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Reflection for learning: understanding the value of reflective writing for information literacy development

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Abstract

Reflective writing has long been acknowledged as an important aspect of personal and professional development. There is increasing evidence of the use of reflective writing assessments and activities in the context of information literacy (IL) education, particular in higher education (HE). Writing reflectively can help students to understand their own IL development and engage in deeper learning. Students on an undergraduate business intelligence module at the University of Sheffield completed a piece of reflective writing about their IL development as part of the assessed work for the module. This writing was mapped against a model of reflection and a model of IL to understand the depth and spread of reflection offered by these students. The results showed that students had chosen to reflect in some but not all areas of IL, and the depth of reflection was variable. However, the aspects of IL where students were reflective illustrated that the learning outcomes of the module had been met. Mapping reflective statements against models of reflection was found to aid in the analysis and assessment of the reflective writing. The analysis undertaken by the researchers supported their own reflective practice as scholars of teaching and learning.

This article is based on a paper presented at LILAC 2012

Keywords

reflection, pedagogy, teacher's reflective practice, Seven Pillars, UK

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1. Introduction

This paper presents findings from research analysing the reflective writing created by students studying an undergraduate module in business intelligence at the University of Sheffield. This module is offered as an elective module to final-year single- and dual-honours students in the Information School, and is also available to students in other departments. The module aims to develop students' understanding of the value to business of exploiting internal and external information in terms of supporting organisational strategic decision-making. Throughout the module there is a significant focus on building IL competencies as students develop an awareness of, and ability to search, business information sources; and develop abilities to synthesise information from a variety of sources to create a valuable business report tool.

The module is assessed through a combination of group and individual assessment. The group assessed activity involves students working collaboratively to solve a business intelligence problem proposed by a business partner: a small business or individual. These business partners act as clients for the students who carry out an information interview to determine their client's information

needs; carry out internet-based research; compile a written report and also present their findings verbally to the business partners. The individual assessment involves two pieces of reflective writing of 800 words each, one about their IL development, and one about their experiences of working as a group. It is the IL reflections written by students on the module that comprise the data for this research.

"Reflection provides an active and structured way of thinking and of facilitating professional development." (Schön 1983); this classic definition of reflection introduces the ideas that reflection is not just an abstract concept, it is dynamic and practical and gives framework for professional change and development. This module is one of the last that students study before moving into professional roles and we consider the development of skills in reflective practice an important part of preparing our graduates for employment.

One of the problems often encountered in an educational context is that students are often asked to reflect yet given little or no guidance or support in what it means to be reflective. Moon (2001) presents a range of practical advice for tutors starting by giving students as clear definition of what "being reflective" means. Other suggestions include giving examples of good and bad reflective writing, generating discussion, using tools to aid students to reflect deeply, and to see things from different viewpoints. The need for support and guidance is further confirmed in the literature; Mann et al. (2009) carried out a systematic review of 29 studies and found that guidance and supervision are key to reflection. These suggestions have all been incorporated into our teaching and support of reflective practice, and are addressed in a reflective workshop to support students in preparing for their reflective assessment. The aims of this workshop are to help students understand what reflection is, why it can be helpful, and to understand the value to be gained from engaging with reflection at a deep level. As well as presenting the theory of reflection, students get an opportunity to practice reflective writing, and support each other in improving their reflective writing skills.

Reflection has long been associated with learning with classic theorists such as Kolb presenting his "Experiential Learning Theory" with its four-phase cycle:

1. concrete experience
2. reflective observation
3. abstract conceptualization
4. active experimentation.

Kolb (1984)

Honey and Mumford's four key stages of learning also contained a reflective element and linking stages of learning to learning styles:

- Having an experience (stage 1) → Activists (style 1)
- Reviewing the experience (stage 2) → Reflectors (style 2)
- Concluding from the experience (stage 3) → Theorists (style 3)
- Planning the next steps (stage 4) → Pragmatists (style 4)

Honey and Mumford (2000)

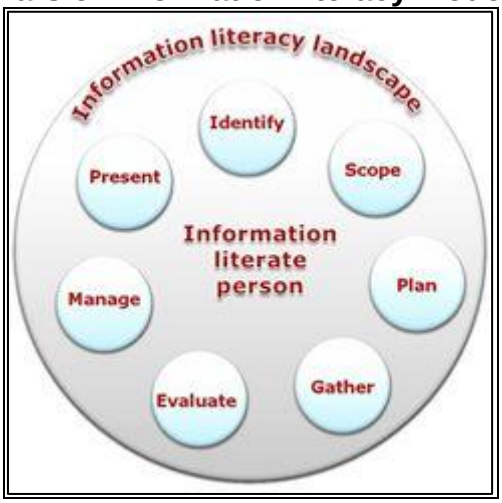
As teachers, having an understanding of the relationship between learning and reflection, and engaging in learning and reflection alongside our students informs our critical pedagogy.

An inquiry-based pedagogical approach is taken in the module, characterised by giving students the opportunity to engage with research and inquiry and investigate open-ended problems (Khan and O'Rourke 2004) in particular the investigation on behalf of the business partner. Inquiry-based learning (IBL) is a based on constructivist educational theory which emphasises the learner's role in actively constructing meaning for themselves leading to deeper learning (Biggs and Tang 2011; Perkins 2009). The process of learning through inquiry is particularly information intensive as

students are required to explore the existing knowledge-base in order to answer their questions and may attempt to build knowledge through their inquiries (Levy and Petrulis 2012). It is acknowledged that students engaging in IBL will build IL capabilities (Hutchings 2007). The reflective assignment on IL development was introduced to the module in an attempt to constructively align (Biggs and Tang 2011) the IL-related learning outcomes, the information-centric teaching and learning activities and the module assessment.

