An Exploration of the effects of an inquiry-based learning technology workshop on Post Leaving Certificate students ability to evaluate the credibility of online information sources.

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Declaration

I declare that the work described in this Dissertation is, except where otherwise stated, entirely my own and has not been submitted as an exercise for a degree at this or any other university.

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Acknowledgement

Abstract

The ability to effectively evaluate the credibility of online sources is part of a suite of information literacy competencies that are necessary to enable learners to fully and effectively use online and digital media.

A review of the literature suggests that the key abilities required to effectively assess credibility are those encompassed in the skills and aptitudes at the cognitive domain levels of Understanding, Applying and Evaluating in Blooms taxonomy.

The affordances of the internet which allows for rapid recycling of content, means that the ability to compare, critique, justify, and make judgements about online information sources are important skills in contemporary learning. These abilities are part of both the connectivist and constructivist narratives that see the sources of knowledge and the ability to locate these as being a critical part of the creation of multiple meanings and points of view.

This research sought to explore how a small group of Post Leaving Certificate students approach the assessment of the credibility of online sources and what are the effects on this approach of an Internet oriented, inquiry based learning workshop.

Following the intervention, participants reported improvements in their knowledge and understanding of the skills required for evaluating credibility as well as the function and operation of search engines. The learning intervention was less successful in effecting practical changes in the behaviour of respondents in relation to establishing credibility of online sources.

This study is limited in scope so generalisations are not possible, however given the scarcity of research on information literacy competencies among students in further education and training in Ireland this study may be viewed as a prelude to more substantial work in this area.

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1 Introduction

The universal nature of the internet and the increasing reliance on it as a vehicle for learning, service delivery and as a source of information about the world means that the ability to navigate it is now as much of a life skill as the ability to read or write. (OECD/ Statistics Canada, 2000) Navigating the multiplicity of information streams online, requires an individual to have mastered an assortment of skills or information literacies.

Working as an information officer in a guidance service for further education students within Laois & Offaly Education & Training Board (formerly Co. Laois VEC) for over fourteen years gave ample examples of issues that Post Leaving Certificate students have in accessing and evaluating online information. The role of a guidance information officer is similar in some respects to that of and academic librarian in that it is principally to respond to information queries from existing and potential students. Answering queries typically involves the location, interpretation and application of information from multiple sources that would facilitate and support learners entering, and remaining, in further education.

Initial information research is done through online sources, all of which are publicly accessible. However, in working with learners it became apparent that students and potential students were struggling with several factors in respect of accessing and using this 'accessible' data. Some of the issues were:

Knowledge of sources: Research by Eshet-Alkali & Amichai- Hamburger (2004) has shown that students and younger adults are not discriminating about where they find particular information. Learners in this cohort are also more likely favour any source that offered information that supports their needs or point of view and have a tendency not to examine the sources of that information (Wineburg, McGrew, Breakstone & Ortega, 2016).

Information Overload: The volume of information online was cited as a factor in restricting learner's use of online sources (Beneselin & Ragsdell 2015). Students also reported finding conflicting answers to the same query when they tried to verify information. This factor was aggravated by poor knowledge of sources as described above.

Complexity of online information: This issue was of especial significance in relation to information on funding and supports for education where different combinations of eligibility criteria, based on a variety of social, economic and geographic factors can affect the payments one can receive. This necessitates a highly complex, branching information tree that may require data from several sources and proves problematic for learners whose information and ICT literacy skills are not well developed. (Eshet-Alkalai, 2004). This issue is further complicated by bias in sources which can emphasise a particular aspect and minimise others that may require equal consideration.

These issues were especially acute with younger adults, specifically, (in the context of educational cohorts), Post Leaving Certificate students. A Post Leaving Certificate (PLC) course is a further educational qualification, usually in a domain specific area, offered on a full-time basis over one academic year. Nationally, the majority of students in this group are in their late teens or early

twenties and have completed the Leaving Certificate exam within the previous three years although there are local exceptions to this depending on the specific course.

An examination of information literacy development in its entirety is beyond the scope of this project so consequently it makes sense to explore a specific competency. A key aspect of information literacy is the ability to effectively assess information for credibility and furthermore, that a consideration of its source is fundamental to establishing its credibility. As has been outlined these are aspects of information literacy that students struggle with therefore the objective of this research is to explore if participation in an inquiry based learning, technology workshop can affect PLC students ability to evaluate the credibility of online sources of information.

1.1 Structure of this dissertation

Chapter 1: The Literature Review locates credibility evaluation in the field of information literacy and offers a definition of credibility in the context of this research study. It looks at some of the approaches students take to assessing the credibility of sources as well as identifying the skills needed to do this effectively. Finally, the issue of evaluating the credibility of sources is examined through the theoretical lenses of constructivism and connectivism as well as exploring some of the features of inquiry based learning as a suitable pedagogy for this form of Information Literacy education.

Chapter 2: This gives an overview of the learning intervention design drawing on influences from the literature and providing a rationale for the choice of approach and technology used in the workshop.

Chapter 3: This chapter deals with the research methodology employed in this study. The overarching epistemology driving this research is constructivist with an interpretivist, (phenomenological) lens. The methodology used, draws from action research in the context of an exploratory case study and a mixed methods approach is taken in terms of data gathering.

Chapter 4: Here the data is analysed through phenomenological interpretivism and the key findings and inferences are outlined. The researcher also identifies the issues that affected the accuracy, reliability and validity of the research.

Chapter 5: In the final chapter the researcher presents her conclusions, recommendations and potential future directions for the work.

2 Literature Review

The internet is where many Post Leaving Certificate (PLC) students start their research for learning information. There is no doubt that it is a rich resource but it is not without its drawbacks. The quantities of data that is now accessible, as well as the ever-changing nature of the online information eco-system means that specific skills to navigate online environments need to be developed and nurtured in learners. It has become almost impossible to avoid online worlds completely, especially in relation to learning, since the internet has become part of the mechanism where life, social, cultural, and civil is played out, at least in part (UNESCO 2011). Therefore, becoming familiar with its conventions, modes and systems has become an important aspect of learning.

Of equal importance to learners is having the abilities to utilise the information available through online environments. These abilities, collectively known under the umbrella term, 'information literacy' are necessary so that learners are able to navigate information-rich, online environments (Eshet-Alkalai, 2004). One of the most widely used definitions of information literacy comes from the American Library Association. The ALA definition, (1989) states:

> "*To be information literate an individual must recognise what information is needed and have the ability to locate, evaluate and use effectively the information needed. Ultimately information literate people are those who have learned how to learn. They know how to learn because they know how information is organised, how to find information, and how to use information.*"

Information literacy has also been described as the set of cognitive skills that are used by an individual to evaluate information in an effective manner, filtering

out data that is inaccurate, unnecessary, biased or irrelevant (Eskhet-Alkalai, 2004). So, the skills involved in effectively evaluating information are prioritised in this description. Martin & Madigan, (2005) offers a similar perspective on the place of information literacy within the broader sweep of digital literacy and further maintains that this skill of evaluation of information is a becoming a prerequisite for learning in many cases given the ubiquitous nature of technology in society and *"the shrinking half-life of information",* (Siemens 2005) PLC students can find it difficult to employ information literacy skills generally but especially in relation to effectively critiquing and evaluating the online sources of information that they use to inform their project and assignment work (McCoy, et al., 2014). The internet is an excellent resource for learning and there has been a significant body of research on young adults ability to critically evaluate information that they find online (Eastin, Yang & Nathanson, 2006, Hargittai, Fullerton, Menchen-Trevino & Thomas, 2010, Head & Eisenberg, 2010 Kuiper, Volman & Terwel, 2005,). The outcome of this research is consistent in one area, that young adults have difficulty employing information literacy skills to successfully source credible information and to make effective judgements about the believability and trustworthiness of sources in the absence of traditional cues and indicators of credibility.

Anecdotally, tutors and teachers report that students in the PLC sector tend to be relatively uncritical, passive consumers of information, an opinion backed by recent research by the Stanford History Education Group on middle, high school and college students in the United States. This extensive piece of work painted a disheartening picture of the abilities of students in this group to effectively assess online information for credibility. This extensive research examined the

ability of students to evaluate online information and distinguish credible from unreliable sources. The results were not encouraging;

"*Overall young people's ability to reason about the information on the Internet can be summed up in one word: bleak*" (Wineburg et al., 2016, p. 4).

However, it is not just the lack of skill in critiquing sources that is an issue, an equally worrying finding of the research was the lack of awareness among students in the studied age brackets as to *why* they should critique sources and evaluate them for credibility. From observation, it does appear that some students, while acknowledging that there is much inaccurate data online are still comfortable using information from highly questionable sources in their work. Part of this can be attributed to a lack of time (Head & Eisenberg, 2010) as well as a lack of understanding as to how to perform these evaluations (Kim & Sin, 2011). Furthermore, many students in this cohort have a lack of understanding how aspects of the internet operate and the bearing that this may have on credibility.

In this context, it is worth mentioning search engines as these are the vehicles through which many students search for information. Recent information from Connector.ie showed that 60% of Irish adults aged from 16 to 64 rely on search engines as the main online research channel, (Connector.ie, 2016). However previous research indicated that students may have little or limited understanding of how these operate and the potential impacts on the information they receive. (Leibiger, 2011).

This finding supported those by Fallows (2008), which showed that students were often unclear as to how search engine algorithms operate and that almost three quarters of subjects, aged under thirty in that research study, attributed a quality assurance role to search engines, believing that such tools provided fair and unbiased information.

However, before it is possible to examine how PLC students evaluate credibility it is important to establish a definition.

2.1   Credibility: A Definition.

The Cambridge online dictionary definition describes credibility as something that is able to be believed or trusted, and this linking of credibility with believability is reinforced in the research (Hargittai, et al, 2010). However, credibility is not considered to be necessarily inherent to a source but rather is a judgement made by individuals through consideration of subjective and objective factors including believability, accuracy, reliability and trustworthiness (Johnson & Kaye, 2014, Metzger & Flanagin 2013).

This definition highlights that credibility is a concept that may need to be evaluated in the context of its subject and is not necessarily inherent in the subject itself. Credibility of information may also be considered in light of the social - constructivist nature of online information creation which features the recycling and repurposing of data. Multiple users, individuals and more focused groups such as communities of practice, amend and add to what is known and this collaborative approach to information creation requires that a consideration of the social origins of information, the contexts of their creation now need to form part of a consideration of its credibility (Farkas, 2012). Indeed Sundar

(2008) posits that source information is crucial to a credibility assessment as it is one of the most significant elements upon which credibility judgments rest. Therefore, a consideration of sources and the ability to critically evaluate them is a fundamental aspect of information literacy. Making assessments as to credibility of sources is not simply a weighing of the content but should also incorporate a consideration of where the information originated and possibly how it evolved. However, this begs the question, just what are the abilities that PLC students require to evaluate the credibility of online information sources? This question is explored in the following section.

2.2 Abilities required to assess credibility.

Kim & Sin (2011) examined students' perceptions of different information sources in relation to their information selection behaviour. This study revealed discrepancies between what the students should have done and what they did do when selecting information from online sources due to the fact that students did not know what constituted good information sources and had difficulty in evaluating the quality of information from these sources (Kim & Sin, 2011). This could possibly be attributed to the fact that students are expected to utilise the internet in their research yet integrated and focused learning opportunities in how to do this effectively are not universally available, (Head & Eisenberg, 2010). Especially in the context of PLC students where a national information literacy policy is non-existent and there is an acknowledged skill deficit among teachers and tutors in the use of ICT in learning (SOLAS, 2016).

What is also clear from the research done in this field, is that decisions as to the credibility of online information are often subjective, context sensitive and incorporate an evaluation of both the content and the visual appeal of the

information (Fogg, Soohoo, Danielson, Marable, Stanford, & Trauber 2003).

