were picking up maths skills whilst on their course, however, similarly to non-deaf students, they were developing numeracy skills outside of the classroom, as social secretary of the DBSL society, scoring and marking in the squash team, organising timetables and budgeting in general.

The students had come to university with a variety of IT skills and abilities. They were all computer literate and confident, but needed support for the different systems in place at the university. They had needed and found support for accessing e-journals, the library catalogue system, and researching in general and had found Study Skills useful, where these were provided in their curriculum. Where Study Skills were not provided formally, they asked friends.

All three interviewees discussed making friends. Interestingly, all three raised points about having both deaf and hearing friends. As two students were on a Deaf Studies course, they felt happy that their peer group could sign. This was important to them and it also highlighted the difficulties they had had previously, when they were perhaps the only signing deaf student in a mainstream class. The students showed high levels of

emotional intelligence; being aware of how difficult hearing people find sign language – and moderating their signing to accommodate new sign language learners.

To start with I signed at a really low level ... There's no awkwardness now, and everyone is signing really well. (James)

Hearing students are usually in the position in the classroom where they have the majority language, now I'm in that position, so I'll step up to the mark. They have to learn about deaf identity and I've to learn about hearing identity. (James)

Mark had been educated orally, but here he was beginning to learn about his own deaf identity which was a revelation to him. He was learning so much through discussions with other deaf students. This peer scaffolding seldom happens when there is a sole deaf student in a class of hearing peers.

If you talk to all the other deaf students, you can talk about deaf identity and stuff [...] we have had real good conversations about cochlear implants [...] and I can see both sides.

Whilst appreciative of the peer support offered by other deaf and signing students, all three interviewees also recognised the importance of being part of both deaf and hearing worlds. They had learnt strategies which had enabled them to communicate with both deaf and hearing students. Mark, for example, could sign with deaf friends and yet speak with hearing peers, such as the friends he had made in the squash team where he was the sole deaf student. Lucinda, a BSL user, was on a Performing Arts course and had to adapt to the practical demands of her course. She was a course rep, which meant she had to communicate with her peers. She split her life into being with hearing people during the day, and then with signing students in the Deaf and BSL Society in the evenings. She found support here:

We got closer and closer [...] we work like a team [...] we help each other [...] it's really useful.

Deaf/hearing relationships also figured very highly when the students contemplated employment. Lucinda, in particular, realised that the ability to move between deaf and hearing worlds was critical for her finding work. She realised that there were only a few 'deaf' jobs to apply for, so she had to be able to function effectively in both deaf and hearing environments, achieving 'a good balance' between the two.

Finally, the students discussed work experience and employability. Whilst the deaf employer thought university did not equip undergraduates for the work place, all interviewees felt they were learning valuable employability skills; time management, ability to meet deadlines, organisation skills, confidence, leadership skills and even written English skills. However, both Lucinda and Mark felt that they still needed more English and Maths skills in order to make them fully employable.

I need to improve my English, because I might get an interview. (Lucinda)

In addition, there was a real awareness of the types of skills and attributes employers were looking for; 'passion', 'interested in learning the job', 'leadership', 'skills to do the job' and 'attitude'.

I think attitude is a massive part in employability. For me the most important thing is obviously being able to do the job, and the attitude you take to the job, your attitude with other people.' (Mike)

The students were preparing themselves for the world of work; two of the students had work placements relevant to their career aspirations. Mike had a regular summer placement at a nursery school with deaf children; he wants to be a teacher of the deaf. James worked tirelessly, often voluntarily, in the deaf world, working with deaf organisations, campaigning on behalf of deaf youth, working with ChildLine, raising deaf awareness, giving presentations at national conferences; he wants to travel the world advocating for deaf rights for disempowered deaf people.

In summary, although the interviewees felt that they were lacking the English and Mathematical literacies expected of them at university, they were acquiring a range of skills and experiences that would serve them well when seeking employment.

9. Outcomes

In this project we explored the development, relationships between and application to employability of a framework of four learning literacies, namely mathematical literacy (the use of mathematics), communication literacy (using reading, writing and speech), information literacy (locating, accessing and using information) and emotional literacy (understanding our own and others' emotions). These literacies are essential not only to a student's academic success at university, but also to their future employability and their everyday lives.

At the outset, the project team set itself seven objectives.

Objective 1: to document what employers expect from graduates in terms of our framework of learning literacies

This objective was achieved by means of an online survey completed by 50 employers and follow-up interviews with 8 employers. A number of strategies were used to boost the number of returns to 50 and these have been summarised in sections 6 and 7 of the report. The results highlighted the importance employers attach to these learning literacies, and particularly to those skills associated with communication and emotional intelligence (although this latter term was not used by the employers). The results and conclusions reinforce those regularly reported in surveys carried out by UK organisations such as the CBI and IoD (e.g. IoD, 2007; CBI, 2010, 2011).

