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Developing a new approach to information literacy learning design

Sarah McNicol, Research Associate, Education and Social Research Institute, Manchester Metropolitan University.
Email: s.mcnicol@mmu.ac.uk

Emily Shields, Deputy Library Services Manager, Manchester Metropolitan University.
Email: e.shields@mmu.ac.uk

Abstract

This article reports on the development of a new model for information literacy (IL) learning design created as part of Innovative Technologies for Engaging Classrooms (iTEC), a European project focused on redesigning teaching and learning. Findings from this project, along with a review of previous studies of IL models, demonstrate why a new approach is needed. The resulting model, InFlow, has been designed to encourage students to engage with information in a variety of ways as they map, explore, ask, make, reflect, imagine, show and collaborate. The rationale behind the development of this model raises fundamental questions about current teaching practices in relation to IL, such as the need to encourage collaborative working; the role of students as producers of information as well as consumers; and the privileging of particular types of information sources and outputs. This article describes the process by which this model was developed, based on approaches used in iTEC, and explains how it responds to criticisms of existing models. A short case study of the use of InFlow in a UK university library demonstrates how the model can work in practice to create IL programmes for students of the 21st century.

Keywords

information literacy; collaboration; creativity; reflection; IL models; learning design

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1. Introduction

There are no shortage of models which can be used to support the teaching of information literacy (IL) in schools, further and higher education (HE), and lifelong learning institutions, for example: Big6 (Eisenberg and Berkowitz 2003); CILIP's Information Literacy Skills (CILIP 2012); SCONUL's Seven Pillars of Information Literacy (SCONUL 2011); and the ACRL's Information Literacy Competency Standards for Higher Education (ACRL 2000). Considering the widespread acceptance of such models among librarians, until recently, they have been subject to remarkably little critical examination (McNicol 2014a). However, there is growing recognition that IL frameworks need to change in order to ensure they are relevant for 21st century society. Kutner and Armstrong (2012) based their recent review of IL standards relevant to HE institutions around the premise that, "our guiding professional information literacy definitions and standards need to be reconsidered in order to remain relevant within the global learning context" (p. 25). They criticise the reductive, skills-based approach which presents, "barriers to consideration of the more 'messy', reflective, content and context-based information literacy education" (Kutner and Armstrong 2012, p. 27). Other commentators, including Johnston and Webber (2003) and Branch and Oberg (2003), concur the latter acknowledging that finding and interrogating information sources is usually a strong section of IL models, but the ways in which they address the 'messier' aspects of the process, "when students have information in hand and are creating their own new knowledge" (p.

19), is often considerably weaker. The types of pedagogies which are becoming increasingly common in 21st century classrooms, such as: collaborative learning, creativity, problem-solving, and authentic learning tasks which prepare students for future life and work, require students to be confident and proficient in precisely these 'messier' tasks. It has been argued elsewhere that IL models need to adapt to the needs of classrooms of the future (McNicol 2014a; Portillo Fuenmayor and Pirela Morillo 2010). This article describes the creation of a new IL model, which attempts to address these issues, and reports on its early evaluation.

2. Background to the InFlow model

InFlow, the IL model described in this article, was developed as part of the Innovative Technologies for Engaging Classrooms (iTEC) project which is working to create a sustainable model for fundamentally redesigning teaching and learning. The iTEC approach is designed to bring about change in classroom practice, in order to better prepare young people for the challenges of society and the workplace. This approach encourages the design and use of inspiring and innovative Learning Activities, which are based upon visions of the future classroom and involve advanced pedagogical approaches, supported by effective use of ICT. Important features of iTEC include support for constructivist pedagogies; developing 21st century skills including collaboration, communication, ICT (or digital) literacy, creativity, critical thinking and problem solving (Binkley et al. 2012); introducing innovative and student-centred technologies into the classroom; and the encouragement of collaboration and group work, alongside developing the role of the teacher as guide or mentor. Sets of specially designed learning activities were introduced in five implementation cycles taking place over four years (2010-14) and students in over 2,500 classes across twenty European countries have participated in iTEC Learning Activities.

