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An investigation of factors that may de-motivate secondary school students undertaking project work: implications for learning information literacy

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Abstract

This paper describes an exploratory, qualitative, study of the motivational issues associated with project work – a method intended to help encourage independent learning skills. The population studied were United Kingdom secondary school students who attended a state funded comprehensive school in Derbyshire. The study chose to explore why students, generally, did not engage in the project process and to determine those factors that either motivated or de-motivated them during this process. Questionnaires were completed by twenty-six Year 7 (11-12 year old) students and ten Year 13 (17-18 year old) students. Interviews were conducted with six Year 7s and ten Year 13 students. In addition six Year 7 students were involved in a focus group and nine Year 13 students in a separate focus group. Different methods, as well as previous research, enabled triangulation of the data and indicated the validity of the findings. Aspects of the students experience when undertaking a piece of research were found to be de-motivating. In general students did not have a clear understanding of the different elements of information literacy. The majority considered that their information skills were not well developed and they were not confident of completing the research process successfully. Specific factors that had significant impact on the students' motivation included choice of topic, the amount of group work, the level of support and feedback during the process and the study environment. It was also found, in this case study, that educators did not utilise Library and Information Science (LIS) information literacy/information behaviour models or knowledge to teach and support project work. Nor was there any recognition of the attitudes and skills or motivational issues associated with the stages of the project process. This was in contrast to the teaching in school of data analysis and handling, using Information and Communication Technology (ICT), during subject based project work where there seems to be a more cohesive approach. Based on these findings recommendations for improving the project process and the learning experience are given.

Introduction

There are a number of models for teaching information literacy, that stem from the Library and Information Science (LIS) profession, including Marland's Nine Steps to Research Model (Marland 1981) in the UK that formed the basis for many of the later models, as did Eisenberg and Berkowitz's (1990) Big Six Skills model in the US. Guidelines have been published. Amongst the most influential in the UK were those of Marland (1981), Irving (1990) and the School Library Association (Dubber 1995 and 1999). These guidelines work on many different levels. At a very general level,

for example, they encourage people to value information, define the topic they are investigating or *'understanding a need'* [for information] (CILIP, 2005). These are applicable in a wide variety of learning situations whether students are undertaking a focused piece of research or searching for information on a broad topic. However the detailed information literacy guidelines tend to relate to those skills and attitudes associated with doing research that places heavy emphasis on secondary sources of information, such as publicly available literature, that would be useful when writing an essay or producing a report on a topic. Hence reference to *'constructs and implements effective search strategies'* are included as information literacy learning outcomes (Bundy, 2004). Generally, in the Information Literacy literature stemming from the LIS discipline, when examples of sources are given, publicly available sources such as newspapers, Web sites etc. tend to be used (CILIP, 2005) rather than primary data or unpublished information. LIS professionals and academics have therefore focused on the use of secondary sources when discussing information literacy. This reflects their library background and also, at the tertiary level, the fundamental importance of secondary published sources for understanding what people have found out before and the need to gather together existing information and knowledge.

In the educational environment a variety of terms are used that could relate to information literacy. These include information skills, enquiry skills, information processing, thinking skills and even the term information literacy. For example, in Learning Across the National Curriculum six skill areas are identified as Key Skills and five Thinking Skills are identified to complement the Key Skills. *"By using Thinking Skills students can focus on…learning how to learn,"* (DfEE, 1999, p. 23). These skills include:

> Information processing
> Reasoning
> Enquiry
> Creative thinking
> Evaluation (DfEE, 1999, pp.23-24)

The Key Stage 3 National Strategy also addresses the teaching of 'information skills'. *"A main tenet of the Key stage 3 Strategy is that schools help pupils to become more competent learners for life and that a sound grounding in information skills is particularly important for Key Stage 4 and beyond"* (DfES 2004, p.3). However, although the same terms are used they do not refer to the same tasks and activities. For example, when educators refer to *'access, select and interpret information'* (National, 2005) they cite addresses, databases, digital maps and photographs as information rather than published, textual, secondary sources. 'Thinking skills' is another phrase used to refer to information-processing and sourcing material but again the material is in fact data rather than information such as data gathered by students when surveying security systems in local shops (Dfes 2005a). The use of 'information-processing' by educationalists is closer to the LIS meaning when it is used to refer to locating parts of the text and evaluating the purpose of the text, its organisation and identifying arguments. Similarly writing is stated to encompass 'recording and organising information' as a written document and 'Thinking In English' guidelines refer to reading text, predicting, hypothesising, checking evidence and types and structures of text types/structures (Dfes 2005b). However there is no indication that these skills are linked to or are consciously incorporated into project