Objective 2: to track and evaluate student confidence and proficiency in these literacies at their transition into HE and at key points through their 1st year in terms of the curriculum and learning process

In order to achieve this objective, participating students attempted a reading test and mathematical literacy test at two time intervals (T1 in semester 1 and T3 towards the end of semester 2) and completed a comprehensive online survey at three time intervals (T1, T2 at the start of semester 2, and T3). In addition, 20 students were interviewed. Overall, the results revealed significant improvements in the students' confidence with regard to their communication literacy, information literacy and aspects of emotional literacy, but not with regard to their mathematical literacy (possibly due to lack of opportunities for practise and further development) during the course of their first year. The results highlight the importance of providing students with opportunities to practise and further develop these skills during their first year in order to enhance their levels of confidence and improve their academic performance.

Objective 3: to investigate how changes in confidence and proficiency predict student retention, adjustment to university, and academic achievement

Our work extends previous work on adjustment to university by determining that there are different trajectories of adjustment over the first six months at university. Those students who remained low on adjustment across the first six months showed lower academic achievement at the end of Year 1; the membership of this group was predicted by low emotional self-efficacy scores; students who felt that they were unable to manage their own and others' emotions were more likely to follow a trajectory of poor adjustment. Students who were high on adjustment over the course of the first six months, and those students who moved from low to high adjustment, scored higher than other groups on emotional intelligence skills, suggesting that the ability to manage emotions ensures adaptation. This suggests that (i) the assessment of Emotional Intelligence and Emotional Self-Efficacy may be helpful for HE staff as it highlights students at risk, but (ii) it points to the need for interventions in HE that help students further develop emotional skills. Already, we have evidence that emotion management skills and self-efficacy are amenable to intervention in HE students (Dacre-Pool & Qualter, 2012; Nelis *et al.*, 2009; Qualter *et al.*, 2009), and further research should explore whether these interventions predict changes in adjustment to university, which then impacts upon academic success and retention.

These conclusions are important for practitioners and researchers in HE. The findings suggest a need for particular interventions based on emotional skills, but they also remind us to view students as individuals who will not all experience the transition to HE in the same way. Factors that predict poor adjustment over time need to be further explored, but this first investigation points to the need to examine emotional skills, particularly emotional management, which is likely to impact on revision, strategies for academic success, etc.

Objective 4: to investigate how we support development of these literacies and whether what we do matches employers' and students' needs and expectations

The project has identified gaps between development of these literacies at university and employers' expectations, particularly in the area of written communication. Providing real work-world examples in teaching will support students' understanding of what is required for employment. Exploring the student experience of study in their first year and at transition into employment shows what skill development is valued, even though not always enjoyed, and how this relates to future employment opportunities and practices. It is significant to communicate that employers focus less on subject knowledge and more on general experience and attributes, endorsed by the alumni; skills and opportunities which need to be developed and embedded within subject programmes.

The employers valued being asked directly what their experiences were of these literacies in graduate employees and were positive about contributing their knowledge to HE providers. The report will be returned to all those who participated, hopefully stimulating further discussion and research in this area. The paper submitted to the *Journal of Learning and Development in HE* explored supporting STEM (Science, Technology, Engineering and Mathematics) subject student writing within an academic and development community, widening the discussion from technical competence through study skills to a wider learning perspective.

Objective 5: to discover the nature of relationships between these literacies, and between these literacies and students' reported employability upon exit from HE

The examination of relationships between the literacies showed high levels of correlations at each time point of the study and prospectively over time. Thus, abilities and self-efficacies in one domain appear to be linked to all others. We explored the association between two of these literacies (mathematics and emotional) further; we examined the role that EI and ESE plays in undergraduates' mathematical literacy, and the influence of EI and ESE on students' attitudes and beliefs about mathematics (see Tariq *et al.*, in Appendix 3). Findings suggest that enhancing an individual's emotional capabilities may encourage improvements in learning strategies used in the study of mathematics or mathematics-related subjects, increasing proficiency in mathematics and thus mathematical literacy. This is important for teachers in HE to know. However, we also acknowledge that further in-depth studies are required to clarify the complex nature of the associations that exist before clear and explicit guidelines can be formulated; future studies need to establish by which mechanism emotional competencies impact on mathematics success. For example, is it the successful management of difficult emotions surrounding mathematics that predicts mathematics success or do higher emotional competencies enable the students to better structure their revision/work even when they do not feel like it?

Both the alumni interviews and survey data suggested that graduates considered all four literacies to play an important role in their full-time graduate jobs. However, some literacies were more important and these data confirmed what the employers were looking for which was the significance of work experience, maturity, and a good work ethic. Graduates considered the most important skills for employability to be general communication skills (writing and speaking), the ability to work in a team, and management of emotions. These findings are in line with the proposals made by the CareerEDGE model of employability (Dacre Pool & Sewell, 2007), which is a prominent model of graduate employability used in HE. This model of graduate employability proposes that in order for students to develop their employability whilst in HE they should have access to opportunities in relation to five elements on the lower level of the model, i.e. **Career** Development Learning, **Experience** (Work and Life), **Degree** Subject Knowledge, Skills and Understanding; **Generic** Skills and **Emotional** Intelligence. Our findings support these suggestions and provide more empirical support for those in HE that are using this model.

Objective 6: to investigate how students use and develop these literacies informally in their everyday lives

Including informal learning, within HE programmes as well as in everyday lives, adds an important dimension to looking at the development and meaning of these literacies both for successful studying and for future employment. The recognition that learning and the use of these literacies cross both formal and informal boundaries will enable teaching to support this development through learning activities and assessment. These are skills the students valued, enabling them to become more independent, developing maturity and general

communication skills themselves. These are attributes employers value; to be able to evidence these would be of advantage to the student and the employer.