2.1 iTEC and information literacy

A comparison of the activities conducted during the third cycle of iTEC (2012-13) with those supported by IL models, indicated a number of gaps or discrepancies between existing models and emerging pedagogical practices, especially those which combine 'pedagogy 2.0' techniques in which "students are empowered to participate, communicate, and create knowledge, exercising a high level of agency and control over the learning process" (McLoughlin and Lee 2009, p. 355) with the use of web 2.0 technologies (discussed in further detail in McNicol 2014a). The five main gaps identified were: design and creativity; primary information gathering; collaboration; reflection; and flexibility of approach.

2.1.1 Design and creativity

Creativity has long been considered an important component of education. However, since the 1990s, there has been a growing recognition of the importance of learner creativity in particular (Loveless 2002). In iTEC, rather than being seen as a discrete subject, design was viewed as a skill set which can be taught, as opportunities arise, across a range of subjects. Design activities offered students greater opportunities to be creative as they produced objects, animations, games and other non-traditional resources. Reviewing existing IL models, it was found that most simply required students to make decisions about the appropriate presentation format, for example whether to opt for a presentation, written report or webpage, but they did not support more complex decision-making which most iTEC students were engaged in. In the past, models have not been designed to support the type of tasks which many students will encounter when they enter the workplace, tasks which require them to design and to create new knowledge, rather than simply reproducing existing knowledge. As Kutner and Armstrong (2012, p. 30) describe, students are "becoming producers of information in addition to information consumers" as they engage in experiential and problem-based learning.

Branch and Oberg (2003) examined several schools-based models but felt that none dealt adequately with the creation (or re-creation) process. The only model they reviewed which

mentioned this aspect, the PLUS model, focused on written forms alone. While IL models often acknowledge that sharing of information will take place, Branch and Oberg felt that none explained how this might occur or showed an appreciation of the importance of audience. Furthermore, they found that insufficient attention was paid to revision, rewriting, reworking, revising and revisiting in order "to make the creation the best it can be". It is becoming more widely recognised that IL models need to adapt and embrace creativity and the production of knowledge alongside its consumption. Indeed, one of the trends informing the development of the new ACRL Framework, which will revise the current Information Literacy Competency Standards, is the "increase in students as creators and participants in research and scholarship" (ACRL 2014, p. 1).

2.1.2 Information gathering

Another way in which iTEC activities did not map onto the format suggested by most IL models is in relation to information gathering skills. In addition to locating information from the Internet and other pre-existing information sources, iTEC students engaged in primary research, for example, interviewing people and observing their environment and recording the information they discovered using photographs, video and audio. 'Location skills', as referred to in IL models are normally taken to mean the ability to search books, webpages, journals, library catalogues, databases and similar secondary information sources. For students in iTEC, however, locating the information they needed was a more wide-ranging activity.

Despite evidence of the importance of people and the environment as sources of information for young people (McNicol 2001) and the role of observation and participation in information gathering (Harlan et al. 2012), the use of primary sources, such as observation and interviews, rarely features in IL models. Coonan (2011, p. 13) contends that, at present, IL teaching often "deliberately remains aloof from the higher-order operations of the research process such as critical evaluation, hypothesis formation, writing skills and synthesis". Primary research is another aspect of the research process which might be added to this list. Furthermore, Lloyd (2005, p. 83) argues that the approach taken by existing models "relates strongly to text as the primary source of information and knowledge for learning and silences other access points to information and to knowledge". As indicated in the findings from the iTEC project (McNicol et al. 2013), in the second decade of the 21st century, there is a growing awareness that such a text-focussed approach is no longer adequate. Tellingly, the new ACRL Framework (ACRL 2014) refers to the need to expand conceptions of IL beyond the text-based focus of the current ACRL Standards.