work, where they are essential. Geography is an area where enquiry skills are highlighted and the use of sources emphasised. However, sources tended to be pictures and satellite images (National Curriculum in Action 2005) rather than text. Key skills such as reading and understanding writing include techniques such as comprehension of text passages, interpretation of numerical information, systems to locate information, use of headings, skimming, interpreting and exploring information – which sound like key aspects of information literacy and useful during the project process that draws on secondary sources. Again, however, the suggested source material for this learning activity was a travel timetable (BBC, 2004) and the emphasis on interpreting numerical data. Students are expected to independently apply these skills in the project context. Information skills are also mentioned in relation to ICT. For example, ICT capability in Key Stage 3 under Skills state that '*to handle information efficiently, pupils need both technical skills in using ICT facilities, such as how to use a particular software package to reorganise information for a new purpose, and information skills, such as skimming and sifting*' (Dfes 2005c). One excellent example of how ICT skills are taught as well as the analysis, synthesis, organisation and presentation of data can be found on the Curriculumonline site. The video case study shows how ICT skills can be developed as well as the management and presentation of data when students explore the topic 'citizenship' (Curriculumonline 2005). Many of these skills are useful when conducting a project. However these learning resources do not encompass the use of secondary resources such as Web sites, newspapers, e-magazines, books or tools such as databases, thesauri, search engines or people or organisations. Teaching materials therefore tend not to mention the term information literacy and do not refer specifically to the processes associated with secondary research.

There are of course exceptions and individual teachers and schools librarians have been involved in the provision of information skills and information literacy in schools. One site that teachers are pointed to aid learning that does provide a good example of a topic that an information literate student should understand is produced by the British Library and called 'Explore the World's Knowledge' (British Library 2005). However sites like this are rare and unless these skills and knowledge are explicitly and comprehensively covered in the curriculum and resources made available to help teachers teach information literacy it is unlikely to be taught in a systematic fashion in all schools. It should also be born in mind that a survey showed that only 26.5% of a thousand school libraries worked closely with all departments and in only 6.7% of cases does the person responsible for the library receive schemes of work from subject departments. Furthermore only 29.7% of the libraries surveyed had a chartered librarian (some of them only part time), and only 8.7% have two (Smith 2000). Hence the impact of one potential driver of change, the school librarian, is likely to be limited. However, it could be argued that the impact of school librarians may have also been limited because of their lack of familiarity with teaching and learning theories and methods. In other countries, such as Australia and the United States, teacher librarians have both a teaching and library qualification and this may help them to be more involved in the curriculum.

Educators therefore seem to have a different perception of information, often referring to data as information or focusing on non textual forms of information and lack an appreciation of the skills and attitudes associated with accessing and using information familiar to the LIS profession. Material from the educational

environment does not seem to distinguish between the information associated with enquiry and the use of primary data and unpublished information and that associated with research that depends on the use of publicly available secondary sources. Nor do they seem to be cognisant of the LIS research that highlights the various processes and problems that students experience when undertaking this kind of task – a task that will be common in their further education and general life. Nor do there seem to be explicit guidelines, from the educational domain, as to how to most effectively teach and engage students in broad, research based, project work.

Nevertheless schools do expect students to undertake project work and it is assumed that this is seen as one approach for learning independent learning skills in schools, although this is not explicitly stated. The students in these situations are expected to find and present information on broad, relatively undefined, topics such as Romans or Drugs (Year 7 topics, aged 11-12 years) or African Dance or Ageing (Year 13 topics, aged 17-18 years). Students are expected to use a range of secondary resources and to produce a report on the topic. Students, however, do not always engage with this process. At worst they merely present unprocessed information downloaded from the World Wide Web. As a result information literacy and associated skills are not taken on board. Recent feedback from the Ofsted English team's survey on the role of school libraries (Lemaire 2005) confirms this view and stated that '*too many pupils struggle to make effective use of information and teaching of information literacy is rarely effective or coherent*'. This is despite strong backing for and perceived importance of school libraries in the development of independent learners (Dfes 2004).

There therefore seems to be a lack of success in teaching information literacy associated with independent project based research using secondary sources. There is also a lack of material, from organisations that support teachers, that guide good practice. It was therefore decided to investigate the motivational dimension and see whether there were specific aspects of the current project based assignment that demotivated students. On the basis of this it was expected that recommendations could be made for changing currrent practice.

Literature review

Different authors have focused on different aspects of learning information literacy and have highlighted challenges faced by tertiary education students, for example Hepworth (2003), but few have specifically concentrated on the motivational issues. An article concerning interface design however does provide an indication of sources of motivation (Watters & Duffy 2005). These include the feeling of self-determination (a basic need to feel competent); having clearly defined achievable goals; a sense of control over outcomes (the ability to complete a task).

One study that did concern motivation and teaching information and library skills was conducted in the US (Small 1998). This study provided an overview of motivational theories and concepts. Based on this and the ARCS (attention, relevance, confidence, satisfaction) model of motivational design techniques to help motivate students to learn information literacy were suggested. Kulthau (1993) provided an overview of the likely affective states, among tertiary students, associated with the project work and indicated that an appreciation of these states may indicate the necessary support

to help them with the process. Detailed studies of the motivational issues associated with the entire project process from the perspective of the learner are therefore rare. However, observations of previous authors, concerning different aspects of the process and the problems students experience do throw light on the possible sources of motivation and de-motivation.