There are various models and standards of IL that have been developed worldwide (e.g. the Seven Faces (Bruce 1997); Information Literacy Competency Standards for Higher Education (ACRL 2000); Australia and New Zealand Information Literacy Framework (ANZIIL 2004)), however it is the SCONUL (2011) *Seven Pillars of Information Literacy* model (see figure 1 below) developed in the UK for the UK Higher Education (HE) context that is used in the University of Sheffield generally and the Information School specifically to define and explain the concept of IL. The Seven Pillars model, originally launched in 1999, was significantly updated and expanded in 2011 to respond to dramatic changes in the information environment. The model defines the core abilities (competencies and skills) and understandings (attitudes and behaviours) deemed to be at the centre of IL development in HE (SCONUL 2011). A key aspect of the model (Figure 1) is that IL development is explicitly defined as a non-linear process, with the expectation that development can occur across pillars both "simultaneously and independently" (SCONUL 2011, p4). Each of the Seven Pillars (Identify, Scope, Plan, Gather, Evaluate, Manage and Present) describes IL attributes that form part of the IL landscape.

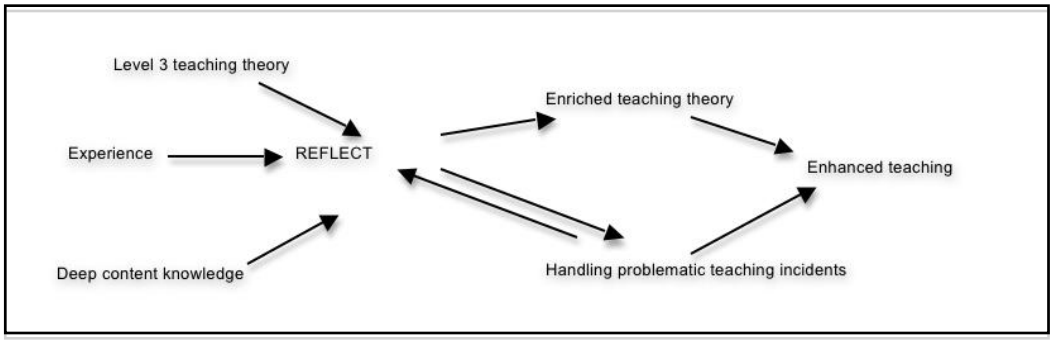
Figure 1: Seven Pillars of information literacy model in circular format



(SCONUL 2011)

Reflection is not only important for our students, it is a vital part of professional practice for educators. As "Scholars of Teaching and Learning" (Boyer 1990) we wish to improve students' learning through our reflective practice. We propose that through analysing the reflective writing of these students we can engage with transformative reflective practice in our teaching, and through this enhance our teaching as "expert teachers continually reflect on how they might teach even better" (Biggs and Tang 2011: p45). Figure 2 shows the relationship between theory, experience, reflection and enhanced teaching that we feel describes our view of the value of reflective practice for teachers.

Figure 2: Theory and transformative reflective practice in education



(Biggs and Tang 2011: 49)

2. Aims and Objectives

This research aims to explore the relationship between reflective writing and IL development through a qualitative analysis of students' reflective writing.

The objectives for this research are:

- To map reflective comments made by students onto the IL landscape to understand where students feel IL development has occurred
- To investigate how deeply reflective students have been on the aspects of IL expressed in the Seven Pillars model
- To investigate the extent to which module learning outcomes related to IL development have been met
- To investigate the value of the Seven Pillars model as a tool for supporting teaching and learning in IL

This paper will offer a model for assessment of IL learning outcomes through the mode of reflective writing. We will demonstrate how models of reflection and IL can be used to provide a framework for assessment, an analysis of reflective writing, and offer our own reflections on the value of students writing reflectively about their IL development.

3. Literature Review

In this review we will first examine the literature on reflective writing in the HE context before looking more specifically at the literature on the use of reflective approaches in the teaching of IL. We will also briefly review the literature on the reflective practice of educators.

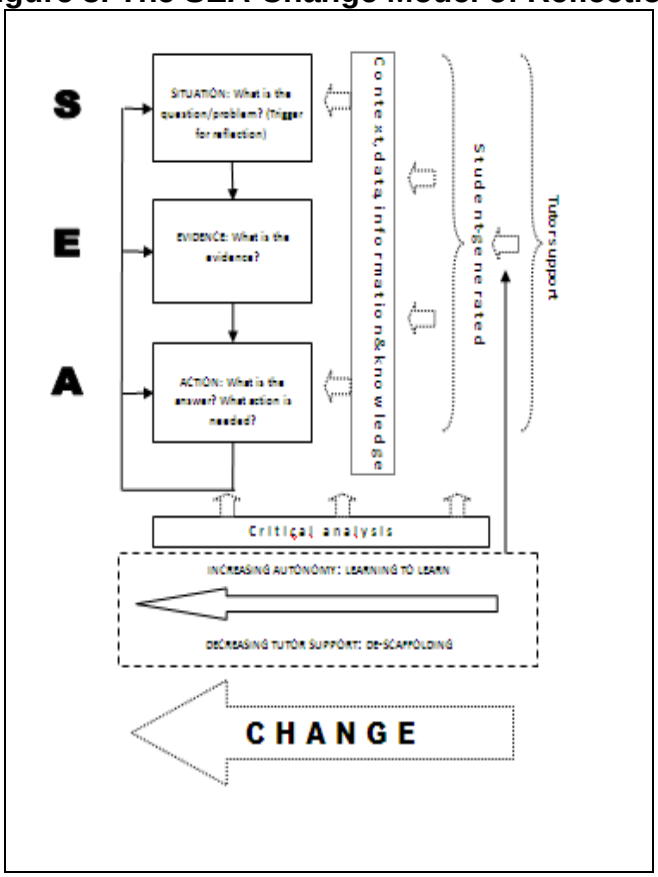
There are differing views and perspectives on reflection presented in the literature (Moon 2001; Ghaye and Lillyman, 2000). Schön (1983) is considered a classic scholar on reflective practice, and distinguishes between "reflection in action" and "reflection on action". "In action" occurs during an experience or event; "on action" looks back at a past experience or event. There is a relationship between deeper learning and reflective practice (Bourner, 2003; Leung and Kember 2003). This deeper learning is more likely to occur when participants engage in what is termed as deep or critical reflection (Mann et al. 2009; Moon 2007). Encouraging deep reflection in students in an educational environment requires the support of a tutor. There is a need to develop a relationship of trust as written reflections can contain sensitive and personal content. Reflective writing is a skill that is developed, so training and guidance is required as students develop their skills (Moon 2001). The reflective process can be developed and maintained to support continuous learning (Khan et al. 2006; Taylor 2006; Watson 2008). Tutors can help by ensuring that adequate support (or scaffolding) is in place to allow deeply critical reflection to take place. Once the student has engaged with the process, and has developed their reflective skills, then a de-scaffolding