2.1.3 Collaboration

Team working was another important feature of iTEC, as students worked in teams to co-create, or co-design, resources and share information. Collaboration is one of the skills most strongly demanded by the 21st century workplace, particularly with the shift away from manual work (Dede 2010). As a result of globalisation, team working is, increasingly, being facilitated by digital tools which allow geographically dispersed team members to collaborate. The importance of collaboration has been recognised as a feature of the changing educational landscape, in particular through the widespread interest in social constructivism (Vygotsky 1978) which stresses the collaborative nature of learning and the importance of cultural and social context. Likewise, Izquierdo Alonso and Izquierdo Alonso (2010, p. 109) emphasize that learning to research does not simply require the transfer of a set of skills, but rather "a social process of production and communication" [un proceso social de producción y comunicación]. Despite this, IL models remain focussed on individual skills and endeavours for the most part. Branch and Oberg (2003) felt that a weakness of the school-level models they analysed was that they are designed for use by individuals, rather than groups. The same is true of models designed for HE, which refer to the 'information literate individual' or 'information literate person' (ACRL 2000; SCONUL 2011), but make little or no reference to appropriate methods of sharing information. However, there are indications that more attention will be paid to this in the future; again, one of the trends on which the new ACRL Framework is based is the rise of collaborative student work (ACRL 2014).

2.1.4 Reflection

Reflection, which has been described as “central to critical thinking and deeper learning” (Quinton and Smallbone 2010, p. 126) was embedded throughout the iTEC process. Two prototype audio-visual tools were created specifically to support reflection. The most widely used, TeamUp, offered the facility for groups of students to record 60-second audio ‘newsflashes’ in the style of news bulletins. As teachers pointed out, however, reflection was often seen as a supplementary activity, rather than an integral part of the learning process; as a result, many students struggled to master reflection skills and failed to appreciate the value of this activity (McNicol et al. 2014). Writing about A New Curriculum for Information Literacy (the ANCIL project), which set out to develop a new undergraduate information curriculum in the UK, Coonan (2011, p. 14) argues that “the most demanding activity in the internet age is no longer searching but evaluating”. Her colleague, Secker (2011), reported on an ‘expert consultation’ exercise which emphasised the importance of providing the learners with opportunities for reflection which were felt to be missing from many IL programmes currently. Indeed, in most existing IL models, ‘reflection’ does not feature prominently. Some models refer to ‘evaluation’, implying a formal, structured activity which occurs as the final stage of a project to 'judge the product' or 'judge the process' (Eisenberg and Berkowitz 2003), but the concept of reflection as an ongoing and formative process which informs the development of the activity is not evident.

2.1.5 Flexibility

Finally, in contrast to most IL models, presentation was not seen as the culmination of a piece of work in iTEC, but as a formative activity which was used to review and revise ideas. Most classes took part in a participatory design workshop in which students presented draft, or prototype, versions of their ideas and elicited feedback, which they then analysed in order to refine their designs. This usually involved repeating many of the earlier stages of their work, for example, revising their ideas about their topic; finding more information; and creating an improved version of their original design.

As Markless and Streatfield (2007) have pointed out, although many IL models refer to the need for flexibility, or to the iterative nature of knowledge construction, the way in which they are presented strongly suggests a linear sequence with relatively little opportunity for adaptation. Likewise, Branch and Oberg (2003, p. 19) argue that the models they analysed “tend to overemphasise linearity and often do not accurately reflect the recursive nature of the phases within the process or within the whole process”. Johnston and Webber (2003, p. 338) criticise the expectation of a “golden pathway to information success” suggested by models such as Eisenberg and Berkowitz’s Big6, and Hepworth and Walton (2009) make a similar point, arguing that models of IL are overly rigid and fail to take into account the iterative nature of dealing with information.

3. The origin of InFlow

The findings of the iTEC project in relation to IL are, therefore, supported by the wider literature; both suggest that existing IL models do not adequately support emerging 21st century pedagogies. However, a series of Learning Activities devised in the fourth iTEC cycle (2013) appeared to offer a potential way to structure an IL learning design model which could respond to the issues described above. These learning activities were:

- ‘Dream’: Introducing, understanding and questioning a design brief;
- ‘Explore’: Collecting information in relation to the design brief;
- ‘Map’: Creating a mind-map to understand relations between the collected information;
- ‘Reflect’: Recording audio-visual reflections and feedback;
- ‘Make’: Creating a design;

- ‘Ask’: Performing workshops with people who may represent future users of the design;
- ‘Show’: Publishing and presenting designs to an audience;
- ‘Collaborate’: Form ad-hoc collaborations with learners from other schools.