One factor that may affect motivation is the apparent lack of understanding by students of the overall process or what should be done and when and the purpose of the activity has been reported. Barranoik (2001) in her study of high school students observed that students were unclear about the steps involved in the project process. This finding supports Kuhlthau's (1993) statement that students (at University) do not have a clear understanding of the sequence of tasks in the project process. It seems likely that this would be the case secondary schools. Herring (1997) states that, when students undertake research, identification of the purpose needs to be done in the classroom and that it is only when this has been completed that students will be able to seek out appropriate information sources. The motivational literature lends weight to the importance of clearly understanding the task, the process, the outcome and the likelihood of success. In addition, understanding the value of the task is also seen to be important for motivation (Vroom 1964, Porter & Lawler 1968). This is known as the Expectancy-value theory. Hence it is important to make clear how the IL learning will help the student to undertake other learning objectives. The latter also provides what is termed 'extrinsic orientation' motivation (Ryan & Deci 2000). Time spent defining the topic and becoming clear about the goals and intervening processes is also likely to make the learner feel more in control which in itself is likely to encourage engagement with the task and exploration of material.

Choice of topic has also been identified as an important factor for engaging the student in the project activity. Seamans (2002, p.118) noted "…*choosing a topic already of interest to them seemed to help the students focus.*" Barranoik (2001, p.43) says the most excited, focused students "…*were those who chose topics of interest and relevance to their current life situation.*" Choice is also likely to lead to students choosing topics about which they are curious, "*curiosity that can only be resolved through the acquisition of knowledge*" (Small 1998). Curiosity leads to exploratory behaviour (Berlyne 1960). In addition Hirsh (1999) states that students are more interested in a subject if they have some prior knowledge of as well as choice of the topic. Irving (1985) concurs and makes the point that at the outset of any research it is necessary to explore existing knowledge. In addition building on previous knowledge may also raise the confidence of participants. Shaping research questions in any case seems to challenge students (Watson 1998) especially when they have a limited knowledge of the topic.

The importance of incorporating new knowledge and building on existing knowledge is also recognised by various models of information literacy including Bruce's (1995) 'Seven Faces of IL', the Association for College Research Libraries (ACRL, 2000), the Australian and New Zealand Institute for Information Literacy (ANZIL) (Bundy, 2004) and CILIP (2005). Referring back to previous knowledge and the associated reflection is also supported by learning theory that describes learning as the continuous building and amending of previous structures (Squires 1994; Fry et al, 1999; Race, 2001) and where people actively construct their own knowledge (Biggs & Moore, 1993). Emphasis on experiential learning and the use of reflection and

discussion stem from constructivist theory where higher order learning can only take place, it is argued, when the learner's underlying schemata are changed to incorporate new understanding. A lack of appreciation of this by the teacher may mean overemphasis on skills such as search skills and not giving the student the opportunity to engage with the topic.

Another reason for building on previous knowledge, including knowledge of information systems, is the need for reassurance i.e. starting with the familiar. Unfamiliarity with the process and the resources can lead to anxiety. Valentine (1993) reported that lack of familiarity with the library and resources were an obstacle to research. Hartmann (2001) and Morrison (1997) identified library anxiety amongst the subjects of their studies. Both studies revealed that students would have appreciated more help in the research process without which the students may feel lost. This may partly explain why students make use of people when undertaking research. Shenton and Dixon (2003, p.20) refer to students approaching people "…*motivated by a desire or necessity to find information on school curriculum topics*" because they were familiar and are used to learning from the people around them. In her study of children McNicol (2003) noted that although students were often uncertain what resource to use when searching for information they were more confident about choosing the most appropriate person to help them.

Knowledge and confidence in information and communication technology (ICT) also has an impact on motivation. "*The learner's perception of his/her competence in successfully navigating this type of system [computer based] and retrieving all of the relevant information may contribute to a positive motivation toward the system and successful accomplishment of learning goals*" (Kinzie 1990 quoted in Small and Ferreira, 1994, p.254).

Lack of confidence and a sense of isolation, especially when students are tackling new topics, undertaking independent learning and using new tools, may be one reason why group work is seen to be helpful. One motivating need that has been identified and can be satisfied by working in groups is the need for affiliation i.e. the need for social interaction. On a more practical level Laverty (2002) and Garland (1995) identified working in groups as one factor that could help students in their formulation of questions i.e. at the start of the project process and contributes to student satisfaction with the research process. Group work is also associated with collaboration which enables learners to develop, test and evaluate different ideas. This articulation enables students to build new knowledge and modify existing knowledge. Furthermore the collaborative process where students negotiate plans for solving problems involves reflecting on what is known, what needs to be known and the viability of plans and hence can be an important part of the learning process (Laurillard 2002, Mayes, & de Freitas 2004 & 1995) and may contribute to a more positive approach to the project process.