approach can be taken where the tutor support is reduced and the student moves to autonomous learning (Simons and Klein 2007; Ford 2008).

When students first embark on a new learning situation they are often dependent learners (Ford, 2008). Dependence refers to a learning situation where information is used directly by the student to inform the problem, the solution, and/or the reasoned evidence supporting the solution. The goal is to increase student confidence and autonomy so that they reach a learning situation in which the student finds information, and/or processes information to autonomously generate knowledge of what is the problem, the solution, and/or the reasoned evidence supporting the solution (Clifford 1999). A goal of HE is to enable and facilitate movement on the part of the student from dependence to autonomy (Clifford 1999). The reflective process is critical to the learning process with students reflecting on their actions past and present and taking that learning forward.

In the process of reflecting on experiences as tutors, encouraging reflective practice in others, critically examining students' reflective writing, and observing the way students learn, a model was developed at The University of Sheffield Information School (Figure 3) to contextualise the dynamic nature of reflection, and to support the students in understanding the learning benefits achievable through deep reflective practice. The model illustrates the stages in the reflective process and how students can be supported by tutors' critical analysis and deep reflection to achieve positive change. (Sen and Ford 2009).

Figure 3. The SEA-Change Model of Reflection



(Sen and Ford, 2009)

This model (Figure 3) has been used for some years as a baseline for teaching reflection within the school (Sen 2010), and for helping students understand the benefits that reflective practice can bring. More recently this work has been developed within the school in relation to IL.

3.1. IL and reflection

The relationship between reflection and IL development is discussed in detail in both the academic literature and in IL models and standards. Reflection is seen to be a critical element of learning to be information literate (Bruce and Hughes 2010) and is noted as such in the ANZIL Framework (2004) and the ACRL IL competency standards (2001). More recently, reflection is described as a "key element" of the New Curriculum for Information Literacy devised through the Cambridge University Arcadia project (Secker and Coonan 2011). There is a growing body of literature that reports on engaging university students with reflection in order to build IL capabilities (e.g. Bruce and Hughes 2010; McGuinness and Brien 2007; Gilstrap and Dupree 2008) and the review will focus on the use of reflective pedagogies and assessments in the HE context. As noted in the introduction, the wider literature on teaching and learning recommends the use of reflection in constructivist pedagogies, and the IL literature supports this view. Johnston and Webber (2003) advocate the use of reflection with students to respond to the need for aligned teaching learning and assessment. Reflection on IL development is seen to be an important aspect of problem-solving and enquiry, linked to deep learning. (Hepworth and Walton 2009). In Bruce's "Relational model" of IL education, the ability of students to actively plan and reflect on their information searching is key to the development of the higher order IL capabilities (Bruce et al. 2006), agreeing with Johnston and Webber (2003) who see reflection is a way to facilitate the development of more advanced IL competencies.

A number of IL educators have employed the use of reflective diaries to facilitate a continuous process of reflection throughout a module (Bruce and Hughes 2010; Bordonaro and Richardson 2004; McGuinness and Brien 2007; Diekema et al. 2011) or longitudinally over the course of the PhD research process (Han 2012) The creation of these reflective diaries can be facilitated through the use of weekly prompt questions (Bruce and Hughes 2010) or through the use of a standard framework for each entry together with a sample entry (McGuinness and Brien 2007). The time intensive nature of assessing reflective diaries has been noted as a limitation of the approach (McGuinness and Brien 2007)

The Reflective Online Searching Skills (ROSS) environment developed at the Queensland University of Technology facilitates reflective practice for students in an online IL resource. ROSS is a standalone e-learning unit that can be used to support IL development in any module, and consists of a series of eight interrelated interactive 'modules' that support the search process. A reflective workspace is provided for students to relate what they have been learning through ROSS to the particular assignment they are working on. (Partridge et al. 2008; Bruce et al. 2006) While the reflective writing students enter into ROSS can be assessed, the reflective element can simply be included as a means to support IL development. (Partridge et al. 2008). Walton and Hepworth (2011) found that tutor responses to students' posts about information search activities on an online forum that summarise and provide a narrative of significant aspects of the posts facilitated students' reflective practice.