Using a social practice approach provides a conceptual frame that takes into account context, history and the process of learning. Again these are things that the employers and students told us they valued. This is a valuable insight for HE teaching.

Objective 7: to explore how deaf students develop these literacies and to what extent they impact upon their employability

In formulating this objective we were conscious of the unique challenges deaf students encounter at university, in gaining employment, and in the workplace.

The original aim of the project was to have a large cohort of deaf students which could be used as a comparative study when discussing the literacies undergraduates develop within their first year. Unfortunately only three deaf students joined the university during the lifetime of the project, which meant that the quantitative data was insufficient to illustrate trends or predict outcomes. However, the students, alumni and employer were all interviewed and this qualitative data provided a wealth of useful information regarding the transition of deaf students and their attitudes to university and employability. The deaf students and alumni raised the same themes as the non-deaf student population to a great extent; fears regarding assessment, anticipated levels of academic difficulty, making friends, acquiring employability skills. However, the deaf students also had other issues to deal with, which impacted on their learning and wider university life; organising and receiving support, difficulties with academic literacies and in particular, written English, communication in its broadest sense, finding employment in a hearing world. The deaf employer made it clear that different literacies were required of deaf people working with deaf people. It would have been interesting to include questions regarding deaf employees in the generic employer survey, to identify similarities and differences in employer expectations.

Very little research has been done regarding deaf students in HE. Nothing has been written about deaf students and literacies supporting their learning and enhancing their employability. The impact of this project will inform those who support deaf students in higher education, such as disability advisers, academic tutors, careers staff and work placement officers. In particular, this information will be disseminated via the Deaf Futures Network, funded initially by Action on Access. It will also be disseminated via CHES (Consortium of Higher Education Support Services for Deaf People) and NATED (National Association of Tertiary Education for the Deaf) networks and websites, e.g. www.uclan.ac.uk/schools/education_social_sciences/CHES.php.

Main beneficiaries:

This innovative project represented the first attempt to investigate collectively a number of important learning literacies that influence students' learning experiences and future employability. Our methodology and findings make a substantial contribution to the existing body of knowledge concerning learning literacies within HE pedagogy, offering new insights, particularly with regard to the learning strategies and employability opportunities of minority groups of undergraduates such as deaf students.

The main beneficiaries of the outcomes of this project are:

- Students through:
 - curriculum changes and modifications to teaching, learning and assessment strategies or the establishment of extra-curricular opportunities aimed at enhancing students' competencies in these literacies
 - direction to additional central support facilities (e.g. WISER, Futures, Library and Information Services, mathematics drop-in sessions at UCLan). Access to online resources to support self-directed learning, increased opportunities for practice, and self-assessment.

Students participating in the project benefitted directly through active participation in the research, reflection on test performance, and (for interviewees) the opportunity to reflect upon and discuss their first year experience.

- Academic tutors (including support staff) and research communities through a greater awareness of:
 - the importance of these learning literacies to students' future employability

Literacies Supporting Learning and Enhancing Employability

- the extent to which skills associated with these learning literacies overlap and influence one another
- those factors which influence the nature and extent of students' adjustment to university and which can, therefore, influence student retention

The research findings have been disseminated widely to local, national and international research communities through workshops, conference presentations and papers, academic journal articles, and this detailed report (made available via the Higher Education Academy's EvidenceNet website at <http://www.heacademy.ac.uk/evidencenet>).

10. Conclusions

Employers and alumni

Employers attach a high level of importance to all four of the learning literacies explored within this study and expect a basic level of competency. However, there exists a significant mismatch between the level of importance employers attach to many of the skills associated with these literacies and their perceptions of graduate proficiency in those skills, with the level of perceived competence often significantly lower than the level of importance attached to the skill.

Employers expressed least concern about graduates' information literacy skills, but felt there had been a decline in standards of writing and numeracy, with graduates increasingly requiring additional support or training in the workplace. Employers' concerns with the low level of competency in written work is somewhat at variance with the views of alumni responding to the survey, a significant number of whom reported reasonably high levels of proficiency and confidence. This discrepancy may be explained by employers pragmatically adjusting their standards downwards, which are the working standards the alumni experience, whilst still maintaining an ideal standard based upon the employers' own graduate experiences.

Although people skills and the ability to work in teams were not referred to explicitly by employers as emotional intelligence, but rather as maturity, showing independence and being able to adjust to new situations, employers valued and expected good interpersonal skills; applicants lacking such skills posed a significant risk since employers believed they would be unable to work effectively as part of team and would be unable to communicate and work effectively with clients. However, employers raised concerns about the level of maturity exhibited by some graduate applicants, with their expectation of obtaining a job upon graduation exposing unrealistic expectations. There was a diversity of opinion as to whether universities should and could teach students to be more independent.