With regard to locating information a number of problems have been identified. According to Schacter, Chung and Dorr (1998, p.847) children are "…*reactive searchers who do not systematically plan or employ elaborate search strategies.*" Valentine (1993) in her study of undergraduates found that none of the students used an organised search. Having no well defined strategy can lead to ineffectual searches and could contribute to a feeling of insecurity. A general lack of search knowledge is

well documented. Seamans (2002) found that most students used one word to search the Internet and that they were not comfortable with Boolean operators. Morrison (1997) reported that students were frustrated by their inability to refine search topics. Bilal (2001) summarised current research to reveal that children in Grades one to seven have difficulty formulating search strategies. Hirsh (1999) noted that although students in her study were experienced searchers they did not keep track of how they searched for information, instead they would start each search anew. Hepworth (2003) also found that students, at the tertiary level, had difficulty identifying sources, narrowing and broadening the search and, if unsuccessful, tended to abandon the current source and tried a new source rather than trying to modify their current search strategy. Furthermore if the iterative nature of the process is unexpected this could lead to frustration and disengagement with the task. A lack of skills and a lack of familiarity with the process is likely to lead to a lack of confidence in being able to conduct the task and which will be confirmed if students go ahead with out training and experience problems, achieving a kind of learnt helplessness. Not expecting to succeed is as indicated above a source of de-motivation.

Making effective use of information includes a range of skills (reading, viewing, listening and understanding). Irving (1985, p.76) describes these skills as "…*some of the most neglected skills in secondary education*." Herring (1996) talks about the importance of reading for information and the need for teachers and school librarians to examine whether students are competent in this skill. Greater emphasis has been placed on 'thinking skills' over the last ten years (Moseley et al.2004) and we are now seeing 'learning to learn' in the secondary school curriculum. However there is no indication, in the literature, that thinking skills are specifically associated with project work or are clearly identified and supported in the classroom. They are, nevertheless, identified as important in the various information literacy models, and are associated with the tasks: evaluation, organisation, integration and synthesis of information.

Another area that may influence individual motivation is whether the characteristics of the learner in terms of how they learn should be taken into account when students undertake project work. Ford (2004), for example, Marton and Saljo (1997) identify different approaches to learning; deep and surface. Honey & Mumford (1982), Pask (1976), Kolb et al (1991), and Ford (2004) also identify learning style as a factor that affects how people learn. Logically, therefore, project based work that does not take into account learning style may also have a negative impact on the process since students with a particular learning style may feel alienated by a project learning process that assumes there are no individual differences in how people learn. Little attention, however, is paid to learning style in the models of information literacy.

The final stage of presentation also raises issues. Irving states that '*the presentation of information about what has been studied is…a necessary part of education; it is the vehicle for assessing what learning has taken place…it is also essential for the process of learning itself*'(Irving 1985, p.104). Barranoik (2001, p.43) suggests, "*Allowing students to design their final product may create more interest in the research project.*" The possibility of presenting information in various formats should therefore be considered as a means of motivating students bearing in mind the importance of choice and the different learning styles of students. For example some students may prefer presenting results in more active or visual ways than via the usual textual report.

Motivation can also be influenced by different modes of assessment, an extrinsic form of motivation. Currently the marking of the task tends to focus on the final product. However, Moore and St. George (1991, p.168) observe, "…*the range of skills needed to complete library research assignments suggests that a blanket assessment of the end product ignores most of the learning potential inherent in the task.*" Barranoik (2001, p.44) states, "*Marking both the process and the product may encourage students to focus on making the information gained in the project meaningful to themselves.*" Marking can also provide feedback. Squires (1994) emphasises the importance of feedback both in terms of keeping people on track but also providing an opportunity for reflection. Regular feedback therefore keeps people on track, provides emotional reassurance and positively encourages reflective thinking which is an important part of the learning process (Race 2001, Kolb et al. 1991).

An overall impression given by these authors is the student is very uncertain as to the purpose of the task and how to go about it. A number of factors and problems experienced by students have been identified that may have an effect on their motivation to engage with the project experience. It was therefore decided to see whether an investigation of the current situation in one school would find similar or different factors that motivated or de-motivated the students.

Methodology

The research took place during the autumn term 2003 and spring term 2004. The population came from a state-funded comprehensive school, in Derbyshire, for students aged eleven to eighteen years. Participants from the school were drawn from a mixed-ability Year 7 (age 11-12) history class and a Year 13 (age 17-18) A Level art class. This location was chosen because of personal contacts and the willingness of teachers to be involved.

Due to the exploratory nature of the research and that, to a great extent, feelings and emotions were being investigated a qualitative approach was taken. Numbers are used to represent the findings from the questionnaire, however, these numbers are indicative and they do not claim to represent the situation among students and schools in general. A number of techniques including, questionnaire, interview and focus groups, were applied to aid triangulation and to help determine the validity of the data. Previous research provided a further indication of the validity of the findings.

A semi-structured questionnaire was used in order to capture data on students' understanding and perceptions of information literacy and skills, the barriers to their engagement with that process and the factors that might motivate them to engage with the process. Closed questions captured data about the students training in information seeking, their understanding of purpose and their perception of their ability to locate, evaluate and use information. Open questions captured data about students' history of information seeking, their motivation and perceived barriers. The questionnaire was piloted with four secondary school students. Twenty-six Year 7 history students and ten Year 13 art students completed the questionnaire in the autumn term 2003.

Six Year 7 history students were interviewed in pairs during the autumn term 2003. Each semi-structured, interview lasted for thirty minutes. Ten individual interviews were carried out with Year 13 art students in the autumn term of 2003. Each

interview lasted fifteen minutes. Interviews were used to explore the participants understanding and perceptions of information literacy and skills as well as the barriers and the factors that might motivate them to engage with the process. All interviews were recorded. Two focus group interviews were conducted during autumn term 2003, one with six students from the Year 7 history class and one with nine students from the Year 13 art class. The duration of each was one hour. Questions were formulated based on the initial research questions and findings from the questionnaire and interview data.