Some credibility judgements may be based on a surface evaluation of the

stylistic and interface elements of the site and if these meet personal

expectations for credibility, users then assess the content for believability

(Wathen & Burkell, 2002). Similarly, Fritch and Cromwell (2001) proposed an

expanded description of the evaluative cyclical stages a user moves through

when making credibility judgements. This model is based on cognitive authority

and suggests a filtering framework based on four types of information: format

and presentation, author identity and expertise, institution and affiliation. Once

categorised according to these areas, a user then evaluates the content of each

and it's the combined analysis of these considerations that lead a user to decide

if the source is credible. Both of these models fit within the Prominence-

Interpretation theory of Fogg (2003) which linked the assessment of credibility

with both stylistic and content based judgments of the users. Fogg suggests

that not all elements of a website can be noticed so not all elements will be

considered in a credibility evaluation task. As users spend limited time on a site

they tend to develop an instinctive short hand for assessing (in their individual

estimation) the relative credibility of a website;

> *"… one could argue that people typically process web information in*
>
> *superficial ways, that using peripheral clues is the rule of web, not the*
>
> *exception'* (Fogg et al, 2003 p.15).

Therefore, how a user makes credibility assessments is fluid, with different

criteria for credibility emphasised in the assessment depending on a variety of

influences including the level of need for the information, the level of cognitive

effort the users wishes to expend, the timeframe they are operating in as well as the motivation for the search (Metzger, 2007).

Such research points to the fact that users typically may not use their full cognitive processes when evaluating websites for credibility. Other studies found significant evidence that young adults can employ a variety of informal strategies or heuristics in order to decide on the credibility of sources (Hargittai, et al., 2010, Pierce, Redslawk & Cohen, 2016). These strategies have different levels of success depending on the context in which they are used and there are a number of key heuristics identified as influencing a perception of believability in online sources. These include a reliance on the reputation or the perception of reliability of a particular brand name or known individual. Users also rely on recommendations or endorsements of particular sites or information by someone or some organisation that they trust. They are also more likely to trust a source if the information confirms something they already believe. On the other hand, users are less likely to trust sites perceived as having ulterior motives or those perceived as attempting to manipulate the users point of view. (Hilligoss & Rieh, 2008, Metzger & Flanagin, 2013, Sundar, 2008)

Such heuristics provide a useful explanation and rationale with a sufficiently good degree of success in assessing credibility (Metzger, 2007). However, they are not infallible and can leave the user exposed to making significant errors in judgement if not tempered by more organised assessments. 'Common-sense' judgements of credibility may be open to failure as they are so closely aligned with individuals own values and attitudes. If these are inflexible and not open to change or modification based on an assessment of other points of view then the judgments made about the credibility of a source may be flawed. There is a

need, not just for a strategy for examining indicators of credibility, but also an awareness that determining a sources credibility involves making a decision and as such may be incorrect with attendant consequences (Winter, Metzger & Flanagin, 2016).

This points to a need for a more objective framework through which credibility assessments can be made. Research into evaluations of credibility in traditional media resulted in the collation of a set of criteria that could be used in assessing for credibility in online information also. These are outlined in Metzger (2007) and are summarised in the table below:

Table 2-1
Credibility assessment criteria, (Metzger, 2007)

Criteria	Description as it relates to online sources
Accuracy	The degree to which a source is error free, provides information that is reliable and can be verified offline.
Authority	This criterion can be evaluated if the creator of the information is evident, if contact information for the author is available, if the credentials, qualifications and experience of the author is provided and / or if the site has been recommended by a trusted source.
Objectivity	Involves identifying: • the site's purpose or agenda • if the information is fact or opinion, • commercial or informational etc. It requires the user to consider the nature of the links between information sources, and to be aware of questions such as conflict of interest on the part of the authors.
Currency	Is the content up-to-date?
Coverage	This refers to the depth and breadth of information on the site. Is the information comprehensive? Are site users getting the 'whole story'?

These criteria have led to the development of checklist approaches to determining credibility based on an examination of features of the site for the

criteria above. This model has proven to be a popular approach within the education sector.

So, if Metzger provides an objective lens through which the credibility of sources can be assessed, what then are the abilities required to perform such assessments?

Research, (Wenger, 2014, Head & Eisenberg, 2010), indicates that in order to use the criteria to best effect, a learner needs to employ both lower, and higher-order thinking skills as well as use a critically analytical approach (Paul & Binker, 1990). There needs to be an understanding of the meaning of the criteria in the context of online credibility evaluation and the knowledge of when and how to apply a framework of evaluation based on these. Furthermore, the learner requires the skills to evaluate informational content and its source both as a unit and separately.

In terms of a structure that can guide the development of specific abilities it is worthwhile considering the revised Blooms taxonomy as described by Krathwohl, (2002). This taxonomy with its delineation of both lower and higher order thinking skills outlines a structure that can guide the identification of the abilities required to make effective credibility assessments as well as guide the creation of activities aimed at developing these. From a review of the revised taxonomy, the abilities that may be most useful in relation to making credibility assessments are;

- Understanding, defined as "*Determining the meaning of instructional messages, including oral, written, and graphic communication.*"

- Applying, defined as *"Carrying out or using a procedure in a given situation."*

- Evaluating, defined as "*Making judgements based on criteria and standards."*

(Krathwohl, 2002, p.215)

These skills encompass the range of abilities required to make appropriate credibility assessments and effectively, this answers the second research question regarding the abilities required to evaluate the credibility of online sources of information

Consequently, activities within the workshop were oriented around the development of abilities in these areas within Blooms revised taxonomy. For example, part of the workshop involved participants replying to multiple choice questions which aimed to encourage the group to think about how they do what they do when selecting online information. The multiple-choice questions used in this activity were based on a deconstruction of the reasoning processes involved in making judgements regarding online credibility (Pugh, De Champlain, Gierl, Lai & Touchie, 2016), and how these translate to choices students make in relation to selecting information.

2.3 Theoretical basis informing this research.

Connectivism and Constructivism are the learning theory perspectives underpinning this study, and have the greatest influence on the design of the learning intervention.

2.3.1 Connectivism

Connectivism, as described by Siemens (2005), highlights the effects that contemporary technology has on learning, emphasising the shift away from traditional, formal learning environments, distinguished by teacher or instructor directed learning, to more nebulous environments where the ability of a learner to make decisions about the relevance, worthiness or credibility of data is central. The ability to find information has now become at least as important as mastery of the knowledge itself (Farkas, 2012), since 'know-how and know-what is being supplemented with know-where" (Siemens, 2005). Furthermore, it is not simply enough for a learner to be able to access data, they must be able to make pronouncement as to its relevance to their informational need. A consideration of relevance which needs must include a consideration of its credibility as a source.

As a learning theory connectivism outlines how the features of the internet which allows for the rapid production and dissemination of data means that the accuracy and relevance of such information may be subject to change more rapidly than that of information produced and distributed in the past. The dialogic nature of the internet, its ability to support and foster communities of practice and knowledge, means that the production of new knowledge can be quite rapid and part of this process can call into question the accuracy or credibility of some, or all, of the information that preceded it.

The implication of this for learners is that they need to be equipped with the skills to revisit and revise previous decisions regarding the level of credibility that they allocated to the information in question. This is a delicate operation, and relies of the ability of a learner to make effective decisions regarding what they choose to believe as being true as well as being aware of the potential

need to alter decisions in light of more accurate or current data. In such

circumstances the learner should be able to apply effective decision-making

skills, knowing what information to retain and what to exclude. Such delicacy

requires the ability to make effective and selective judgements requiring the

integrated use of lower and higher-order thinking principles.

2.3.2 Constructivism

Constructivism shares some similarities with the view of knowledge outlined

above. Constructivist epistemology posits that knowledge is created through

shared interactions with others and can be described "as a compilation of

human constructions" (Raskin, 2002). Jonassen, (1994) described the features

of effective constructivist learning environments as those which emphasise the

value in providing real-world settings for learning, they prioritise the

construction, rather than the reproduction, of knowledge and highlight the

importance of reflection, team-working and dialogue in learning. This last point

in particular is important in developing the skills of learners to assess credibility.

As has been outlined, deciding on credibility is often a judgement call requiring

a learner to make well-informed, rational and reasoned choices.

2.3.3 Inquiry Based Learning.

Constructivist learning approaches and environments can optimise the

opportunities for learners to develop the skills outlined above and are enhanced

by active learning pedagogies such as inquiry based learning which can cover

specific learning process. These include supporting learners in developing their

own questions and hypotheses and in developing independent learning skills to

enable them to seek answers, to analyse and interpret information and used it

to present accurate and effective explanations in a real-world context. (Bell, Urhahne, Schanze, & Ploetzner, 2010).

The University of Wisconsin Extension Service information leaflet on Inquiry based learning (chttp://ce.uwex.edu/wp-content/uploads/2015/06/Inquiry-basedlearning.pdf), describes four different levels within inquiry based learning:

Level 1 Confirmation Inquiry: The learning activity is scaffolded to reinforce recently taught concepts and to introduce the processes and procedures required for EBL at the higher levels.

Level 2 Structured Inquiry: The teacher supplies the question and an overview of the process. Students are expected to develop their own explanations and to formulate explanations for the question through evaluating the data that they collect.

Level 3 Guided Inquiry: At this level only the research topic is provided and the students themselves must design their own procedures for answering the question and then communicate their results appropriately.

Level 4 Open/True Inquiry: In this case students are responsible for developing their own research questions and explore these through their own research process. Again, they must communicate their results accordingly.

 These levels are hierarchical and provide a useful structure in designing activities to meet specific skill development objectives with more complex, higher order thinking skills required at the higher levels.

Since the objective of the learning intervention is to effect a positive change in the real-world application of certain information literacy skills, an inquiry based learning model may provide the necessary scope for a learning experience that

can be contained and focused yet allow for capacity building and skill development in a real-life context for learners.

This pedagogical approach is one that could be facilitated within a practical workshop. Despite the fact that much of the research on information literacy education emphasises that optimal outcomes occur where the education is embedded in the particular module or subject (Breen & Fallon, 2005, Carbery & Hegarty, 2011), more recent research by Connolly, Curran, Lynch & O'Shea (2013) has revealed a move away from this embedded model to more detached standalone formats for information literacy education. In this context, a once-off learning intervention may be considered a viable option in the development of the information literacy skills required to asses for credibility. This format also facilitates an exploratory approach to the learning and allows the researcher to act as the 'more able other' (Vygotsky, 1978), while creating a tier of learning activities, each building on the one before as per Bruner's spiral pedagogical process (Bruner, 1966).

2.4 Research questions.

Considering the concepts outlined in the preceding section leads to two main research questions that this study will attempt to address.

Firstly, how are PLC students approaching the issue of establishing credibility for online sources?

Secondly, what are the effects of an inquiry based learning intervention on the abilities of these students to evaluate credibility?

3 Design

The objective of the workshop was to equip students with a framework with which to assess the credibility of sources and to encourage them to develop the cognitive skills needed to effectively perform this assessment and to engage in more deliberate and objective decision making in deciding on the credibility, or otherwise, of online sources.

The ADDIE instructional design model was used to frame the design of the learning experience and its evaluation. The design of the workshop was guided by the ADDIE model; Analysis, Design, Development, Implementation, Analysis. The figure overleaf maps this process.

3.1 ADDIE: Analysis

The researcher approached the PLC College to seek access to a class group in February. This resulted in access being given for a single, once off session of four hours to the learner group on the PLC in Applied Social Studies. This group was selected as the college principal felt that this class would benefit most from being involved in the research project.