The use of critical incidents as triggers for reflection has been employed in the IL context. Students' assignments included reflective writing in response to critical incidents of information search and use (Bruce and Hughes 2010). Gilstrap and Dupree (2008) report on the use of a Critical Incident Questionnaire with students in each of a short series of IL classes. Students were asked to reflect on the critical incidents that had occurred for them during the class and complete the short questionnaire. Their responses were used to support the librarians' reflective practice as teachers and understand where the students had developed IL. The research found that through reflecting on critical incidents of confusion the students demonstrated a deep level of reflection and a resulting iterative learning cycle.

It is seen to be important to assess reflection in order to determine that learning has taken place; to provide effective feedback to students, and to prioritise and legitimise reflective practice for students (Bourner 2003). Nutefall (2005) describes the use of a "Paper Trail" assignment, one of

six IL focused assignments for a particular module. For this assessment students had to create a reflective annotated portfolio on the research process they used for a different assignment, and were invited to reflect specifically on how successful their search strategies were. Another example of a reflective assignment is reported by Lehlafi et al. (2012), where students were asked to reflect on what they had learnt about using the internet as a research tool in a particular module, following librarian facilitated IL interactive support lectures.

Students' reflective writing can show coping strategies for finding and using academic information (McGuinness and Brien 2007); the development and improvement of approaches to research, greater understanding of the value of IL, and an enhanced understanding of the value and purpose of the Library electronic services (Lehlafi et al 2012). It has also been shown that reflection in the context of the search process can help students understand more advanced search techniques (Bruce 2006).

Reflective assessments have been used to determine whether or not learning outcomes have been met (Nutefall 2005) and whether or not students have achieved defined competencies, in for example an institutional IL framework (Lahlafi et al. 2012). The Big 6 model (Diekema et al. 2011) and the ACRL standards (Gilstrap and Dupree 2008) have also been used as frameworks for analysis. However in many of the projects included in this review it is not clear whether specific learning outcomes related to IL have been included in modules, nor whether teachers have discovered if these have been met through the analysis of the reflective writing. Bruce's "Seven Faces" model (Bruce 1997) has been used as a framework to analyse reflective writing (Han 2012), however none of the research included in this review has used the SCONUL Seven Pillars themselves as a framework for assessing the extent to which IL has been developed and in which areas.

3.2. IL educators' reflective practice

There is a strong tradition of IL educators themselves engaging in reflective practice facilitated through the analysis of students' reflective writing (e.g. Bruce and Hughes 2010; Gilstrap and Dupree 2008; Belanger et al. 2012). Jacobs (2008) strongly identifies a need for "self reflexivity regarding pedagogical praxis" (p. 256) and goes on to link reflective practice to contributing to the ongoing conversation around the global vision of IL. Through writing and publishing our pedagogical reflections we can thus conform to this ideal. Engaging in pedagogical reflection and publishing can also facilitate successful librarian-faculty partnerships (Belanger et al. 2012). Tutor reflections can be stimulated through the analysis of students' reflections but can also be stimulated through collecting reflective data from students after each face-to-face teaching session. The issues raised can be subsequently incorporated into the following teaching session (Gilstrap and Dupree 2008). Lehlafi et al. (2012) describe a method for facilitating reflection on face-to-face IL teaching sessions through the collection of simple feedback written on post-it notes on the themes of "stop/start/continue".

This review has demonstrated that there is an established relationship between reflection and learning that has value for both students and teachers. This relationship can be exploited for mutual benefit in the teaching of IL skills. This study explores these issues further when working with a small group of undergraduate students in the context of a piece of assessed reflective writing.

4. Methodology

In the 2010-11 iteration of the business intelligence module, a total of 14 students were enrolled on the module. Of these, nine students gave their informed consent to take part in the research, following provision of a detailed participant information sheet as per the University of Sheffield ethical guidelines for research. Eight students were male, one female; two were overseas and

seven home students; six students were studying on the BSc Information Management programme, two studied BSc Computer Science and the remaining student studied dual honours BA Accounting and Financial Management and Information Management. Students understood that the reflective writing that they submitted as part of the assessed work for the module would form the data for the research project, and they were assured that they would remain anonymous in any subsequent reporting.

The overall aim of the research was to explore the relationship between students' reflective writing and their IL development. In order to do this we identified 3 distinct methods of qualitative analysis:

1. We mapped the extent to which students had chosen to reflect across the breadth of the IL landscape; looking for reflective statements that evidenced development in each of the SCONUL Seven Pillars; Identify, Scope, Plan, Gather, Evaluate, Manage and Present, (SCONUL 2011), using the detailed descriptions provided in the updated 2011 model.
2. We then "scored" each of these comments for depth of reflection using the Jenny Moon model of reflection (2001) which defines four levels of reflection: 1. Descriptive writing with little reflection; 2. Descriptive writing with some reflection; 3. Reflective writing (1) showing some analysis and self questioning; 4. Reflective writing (2) showing clear evidence of standing back and learning,
3. We analysed the content of the reflective assessment looking for evidence of whether or not the module learning outcomes had been met.

Furthermore we wanted to engage with the reflective process ourselves as Scholars of Teaching and Learning to determine whether this was a valuable assessment in terms of student learning. Data revealed through the three methods outlined above has fed into our tutor reflections on the facilitation and design of the assignment and our reflections on the depth of the student learning in terms of IL.

5. Results

> *"I believe I have been aware of information literacy throughout my course, nonetheless, carrying out this reflective report has enabled me to further deepen my understanding. It has helped me understand the competencies and reflect on how I can become more information literate in future."(S7)*

The quote above exemplifies the depth of reflective practice that the students on the module engaged with, and also how their understanding of themselves and their IL was enhanced through the module activities. The following results section will be structured using the research objectives and will present more detailed aspects of students' reflections about their IL.