Findings

General data is first presented giving an overview of where students went for information and causes for concern.

Figure 1: Sources of information used by students

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Year 7 students can be seen to place greater emphasis on the family as an important source of information. However, in general, a similar distribution of sources used is evident. Year 13 students tended to feel more enthusiastic about starting a project than Year 7. This was probably due to the fact that they chose to do Art. A total of 4 of the Year 7 students claimed to be bored by the idea.

A majority of students (24 Year 7 and 10 Year 13) preferred to choose their own topics. Negative comments on the lack of choice included:

"*In geography we have to do a 3D map of Australia so we have to find out all about it. I don't even know where Australia is, why can't we do one of England? I would find that interesting.*" (Year 7 student)

"*I don't like doing all this searching and writing up about the Romans but I suppose it will help me to get a good job.*" (Year 7 student)

The younger students had less understanding of what the questions meant at Year 7, 14 sometimes understood and 11 nearly always understood the question in terms of what they had to do.

"I've no idea where I am going to start looking for information I don't understand what I've got to do I'll have to ask my parents for help". (Year 7 student)

The need for discussion, preparation and recall of existing knowledge related to the project was reflected in the following comments:

"When a piece of work is given out I don't always understand what to do. The teacher needs to explain it more. There needs to be more discussion about what needs to be done, perhaps a plan so we know what to do next" (Year 7 student)

Students felt motivated when working with others, particularly the younger students who appeared less confident and wanted more opportunities for group work.

"Working in groups is best especially at the beginning. You might not be sure what to do but when you all talk about it together you share ideas and it becomes clearer." (Year 7 student)

Working with others was considered particularly important in the initial stages of project work. Some students felt a sense of anxiety, even panic, when asked to research an area they were not familiar with. Discussion and sharing of ideas with others enabled some students to identify knowledge they possessed which they may not have recognised at first as linking to the topic in hand. In interviews and focus groups students talked about sharing information and discussing and clarifying the question with friends.

"We discussed the task with the teacher and as a group. We had a brainstorming session. It gets you thinking." (Year 13 student)

"Sometimes I talk to my friends in school about the work we're doing. If I'm at home I'll sometimes ring my mate and we'll look on the Internet together and chat about it. It helps you think." (Year 7 student)

Building on previous knowledge and the familiar was seen to be important. Students of all ages used books in class, in school libraries and public libraries. Students referred to a sense of familiarity with books and for this reason particularly liked to use them as a starting point in the searching process.

"I like books best. I don't go on the Internet that much I don't have it at home and I'm not confident of using it. There are too many websites." (Year 13 student)

"I do use the Internet but I like to start with a book. You feel more comfortable with a book." (Year 13 student)

With regard to information skills students were familiar with various skills but the majority of students considered that their skills were not well developed and were not confident of completing the research process successfully.

Students thought that training in the use of resources would help them to engage with the process. Finding too much information on the Internet was a problem. They also worried about their inability to refine search terms; this led to feelings of frustration.

Students identified their inability to use a library effectively as a barrier to engagement. Findings from the interviews show that students, especially the younger ones, were anxious about locating material both on the shelves and in books.

Some students had received information skills training but this appeared to be patchy and taught in isolation and not related to topic work. The questionnaire revealed that Year 7 students had received more training in planning a search and in search techniques than the Year 13 students but this training did not always help them. When searching only 14 of Year 7 students planned a search. The students expressed a desire to be taught skills whilst doing research work.

Libraries were used but students considered them a less convenient and more time consuming way of locating information. There was some apprehension amongst students about using public libraries.

"*I don't use public libraries very often because I don't like the people in there. They never seem friendly or willing to help.*" (Year 13 student)

However one student stated:

"*I use the school library regularly. The librarians there are great they can always help if I'm not sure where to look for information.*" (Year 13 student)

The Internet was widely used and seen in a positive light. It was seen as a quick, easy and convenient method of gathering information requiring less effort than other methods.

"*The Internet is easy to use. You can access all the information you want just by clicking. It is easy to find things and you can find them quickly.*" (Year 13 student)

The questionnaire found that 7 of Year 7 students said good resources would help to make learning information literacy skills easier. Good access to the Internet was regarded as a motivating factor and students expressed the desire for more computer provision.

Students made use of people when searching for information. Younger students, in particular, used family to find information. They were comfortable and secure approaching family members for information and felt confident that they could answer their queries. The questionnaire found that friends were used by students of all ages (see Fig 1).

The questionnaire (see Figure 1) found that Year 13 students also used their families when searching for information but interviews revealed that they used them less than they used to because they did not perceive them to have sufficient subject knowledge to help them as their studies became more complex. Now they preferred to use people who were more subject specialist such as teachers.

Teachers and librarians were used less by Year 7 students. In interviews they talked about feeling awkward asking for help.