The researcher met with the main class teacher of the PLC group in late February to finalise the topics on which to base the workshop activities as well as clarify the academic level of this group. The class tutor clarified that:

- The group used the internet widely in researching project work.

- There is no specific educational focus on how to use the internet in learning being offered as part of the course.

Figure 3-1

DESIGN of the Learning Experience

ADDIE frames the Process of Design

Analysis

Narrowed the focus to a specific aspect of Information Literacy:

Credibility Evaluation.

Reviewed this topic and approach with teaching staff and incorporated feedback.

Design & Development

Delivery option: Enquiry based learning workshop

Designed initial activities based on consultation with the course tutor: Identified learning outcomes.

Devised activities using online sites. Tested activities with two PLC students.

Incorporated changes based on this feedback

Retested and approved.

Implementation

Introduction of topic & concepts to group

Invited students to participate in the research project and addressed questions

Learning Episode: Practical engagement with tools and criteria for evaluating credibility during the workshop

Evaluation

Presentation by the students on researcher assigned topics where the information was evaluated using the skills learned.

This took place at the end of the workshop

Progress of Project

| Nov 2016 | Dec 2016 | Feb 2017 | Feb 2017 | March 2017 | March 2017 | April 2017 |

Ethics Application. Assess potential risks to participants

Seek permission from LOETB and Portlaoise College principal.

Develop survey instruments, questions and approach for data gathering based on lit review and meeting with course tutor and group.

Final Ethics approval

Pre -Workshop Survey:

Qualitative & Quantitative data using paper surveys.

Data to clarify existing approaches to credibility evaluation.

Learning Attainment:

Method: group presentation & discussions

Qualitative data: Indicators of credibility used and students feedback.

(Kirkpatricks Learning)

Evaluation: Post Learning Experience

Method: Focus group & questionnaire with students.

One to One interview with teacher

Qualitative data collected through open response questions and interviews.

(Kirkpatricks Reaction, Learning, Behaviour, Results through self-report and teacher observations)

Research

Kirkpatrick frames the process of Evaluation

Kirkpatrick: Reaction, Learning, Behaviour, Results.

- The tutors own understanding of using the internet in researching was limited.

- The technical ability of the group was mixed but all had basic skills and could access online information.

(Information sheets and consent forms for all parties are attached as appendix A)

3.1.1   Learning Objectives:

Taking the above information into consideration and in consultation with the class teacher the following learning objectives were clarified:

On completion of the workshop students would:

- Be able to demonstrate the skills required to assess the credibility of online sources.

- Understand the importance of assessing the credibility of online information sources.

- Understand how Search Engines operate and the effect this can have on accessing credible online information sources.

3.2   ADDIE: Design & Development

The key texts informing the development of the workshop, its theoretical basis, learning activities and implementation are summarised in the following table.

Table 3-1

Design Rationale

Finding from the Literature	Influence of finding on the design	How this was implemented in practice
Siemens (2005) **Connectivism**	The 'half-life' of information is shrinking and 'know-how and know-what are being supplemented by know-where.'	Determined the focus on the evaluation of online information sources for credibility.

Farkas (2012)	Being able to re-evaluate sources as fields of knowledge evolve is an important skill.	
Bruner (1966) **Constructivism**	Students gain and construct understanding by drawing from, and building on, their past and present knowledge.	The learning intervention used online content and sites that are familiar to the students but presenting different aspects to them, e.g. How Search Engines work,
Metzger & Flanagin (2013)	'Common sense' judgments are often used as a short-cut to credibility assessments.	Presentation: Illustrations of why 'common sense' credibility assessments are not infallible.
Connolly et al (2013)	A workshop / once-off learning event can be effectively used in information literacy education.	The learning experience was designed as a single instance workshop.
Carbery & Hegarty (2011)	Active learning pedagogies such as Inquiry based learning are an effective method of teaching information literacy.	Workshop constructed around EBL activities. Students supported in putting theory into action.
University of Wisconsin Extension Service, (2015)	Hierarchy of levels within Inquiry based learning.	Allowed the researcher to 'pitch' the workshop at a particular level, in this case the Structured Inquiry level as described by the authors.
Hargittai, et al (2010)	Learning to evaluate the credibility of online sites is best done using real world examples sites and resources	Some of the activities involving exploring information took place on the internet. Students accessed their own choice of informational resources in the activities.
Metzger (2007)	An online source can be	A structure for evaluating

	assessed for credibility under the criteria of: • Authority, • Accuracy, • Objectivity, • Currency, • Purpose	online sources of information based on these criteria was developed and used as the framework for developing the presentation and the workshop activities.
Krathwohl (2002)	Blooms taxonomy. Levels essential for assessing the credibility of online sources are Understanding, Applying and Evaluation	Activities were devised to build the skills required in the levels of Understanding, Applying and Evaluation of Blooms taxonomy.
Wineburg et al (2016)	Appearance influences credibility assessments.	Focus on the comparison between different types of web pages and how it influences perceptions of credibility.
Fallows (2008)	Students ascribe an informational quality control role to search engines.	Activity on the implications of using different search engine.
Paul & Binker (1990)	Critical thinking skills are required to make effective credibility judgements. Socratic questioning is central to developing critical analysis skills.	Discussion spaces part of each activity. Socratic /spiralling questions developed around each activity.
Pugh et al (2016)	Multiple choice question item design based on deconstruction of tasks associated with establishing credibility.	Use of Plickers to access real-time student perspectives on the points under discussion using multiple choice questions. Questions drawn from choices students are faced with when selecting information

3.2.1 Technology and the design.

The main technology used in the workshop was the internet. The rationale for this is that this is the most significant technology that PLC students may be expected to use in their learning within the Further Education and Training sector. It makes sense therefore to improve their ability to engage with it. Plickers were selected as they allow for real time capture of information within the workshop. Plickers are a form of 'paper- clickers' consisting of individual unique QR codes that are assigned to each student. These enable students to anonymously select an answer to a multiple-choice question depending on the orientation of their QR code. The students hold up their card and the teacher scans the group using the Plickers app that picks up the orientation of each code and translates it into an answer for each student. This app is a useful relatively low-tech tool that can be integrated easily into classes who are inexperienced in the use of technology in the classroom.

 The objective of in using this app was to encourage the group to think about how they do what they do when selecting online information. Plickers functionality allows for anonymous responses which was an ethical consideration for this research study, they are very simple to use and this was important given that technology in learning has not been used in this class to any extent and so their experience with it limited. The multiple-choice questions used in the Plickers sessions were based on a deconstruction of the reasoning processes involved in making judgements regarding online credibility and how these translate to choices students make in relation to selecting information. The app's functionality permits effective, real-time formative assessment to take place. It provides the teacher with accurate information on the level of

understanding across the class which allows the teacher to respond to the needs of the students as reflected through the app. The reporting function allows analysis of student responses after the class and allows the teacher to map those areas where more time or a different questioning approach may be required as well as monitor the progress of individual students and identify specific areas where certain students may be struggling.

Plickers uses a variation of the traditional 'hands-up' answering practice, the difference here being that, unlike the system where putting a hand up was to get the opportunity to answer the question the hand-up with Plickers means that all students are actually answering the question. This prevents a small, more confident group from dominating Q & A sessions and means that the teacher can gain a more rounded, accurate view of how the class is learning.

Google sites was selected as this is the online workspace preferred by the PLC course tutors and so many of the students had a Google account. Also, the affordances of Google sites with its 'drag and drop' facility made it easier for the teacher to place content.

The role of technology in this learning event therefore was both object (use of the internet and Google sites as the focus of content) and facilitative (Plickers).

3.2.2 Evaluating credibility: Criteria and Skills

The primary learning outcome for this session was that students would be able to demonstrate the skills required to assess the credibility of online sources as well as understanding the necessity for doing so.

Metzger (2007) outlined the five criteria that can be evaluated by users of online information to make a judgement on the credibility of the information and its source. The design of the learning activities was based on the idea that the features of online sources of information relating to these criteria can be understood, applied and evaluated (Bloom's taxonomy) through activities focused on developing the specific skills required to perform actions at this level of the taxonomy.

A breakdown of such skills is given in the table below.

Table 3-2
Blooms categories and associated skills

Blooms Category	Definition	Activities
Understanding	Determining the meaning of instructional messages, including oral, written, and graphic communication.	Interpreting Classifying Summarising Inferring Comparing Explaining
Applying	Carrying out or using a procedure in a given situation.	Executing Implementing
Evaluating	Making judgements based on criteria and standards	Checking Critiquing

The learning activities were constructed to encourage and support students to use the different skills integral to the three areas above. For example, they were asked to compare sites under the headings of Authority, Accuracy etc.; They were asked to critique the objectivity of a site and to form an opinion or judgment as to the credibility or otherwise of these sources.

3.2.3 Learning activities: Trial run.
As part of developing the design an initial trial run of several activities took place in late January with two learners who were not part of the main workshop group.

This was to assess how the learners experienced the activities and to get their feedback. As a result, modifications were made to the design with some activities being amended and some removed. These initial testers recommended a more guided, step by step approach to the practical activities to clarify expectations. This recommendation was incorporated in the final design. They also recommended simplifying the multiple choice questions used with the Plickers technology.

3.3 ADDIE: Implementation

The workshop was delivered in early March to the volunteer participants from the PLC group studying the QQI level 5 Applied Social Studies programme. It consisted of a slide-based presentation on the key indicators of credibility of online sources as described by Metzger (2007). The presentation was interspersed with practical activities where students were supported in applying and exploring the theory covered in the presentation. (For a complete lesson plan see Appendix B).

Information on the activities and resources required for this workshop were hosted on a Google Site developed by the researcher to support this lesson and which is also available to other tutors who wished to run this workshop with their own groups:

https://sites.google.com/tcd.ie/onlinecredibility/home

The workshop followed the sequence:

1. Presentation of a point or feature

2. Discussion section with a Socratic questioning approach

3. Activity to explore the topic more fully and consolidate learning.

Each activity built on the one before and each activity was bookended by discussion spaces to address questions thrown up in the activity as per the figure below.

Figure 3-2
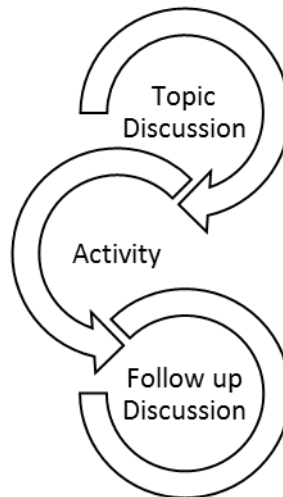
3.3.1 Workshop

The workshop was organised as a form of inquiry based learning. From a constructivist perspective, the multiple constructed realities of participants require interaction with them in a way that would unearth these. This means that the learning actions should be based on real world activities as their *'realities are wholes that cannot be understood in isolation from their contexts'* (Lincoln & Guba 1985 p. 39). This provides additional rationale for the use of a learning intervention that is embedded in the real-world context which is an approach that is well suited to inquiry based learning.

In terms of the hierarchy of levels in inquiry-based learning this workshop was pitched at the Structured Inquiry level. The researcher provided the questions for each activity and guidelines to the process but the outcomes were unknown. It was left to the students as to how they applied the steps to check for credibility.

3.3.2 Overview of Workshop activities.

Activity No.1: Credibility as a judgment call. In this activity, the researcher asked the class to answer several light-hearted questions about the researcher using their Plickers cards. This was to illustrate the point that sometimes decisions may be made about the truth of something based on arbitrary factors and/or very little information. This activity stimulated debate around the nature of trustworthiness and encouraged the class in thinking about the factors that influence their decisions about believability.