The importance that employers attach to work experience was highlighted by respondents to the survey and by the interviewees, who considered that work experience provided graduates with an opportunity to take responsibility for themselves and for others, to work with people and to show maturity and initiative. But there were concerns that some graduates lacked work experience. However, a graduate's work experience does not have to be specifically related to the type of employment for which the graduate is applying and many employers are happy to accept a wide range of work experience, including voluntary work. One of the most important attributes employers seek is a good work ethic, i.e. turning up to work on time, working with a diversity of people, being able to work in a team, demonstrating maturity and confidence, and dressing appropriately. Some employers will not interview or appoint a candidate who lacks work experience.

Most of the employers interviewed saw graduates as 'raw material' which they could then shape and develop to meet their own organisation's requirements.

The alumni interviews and survey data suggest that graduates consider all four literacies to play an important role in their full-time graduate jobs, but that these literacies represent a base-line with regard to graduate employment. Alumni believe that, although employers expect graduates to have a reasonable level of proficiency, in most cases these literacies are not key determinates of employment. A lack of base-line proficiency will, however, prevent or impede success in employment.

The alumni considered that some literacies were more important than others and the data confirmed what the employers were looking for, namely work experience, maturity, and a good work ethic. Graduates considered the most important skills for employability to be general communication skills (writing and speaking), the ability to work in a team, and management of emotions.

First-year undergraduates

In terms of these four literacies, individuals found the transition to university challenging and many struggled during their first semester. For example, students were unfamiliar with academic writing and lacked confidence when it came to speaking with their peers in groups. Although, overall, students within the sample were moderately confident with regard to their mathematical literacy at their transition into university, maintenance of that confidence appeared dependent upon the extent to which students had opportunities to practise and

further develop their numeracy skills; whilst some felt their numeracy skills had improved, others felt they had deteriorated through lack of use. The students' information literacy skills increased significantly during their first year as they learned to locate, access and critically evaluate the extensive amount of information available to support them in their academic studies. Students had to rapidly develop an understanding of what the university's expectations were with regard to academic writing, referencing and plagiarism, and some students took advantage of the university's support systems (e.g. WISER) to improve their skills. However, with practise the students' confidence in these learning literacies increased during their first year. A comparison of the emotional literacy skills of Psychology students (who are provided with opportunities to improve these skills) with those enrolled in other disciplines revealed that students in Psychology reaped the benefits of the emotional literacy intervention available to them, but that the intervention appeared to influence only their emotional self-efficacy.

Overall, results revealed significant improvements in the students' confidence with regard to their communication literacy, information literacy and aspects of emotional literacy, but not with regard to their mathematical literacy (possibly due to lack of opportunities for practise and further development) during the course of their first year.

We also found evidence that there are different patterns of adjustment amongst students within their first 6 months at university. Those students who remained low on adjustment across the first six months showed lower academic achievement at the end of Year 1; the membership of this group was predicted by low emotional self-efficacy scores; students who felt that they were unable to manage their own and others emotions were more likely to follow a trajectory of poor adjustment. Students who were high on adjustment over the course of the first six months, and those students who moved from low to high adjustment, scored higher than other groups on emotional intelligence skills, suggesting that the ability to manage emotions ensures adaptation. In our article submitted to the *Journal of Learning and Individual Differences* (Nightingale *et al.*; see Appendix 3), we explore these ideas in more depth, and consider how and why emotional management influences adjustment and help-seeking behaviour in the academic setting.

The interviews with students showed that their expectations of developing these literacies were being met in their first year at university. Some of the increase in proficiency was valued for supporting success in studying and in ultimately gaining a degree. Although these were seen as useful skills for future employment most students interviewed thought that employers were more interested in their previous experiences of work and personal attributes. The interviewees we spoke to were accurate in their estimation of what employers expected in terms of general communication skills, maturity and a work ethic. They almost all recognised the significance of work experience as providing evidence of these skills.

There are correlations between all four literacies at any one time and prospectively over time. Thus, abilities and self-efficacies in one domain appear to be linked to all others. In our submission to the *International Journal of Mathematical Education in Science and Technology* (Tariq *et al.*, see Appendix 3) we explore the association between two of these literacies much further, and examine the effect of gender on this relationship; we examine the role that EI and ESE plays in undergraduates' mathematical literacy, and the influence of EI and ESE on students' attitudes and beliefs about mathematics. In our article, we propose that enhancing an individual's emotional capabilities may encourage improvements in learning strategies used in the study of mathematics or mathematics-related subjects, increasing proficiency in mathematics and thus mathematical literacy. However, we also acknowledge that further in-depth studies are required to clarify the complex nature of the associations that exist before clear and explicit guidelines can be formulated.

What is often mentioned less frequently in HE is learning how to learn, something explored by the students informally and in their everyday lives. In an article submitted to the *Journal of Learning Development* (Appleby *et al.*, see Appendix 3) we explore the significance of informal and everyday learning, recognising that these literacies cross boundaries between different sites in individual's lives (Appleby & Hamilton, 2005). The students were engaging with many social practices (e.g. as a student, a colleague, a mentor and employee) which impacted upon their learning. Acknowledging that the students were aware of, and in some cases proactive in, learning how to learn suggests the possibility of relating this more closely to what employers value in graduate employees. Employers also do not want spoon-fed graduate employees. Being able to cite and present references correctly may not be perceived by employers as being a useful transferable technical skill, but understanding how to learn a new skill and the knowledge that underpins it is. A social practice approach

to learning (Lave, 2009; Lave & Wenger, 2005) distinguishes between intentional instruction and learning; recognising that learning is not always an outcome of instruction. Therefore writing, or mathematical, instruction (which may be technical and skills oriented) may be less effective than developing an understanding of the learning process; an understanding which is recognised and valued by employers. This is something the students recognised themselves in developing their social and collaborative networks.