5.1 Research objective 1: Mapping reflective comments onto the IL Landscape

The 2011 version of the Seven Pillars (SCONUL 2011) model defines a set of attitudes/understandings and competencies/abilities of the information literate person under each of the Seven headline Pillars. We analysed the students' reflective writing to identify statements which demonstrated that the student had either gained a competency/skill or achieved an understanding of these aspects of IL. The following table (Table 1) shows which aspects of IL *were* represented in the students' writing, these are highlighted in bold

Table 1. Aspects of IL represented in the students' writing using the SCONUL Seven Pillars (2011)

Aspect evidenced in reflective writing Aspect not evidenced in reflective writing		
Pillar	**Understanding of**	**Ability to**
Identify	• **That new information and data is constantly being produced and that there is always more to learn** • That being information literate involves developing a learning habit so new information is being actively sought all the time • That ideas and opportunities are created by investigating/seeking information The scale of the world of published and unpublished information and data	• **Identify a lack of knowledge in a subject area** • Identify a search topic / question and define it using simple terminology • Articulate current knowledge on a topic • **Recognise a need for information and data to achieve a specific end and define limits to the information need** • **Use background information to underpin the search** • **Take personal responsibility for an information search** • Manage time effectively to complete a search
Scope	• **What types of information are available** • The characteristics of the different types of information source available to them and how they may be affected by the format (digital, print) • The publication process in terms of why individuals publish and the currency of information • Issues of accessibility What services are available to help and how to access them	• **"Know what you don't know" to identify any information gaps Identify which types of information will best meet the need** • **Identify the available search tools, such as general and subject specific resources at different levels** • Identify different formats in which information may be provided • **Demonstrate the ability to use new tools as they become available**
Plan	• The range of searching techniques available for finding information. • **The differences between search tools, recognising advantages and limitations** • **Why complex search strategies can make a difference to the breadth and depth of information found** • **The need to develop approaches to searching such that new tools are sought for each new question (not relying always on most familiar resources**) • **The need to revise keywords and adapt search strategies according to the resources available and / or results found** • The value of controlled vocabularies and taxonomies in searching	• **Scope their search question clearly and in appropriate language** • **Define a search strategy by using appropriate keywords and concepts, defining and setting limits** • Select the most appropriate search tools • Identify controlled vocabularies and taxonomies to aid in searching if appropriate • **Identify appropriate search techniques to use as necessary** • **Identify specialist search tools appropriate to each individual information need**

Table 1 contd. Aspects of IL represented in the students' writing using the SCONUL Seven Pillars (2011)

Aspect evidenced in reflective writing	Aspect not evidenced in reflective writing	
Pillar	• **Understanding of**	• **Ability to**
Gather	• How information and data is organised, digitally and in print sources • How libraries provide access to resources • **How digital technologies are providing collaborative tools to create and share information** • The issues involved in collecting new data • The different elements of a citation and how this describes an information resource • The use of abstracts • **The need to keep up to date with new information** • **The difference between free and paid for resources** • The risks involved in operating in a virtual world • The importance of appraising and evaluating search results	• Use a range of retrieval tools and resources effectively • **Construct complex searches appropriate to different digital and print resources** • Access full text information, both print and digital, read and download online material and data • Use appropriate techniques to collect new data • Keep up to date with new information • Engage with their community to share information • Identify when the information need has not been met • Use online and printed help and can find personal, expert help
Evaluate	• The information and data landscape of their learning/research context • **Issues of quality, accuracy, relevance, bias, reputation and credibility relating to information and data sources** • How information is evaluated and published, to help inform personal evaluation process • **The importance of consistency in data collection** • **The importance of citation in their learning/research context**	• **Distinguish between different information resources and the information they provide** • **Choose suitable material on their search topic, using appropriate criteria** • **Assess the quality, accuracy, relevance, bias, reputation and credibility of the information resources found** • **Assess the credibility of the data gathered** • Read critically, identifying key points and arguments • **Relate the information found to the original search strategy** • **Critically appraise and evaluate their own findings and those of others** • **Know when to stop**
Manage	• Their responsibility to be honest in all aspects of information handling and dissemination (e.g. copyright, plagiarism and intellectual property issues) • The need to adopt appropriate data handling methods • The role they play in helping others in information seeking and management • **The need to keep systematic records** • The importance of storing and sharing information and data ethically • The role of professionals, such as data managers and librarians, who can advise, assist and support with all aspects of information management	• Use bibliographical software if appropriate to manage information • Cite printed and electronic sources using suitable referencing styles • Create appropriately formatted bibliographies • **Demonstrate awareness of issues relating to the rights of others including ethics, data protection, copyright, plagiarism and any other intellectual property issues** • Meet standards of conduct for academic integrity Use appropriate data management software and techniques to manage data

Table 1 contd. Aspects of IL represented in the students' writing using the SCONUL Seven Pillars (2011)

Aspect evidenced in reflective writing	Aspect not evidenced in reflective writing	
Pillar	• **Understanding of**	• **Ability to**
Present	• The difference between summarising and synthesising • **That different forms of writing/ presentation style can be used to present information to different communities** • That data can be presented in different ways • **Their personal responsibility to store and share information and data** • Their personal responsibility to disseminate information and knowledge • How their work will be evaluated • The processes of publication • The concept of attribution • **That individuals can take an active part in the creation of information through traditional publishing and digital technologies (e.g. blogs, wikis)**	• Use the information and data found to address the original question • **Summarise documents and reports verbally and in writing** • Incorporate new information into the context of existing knowledge • **Analyse and present data appropriately** • **Synthesise and appraise new and complex information from different sources** • **Communicate effectively using appropriate writing styles in a variety of formats** • Communicate effectively verbally • Select appropriate publications and dissemination outlets in which to publish if appropriate • Develop a personal profile in the community using appropriate personal networks and digital technologies (e.g. discussion lists, social networking sites, blogs, etc.)