Activity No.2: Search Engines Exercise: Each group was allocated a different search engine and all groups were asked to search for the same topic. The differences in the results returned were discussed and proved to be a surprise to all the group as they were unaware of how search engines operate.
An overview of Google search operators was also provided. The discussion around this activity focused on the quality control assumptions made about Search Engines and the implications for credibility assessments if information is being filtered through mechanisms students aren't aware of.

Activity No. 3: Where we think we can find credible information? In this activity, the students used Plickers to answer several questions aimed at encouraging them to reflect on how, and where, they source information for learning assignments and to think about their priorities and their behaviour in selecting sources.

Activity No. 4: Climate Change; who's telling the truth? In this activity, the researcher allocated a set of websites, each site within the set presenting differing views on climate change, to each group. The group was asked to assess these under the five criteria and then report their findings to the whole class.   This activity gave the class an opportunity to start using the framework to evaluate the credibility of sites. This was an important step as not only were there cognitive and technical elements to master but students also had to work through the semantic issues that arose. For example, each group had to negotiate their own meanings for what constituted 'Accuracy' or 'Authority'. There was discussion among some of the groups about the different ways these were interpreted and how different standards of these concepts were applied depending on the context of the informational need; the less important the informational requirement was reflected in a lower standard of credibility assessment being applied to a source.
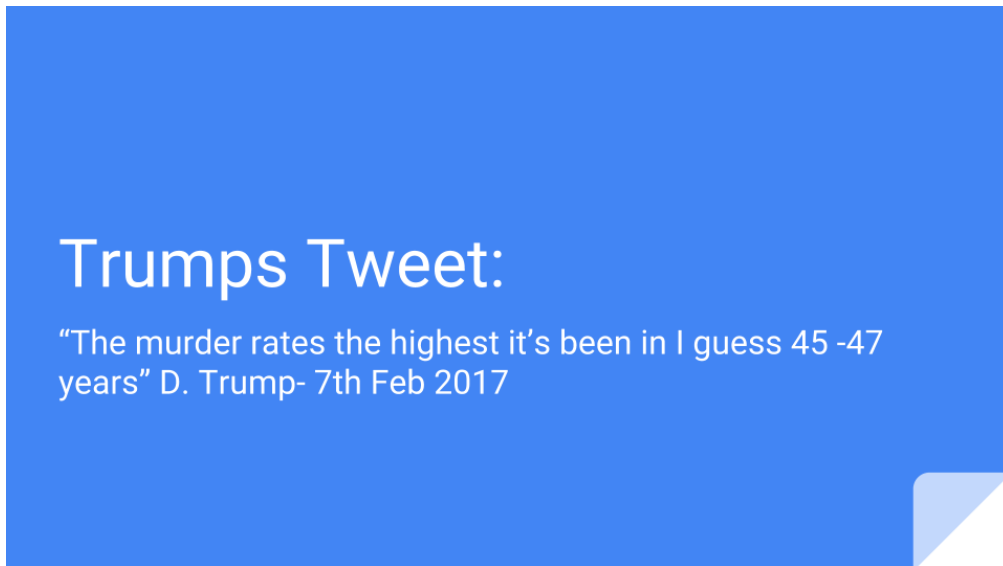
Activity No. 5: Testing Trumps Tweets: In this activity, each group was given a statement made by US President Donald Trump and had to source information from credible online sites to refute or substantiate it. Students were free to use whatever sources of information they wished as long as they could justify them under the five criteria. Each group had to give a brief presentation to the class on their findings and sources.

This activity allowed students to incorporate elements of what they learned regarding search engines as well as being encouraged to use higher order thinking skills to evaluate the information sources as outlined in Metzger, process the information and present the results.
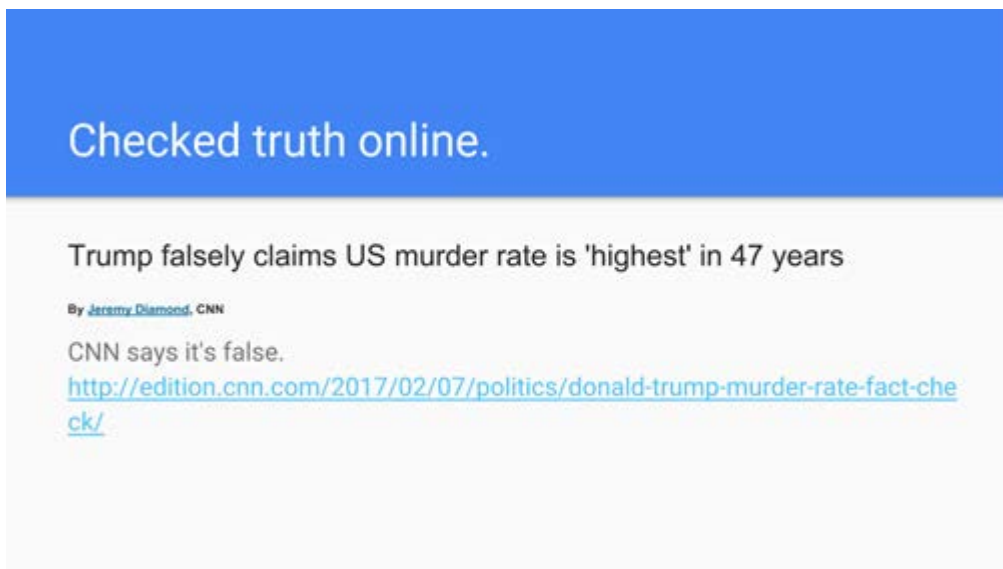
Below is an example of a presentation made by one of the groups as part of the final activity. Other samples included in Appendix C)

Testing Trumps Tweet: Group 3 Presentation.

Figure 3-3

Trumps Tweet:

"The murder rates the highest it's been in I guess 45 -47 years" D. Trump- 7th Feb 2017

Checked truth online.

Trump falsely claims US murder rate is 'highest' in 47 years

By Jeremy Diamond, CNN

CNN says it's false.
http://edition.cnn.com/2017/02/07/politics/donald-trump-murder-rate-fact-check/

Credible source referenced: FBI

Murders and negligent homicides per 100,000 people. Oklahoma City bombing and September 11 attacks are not included.

Source: FBI Uniform Crime Reports

Second point

We tweeted Trump to ask him but he didn't reply.

> | @
> Whats the craic. Just in college. Did you say that the murder rate is the highest it's been in 45-47 years?
> @t   @realDonaldTrump

We think it's not true.
CNN and FBI are credible sources

4 Research Methodology

4.1   Research Philosophy and Approach

Crotty (1998) identifies four hierarchical, conceptual levels, outlined below, which govern the decision-making processes in research and the nature of the relationships between each level.

1. Epistemology relates to the researcher's stance in relation to the nature of knowledge, their own views on what constitutes legitimate knowledge, for example Subjectivism, Constructivism, etc.

2. The epistemological position underpins the entire research process and influences the theoretical perspectives that inform the research process and design. E.g. Positivism, Interpretivism, etc.

3. The theoretical perspectives dictate the methodology and research approach.

4. Finally, the methodology influences the research methods used.

(Adapted from Crotty, 1998)

Figure 4-1
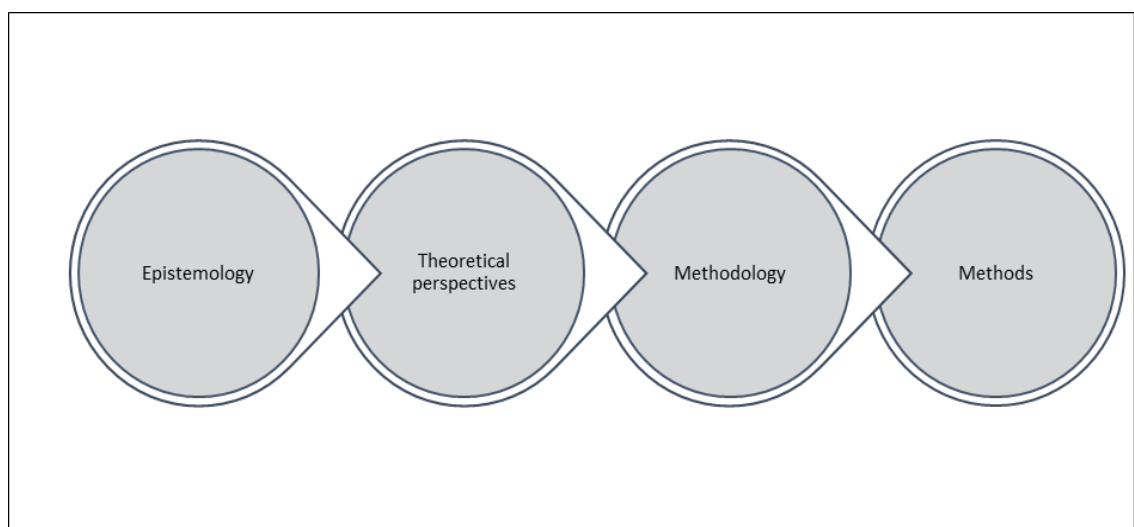
Crotty recognises that this structure omits ontology, however he conflates this

with epistemology, arguing that these are conceptually similar from a research

point of view; '*to talk about the construction of meaning is to talk of the*

construction of a meaningful reality' (Crotty, 1998, p. 10)

Using this model to frame the theoretical structures of this research meant that

there could be a logical sequence to such structures.

Below is an overview of the theoretical perspectives and approaches used in

this study, based on Crotty's outline

Figure 4-2
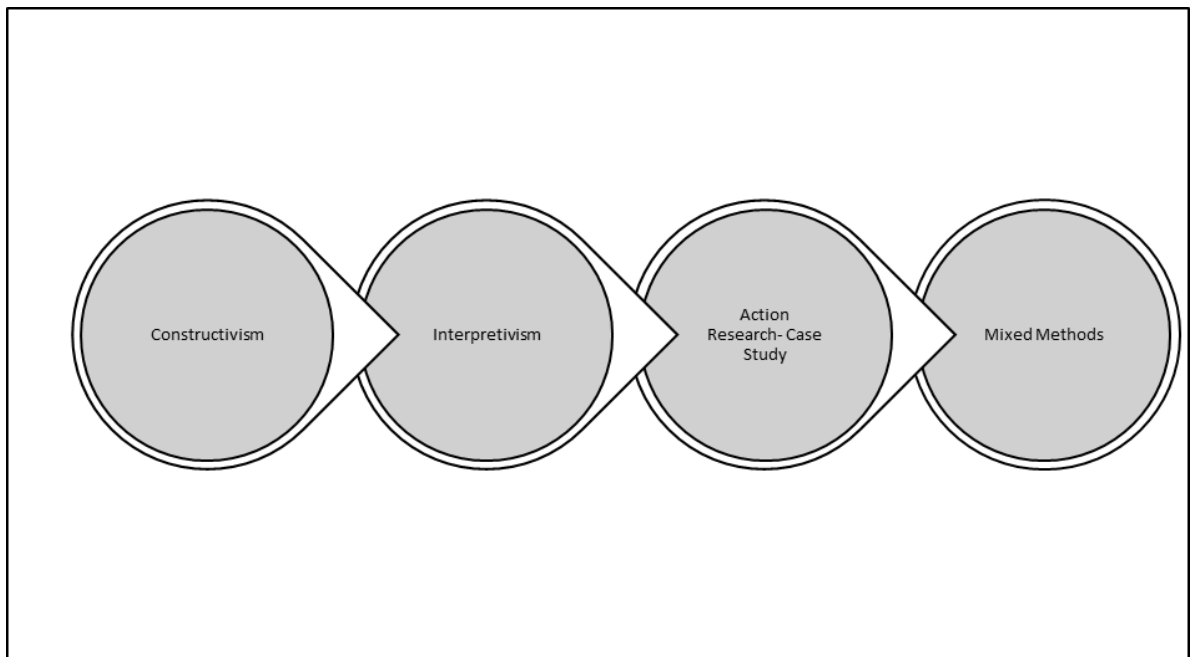
The theoretical aspects governing this study are described more fully in the

following sections.