Deaf individuals

Whilst there are many similarities in the experiences of deaf and hearing students during their first year at university, there are also many differences. Communication literacy means something quite different for deaf students and for deaf employers. Rather than being of utmost importance, oral communication skills do not factor in consideration of recruitment. To a certain extent, neither do high level written English skills, as it is acknowledged that congenitally deaf people have delayed literacy development and will be unable to compete with non-deaf people on this criterion alone. Deaf undergraduates also have problems with numeracy, which for them is inextricably bound to communication literacy and often confounded by poor communication support in the classroom.

As with hearing students, deaf undergraduates are aware of the skills employers need and are confident that they are acquiring these skills at university, often in an informal fashion. However, more formal avenues are also open to them (within UCLan), such as working with Language Tutors to help them to develop their written English skills, having bespoke careers events aimed at improving their employability opportunities and skills, and via assessment methods which allow them to present work in BSL; this will not be the case within all HEIs.

Emotional intelligence was evident throughout all of the data collected. The employer emphasised its importance within their workplace, alumni recognised its value and employed these skills at work, and the students gave examples of how empathy and cultural understanding was helping them to settle into university life, alongside hearing peers.

Nevertheless, there are also barriers and challenges for deaf students which make transition to university more difficult perhaps than for non-deaf students. Communication is the key to success. Having people at university who could sign and facilitate academic scaffolding in their first language was seen as a huge advantage. Having a good support team, particularly interpreters, was cited as the main reason they chose UCLan as their place of study. However, the ramifications of organising and receiving this type of support also made transition more difficult at a time of stress and competing priorities.

The majority of respondents in this study wished to work, or were already working, within the deaf community, in either a paid or voluntary capacity. Whether deaf employers attract deaf graduates because they require a different set of skills and literacies from mainstream employers, or whether deaf graduates gravitate to 'deaf' employment simply because they feel more comfortable, confident and capable working within the deaf signing community are among the questions we explore further in Barnes *et al.*, (in preparation.; see Appendix 3).

11. Implications

The results of this research project and its conclusions have implications for HEIs in terms of:

- increasing HE professionals' awareness and recognition of the importance of these learning literacies to their undergraduates' future employability;
- helping HE professionals recognise some of the key factors that may influence their undergraduates' adjustment to HE;
- the teaching, learning and support strategies HE professionals need to put in place to ensure that their undergraduates have the necessary skills to enhance their prospects of graduate employment, whether in their chosen academic discipline/vocation or in an alternative career pathway.

Although the undergraduates and alumni who participated in this project represented a relatively narrow range of academic disciplines, the project's findings and conclusions have implications for a wider range of disciplines, beyond those included in the project.

Much of the evidence presented should provide the necessary driving force to encourage curricular changes and/or the provision (or modification) of central support facilities which (i) emphasise the importance of these learning literacies to future graduate employability, and (ii) offer a range of support strategies which cater for a diverse undergraduate population.

Adjustment to HE

At an institutional level, the Learning Development Unit at UCLan is keen to further explore adjustment to HE. Their aim is to use the system of Personal Advisers to monitor student adjustment so that students get support early in their studies in order to increase retention and academic success.

Interactions between the learning literacies

Interactions between the learning literacies should be explored further. For example, the associations between mathematics anxiety and emotional intelligence and the apparent gender differences warrant further investigation, since a better understanding of the factors influencing mathematics anxiety could lead to better strategies aimed at countering its effects.

Challenges faced by deaf students

As little research is undertaken with deaf students, a wide range of other professionals will benefit from the results of this project. Further research is needed to expand the data sets collected in this study. This will provide opportunities to more effectively identify trends and patterns in deaf students' literacies and to determine the impacts of these literacies on employability and long-term career and job prospects. More representative data would allow academic institutions to more effectively tailor skills and employability training for their students to match the specific needs of both deaf students and employers.

Due to the small sample of deaf students interviewed for this project, we are seeking funding to roll this out nationally, or at least to those universities which traditionally recruit larger numbers of deaf students (e.g. Sheffield Hallam and Wolverhampton) in order to find stronger themes and patterns regarding transition and employability. Previously, we have worked closely with the Learning and Skills Improvement Service (LSIS) on a number of projects regarding 'deaf learner voices', and we are seeking further funding here.

12. Recommendations

Recommendation 1: Communication and mathematical literacies

It is vital that universities, through their teaching, learning and assessment strategies, continue to play their part in addressing what employers perceive to be a deficit in graduates' communication (oral and written) and numeracy skills. Universities should ensure that all students are provided with sufficient opportunities to practise the skills associated with these learning literacies.

Recommendation 2: Developing independent learners

Rather than spoon-feeding students, from their first-year at university, HEIs should encourage greater use of teaching and assessment strategies that support independent learning.