To support teachers in the implementation of these Learning Activities, the iTEC team prepared detailed descriptions for each activity, which included a descriptive narrative, suggested classroom activities, ideas for using technology, and potential teacher and student outcomes. The following is an example of the descriptive narrative for ‘Ask’:

> *Teams meet with 2–4 people, who could be future users of the prototypes, and communicate their prototypes and design ideas using prints, drawings or models. These participating people are considered to have an expert understanding of the domain the student designs are framed within. Expertise may be interpreted broadly, for example, a construction site worker can be considered to offer deep insight into the everyday practices of people on a building site. The expert participants are encouraged to use pens and post-it notes to modify and comment on the prototype. After the workshop the students analyse the comments and decide how to interpret them for their re-design. They then refine their design brief, especially in relation to the design challenges, context and added value of the result, record a reflection and update their documentation. This activity can happen more than once at varying time investment. Students can collect feedback on their work by asking experts, potential future users as well as from other student teams and the teacher. Classroom time: Approximately 2-3 lesson(s).*

Overall, the reaction to these activities from teachers was highly positive. The evaluation reported that teachers felt that the activities impacted positively on student attainment, motivation and 21st century skills development, including collaboration, communication, digital literacy, creativity, critical thinking and problem solving. Participation also had a positive impact on teacher competencies, attitudes and motivation. 86% of teachers responding to the survey (n=342) said they would use the Learning Stories and Learning Activities again and 87% said they would recommend them to other teachers (McNicol et al. 2013).

There were strong links between many of the activities which iTEC classes engaged in during this cycle and typical IL teaching activities. For example, students in Norway carried out research into religious buildings and then constructed scale models, while students in Turkey investigated the lifecycle of a butterfly and produced a visual online story (described in greater detail in McNicol et al. 2013). Therefore, following the successful piloting among teachers from 19 European countries, it was decided to investigate the possibility of adapting this set of activities to support librarians in the delivery of IL.

3.1 Development of InFlow

InFlow was therefore designed to address the five features of 21st century learning found to be lacking in existing IL models, namely, support for design and creativity; the use of primary as well as secondary information sources; collaborative working; reflection; and flexibility in learning design. The first stage was the development of a draft model closely based on the Cycle 4 Learning Activities. This was based on the descriptions created within the iTEC project for each of the eight activities listed above. However, the design of the model also took account of feedback, gathered through the evaluation, about how teachers had interpreted, and adapted, the descriptions in practice. For example, based on the evaluation findings (McNicol and Lewin 2013), the descriptions were simplified, some of the design-based language was altered, and it was recognised that activities may be carried out with non-digital, as well as digital, tools. The draft model was shared with librarians via relevant mailing lists (JISC-INFOLITERACY and JISC-EDUC) and detailed feedback was received from twelve librarians. All but one of those responding were based in the UK and they were from a mixture of school, further and higher education libraries.

Much of the feedback was highly positive. For example, the model was described as, '*engaging for students*', '*more logical and relevant to the work that students are doing*' and '*much more active, communicative, integrated and applied than our usual approach*'. There were also some suggestions for improvements and as a result of the feedback received, a revised version of the model was created (McNicol 2014b). The changes include an emphasis on reflection about the resources used, as well as reflection on learning development, and the replacement of 'dream' with 'imagine' which was thought to be more immediately understandable. The fact that the model could be used for both small and large-scale projects and without necessarily having access to a well-developed ICT infrastructure was also made more explicit.

3.2 Overview of InFlow

InFlow consists of eight elements which can be used in any order to create an activity or project. It is not necessary to use every element in an activity, and equally, elements can appear more than once. A summary of each of the elements is presented in Table 1 (in alphabetical order).

Table 1: InFlow elements

Element	Description
Ask	Students communicate their prototypes and design ideas to teachers, other students, or people who could be future users of their outputs using models, drawings, mock-ups etc, and ask for comments and ideas for modification.
Collaborate	Students form teams based on interests and/or skill sets. They share collected media files and information within these teams, or with students from other classes or schools, and external collaborators where appropriate.
Explore	Students explore ideas for their output by collecting information from both secondary sources (books, websites, videos, blogs etc) and primary data (observation, interviews etc).
Imagine	Students discuss, question and familiarise themselves with the task set; identify possible challenges they will face; and consider ways they might overcome these. They then create (or refine) an activity plan.
Make	Student teams create their output. This might take a variety of formats, including a presentation, game, learning resource or artefact (digital or non-digital). Students may do this several times as they create an initial prototype, revised version(s) and their final output.
Map	Students organise initial (or revised) ideas and analyse their findings using mind-mapping techniques.
Reflect	Students share and record reflections on project progress, challenges and future steps. They also evaluate the tools and resources they have used to support their learning and build a shared collection of ways to tackle challenges.
Show	Students present their outputs, processes, learning achievements and possible future steps to other students, teachers, parents, local community or other groups.