4.2 Epistemological Perspective - Constructivism

The process outlined above provides a useful structure around which the

varying elements of a research study may be constructed. Clarification of the

dominant epistemological perspective is important for several reasons; not only is this perspective the primary factor influencing the methodological approach (Creswell, 2013); it also influences the type of data being gathered as well as how this data is analysed (Gray, 2004).

The research design of this study is similar to the learning design in that it is largely informed by the constructivist perspective. Constructivism is concerned with how knowledge is *'a compilation of human-made constructions'* (Raskin, 2002), as Vico said '*the norm of truth is to have made it'* (Marshall, 2011). This is especially relevant to an evaluation of the credibility or the truth, of an informational source and so the student's own assessment of what they gained from participation in the workshop is of especial importance.

4.3 Theoretical Perspective – Interpretivism

Interpretivism is a theoretical perspective that marries well with the constructivist view. Interpretivism posits that the world is socially constructed and subjective, that meaning arises from the process of social interaction and are fluid, open to revision and change through idiographic reflection on an experience. A number of interpretivist paradigms have been identified. Of specific interest to this study is the Phenomenological paradigm which emphasises a research focus on the construction of meaning using inductive approaches and multiple data gathering methods to develop different views of the research focus. Within phenomenological research, inductive methods of data gathering are considered more likely to uncover themes and factors that were not part of the original focus of the research but give a broader, more richly detailed context to the research outcomes (Gray, 2004). Establishing the

credibility or otherwise of an informational source can be a complex activity given the range of factors that can influence decisions of this type. Therefore, a research perspective that supports the creation of rich, nuanced data is preferable.

4.4 Methodology – Action Research- Case Study

This study draws on elements of both action research and the case study approach and attempts to integrate elements of these in a meaningful way. This study may be characterised as an exploratory case study drawing from the action research cannon in that the researcher is both actor and observer within the process. A breakdown of the relevant elements of each may be found in sections 4.4.1 and 4.4.2.

An experimental approach was considered for this study as a central objective of the workshop was to develop specific skills. There are elements of this research study that share features with experimental design, in that it attempts to gauge the extent that specific skills could be improved through a specific learning intervention directed towards a specific group. However, it differs from true experimental design in that there is no control group, that the expected relationships between variables are not predetermined and the emphasis on the qualitative nature of the gathered data as opposed to strictly quantitative. The researcher's preference was to employ a methodology that could generate 'thick descriptions' (Patton, 2015) in order to provide participants an opportunity to communicate the breadth of their experiences.

The study also draws, in a small way from the double loop learning theory of Argyris & Schön (1974) in the development and trialling of the learning activities

and the incorporation of feedback from this group into the final learning

intervention delivered to the research participant group.

4.4.1 Action research

Action research has been identified as an approach that *"focuses on research*

in action rather than research about action … [and is] a collaborative,

democratic partnership" (Coghlan & Brannick, 2014 p.6). The objective of this

research study was to explore the relationship between the learning intervention

and their skills and attitudes to evaluating online sources. This research process

included the central features of action research as described in Gray (2004),

namely that:

- *"Research subjects are themselves researchers or involved in a*
  democratic partnership with a researcher.
- *Research is seen as an agent of change*
- *Data are generated from the direct experiences of research participants."*

(Gray, 2004, p.374)

During the workshop the participants' questions and insights directed the

progress of the learning intervention. Different aspects of the topics were given

different emphasis depending on the comment and real-time feedback from the

group. The workshop had clear learning objectives aimed at improving the

abilities of the participants in how they evaluate online information for credibility.

Finally, the primary research objective is the gathering of qualitative data on the

participants' perceptions of the workshop and ancillary themes that may emerge

for them.

4.4.2 Case Study.

The case study has been defined as "*An empirical inquiry about a contemporary phenomenon (e.g., a "case"), set within its real-world context"* (Yin, 2009a, p. 18). The exploratory case study is one which seeks to both describe salient features of the research subject as well as generating hypotheses for further investigation (Baškarada, 2014).

This form of case study approach provides a structure for the organisation of relevant elements, including the planning and development of both the learning and the research design as well as the data gathering, analysis and reporting components. This research is a single/ holistic case study where the units of analysis are the individual participants.

4.5 Data Gathering Methods – Mixed Methods

The data gathering approach was a concurrent triangulation, mixed methods design (Creswell, 2013), with quantitative and qualitative data gathered and analysed together. The choice of this design was influenced by both the research objectives and the logistical issues that affected access to the participant group. Due to these access issues, which placed restrictions on the amount of time available to work with the group, the researcher had to make decisions in how to balance the amount of time available for delivering the learning intervention with the time dedicated to data gathering which was somewhat curtailed. This had an impact on the data that could be collected and accordingly affected the validity and reliability of the study. Further details on this are covered in Section 4.6.

4.5.1   Research Questions and Application of Mixed Methods

Table 4-3 attempts to explicitly describe where the research questions will be
answered in the varying stages of the research process.

Table 4-1
Research questions and data gathering & Analysis processes

Research Question	Data gathering Tool / Process	How it is Analysed
How are learners approaching the assessment of credibility of online?	Pre-Workshop Survey	Quantitative Analysis
What are the effects of a single instance EBL workshop on these abilities?	Post workshop focus group & teacher interview	Qualitative data analysis; Interpretative Phenomenological Analysis

It is also worth commenting that the Methods stage comprises both the
collection and the analysis of the data. This chapter covers the data collection
aspect and in-depth descriptions of the analysis may be found in Chapter 5. In
line with the constructivist and interpretivist perspective of this research the
analysis of the data was done through Interpretive Phenomenological Analysis
(Reid, Flowers & Larkin, 2005) as this approach facilitates the exploration of the
learner perspective which is central to this study.

The data gathering methods employed were:

- Quantitative survey administered immediately before the workshop

- Focus group session one week after the workshop

- Interview with course teacher ten days after the workshop.

These are described in more detail in the following sections.

4.5.2   Pre-workshop Survey with Participants

To assess if there was an improvement in students' skills at evaluating
credibility it was necessary to explore how, or if, they approach this before the
workshop. The survey was administered immediately prior to the workshop and
the survey instrument used was that developed by Flanagin & Metzger (2000)
to assess verification strategies for online information, (copy included in
Appendix D).

The survey aim was to answer the question "*How are learners approaching the
assessment of credibility of online sources of information?"* This question
contains three subject or topic areas that were explored in the survey. The table
below outlines these areas, the survey question that explored them and the type
of survey instrument used.

Table 4-2
Research Question 1. Topic areas

Topic	Survey Question number	Survey format
Importance of credibility to respondents.	Question number 1.	Likert Scale
Approaches to credibility assessment in their own	Question number 2a.	Open response.
Performance of credibility assessment actions.	Question number 2b.	Likert Scale

This survey gathered both quantitative and qualitative data and sought to gather
information on the participants' attitudes and approaches to establishing the
credibility of online informational sources. The decision to administer a
principally quantitative instrument at this point in a study that is largely
concerned with qualitative data, was done from the need to establish a starting
point in relation to assessing the development of the participant's skills in

making credibility assessments. As access to the group was limited and in order to maximise the class contact time for the workshop the survey instrument was chosen. In terms of survey details the survey population was PLC students, the sample was drawn from students in the Applied Social Studies Class in Portlaoise College and the sampling frame were students from this class who agreed to participate in the research. This group comprised 16 students, 5 male and 11 female ranging in age from 18 to 52 years.

4.5.3 Focus Group with workshop participants.

Metzger, Flanagin & Medders, (2010) advocated the use of focus groups as a method of gathering data on how credibility evaluations are made as they allow participants to reflect on personally relevant and real-world information as well as providing a more nuanced view of how participants both regard and evaluate credibility. Planning and implementation of the focus group was guided by the principles outlined in Krueger & Casey (2014).

During the workshop the researcher made observational notes of issues, events or aspects of the presentation that seemed to be especially significant to the group.

These notes then formed the basis for follow up questions for the focus group. The interview was semi structed in nature with a 'backbone' of core questions, however the participants could bring the discussions into areas that, were tangential to the workshop. This is in keeping with the idiographic nature of IPA. This was the primary method for gathering the research data. Seven of the participants who originally attended the workshop agreed to participate in this session. Of this group two were male and five female. The focus group

interview was held one week after the workshop. This was to give the

participants an opportunity to reflect on their learning and in relation to how they

assessed for credibility could emerge.

The focus group interview took place in Portlaoise college and ran for

approximately one hour.

4.5.4 Interview with course tutor.

To facilitate a more rounded inductive view of the research focus, a one to on

interview with the course tutor took place ten days after the workshop.

Questions focused on the responses to the workshop that the participants

communicated to the course tutor as well as the tutor's perspectives on

behavioural changes that may have taken place and the tutors own insights into

the workshop.

(The protocols covering the focus group and the teacher interview is attached

as Appendix E)

4.6 Data gathered & Analysis
As this research used a mixed methods approach, both quantitative and

qualitative data were gathered.

4.6.1 Quantitative Data
Quantitative data was limited in this study, this was due to the restricted access

to the participant group and also to the interpretivist, phenomenological

underpinning of this research which prioritises qualitative data. This form of

information is more time consuming to gather and analyse which restricted the

time available for more quantitative techniques.

In this study, quantitative data was gathered via a survey instrument based on that developed by Flanagin & Metzger, (2000). This was administered prior to the commencement of the workshop. The object was to gather information on:

- The level of importance that students place on establishing the credibility of online sources

- How they currently assess credibility of online sources.

- Influences on how they assess the credibility of online sources.

Simply described, the objective of the survey was to establish a basis in relation to the students attitudes and approach to establishing credibility against which any changes could be identified following the workshop.

4.6.2 Qualitative Data.

Most the data gathered in this survey was qualitative. A significant feature of qualitative research is the attempts to explore the meaning ascribed to events and phenomena by the participants and proceeds from the assumption that participants are the experts of their own experiences. (Creswell, 2013). This fits with the interpretivist theoretical lens underpinning this research. In this context the perspective, thoughts, insights and views of the participants is of greatest interest, therefore an emphasis on qualitative data is justified.

The participant data was gathered through a focus group session using a non-directive approach and semi-structured interview questions. The interview process took approximately 45 minutes and was conducted in Portlaoise College. The questions focused on the learners' views on the workshop, the aspects they found most valuable, the learning they took from it, the things that worked well and the broader issues that the experience brought up for them.

To provide a counterpoint and additional data for triangulation a one-to-one interview was held with the main class tutor one week after the research. The class tutor had been involved in the planning process for the workshop and was supplied with the lesson plan. They were also present and observing for part of the workshop and additionally, they were able to observe the reaction of the participants in the classroom setting in the week after the workshop in a way that was not available to the researcher. This was a semi structured interview.

4.6.3   Triangulation

Triangulation was attempted through a post session interview with the course tutor ten days after the workshop. There is also the opinion, as expressed in Reid, Flowers & Larkin, (2005) that triangulation can also occur in interpretivist investigations, such as those through IPA, where multiple perspectives on the same data is considered by the participant group.

4.6.4   Data Analysis: Interpretative Phenomenological Analysis

In keeping with the interpretivist philosophy underpinning this research, analysis of the gathered qualitative data was done using Interpretative Phenomenological Analysis (IPA). This type of analysis is rooted in the interpretivist perspective and rather than testing hypotheses IPA seeks to document and explore the participants' perspectives and the meaning that their own experiences hold for them. IPA also takes account of their experiences at both the idiographic and the group level and according to Reid, Flowers & Larkin (2005) '*A successful analysis is: Interpretive (and thus subjective) so the results are not given the status of facts: transparent (grounded in example form*

the data) and plausible (to participants, co-analysts, supervisors, and general readers)." (pg.10)

IPA is a proven method for working qualitatively with a small number of cases study since it is not solely concerned with patterns and trend across a large group but on the specific insights and perspectives of the individual participants which can provide a richness and texture to the results. An analysis of this form of data also enhances reliability in the study in relation to the validity of claims made about the experiences of this case study group as a singularity that could be considered in comparison with other similar studies in the future.