It can be seen from this table that there are aspects of IL that are not represented in student's reflective practice, and we can also see where students have demonstrated that they have gained particular skills or developed their understanding. For example there were very few reflective statements that illustrated development in the "Manage" pillar, nevertheless students did demonstrate they had these skills through citing sources and submitting appropriate bibliographies in their group reports. In the "Scope" pillar students demonstrated the development of many skills and competencies, but demonstrated little development of "understanding" attributes, for example their understanding of attributes of different types of information resources and their understanding of the publication process.

In the "Gather" pillar the reverse was true; students reflected more on their understandings than their abilities. They did not reflect for example on the use of abstracts, again despite being required to submit an executive summary with their group coursework. They also did not reflect on their ability to keep up to date with new information or use online help functions, despite this reasonably being part of the activities, not did they reflect on engaging with the community to share information which would probably not be a focus of their activities. In the "Present" pillar students reflect on their understanding of the publication process, and this was not an aspect of the module activities.

This mapping process shows that it is not necessary then to develop understanding before abilities. Indeed the creators of the Seven Pillars model state that it is not a linear model, and there does not seem to be an actual or implied hierarchy of understanding before abilities. The high level of detail supplied for the attributes under each Pillar made it possible to map reflective writing against the Pillars very effectively, and this is a clear advantage of the 2011 version of the model. We can also see that students may not choose to reflect on aspects of IL that we know they have used.

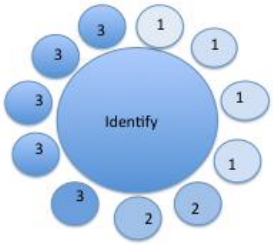
5.2 Research objective 2: How deeply reflective have students been?

Each of the reflective statements attributed to each pillar was scored for depth of reflection using the criteria developed by Jenny Moon (2007). So for example a statement was scored with a 1 if it was descriptive and only considered one point of view, a 2 if it was descriptive with a limited amount of reflection; 3 if it showed some analysis and self-questioning. The deepest reflections scored a 4, and demonstrated critical self-questioning, and ability to see others point of view, and where it was clear that learning had taken place.

We will present the depth of reflection in each of the Seven Pillars pictorially. In each of the diagrams each of the small circles surrounding the central circle represents a individual reflective comment, and the number in the circle indicates the level of depth of reflection as judged on the Moon scale. Thus the diagrams represent both the depth of and volume of reflection in each pillar (Figures 4-10).

5.2.1. Pillar 1: Identify

Figure 4: Depth and volume of reflection in the Identify pillar



There is a good spread of reflection across the attributes defined in the “Identify” Pillar (Figure 4) and a good level of depth of reflection with five statements scored at level 3. The nature of the project task required students to interview their business partners to identify their information needs, and many of the students reflected on this process as being different from identifying their own information needs, and this was no doubt a point of development for the students:

> *Although this was achieved in a moderate manner, I think personally we should have strengthened the explanation of the information need for the business, as on several occasions we struggled to fully understand the task that was set for us, resulting in later stages to go back to recognizing the information needs of the company. (S6)*

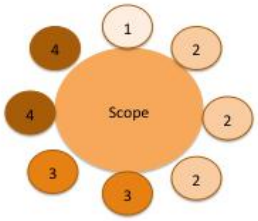
The idea that information needs change over time also came through very strongly in the students’ writing:

> *The list of needs we have product has been change over time compare those in the final report due to some needs were less important and more focus on certain needs. (S2)*

This is a concept that is not currently expressed in the Seven Pillars model.

5.2.2. Pillar 2: Scope

Figure 5: Depth and volume of reflection in the Scope pillar



Although there are not many statements relating to this pillar (Figure 5), there was a lot of depth of reflection with two statements scoring a 4 and two a 3. Students were deeply reflective about choosing sources and defining a strategy for choosing sources:

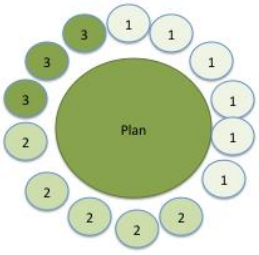
> *On reflection, I think I did well as I felt confident in selecting the best sources and with only one experience of difficulty, I found all the information I required using those sources. I have learnt about information sources I didn't know existed, which proved useful in researching businesses and markets. I wouldn't have without the business intelligence module. I will definitely be using these sources more in the future. (S1)*

It seems that these students had to change the type of sources they habitually used for this assignment and to broaden their experience of subject specific sources (e.g. MINTEL):

> *In order to address this information gap I went straight to Google without devising an appropriate search strategy and as a result I found it hard to find a good amount of relevant information. At this time it did not occur to me to use MINTEL or any other business sources. On reflection this was perhaps the biggest flaw in my strategy as I didn't consider what sources would be best for my specific need. (S3)*

5.2.3. Pillar 3: Plan

Figure 6: Depth and volume of reflection in the Plan pillar



There was a lot of low level reflection in the “Plan” pillar (Figure 6) , featuring a description of the search terms used on particular sources, and of how searches had been narrowed and broadened e.g.:

> *I used a basic plan to search for the different types of information although much was from the same source. I feel this isn't a negative thing as it worked. (S1)*

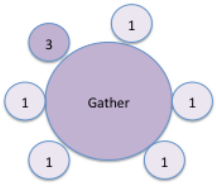
When using the search engines we would use both advanced and normal searches to give us the best possibilities of variance in the results…. (S6)

These reflections demonstrate a certain level of competency without being very deeply reflective The more deeply reflective statements revealed that students had identified ways in which their search strategy could be improved:

I also should have perhaps constructed more complex searches that used phrases and other specialised commands. It is evident that my search strategy formulisation needs improving. I also learned that I need to be more open minded when constructing search strategies and carrying out searches. (S3)

5.2.4. Pillar 4: Gather

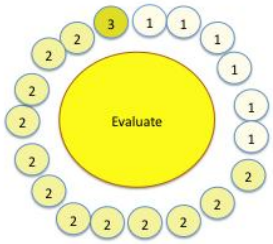
Figure 7: depth and volume of reflection in the Gather pillar



The "Gather" pillar (Figure 7) did not attract much volume or depth of reflection. In the module workshops students were introduced to and experienced searching a number of paid for information resources (Mintel, Lexis Library, Newsbank) and the quality of information provided by these services vs what they were able to find for free on the internet was a point of reflection. It was also noted that information they needed was available on the internet but only for a fee.

5.2.5. Pillar 5: Evaluate

Figure 8: depth and volume of reflection in the Evaluate pillar



There were many reflective statements related to the process of evaluating information, indicating a lot of interest/development in this area (Figure 8). However there was not a lot of depth to the reflections, often reflections comprised a description of what criteria were used to evaluate information e.g:

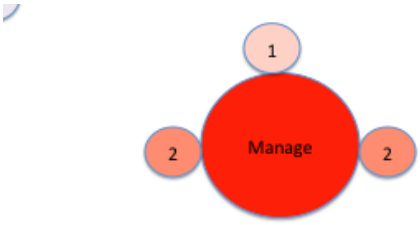
I evaluated the quality and relevance of information by researching into the source it came from to identify whether it is a reputable source. For example, .edu, or .ac source is more likely to contain higher quality and reputable information, (S1)

In many cases these reflections revealed that the students were successfully applying IL competencies to the task at hand, even though they were not reflecting very deeply on these

competencies. When students reflected on how they had evaluated information, and how they had chosen suitable material to include in the final version of the project it often took place in the context of a group discussion, so the collaborative nature of the task included elements of IL development.

5.2.6. Pillar 6: Manage

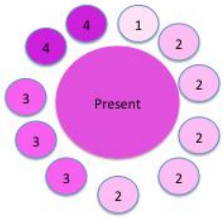
Figure 9: depth and volume of reflection in the Manage pillar



The “Manage” pillar attracted the least amount of reflection (Figure 9). Students discussed issues to do with storing information effectively, although they simply described what they did rather than reflecting deeply on the process. Nevertheless the students’ projects were well referenced with accurate bibliographies indicating that they had applied competencies in this Pillar, even if they did not reflect upon them.

5.2.7. Pillar 7: Present

Figure 10: Depth and volume of reflection in the Present pillar



The “Present” pillar attracted a deep level of reflection; close to half of the reflective statements were assessed as level 3 or 4 on the Moon scale of reflective writing (Figure 10). Students reflected on how they had stored and shared information with others in their group, and how they had attempted to present the information effectively for their client. The creation of a business report (rather than an academic essay) also attracted reflection eg.:

> *In contrast, I believed that the report required a different approach. It required more formal and objective writing. In the report the information was organised in a structured way with the appropriate evidence and citations. When looking back I believe that from the report we produced, new and relevant findings emerged and perhaps they presented the nutrition start-up with a fresh perspective of potential gaps in the market (S3)*

The deeper reflections clearly identified ways the students thought they could have improved their practice.

5.3 Research objective 3: extent to which module learning outcomes related to IL development have been met

There are eight module learning outcomes for the module as a whole, and three of these relate directly to IL development. We analysed the extent to which students demonstrated that they had met the module learning outcomes through the IL reflective writing. The following table shows the extent to which individual students demonstrated meeting the learning outcomes for the module:

Table 2. Module learning outcomes achieved. Identified from an analysis of student reflections.

LO1 - the types of, and channels for, information preferred by businesspeople								
LO2 - purposes for which external information can be used within the organisation								
LO3 - to understand models of information use within business								
LO4 - to identify environmental factors affecting business information								
LO5 - to identify key types of business information								
LO6 - to search selected business information sources effectively								
LO7 - to locate, collect, analyse, and synthesise information retrieved from a variety of sources into a client report								
LO8 - [for information management students] to relate this learning to what students have learnt about information management and knowledge management in modules earlier in their studies								
Students	**Learning outcomes**							
	LO1	**LO2**	**LO3**	**LO4**	**LO5**	**LO6**	**LO7**	**LO8**
S1		√	√	√	√	√	√	√
S2	√	√			√		√	
S3	√	√			√	√	√	√
S4	√	√			√	√	√	√
S5	√				√	√	√	√
S6		√	√			√	√	
S7		√	√		√	√	√	√
S8		√			√	√	√	√
S9		√				√	√	

It can be seen that all the students demonstrated that they could locate, collect, analyse and synthesise information

6. Discussion

The reflective writing assignment and our analysis of it has given both students and tutors on the module a valuable opportunity to reflect “on action” (Schön 1983)

The use of the revised Seven Pillars model (SCONUL 2011) was helpful in analysing the data in this research project as it gives detailed descriptions aspects of IL enabling the statements made by students to be mapped against them. It is apparent from the literature that other researchers (Lehlafi et al. 2010; Diekema et al. 2011; Gilstrap and Dupree 2008; Han 2012) have also found it illuminating to map reflections against IL models and standards. In looking at conceptions of IL revealed by the breadth of competencies described in the Seven Pillars model, we can develop our own conceptions of IL. In mapping our students’ reflections against the model we can further validate the model by giving example of the understandings and abilities described in the model, and also offer potential additions and improvements. One “understanding” of IL revealed by the data was that IL needs can change over time as a research project progresses and in the light of information found. This is not currently expressed in the Seven Pillars model but could be inserted if the model is revised.