"*You put up your hand to ask the teacher something but you feel awkward like you should know it already.*" (Year 7 student)

Students worried about not understanding the information they found. Year 7 students had more problems understanding information than the older students. Levels of language were cited as a problem. In interviews students talked about sensing that they had found the required information i.e. the information wanted by the teacher but as they could not understand it well enough to put into their own words they copied it. Responses to the questionnaire indicated a concern with 'writing up'. More worryingly, the questionnaire revealed that only 14 of Year 7 students read the information.

"*When you've found the information you write it down, what you think is important but you don't know if you're making mistakes you don't know if you've left something out.*" (Year 7 student)

The questionnaire found that 6 of Year 13 students said that more help would assist to make learning information literacy skills easier. Although the figure for Year 7 students was much lower (2) it was apparent from interviews that they felt a strong need for more help. They talked about the difference in levels of support in their primary schools and their secondary schools. At primary school there had been more 'helpers' in the classroom whom they could approach for help. In interviews students of all ages expressed the desire to have more contact with teachers throughout the process.

"*A worry for me is not knowing if I am doing the right thing. In primary school the teachers checked up on our work more. At secondary school this doesn't happen.*" (Year 7 student)

"*More help is needed. If there is a certain area that you are not sure about you need someone to come and sit next to you and explain it clearly and sometimes I don't feel that you get that in any lesson.*" (Year 13 student)

"*Help and support are important. In the sixth form our groups are much smaller and you benefit from having more access to the teachers. In lower school it was much harder to get help from the teacher.*" (Year 13 student)

With regard to keeping on track students felt that it would be easier if teachers checked work more regularly:

"*I'm not always sure if I'm going about it in the right way. It would help if the teachers could check your work but they don't have the time there are too many kids.*" (Year 7 student)

Students thought that class sizes were too large for project work, especially in Key Stage 3 and that teachers did not have enough time to give individuals the help they needed. Students demonstrated a need for words of encouragement and praise.

The Year 7 focus group felt overwhelmed with the number of topics they had to complete. They thought that one topic at a time should be completed in Year 7 and teachers should give guidance and instruction throughout the process.

One positive aspect of project work was that a number of students liked that the searching process allowed them to move around the classroom and even leave the classroom to go to the library or computer suite. This movement was a welcome change from sitting at a desk.

"I like projects because you get to move around. Sometimes you can get out of the classroom. I like going to the computer room to search on Google." (Year 7 student) Students referred to the environment, comprising of resources, the physical layout and ambience, as a factor that could motivate them to engage with the topic. The physical environment was referred to in interviews and focus groups. The ability to get up and move around during lessons to visit the library or computer suite, as mentioned earlier, was a motivating factor when carrying out research.

Students made the point that classrooms and the library in school could be crowded and airless with uncomfortable seating. This made it difficult to concentrate. Students did not favour sitting in rows. They would prefer seating to be arranged so that they could talk with others. This hub type arrangement was also favoured when using computers. Many students described the hectic environment in school and the difficulty in concentrating because of noise. Students complained that it was more difficult to conduct research in school because of having to adhere to a timetable. They talked about their work being interrupted by the school bell. Students want bright and welcoming environments that offer comfort and support with the facilities to work in a relaxed atmosphere.

"The place where you work and what it is like is important. If you have to sit on a hard metal chair in a stuffy room then you're not going to be able to concentrate. If you're comfortable then you feel good and get on with your work." (Year 7 student)

For this reason a number of students preferred to do their research work at home.

"When you are in your own room you can listen to music. You are in your own environment. You feel comfortable and more like working." (Year 13 student)

Discussion

The findings of this case study provide an insight into the range of challenges experienced by secondary school students when involved in a piece of project work. These challenges de-motivate students and reduce the opportunity for learning. It was also seen that the lack of a pedagogic framework specific to the project process, that requires secondary information as well as data, limits the learning of information literacy.

Students experienced similar problems to those identified, among other students, by previous authors. This study also highlighted the importance of emotional support and the need for regular feedback on students' progress throughout the project process. The need for an appropriate learning environment was also identified. Many students

did not have a clear understanding of the components of the project process, echoing Barranoik (2001) and Kuhlthau's (1993) findings. They were familiar with various information skills but the majority of students considered that their skills were not as well developed as they should be and were not confident of completing the research process successfully, which was de-motivating. Students needed to spend more time on the initial stages of the process. They wanted more time to talk and share ideas. This would provide the opportunity to reflect and identify previous knowledge. This would help them to formulate their research questions, plan and foster thinking skills associated with goal setting and planning. Furthermore this would help develop an understanding of the goal and purpose of the project and lesson the worries about keeping on track and completing the project hence giving them confidence. Widespread and effective integration of the principles of Assessment for Learning (Assessment, 2005) into the project process could help address these issues. The relevance and importance of group work, particularly during the early stages, to facilitate discussion and orientation to the project process is self evident and is supported from a pedagogic perspective (Laurillard 2002, Mayes & de Freitas, 2004).