4.7 Limitations of this study.

As this is an interpretative study the usual restrictions and disadvantages of such studies apply, to whit, the subjective nature of this approach and the room that this leaves for researcher bias and the contamination of data by the researchers own personal philosophies and values. This can be a difficult issue to manage correctly in an interpretivist oriented study, especially as Ponelis highlights that "a*t an axiological level, the interpretivist paradigm is more concerned with relevance than rigor"* (Ponelis, 2015 p.538). Despite this there is a need to ensure that researcher bias is minimised and in the context of this study attempts to do this included ensuring that the focus group and tutor interview proceeded from open questions and that all responses were included in the analysis. Further that the researcher mapped her expectations early in the process to maintain an awareness of where potential bias could occur.
A further approach to minimising this would have been to review the data with the research participants to ensure that the analysis agreed with their viewpoints. Alternatively, it could be reviewed by a knowledgeable third party

not involved directly in the study for an outside, more objective view. Due to time pressures these actions did not take place.

The research sample in this study is statistically insignificant, therefore issues of generalisability certainly exist. It would be impossible to draw significant conclusions for the entire population based on the low numbers of participants and the limited data. However, it may be argued that in its localised context this case study can claim a sufficient degree of validity to justify a more in-depth quantitative research process to generate more generalisable findings. A slightly different perspective on the generalisability of case studies overall, which may have relevance in the context of this study, is found in Yin; "*Case studies, like experiments are generalizable to theoretical propositions and not to populations or universes",* (Yin, 2009 p.15). In other words, the object is to comment on the theoretical basis or question and not necessarily to provide a statistical generalisation but rather an analytical one. Yin also makes the point that case studies play a role in providing complementary data to other forms of research. This sits well with an evaluation of this research as a preliminary, localised exploration of the research question. One that identifies a starting point for a more significant study as well as providing a process map that could be scaled up to a more quantitatively significant study.

Problems and lessons from the research study

Initially a student group in a different PLC centre had been approached to participate, however due to circumstances outside the researchers control this did not take place and an alternative group were sought at short notice. This did affect the delivery of the workshop.

The focus group was difficult to manage to keep on topic at all times and the discussion was quite wide ranging. Also as the researcher was also the note taker and questioner it was difficult to manage the two tasks effectively. A solution would be to have a second person to observe and take notes.

The interview with the participants also tended to meander and stray from the topic under discussion. This reflected the researcher's lack of experience although it did permit the participants to comment on tangential aspects of the topics which were useful for getting a sense of the scale of the themes. These could be used as a basis for a deeper study as well as providing a degree of richness to this one.

Group dynamics were also a factor in the focus group interview as there was an element of friction between two participants that at times needed to be managed. This friction manifested in negativity towards the other persons point of view and instances of 'one-upmanship' where one student tried to denigrate the others opinion. This required careful management by the researcher which included inviting the opinions of both students in a measured way and according them equal weight, as well as moving the conversation away from the disputed topic and returning to it later.

5 Findings & Analysis.

Three sets of data were gathered in this study and the findings and analysis of these are covered in this chapter following the structure below.

Section 1 deals with the findings and analysis from the Pre-Workshop Survey. The overall survey respondent group was divided into those who participated in the survey and workshop and those who participated in the survey, workshop and focus group. This enabled a comparison of the data within the overall survey group which allowed for more detailed analysis than a simple consideration of the group as a whole.

Section 2 deals with the themes and analysis from the focus group interview. In keeping with the ethos of IPA the emphasis in this section is on the insights and perspectives of the participants and while there is some statistical analysis most the data review is qualitative. The themes which emerged in this section are:

- o Learning
  - Knowledge
  - Insights
  - Skills
  - Behaviour
- o Search Engines,
- o The Overarching Technological Context
  - Relationships with technology
  - Anthropomorphic views of technology

- Information Literacy excluding Credibility Assessments.

Section 3 deals with the findings and analysis from the teacher interview and their intersection with those of the focus group.

Section 4 offers a summary analysis of the findings and an evaluation.

5.1 Section 1: Pre-Workshop Survey, Findings & Analysis

This survey took place immediately before the workshop. As described in the preceding chapter the survey attempted to explore perspectives on the first research question:

RQ1: *How are learners approaching the assessment of credibility of online sources of information?*

Population Size

There were sixteen responses to this survey of which two were excluded from a consideration of findings due to being incomplete. To allow for comparison, the survey responses were divided between those who had participated in the survey and workshop from those who had participated in the survey, workshop and the focus group.

For ease of identification, the participants who only took part in the survey and not the focus group are identified as Survey Group (SG) and the respondents who took part in both the survey and the focus group are identified as Focus Group (FG) in the charts and text below.

Question No.1

How important is the credibility of an online site when it comes to using the information on it?

This was a single question asking respondents how important they believe credibility to be when using online information. All the group of fourteen participants answered that credibility is important when it comes to using information from an online source with the numbers of respondents split evenly between 'Important' and 'Very Important'.

However, the proportion of respondents who answered, 'Very Important' was higher among the focus group respondents.

Figure 5-1
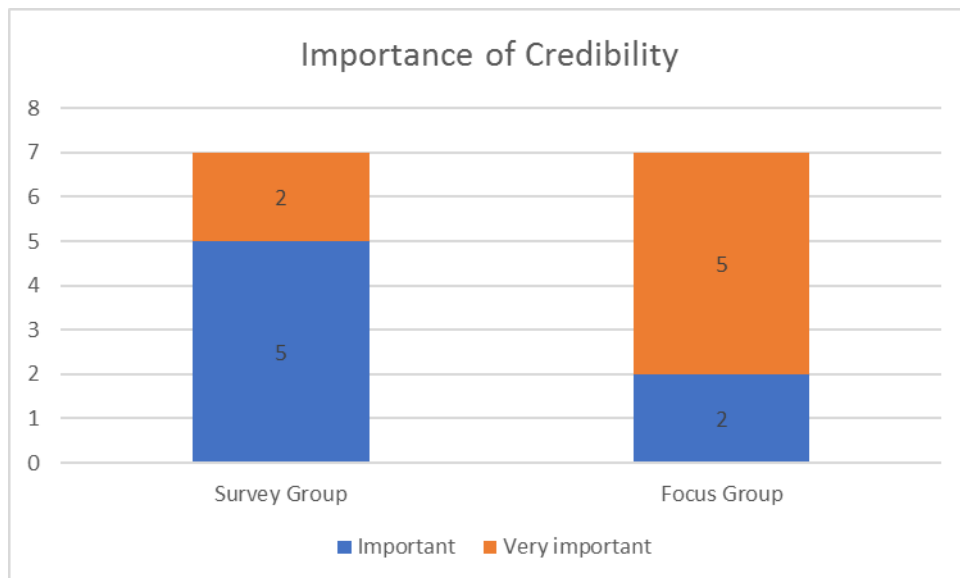
Question No. 2a

How do participants approach the assessment of credibility of online sources of information currently? Respondents were given the opportunity to describe in their own words their current approach to the establishment of credibility of

online sources and the main methods they employ to assess credibility. The pattern of responses is outlined in the graph below.

Figure 5-2

Analysis of Q 1 & Q 2a

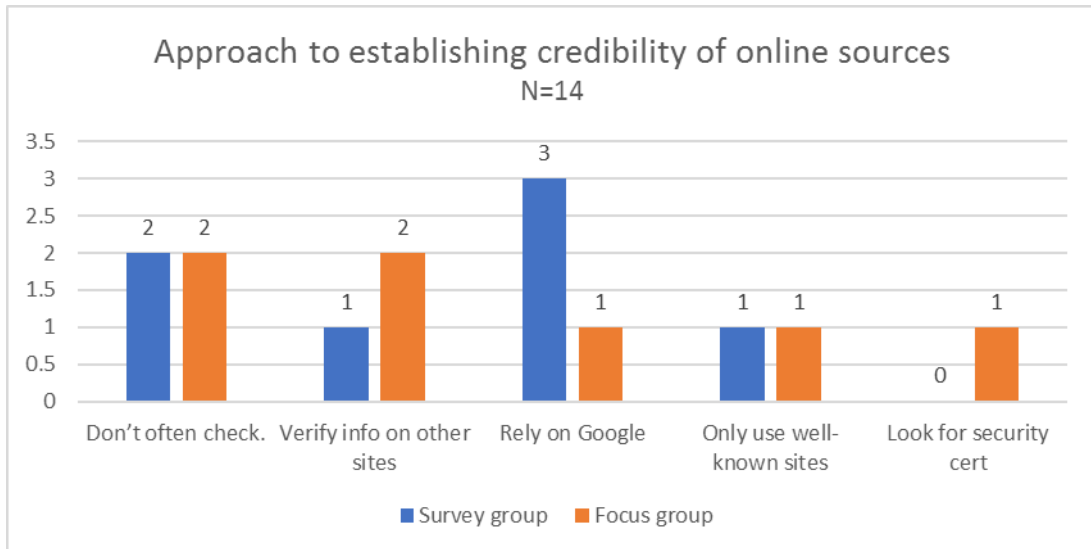Positively, most the group do engage in some form of assessment of online credibility. However, how they check for credibility may impact on the effectiveness of these decisions.   Despite the entirety of the group rating the importance of credibility as 'Important' or 'Very Important' four respondents report that they do not often check for credibility. The focus group respondents have a marginally broader range of approaches to assessing for credibility and engage in the corroboration of information slightly more than the survey group The responses to question 1 indicates that all the group, ostensibly at least, rate the credibility of online sources as an being important in their choice of using the information they find there.

The responses to the open response question (2a) does indicate that most the students surveyed do make some attempts to establish the credibility of sites. However, some of these behaviours, for example a reliance on Google to

gatekeep information or on the presence of a security cert, may be unlikely to offer a sufficiently robust process for ensuring accurate credibility judgements are made. There seems to be an offloading of the responsibility for checking credibility onto the technology rather than respondents utilising a more proactive investigative strategy for checking this themselves.

Of interest also, is the cohort who indicate that they do not often check for credibility which contrasts with the responses to question (1) where all the respondents indicated that establishing credibility was at least 'Important' if not 'Very Important'. The reasons for not checking aren't clear from the survey.

Five of the respondents use what can appear to be slightly more reliable methods to ensure credibility. However, relying on well-known sites may be problematic depending on what definition of 'well-known' is used. Also, verifying information on other sites, while superficially at least is a positive step it can be affected by the search tools used, and issues such as previous search histories and information bubbles.

Question No. 2b. How often do participants perform a range of specific credibility assessment behaviours.

This question gathered information on the frequency with which respondents performed certain credibility assessment behaviours for online information. Respondents were asked to select the level of frequency with which they performed these actions. Each of these actions are linked to the five objective criteria for assessing credibility as described by Metzger (2007);

- Authority
- Accuracy
- Objectivity
- Currency
- Coverage

As before, responses were divided into two categories, Survey Group and Focus Group.

Note on Data Analysis

Although not ideal, since the numbers of respondents in the two groups were so small as to make fine distinctions statistically insignificant the researcher decided to aggregate the numbers of respondents in the Never and Rarely categories into one number and to do the same with the numbers in the categories of Often and Always. This effectively condenses the number of categories from five to three and creates an abbreviated continuum of frequency choices. The rationale for this choice was that this provides a better 'gross' description of the respondents behaviour which may provide more scope for analysis. However, in order to attempt to maintain a level of accuracy, the actual numerical response for each original, individual category is included on the bar charts.