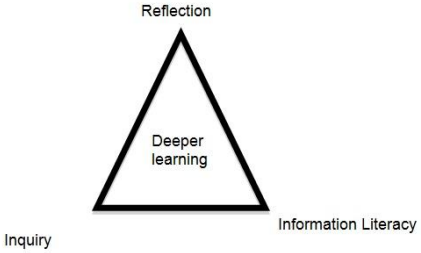
In looking at the depth of students' reflections the analysis revealed that students had the ability to be deeply reflective, and identified in a number of cases clear examples of what they thought they had learnt and a self questioning, critical approach to learning. Moon's (2001, 2007) work identifies the benefits of deep reflection as opposed to surface level reflection. This is supported by later work by Sen and Ford (2009). The literature is clear on the value of, and the need to provide support and scaffolding for reflection (Moon 2001; Mann 2009), and although there is no absolute certainty, we are hopeful that the reflective workshop gave our students a pathway to being deeply reflective. One question that emerged through the analysis was whether the depth of reflection illustrated through students' writing indicated that the student had achieved a deeper level of development, a higher level of competency in a particular aspect of IL. In a numbers of cases students demonstrated that they had a certain level of competency, e.g. that they could apply suitable evaluation criteria to a piece of information; without reflecting very deeply on it. So if it isn't the level of competency that stimulates reflection, what does stimulate deep reflection? We can speculate that it is development that students' found particularly interesting, or surprising, but without further research we will not know for sure.

Another conclusion that was drawn as a result of mapping reflections against the Seven Pillars is that it would be difficult for one learning task or assignment to support the development of IL competencies across the full spread of the Seven Pillars. Inevitably the activities required by particular assignments will require students to use and develop a selection of competencies, so for example this task did not particularly require students to engage with the ethical use of information or use data management software and these are aspects of IL that do not form part of the students' reflections. Nevertheless we would consider it important that the spread of understandings and abilities described by the Seven Pillars was addressed across a programme of study, and suggest that that these be assessed through the medium of reflection.

None of the IL literature included in the review mentioned the use of reflective models as a means to analyse the depth of reflection of their students' writing. We found that the Moon model with its clearly described four levels of reflection (Moon 2001) not only gave us a framework for our assessment of the students, but also provided an excellent framework for analysing the depth of reflection for this research.

Diekema et al. (2001) caution that providing easy to measure learning outcomes can lead to a "generic skills-based pedagogy of information literacy" (p.262) However this is not the case in the business intelligence module, where it has been shown that it is "easy" (or at least straightforward) to measure IL learning outcomes through the use of reflective writing, in the context of a constructive, inquiry-based pedagogy. The literature is clear about the link between deeper learning and reflection, (Bourner, 2003; Leung and Kember, 2003), deeper learning and Inquiry (Biggs and Tang 2011) and deeper learning and IL development (Hepworth and Walton 2009). The relationship between all four concepts could thus be summarised (see figure 11).

Figure 11: Reflection, inquiry, IL and deeper learning



In reflecting on our need to learn as teachers we have identified a need to make it more explicit to students that their reflective writing helps us to be reflective practitioners. Thus we can establish a more equal dialogue with students following the teachings of Freire and become “teacher-students with students-teachers”(Jacobs 2008: 261)

7. Conclusion

The research has demonstrated that reflective writing is a suitable method of assessing IL development in the HE context. Reflective writing by students can offer an insight into which aspects of IL have been developed, and indicate where learning activities have provided opportunities for IL development. Reflective writing assessments are appropriate for inquiry-based learning and constructivist pedagogies more generally and can stimulate deeper learning in students.

It is appropriate to use models of IL to give a framework for both assessing and analysing reflective writing. In particular we recommend the Seven Pillars (SCONUL 2011) model in the HE context due to the detailed descriptions of the understandings and abilities and the range of competencies covered. The Jenny Moon model of reflection (Moon 2011) gives a standard framework for assessment and analysis that can standardise approaches.

Students’ reflective writing can provide a valuable set of data for educators who themselves wish to be reflective practitioners. Reflective statements can be mapped against module learning outcomes to demonstrate the level of success of the teaching and learning environment of a module, and indicate where changes need to be made to learning activities.

Further research into student’s IL-focused reflective writing in this module context would give further insight into which aspects of IL are developed and which could be better supported through the learning activities. To this end data has been collected from 11 students who studied the module in 2011/12. In addition it would be interesting to see how this type of assessment could be applied in other learning contexts. Deeper meaning could be found through more qualitative conversations with students exploring their reflective writing after assessment had concluded. Unfortunately this is difficult due to the timing of this particular module but may be applicable in other learning contexts.

The small cohort and hence sample size is a limiting factor in this study, as is the specific learning context. Therefore it is not possible to generalise these findings to a wider population or contexts. However the assessment design could easily be applied in other contexts and the results feed into a growing body of research conducted in the Information School into the value of reflective writing.

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