In contrast to the linear arrangement of most existing models, InFlow consists of eight elements which can be undertaken in any order and an iterative approach is strongly encouraged as students may return to a given element several times. It is therefore evident that there is no single 'correct' order of activities; instead, librarians, teachers and students can design different options which are best suited to their environment, student needs, resources available and other factors. Furthermore, some librarians may wish to plan each stage before they embark on a project, while others may prefer to adopt a more flexible approach, deciding on successive elements as the project progresses. In either case, it is possible to involve students, and other stakeholders such as subject teachers and ICT co-ordinators, in designing the project.

Unlike most IL models, InFlow takes as its starting point a series of practical activities which have already been tested with, and well-received by, large numbers of teachers. This is an important advantage given the challenge librarians often face when trying to engage teachers in IL. For example, Williams and Wavell (2006) found that, although the teachers in their research usually responded positively to the IL frameworks shared with them, very few expressed any intention to use them in practice. Teachers struggled to see IL as a way of teaching which could be integrated into their subjects. In the case of InFlow, however, the model is grounded in practice and numerous examples already exist demonstrating the ways in which teachers have designed and implemented the types of activities supported by the model, and of the positive results they report in doing so (McNicol and Lewin 2013). The language and terminology used, as well as the simple structure of InFlow, can be readily understood by both teachers and students, and does not seem unfamiliar or inaccessible to those outside the library profession. The model's flexibility means it can be used for shorter activities as well as long-term projects without drastic timetable restructuring or access to substantial resources, although it accommodates innovative methods and technologies if these are available. Rather than tailoring the model for identified sets of learners, as in the case of the SCONUL lenses for example, the aim was to produce an open model which can be applied across different sectors and user groups. It is left to the librarian to decide precisely if, and how, they wish to adapt the model to meet the specific needs of their learners.

While InFlow can be used to produce traditional outputs such as essays or presentations, it is equally applicable to making more creative outputs such as games, videos and artefacts (digital or non-digital). An essential element of design is the need for prototyping, soliciting feedback and revising designs, often several times. In InFlow, therefore, the production of an output is not necessarily seen as the culmination of the project, but can also be an intermediary stage of the process.

In contrast to most IL models which focus, almost exclusively, on the location, evaluation and use of secondary sources, InFlow encourages students to engage with primary information sources in a more direct and active way, by interviewing people; asking potential users of their outputs for feedback; and by observing aspects of their environment for example, as well as through the use of sources such as books, journals and internet resources.

Reflection is another important element of InFlow, but it is acknowledged to be an area where students can struggle. The model, therefore, offers suggestions on ways in which reflection can be integrated more effectively into Learning Activities, for example through the use of learner response systems, group poetry or video diaries.

Finally, as one of the eight elements of InFlow, collaboration is a key component of the model. It is explicitly designed to support social constructivist pedagogies and group projects and to help develop students' team-working skills. The importance of engagement with peers is emphasised, but this need not necessarily mean working with other students throughout the project; some tasks may be completed as individuals and at other points, students may work with external collaborators from outside their institution.

4. Early feedback on InFlow

Two workshops were held during 2014 for librarians from UK schools and further and higher education institutions. During these sessions, a total of thirty librarians were introduced to the InFlow model and offered an opportunity to use it to design a practical learning activity or project. Participants from both groups commented on the simplicity and flexibility of the model and the freedom it gave them to develop individualised activities. They saw this as one of the most appealing features and an advantage which InFlow has over existing models. They also felt that the process was potentially empowering for students as it was straightforward enough for them to use independently to plan their own projects and research activities. Several participants have

already started to use the model in their libraries. One school librarian has focused on its use in creative activities including an animation club and a concertina book about Japanese culture, which was designed collaboratively by a geography class. Another school librarian has created a set of InFlow 'prompt cards' for her students to use when engaged in research activities. Feedback gathered from these workshops has been extremely useful to discover ways to develop the model further. Planned developments include designing an evaluation framework which is simple enough for students themselves to use, as well as being a tool for librarians. There are also plans to provide further resources to support the 'reflect' element which is seen as one of the most challenging by a number of librarians.