5.1.1 Survey Group

Figure 5-3
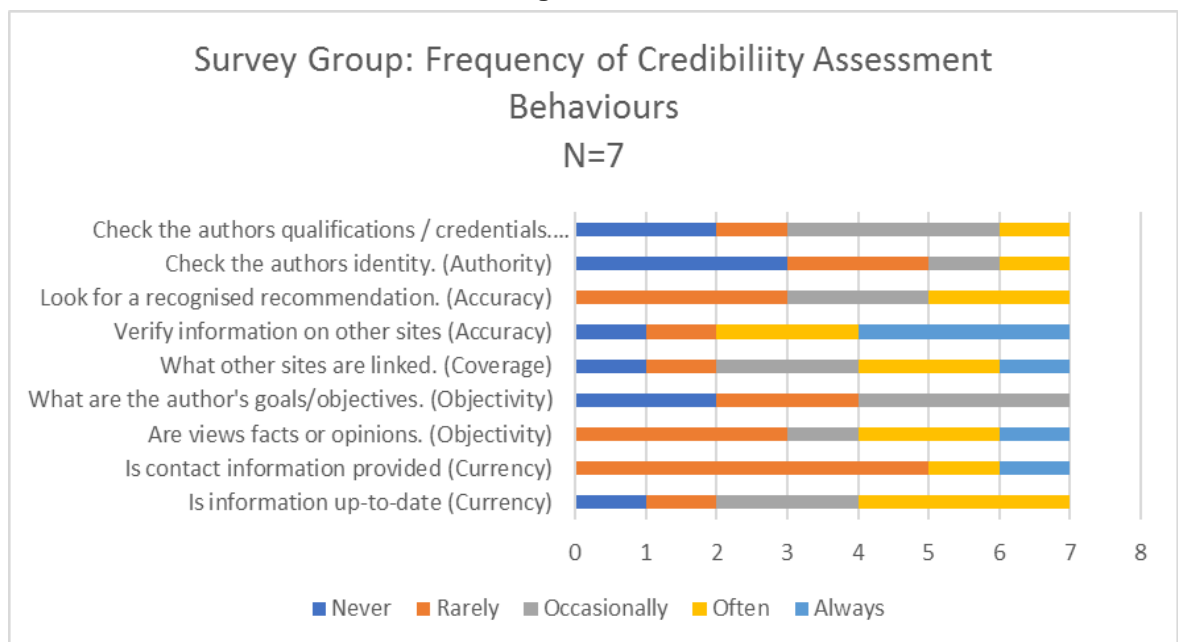
Authority: The concept of checking if an author is qualified or accredited to provide certain types of information is not one that the Survey group has used according to these responses. Almost half of this group never and/or rarely check these while most the remaining respondents only do so occasionally. Even less likely are this group to check the identity of the author with five out of seven respondents saying that this is something that they never and/or rarely do.

Accuracy: The most frequently used method of checking for credibility is to verify the information itself on other sites. Regarding seeking a recommendation or stamp of approval on a site it is a more mixed picture with three respondents saying they 'rarely' look for this and a further two saying they 'often' do so.

Objectivity: There is a higher incidence of considering whether information is factual or opinion based in relation to assessing for objectivity yet there is comparably little consideration of the author's objectives in providing the information when making decision on objectivity with four respondents saying that they never and/or rarely give thought to this aspect.

Currency: Contact information as a possible indicator of credibility is also not something that this group has considered with five respondents indicating that this is something they rarely look for. Respondents are slightly more likely to check the date of the information yet it is still less than half of the group who say they do this 'often'.

Coverage: Again, in terms of checking coverage it's a mixed picture with two respondents saying they 'rarely' or 'never' check this and three saying they often and/ or always check this.

5.1.2 Focus Group

Figure 5-4
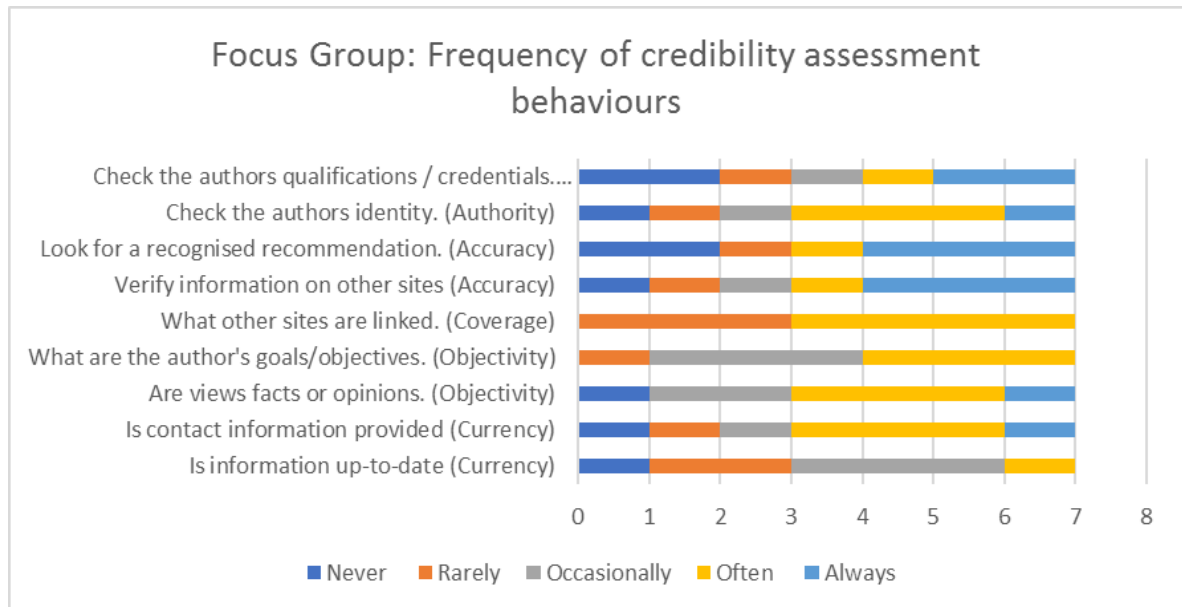
Authority: The group is split relatively equally in relation to assessing the authority of a site based on the qualifications of the author. Three respondents indicate that they never and / or rarely consider this while a further three reported that they often and/or always check this. Regarding seeking information on the identity of the author over half of the group, four respondents, claimed to do this often and/or always, compared to two who never and/or rarely do this.

Accuracy: There is a marked spilt in relation to the numbers of respondents who seek a recommendation as part of considering the credibility of the site. Three respondents indicate that this is something that they always do while a

further three never and /or rarely do this. As with the survey group there are comparatively high numbers of respondents who rely on verification of the information on other sites as the main method of assessing credibility. Four respondents indicate that they always and/or often do this compared with two who never and/or rarely do so.

Objectivity: In relation to considering the goals or objectives of the author in making a credibility assessment almost half report that this is something the often do. A further three respondents say that they do this occasionally. There are no extremes in this option, no respondents indicate that they never or always do this. However, individuals in this group are more likely to consider if the information is fact or opinion with four respondents saying that they often and/or always do this.

Currency: In common with a consideration of the factual basis of the information, over half of the group reported that they often and/or always check if contact information is provided, however they are less likely to check the date of information with one respondent saying this do this often and three occasionally.

Coverage: This is evenly split regarding the numbers who check the links to the site with three reporting this is something they do rarely and four that they do often.

5.1.3 Comparison between groups

In general, the respondents who participated in the focus group indicate that they are more likely to engage in activities to assess the credibility of an online

information source. This group indicates a wider range of approaches that they could take, including considering the identity of the site author, considering the authors goals and objectives, they are also more likely to look for a recommendation or stamp of approval before deciding on credibility.

By and large, both groups make decisions tend to base judgements on a sites credibility on a consideration of the informational content rather than on the site they find it on, (a total of ten respondents indicate that 'often' / 'always' verify information across other sites to confirm credibility). This, in many respects is a sensible approach, but it does mean that the access routes through which learners find information online become significant as such gatekeepers control the data on which decisions are made. The trend toward using algorithms that return individualised results based on previous search histories means that certain 'blocks' of information may be omitted entirely from a search. This effectively means that learners may be excluded from accessing sources that can offer alternate views and may become trapped in an information bubble, potentially unable to access all the relevant data and therefore make a decision on credibility that is based on incomplete information and may be in error. To avoid this, learners need to be proactive in how they search, what they search with and the information streams they choose to navigate.

Information as the basis of the credibility judgement may also be seen in the number of respondents who consider the objectivity of what they find with half the group indicating that they always and /or often consider whether the information is fact or opinion. Yet only three respondents claim that they often consider the objectives or goals of the site author. This could mean that the

context that the site is operating in and the narrative to which it subscribes is not taken into account to a great degree.

5.1.4   Comparison between groups and 2001 survey

The averages across all respondents for all questions were graphed below to compare with the results of a similar study of college students by Metzger & Flanagin in 2001 (Metzger 2007). However, it must be highlighted that the population in that case was N=300 compared with the extremely smaller numbers in this study.

This exercise revealed that for many of the behaviours, the cohorts in the current compared favourably with the group surveyed in 2001, especially in the area of corroborating and verifying information across other sites. An overall average calculated across all the behavioural categories also indicates a higher rate of credibility assessment among the focus group compared with the survey group which was similar to the cohort surveyed in 2001.

- Metzger & Flanagin 2001:   2.64.
- Survey Group: 2.62
- Focus Group: 3.21

It is interesting to note the higher score of the focus group participants. As participation is voluntary it is possible that those who chose to take part in the focus group already place a higher value on establishing credibility in their online sources and this is reflected in the score above.