Recommendation 3: Emotional literacy and adjustment to university

Rather than assessing adjustment to university over time, it may be possible to determine patterns of adjustment from earlier risk factors. The assessment of these personal characteristics and appropriate interventions are important. Offering students opportunities to develop emotion management skills and increase emotional self-efficacy should improve students' adjustment to university and their academic performance.

The assessment of Emotional Intelligence (EI) and Emotional Self-Efficacy (ESE) may help staff in HEIs determine which students need help in developing these skills, since we have shown these skills to be important in predicting continued problems in adjusting to university life. Where EI and ESE scores are low, students could be offered development opportunities. Given previous work showing that emotion management skills and self-efficacy are changeable in university students as an outcome of direct intervention in class (Dacre-Pool & Qualter, 2012; Nelis *et al.*, 2009; Qualter *et al.*, 2009), we predict that such interventions are also likely to have an impact on adjustment to university, which we have shown to be important for academic success and retention.

Our findings are in line with the proposals made by the CareerEDGE model of employability (Dacre Pool & Sewell, 2007). This model of graduate employability proposes that in order for students to develop their employability whilst in Higher Education they should have access to opportunities in relation to five elements on the lower level of the model, i.e. **Career** Development Learning, **Experience** (Work and Life), **Degree Subject Knowledge, Skills and Understanding**; **Generic Skills and Emotional Intelligence**.

Thus, universities should provide and encourage students to take advantage of any opportunities to improve their emotional literacy skills, e.g. the emotional literacy module available at UCLan.

Recommendation 4: Employer and student expectations

Universities need to provide students with more information about what employers actually want and expect from their graduate applicants in an increasingly highly competitive graduate labour market. Ideally, any strategy and its implementation should directly involve employers and alumni.

Students should be helped to develop more realistic expectations with regard to obtaining graduate employment and to understand that once employed their degree represents the beginning of their professional learning, not the end of it.

Recommendation 5: Work experience

Increasingly, universities are aspiring to offering as many students as possible work placements as part of their undergraduate programme. Opportunities for work placements in 'real work' environments should be explored, with greater liaison with employers. However, for some disciplines, and when dealing with very large numbers of students, it may not prove feasible to provide every student with such an opportunity, particularly in the current economic climate.

Our data suggest that not all employers equate undergraduate 'work placements' with 'work experience', i.e. experience of the 'real' world of work, where an individual's maturity and work ethic develop, since the pressures are not the same. Therefore, where it may not be possible to give every undergraduate on a course

the opportunity of a work placement, universities should encourage students to gain extra-curricular work experience, and provide formal accreditation of that work experience, e.g. as part of an 'employability' module or university certificate in employability.

Recommendation 6: Social learning

Universities need to acknowledge the social learning that takes place inside and outside of university through responsive assessment practices to encourage or recognise this development. Universities should support the development of virtual communities of practice (cf. [Hargreaves & Gibels, 2011](#)) using media such as Facebook and Twitter to increase peer collaboration and independent learning both inside and outside the university. Virtual communities of practice encourage students to communicate and share ideas, knowledge and insight into specific subject areas, methodologies or theoretical perspectives; they recognise that learning can be informal, collaborative and extend beyond the confines of physical environments.

Much workplace learning recognises the significance of 'participatory practices' ([Billett, 2004](#)) based upon a social approach to learning. Participatory practices take account of the context of the working environment, existing working practices, and that learning is often collaborative and social. To enable graduate transition into employment universities should link to what is occurring in workplace curricula ([Billett, 2011](#)) to establish shared meaning and learning practices between employers and universities. Universities should embrace the good practices developed in workplace learning.

Recommendation 7: Recruitment of deaf students

Universities should develop a pro-active approach to recruiting deaf students. Sole deaf students, especially BSL users are disadvantaged in terms of peer support, peer (and tutor) scaffolding, academic learning experiences and general information sharing. If significant numbers of deaf students cannot be recruited, HEIs should explore the possibilities of networking and buddying for students across HEIs. This could be done via existing discussion groups supporting deaf students, such as the **Consortium of Higher Education Support Services with Deaf Students (CHESSForum)** at: www.uclan.ac.uk/schools/education_social_sciences/CHESS.php.

Recommendation 8: Support mechanisms for deaf students

Support mechanisms for deaf students need to be in place at the very beginning of their first semester. This is a critical time, when important friendship groups are formed, vital course information disseminated, academic rules and regulations explained and first lectures and seminars delivered. First impressions and experiences are crucially important and set the foundations for university life. It is vital that deaf students are not disadvantaged through lack of or inadequate support.

Recommendation 9: Induction programmes for deaf students

Bespoke induction programmes for deaf students are invaluable; these should include information about support, but also information from specialist careers advisers (such as Deaf Futures at UCLan) setting the scene from the outset, that deaf students (perhaps more than most) need to acquire a work placement or volunteer work experience to show that they have the potential, the willingness and general skills to secure and succeed in employment

Recommendation 10: Deaf awareness training

Any university employer fora should include deaf awareness training to encourage 'mainstream' employers to employ deaf people. There should also be deaf awareness training for placement supervisors regarding placements for deaf students linked to industry or the discipline. It is possible that deaf students are missing out on specific work placement opportunities due to lack of information or access to information regarding potential placements.