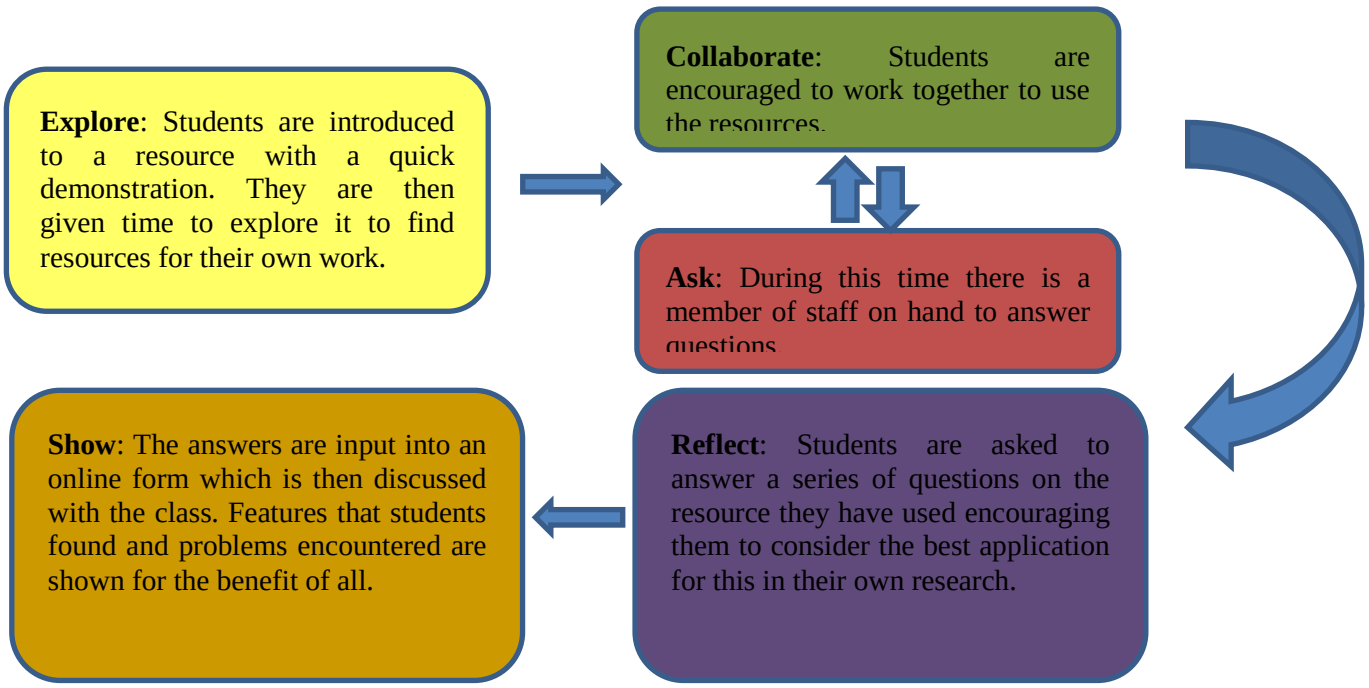
5. A case study of InFlow in practice

Since its development, InFlow has been piloted on a small scale in a number of libraries. It has been used both to create entirely new activities and also to enhance or improve current programmes. The following case study describes its implementation as part of Manchester Metropolitan University (MMU) Library Services' information skills sessions.