Students reported having no interest in the subjects they were studying and as a result were not motivated to engage in the research. As Seamans (2002) and Barranoik (2001) recognised, choice of topic was a prime motivating factor. Students needed to feel a sense of ownership of the work they were doing. In addition the process of thinking about, defining and choosing a topic seems to be fundamental in helping the student engage with the topic. This ties in with the motivational concepts of curiosity, control and the belief that they can complete the task. Choice of topic would therefore be an important part of the initial stages of the process. Furthermore students wanted to study subjects they had some familiarity with, use familiar books, they sought help from people they were familiar with. This supports the work of Valentine (1993, p.302) who found that "…*for many students, conducting 'easy research' meant starting with something familiar*."

Students lacked confidence in their ability to use resources effectively. They thought they were inadequately trained to find information in a library and on the Internet and expressed frustration at the amount of time they spent searching supporting the views of Valentine (1993), Seamans (2002), Hepworth (2003), Morrison (1997), Bilal (2001), and Herring (1997). Students described losing interest in their work if they reached a point where they did not know what to do next. Some students had received information skills training but this appeared to be patchy and taught in isolation and not related to project work. Students referred to receiving instructions in some of the steps of the research process e.g. planning but this knowledge was not always applied to their research. This method of teaching i.e. separate from the project task, did not appear to benefit students. The students expressed a desire to be taught skills whilst doing research work i.e. taking on a more problem based approach to teaching project work.

Students wanted good, accessible resources and more training in the use of those resources. Students also wanted help and support to be available. Students wanted work to be checked throughout the process. This would help them to keep on track and would also mean that they received credit for effort made during the process as well as for the end product. More training would familiarise students with the research process. This training could take the form of a series of small-scale tasks

delivered at the different stages of the process and aimed at developing skills required to complete those various stages (see Figure 2). At each stage the opportunity for discussion and reflection could be included allowing students think about, become conscious of and internalise the skills and attitudes associated with information literacy and independent learning.

Feedback on students progress and help should be offered throughout the process. Furthermore, some form of reward or assessment should be given for the separate parts of the project process. These strategies would help students to keep on track, give them confidence and the necessary guidance. In addition regular assessment would help to reinforce the value of each stage in the process. Students referred to help they had received at primary school from classroom helpers. These were familiar people whom students felt comfortable asking for help. It was felt that secondary schools did not provide adequate levels of support. This problem could be addressed by providing mentors to help students. They could be described as 'family' mentors and would play the role of friendly, non-threatening helpers supporting students as they undertake research. Their aim would be to support the students with help and guidance, keep students on track, take an interest in students' work and offer encouragement and feedback. Intervention by a mentor would offer students support and encourage them to re-engage with their work. These issues are particularly important at cross phase transition. Year 7 students missed the support they had received at primary school from classroom helpers. Workforce remodelling has the potential for secondary and primary schools to jointly employ teaching assistants and librarians to work in both schools to take on a 'family' mentoring role to provide a continuity and emotional security for students. Enthusiasm from teachers about the subject being studied and praise and encouragement for students were considered motivational factors.

More choice over the final output was also highlighted as a potential motivator for students. This relates to the abilities of the student and possibly their style of learning. The following quote reflects this view and supports the findings of Baranoik (2001), Irving (1985) and Small (1998):

"*If a student is not very good at writing then they are not going to feel confident of doing well from the start. If they are going to be marked on a piece of written work they are going to struggle. If they had an option of how to present the work then it could motivate them.*" (Year 13 student)

The environment emerged as an important motivational factor. The resources provided, the physical layout and ambience all contribute to motivate students to engage in the information seeking process. Students were more motivated to work in a comfortable, attractive environment. Students wanted to feel able to get up and move about easily. Sitting in rows made students feel trapped and also inhibited group work. Students valued the opportunity to work in groups and exchange ideas and provision should be made for this. An open plan area specifically designed for project work with 'hubs' of computers and desks for group work would be ideal.

Time and the pressures of the school timetable were also felt to inhibit engagement. Students described the current environment as 'hectic' and 'crowded.' They talked about the difficulties of carrying out research during timetabled subject lessons. They

felt pressurised and anxious about being interrupted by the bell. Timetables are a necessary part of school organisation but it may be possible to provide within the timetable, lessons dedicated for research when students would have good access to resources and support. In addition the study found that students would appreciate after school clubs where they could work in a calm, relaxed atmosphere with help available.

Conclusion and recommendations

This research suggests that far more thought needs to go into the teaching of information literacy associated with project-based research using secondary sources. Lessons learnt from information behaviour studies and research related to information literacy where a detailed understanding of the project process, and the learners experience, needs to be used to help develop teaching material. Good practice needs to be able to demonstrate the underpinning learning theory. Fundamental changes are required in the way project work is taught and facilitated and the environment within which it takes place. Dialogue is needed between educators and LIS professionals and academics to clarify what is meant by independent learning and the skills associated with them. A clear distinction needs to be made between the IL, thinking skills, processes and support required for focused exploration (often using primary data and information that has not been formally published) and the IL, thinking skills, processes and support required for the broad piece of research, that is 'project work', that tends to involve the use of a range of secondary sources. Furthermore the common ground needs to be clearly defined. This would help to avoid confusion where the same terms are used to talk about different things and to appreciate what knowledge, skills and attitudes are appropriate when. Furthermore the motivational and emotional aspects of the project process, as well as the impact of the environment in which it takes places, needs to be recognised.