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14. Appendix 1: Demographics of participating first-year undergraduates

Table A. Characteristics of the 179 undergraduates participating in the tests and survey at T1

	All (N = 179)	Psychology (N = 50)	Forensics (N = 46)	Computing (N = 42)	ESS* (N = 19)	Policing (N = 18)	Retail management (N = 3)	Theatre studies (N = 1)
Female (%)	54	76	67	12	74	28	67	100
Age (years): mean (SD)	20 (5)	20 (6)	19 (2)	21 (5)	23 (8)	19 (1)	18 (0)	21
Age (years): range	18 - 49	18 - 48	18 - 30	18 - 43	18 - 49	18 - 22		
Registered as full-time student (%)	98	100	96	100	90	100	100	100
New student in 2010 (%)	93	96	94	95	79	89	100	100
<i>Term-time residence (%):</i>								
Student halls	49	42	57	38	47	61	100	100
Parental/guardian home	35	42	33	41	16	39		
Own residence	10	10	6	12	26			
Other rented accommodation/other	6	6	4	9	11			
Home (UK) student (%)	96	98	94	93	95	100	100	100
<i>First language (%):</i>								
English	92	94	91	91	90	100	100	
British Sign Language (BSL)	1							100
Other spoken	7	6	9	9	10			
<i>Ethnicity (%):</i>								
White	87	80	91.5	86	90	100	100	
Asian British	7.5	18		7	5			
Black British	2	2	2		5			100
Chinese	1		4.5					
Other	2.5		2	7				
<i>Disability (%):</i>								
No disability	84	78	94	81	79	94	67	
Deaf/hearing problems	2				11	6		100
Visual impairment	1			2				
Specific learning difficulties	7	14	2	5	5		33	
Other disabilities	6	8	4	12	5			

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	All (N = 179)	Psychology (N = 50)	Forensics (N = 46)	Computing (N = 42)	ESS* (N = 19)	Policing (N = 18)	Retail management (N = 3)	Theatre studies (N = 1)
<i>Level of highest literacy qualification:</i>								
No qualification	0.5		2					
≤ GCSE (or equivalent) (%)	49	58	44	48	69	28	33	
> GCSE (or equivalent) (%)	13	12	20	5	21	11		
Overseas qualification (%)	2.5	2	4	2	5			
Missing data (%)	35	28	30	45	5	61	67	1
<i>Level of highest mathematics or numeracy qualification:</i>								
≤ GCSE (or equivalent) (%)	46	56	35	34	95	33	33	
> GCSE (or equivalent) (%)	17	14	33	19	0	6		
Overseas qualification (%)	2	2	2	2				
Missing data (%)	35	28	30	45	5	61	67	1
<i>Level of highest ICT qualification:</i>								
No qualification	6	4	2	10	16	6		
≤ GCSE (or equivalent) (%)	45	60	59	10	63	33	33	
> GCSE (or equivalent) (%)	13	6	9	33	16			
Overseas qualification (%)	1	2						
Missing data (%)	35	28	30	45	5	61	67	1
UCAS score (N = 136): mean (SD)	311 (76)	318 (81)	306 (83)	306 (70)	266 (61)	335 (63)	330 (85)	360
UCAS score (N = 136): range	120 - 560	120 - 550	160 - 560	180 - 440	140 - 330	220 - 460	250 - 420	

* Variety of degrees in Education and Social Science (ESS)

Table B. Characteristics of the 117 undergraduates participating in the tests and survey at T3

	All (N = 117)	Psychology (N = 36)	Forensics (N = 32)	Computing (N = 23)	ESS* (N = 18)	Policing (N = 7)	Retail management (N = 1)
Female (%)	58	81	69	4	78	29	0
Age (years): mean (SD)	21 (6)	21 (7)	20 (3)	22 (7)	23 (8)	19 (0.5)	18
Age (years): range	18 - 49	18 - 48	18 - 30	18 - 43	18 - 49	18 - 19	
Registered as full-time student (%)	97	100	97	100	89	100	100
New student in 2010 (%)	94	97	97	96	83	86	100
<i>Term-time residence (%):</i>							
Student halls	48	39	66	35	50	43	100
Parental/guardian home	31	42	19	35	17	57	
Own residence	14	14	9	13	28		
Other rented accommodation/other	7	5	6	17	5		
Home (UK) student (%)	94	97	91	91	94	100	100
<i>First language (%):</i>							
English	91	94	88	87	89	100	100
British Sign Language (BSL)							
Other spoken	9	6	12	13	11		
<i>Ethnicity (%):</i>							
White	89	89	87.5	91	89	100	100
Asian British	5	11		4.5	5.5		
Black British	2		3		5.5		
Chinese	2		6.5				
Other	2		3	4.5			
<i>Disability (%):</i>							
No disability	81	72	94	78	78	86	100
Deaf/hearing problems	3				11	14	
Visual impairment	1			4	5.5		
Specific learning difficulties	8	17	3	9	5.5		
Other disabilities	7	11	3	9			
<i>Level of highest literacy qualification:</i>							
No qualification	1		3				