The Library Services team was in the process of reviewing their programme for final year undergraduate students and decided to redesign sessions using InFlow to give a more coherent structure to their approach. When this session has been delivered in the past, library staff demonstrated a number of resources, such as the library catalogue and online databases, and allowed students the opportunity to use them to research their current assignment. When reviewing the sessions in the light of the InFlow elements, staff felt that what was lacking was the opportunity for students to think critically about the resources themselves and how they might be best used to support their studies. They believed that the sessions could be improved by providing more opportunities for students to reflect on the different types of resources available to them, and also by allowing for greater collaboration within the class. They therefore redesigned the 'Exploring and evaluating web resources' session as shown in Figure 1.

Figure 1: Overview of exploring and evaluating web resources session

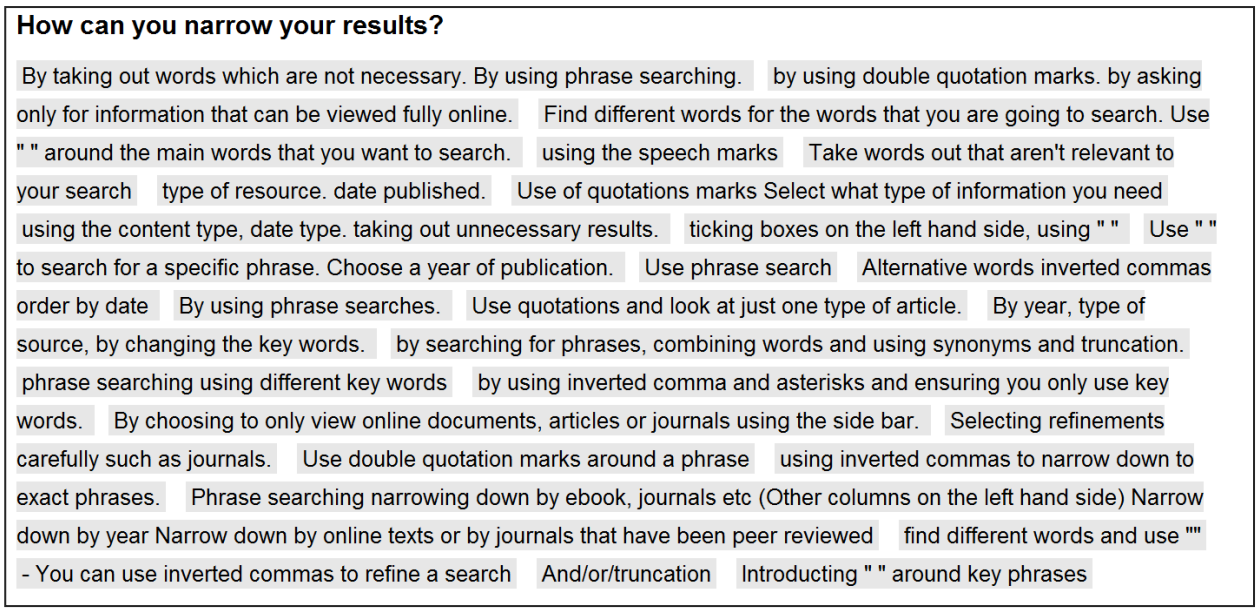
Task: Students use, evaluate and consider the application of web resources.



This revised session included a number of new features not present in the previous programme. Firstly, the 'collaborate' element was introduced to encourage students to work together, support

each other in using the resources, and discuss the questions posed. Secondly, the 'ask' element made it clear that students were encouraged to ask members of staff for help, as well as their peers. Thirdly, the 'reflect' element, which was acknowledged to be lacking in previous sessions, was introduced as a defined activity. After having an opportunity to explore each resource, students were asked a series of questions about it. Students' feedback was gathered using Google Forms and students were asked to comment on: strengths and weaknesses of the resource; ways to narrow their results; the best applications for the resource in their research; and any barriers encountered. Figure 2 shows an example of the feedback received. Using Google Forms allowed the librarians to introduce the 'show' element into the session. They collated feedback from the forms instantly and were able to use this with the class. The librarians also emailed the feedback to the students' tutors, creating a permanent record of their reflection-in-action (Schön 1987) which students were able to refer back to after the class to support their future investigations. This meant that, although students were primarily using traditional secondary information sources, they also produced their own collective resource bank of information about these resources.