The following diagram provides an overview of the necessary interventions highlighted in this research necessary to support the project process.

Figure 2: Suggested interventions to support the research process

Figure 2 should be placed here.

Ideally a new approach to teaching project work and learning information literacy that takes on board the findings of this and related research in information literacy, information behaviour and learning theory would be developed that would contribute to the development of independent learning ability. The design of this information literacy programme should take note of good practice by information professionals as well as good pedagogy particularly that associated with teaching ICT and information processing and enquiry skills, guidelines offered by organisations such as Becta and the wider work of educational theorists. Special attention would need to be paid to the motivational aspects of developing information skills and the implications for the environment and support. This approach could then be tested and further developed, using action-based research and changes in the attitude and knowledge of students could be evaluated. This could lead to better teaching and improved information literacy amongst students and contribute to the wider objective of fostering the

independent learner. In the longer term, to sustain such programmes, teachers need to understand the information literacy learning and teaching process associated with the use of secondary sources and associated tools and how this relates to the use of primary data. If the role of teacher/librarians or school librarians as teachers of information literacy was formalised they could play an invaluable role in making sure that learning material was kept up to date and information literacy was genuinely incorporated in the teaching of the curriculum. It may, however, be necessary for school librarians to develop an understanding of the enquiry and information processing skills associated with the use of primary data. This could help to reduce the current confusion caused by LIS professionals and educators using the same words to talk about different things.

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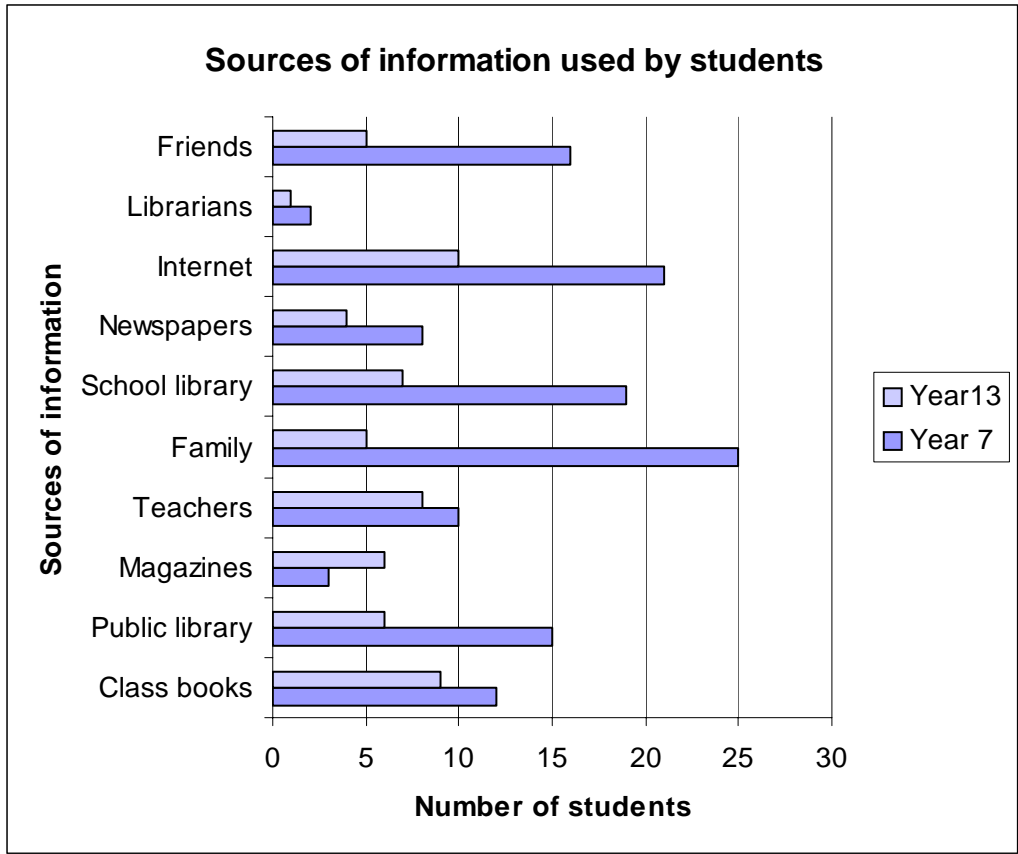
Sources of information used by students

Figure 1: Sources of information used by students

Environment

Calm, relaxed environment suitable for initial group work and later individual research →

Process

Choose & Define Topic	Identify Search Terms	Choose Sources	Construct & Run Searches	Use Information

↑ ↑ ↑ ↑ ↑

Teacher / learner interaction

Facilitated discussion, brainstorming And building On prior knowledge. Developing a research plan. Defining goals.	Help identifying keywords and synonyms	Introduction to range of sources including familiar sources and people. Training in the use of sources.	Familiarisation with strategies to refine the focus of the search. enabling broadening and narrowing the search.	Reinforce Reading for meaning, browsing, evaluation, comparison, synthesis and communication skills and strategies.

Feedback and marks throughout the process →

Critical reflection on each stage in the process →

Mentoring role by teacher / assistant →

Figure 2: Suggested interventions to support the research process

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