Literacies Supporting Learning and Enhancing Employability

	All (N = 117)	Psychology (N = 36)	Forensics (N = 32)	Computing (N = 23)	ESS* (N = 18)	Policing (N = 7)	Retail management (N = 1)
≤ GCSE (or equivalent) (%)	75	80	63	87	72	71	100
> GCSE (or equivalent) (%)	20	17	28	9	22	29	
Overseas qualification (%)	4	3	6	4	6		
Missing data (%)							
<i>Level of highest mathematics or numeracy qualification:</i>							
≤ GCSE (or equivalent) (%)	71	78	50	61	100	86	100
> GCSE (or equivalent) (%)	26.5	19	47	35		14	
Overseas qualification (%)	2.5	3	3	4			
Missing data (%)							
<i>Level of highest ICT qualification:</i>							
No qualification	9	6	3	17	17	14	
≤ GCSE (or equivalent) (%)	68	83	84	17	66	86	100
> GCSE (or equivalent) (%)	21	8	13	61	17		
Overseas qualification (%)	2	3		5			
Missing data (%)							
UCAS score (N = 136): mean (SD)	304 (73)	315 (78)	297 (70)	287 (59)	266 (60)	354 (73)	420
UCAS score (N = 136): range	120 - 490	120 - 490	160 - 410	180 - 360	140 - 330	240 - 460	

* Variety of degrees in Education and Social Science (ESS)

15. Appendix 2: Glossary of acronyms

ACME	Advisory Committee on Mathematics Education
AGCAS	Association of Graduate Careers Advisory Services
AGR	Association of Graduate Recruiters
BOS	Bristol Online Surveys
BSL	British Sign Language
CBI	Confederation of British Industry
CIHE	Council for Industry and Higher Education
CILIP	Chartered Institute of Librarians and Information Professionals
CIPD	Chartered Institute of Personnel and Development
GCSE	General Certificate of Secondary Education
HEA	Higher Education Academy
HEFCE	Higher Education Funding Council for England
HEI	Higher Education Institution
HESA	Higher Education Statistics Agency
ICT	Information and Communication Technology
IFAC	International Federation of Accountants
IoD	Institute of Directors
JISC	Joint Information Systems Committee
LSIS	Learning and Skills Improvement Service
NTFS	National Teaching Fellowship Scheme
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
RNID	Royal National Institute for Deaf People
SME	Small and Medium Enterprise
STEM	Science, Technology, Engineering and Mathematics
UCAS	Universities and Colleges Admissions Service
UCLan	University of Central Lancashire
UKCES	UK Commission for Employment and Skills

16. Appendix 3: Publicity and dissemination activities

Publicity:

1. University of Central Lancashire - Do they have what it takes? *Times Higher Educational Supplement*, 5 August 2010.
“Researchers aim to uncover how undergraduate learning links with the skills needed in the workplace. A team from the University of Central Lancashire has been awarded £200,000 by the National Teaching Fellowship Scheme to investigate the development of, and correlation between, undergraduate employability and skill levels in a range of fields, including mathematical, communication, digital and emotional literacy.”

Conference presentations:

1. Roberts, S., Qualter, P., Tariq, V. N., Appleby, Y. & Barnes, L. (2011) *Emotional intelligence and transition to higher education*. A presentation at the British Psychological Society's Annual Conference (Education Section), 18 - 20 November 2011.
2. Appleby, Y. & Roberts, S. (2011) *“The subject matters, but then it is a lot of life skills as well”*. Student experience and motivation in the first year at university. A presentation at the British Psychological Society's Annual Conference (Education Section), 18 - 20 November 2011.
3. Tariq, V. N., Qualter, P., Roberts, S., Appleby, Y. & Barnes, L. (2012) *Mathematical literacy: role of gender and emotional intelligence*. A presentation at the Higher Education Academy's STEM Annual Conference, Imperial College London, 12 – 13 April 2012.
4. Appleby, Y. (2012, forthcoming) *“Essays are important but I want to get a job”*: skilful and social learning supporting graduate employability. International Society for the Scholarship of Teaching and Learning (ISSOTL) Conference, October 24th – 27th 2012, Hamilton, ON, Canada.

Peer-reviewed articles:

1. Tariq, V. N., Qualter, P., Roberts, S., Appleby, Y. & Barnes, L. (2012) Mathematical literacy: role of gender and emotional intelligence. *Proceedings of the Higher Education Academy's STEM Annual Conference 2012*, 12 – 13 April 2012, Imperial College London.
2. Appleby, Y., Roberts, S., Barnes, L., Qualter, P. & Tariq, V. N. (2013) Who wants to be able to do references properly and be unemployed? Student writing and employer needs. Submitted to the *Journal of Learning Development in Higher Education*, in press.
3. Tariq, V. N., Qualter, P., Roberts, S., Appleby, Y. & Barnes, L. (2013) Mathematical literacy in undergraduates: role of gender and emotional intelligence. *International Journal of Mathematical Education in Science and Technology*, in press.
4. Nightingale, S., Roberts, S., Tariq, V. N., Appleby, Y., Barnes, L., & Qualter, P. Trajectories of university adjustment: emotional intelligence and emotional self-efficacy as risk factors for poor adjustment Submitted to *Learning and Individual Differences*, August 2012.
5. Barnes, L., Appleby, Y., Roberts, S., Qualter, P. & Tariq, V. N. (in preparation). Deaf students in higher education: a tale of transition. *Deafness and Education International*.