Figure 2: Example of reflections collected using Google Forms



After evaluating the pilot session, the Library Services team made some changes to the structure of the activity. Initially, the 'reflect', 'collaborate' and 'ask' elements were run concurrently, but staff observed that this had resulted in the 'reflect' aspect being neglected by students who preferred to focus on the more practical, 'hands on' aspects. This problem was clear from the minimal level of feedback received in the Google Forms, meaning there was little to 'show' and share with the group. Experiencing difficulties in ensuring reflection as an integral part of learning is not uncommon and echoes the problems experienced by many teachers in iTEC (McNicol et al. 2014). In this instance, the library staff decided to respond to the problem by making a clear break to differentiate the different stages of the task; thus, students were first given the chance to 'ask' and 'collaborate' before then moving on to the 'reflect' stage. This approach was found to be much more successful, with the students experimenting in a way that suited them, for example, gaining input from peers; questioning the tutors; and exploring on their own before moving on to the next part of the activity – the reflection. Creating this clear distinction resulted in more in-depth feedback and reflection on the questions asked and this, in turn, elicited further discussion from the group. The quality of students' reflections varied quite widely. Although some put very limited thought or effort into their responses, many engaged more thoroughly with the activity. They had clearly thought much more critically about the strengths, weaknesses, barriers and so forth of each resource, for example:

> *[Library Search (Summon) is] brilliant for finding a range of media I wouldn't usually be able to find through just using google. It is easy to use and the search function in the books to find specific information is very helpful and makes research easier.*

Overall, it is difficult to draw conclusions about the impact of this intervention on students from the evaluation data available. Comparing the results for this group with the previous cohort, there are no significant differences in the results; in both years, at least 95% of students felt that the amount of information provided and level of interactivity were 'about right' and agreed that they felt 'more confident about finding information'. However, a comment in open-ended questions demonstrated that at least some of the students appreciated what the librarians were aiming to achieve in the redesigned session:

> *We were shown different sites in which to research our dissertations which we had not come across before. Being able to evaluate each one made it clear which were useful/ less useful and why.*

Library staff were able to offer more detailed feedback however. Reflecting on their experiences, the MMU Library Services team felt they would definitely use this activity again in future IL sessions. They outlined some of the benefits they believe it offers as follows:

> *We felt it offered a more holistic view to the use of library resources. An important part of IL is understanding what resource to use when and although this is something we knew students struggled with it's an area we hadn't really touched upon in great depth in our teaching. This activity was a successful way to get the students to think about the practical application of each of resource to their own research.*

Furthermore, they felt it was an activity which could be adapted for use in seminars or lecture theatres where hands-on experience is not possible, by asking students to use their own mobile devices to communicate initial thoughts on how they could use resources.

5. Conclusions

Internationally, it is becoming widely accepted that IL standards and models need to be radically revised to meet the needs of today's students as the updating of the ACRL's Standards (ACRL 2014) and the work of Spain's Information Literacy Working Group [Grupo de Trabajo de Alfabetización Informacional] (Ministerio de Educación, Cultura y Deporte, no date) demonstrate. Personalisation and student choice are having an ever more significant impact on teaching and learning at all levels, often facilitated by new technologies, and their significance for IL delivery cannot be ignored. A one-size-fits-all approach is no longer adequate; IL needs to become more adaptable and learner-focussed. Furthermore, as the iTEC project has demonstrated, IL practices from the twentieth century need to change to reflect not merely innovations in technology, but also developments in pedagogy and the life and workplace skills which students need in today's world. Crucial to these changes are the growing emphases on creative production and collaboration, not merely information consumption and individual attainment. InFlow is intended to be a model which can help IL professionals respond to these issues. It is acknowledged that, as yet, the model has been subject to only limited testing and further trials are needed, including evaluation specifically designed to assess the central features of the model outlined above. Implementation and evaluation outside the UK are also needed; French and Spanish translations have been produced and begun to be shared amongst librarians. There is, therefore, much work to be done to fully investigate the possibilities of this model, but early feedback is promising and suggests InFlow may have the potential to promote flexible approaches to IL which support the development of skills such as creativity, collaboration, reflection and critical thinking.

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Resources:

Cycle 4 learning activities: http://prezi.com/o9zihm_cjddd/literacy/

Innovative technologies for engaging classrooms (iTEC) project: http://itec.eun.org

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