Figure 5-5
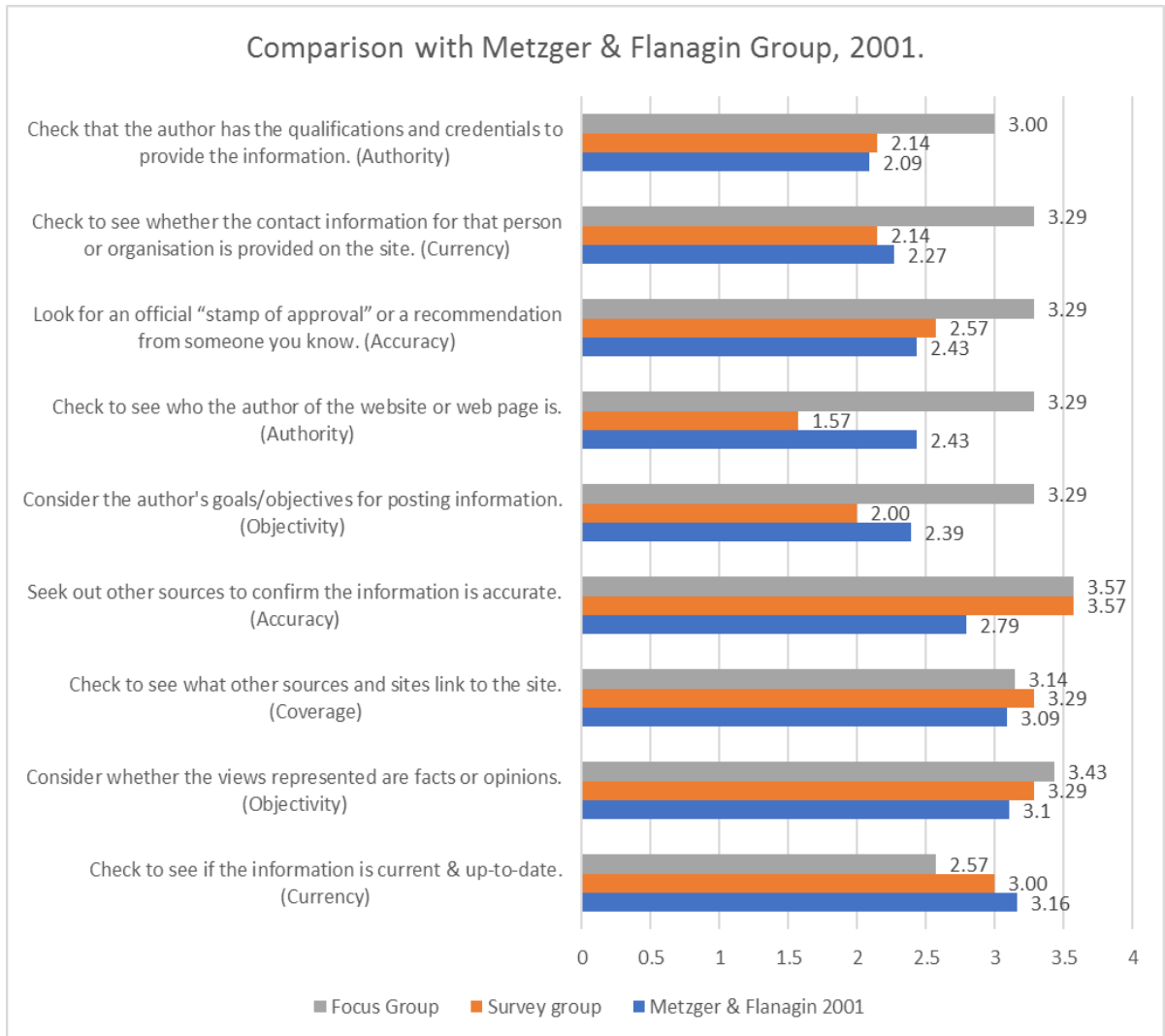
5.2 Section 2: Findings and Analysis from Focus Group Interview.

This interview took place one week after the workshop. Seven out of the original sixteen participants in the workshop took part in the focus group and all of these participants had their responses included in the initial survey prior to the workshop.

The focus group was tape recorded and this recording was fully transcribed and served as the basis for this analysis. The interview was one hour in duration and took place in the same venue as the workshop.

As there is an ideographic aspect to this analysis, ID codes as outlined below, were used to differentiate the respondents so their individual contributions to discussions could be tracked.

Table 5-1
Participant Identification codes

ID	Gender	Age
T1	Female	40
A2	Male	42
C3	Female	19
C4	Female	18
R5	Female	44
F6	Female	36
B7	Male	26

Respondents B7 and F6 have English as a second language and learners R5 and A2 have Nigerian English as their primary dialect.

It should also be noted that the age range of this focus group is outside the typical age range for PLC students who are typically aged in their late teens while the average age for this group is thirty-two.

Process of Analysis

The analysis of the data was influenced by the analytical process outlined in Metzger et al (2010). Consequently, this analysis utilised the constant comparative analytic framework, (Krueger & Casey, 2014) as this approach allows for the identification of patterns and relationships in the data and provides a lens on the similarities and differences that exist between the respondents' perspectives on the workshop and its effects on their abilities to

evaluate online sources for credibility. Comparisons were made based on frequency and similarity.

These responses were then reviewed relative to each other and to the responses to the pre-workshop survey to get a sense of the effect of the workshop on the abilities of the respondents to assess online sources for credibility.

5.2.1 Themes emerging:

A number of themes which emerged from the analysis of the data and those that were of most significance to the respondents are included in this chapter. Some of the themes were conventional and expected, such as 'Learning' but those related to the technological context in which learners are operating were alluded to more frequently and seemed to hold more significance than the researcher expected.

The themes covered in this section are:

- Learning

- Search Engines

- Overarching Technological Context

  - Respondents' relationship with technology

  - Anthropomorphic technology

  - Information Literacy excluding Credibility Assessments

- Value

There are three subthemes within the thematic area of Overarching Technological Context as these appeared, to the researcher, to be commenting on different aspects of the same thing.

5.2.2 Theme 1: Learning.

The objective of this aspect of the research process was to answer the research question;

What are the effects of the single instance EBL workshop on the participants' abilities to evaluate the credibility of online sources?

The questions asked in the focus group interview sought to explore the participants' perspectives on the following areas:

1. As a result of participating in the workshop, what aspects of the criteria based approach to assessing for credibility have participants used, or will use.

2. Other learning that resulted from the workshop.

As the research question related to looking for evidence of the 'effects' of the workshop, responses were reviewed looking for participants references to changes in aspects or dimensions of their ability to assess credibility. These dimensions are outlined below and each was also used as a code in the review of the transcript:

- **Knowledge:** This referred to a change in the respondents' factual knowledge about the topic.

- **Insights:** This referred to a deeper understanding of the topic characterised by interpretation and connection to other knowledge or concepts using the factual knowledge gained.

- **Skills:** Skills referred to abilities that were developed or enhanced as a result of the workshop in relation to the Bloom cognitive domains of Evaluation and Analysis.

- **Behaviours:** This related to changes in how participants approached the practical elements of assessing for credibility as a result of the workshop, through utilising the knowledge, insights and skills developed. Again specific behaviours that related to the Blooms domains of Evaluation and Analysis were the focus.

The broad thematic label of 'Learning' was applied to this aspect of the analysis. Initially the focus group transcript was reviewed for references to each of these codes in the context of the five indicators or criteria for credibility, (Authority, Accuracy, Objectivity, Currency & Coverage). However, it was apparent that there was learning that could be classified into the codes above which were not strictly related to these five criteria. For some of the learners this ancillary learning appeared to be quite important and so these were also noted and analysed separately

Perceived Improvements in using the five Credibility Indicators.

It is important to mention that, universally, the references to changes in ability were positive, i.e. that participants were referencing perceived improvements in each of the dimensions of ability in their answers. These references were counted and gave the following results.

Table 5-2
Number of references to changed ability in each of the learning dimensions.

Learning Theme	Overall references.	Relating to using the credibility indicators;
Knowledge	32 references	18 references
Insights	48 references	29 references
Skills	25 references	18 references
Behaviour	17 references	11 references
Total	**122 references.**	**77 references.**

The number of references to changes in ability in using the credibility indicator as a proportion of the overall number of references to change in each of the learning themes is almost two thirds, (63%.) To give a sense of how this was broken down across the five indicators please see the chart below which documents the number of references respondents made to being able to use each of the criteria in making credibility assessment as a result of the workshop.

Figure 5-6
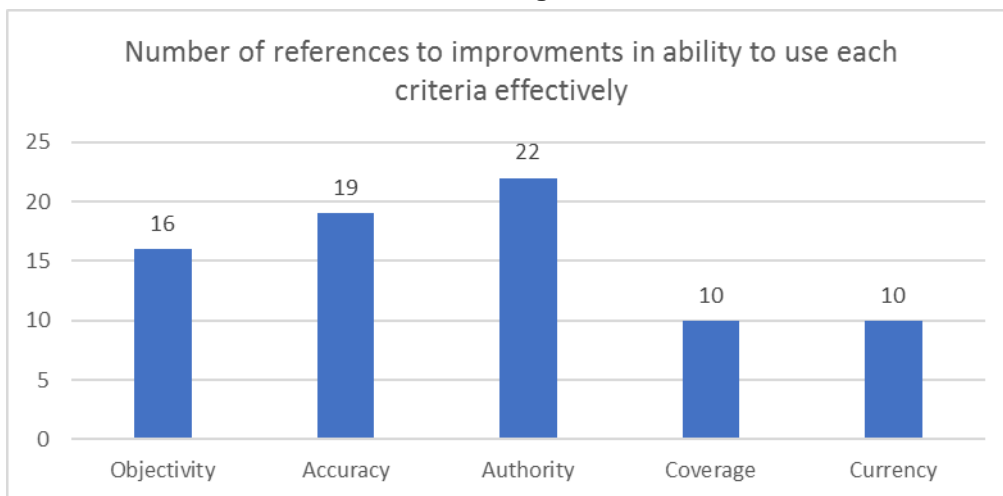
The greatest number of references to improved ability was in relation to using the 'Authority' Indicator which accounted for almost 30% of the total. From the data above it may be said that among the respondents collectively, there is a perception that there have been improvements in the group's collective ability to use all the indicators in making credibility assessments. However, it is important to stress that this is a claim made about the respondents' perceptions and may not translate into actual improvements.

The number of these references were mapped across the four learning dimensions; Knowledge, Insights, Skills and Behaviour to show how perceived improvements in using the indicators related to each. This is summarised in the table below.

Table 5-3
Frequency of improvements in using the criteria for evaluating Credibility

	Currency	Coverage	Authority	Accuracy	Objectivity
Knowledge	2	3	4	4	5
Insights	2	4	8	6	9
Skills	3	1	6	6	2
Behaviour	3	2	4	3	0
Total	**10**	**10**	**22**	**19**	**16**

The most significant gains seem to have been in relation to learning related to Insights, especially in relation to improvements in using the 'Objectivity' and 'Authority' indicators.

The 'Behaviour' dimension shows a limited number of references to improvements however this is understandable as there was only one week between the workshop and the focus group. This restricted the opportunity for respondents to change behaviours significantly. It may be worthwhile revisiting this group later to explore this further.

Individual Respondent Findings

In keeping with the idiographic focus of the study the results of all participants across each area were developed. From a review of these it is clear that some students found greater benefit that others in the session but all reported some improvement in their abilities to assess credibility using the five criteria with two of the group reporting improvements in their abilities to assess across all five criteria, four reporting improvements in assessing four and one respondent reporting three. These are outlined below.

Table 5-4
Frequency of reported improvements in using the criteria for evaluating Credibility by Respondent.

Individual Respondents							
	T1	A2	C3	C4	R5	F6	B7
Authority	6	3	2	2	3	4	2
Accuracy	4	3	0	4	1	2	5
Objectivity	4	3	3	2	2	2	0
Coverage	2	2	2	1	0	1	1
Currency	4	1	1	0	0	1	1
Total	20	12	8	9	6	19	9

The information above is limited due to the small numbers of participants, however, as has been said this is a limitation that can be accommodated in Interpretative Phenomenological Analysis. Accordingly, greater depth and clarity is provided to the study through a consideration of the respondents own statements. The section below contains a synthesis of some of the respondents' key perspectives. A more individualised analysis of the key points from each participant is included in Appendix F

Knowledge and Insights.

The workshop seems to have a noticeable effect on participant's abilities in relation to the knowledge and insights dimensions and given the interconnected nature of these aspects it makes sense to consider them in tandem. Given the limited potential of the workshop to engender significant change in the skills or behavioural dimensions the knowledge and insights aspect is the one where constructivist changes are most likely to be observed in the context of this study.

 The respondents reported a level of improvement in relation to their knowledge across the topics covered in the workshop. This included a greater

understanding of the importance of assessing for credibility, the criteria upon which to make these assessments and the specific tools and approaches that can be used to do so. For some, participation the workshop stimulated reflection on the processes and attitudes that they hold toward sourcing credible information. In addition to this relatively basic, operational knowledge respondents also made reference to improvements in their knowledge regarding more subtle aspects of assessing for credibility. For example, one respondent made indirect reference to the contextual relevance when making these kinds of assessments;

> *"Checking the qualifications of the author was so important like maybe if you are checking a medical site like if the person has a MD in something or something like that. It's important to establish what he or she has done that allows them to say what they are saying. I found that important."* (B7, Male, 26)

The role of habit in dictating the where information resources are found and how they were used was also alluded to by a respondent.

> *"You go to the places online that you are used to going and because you are used to them you think they are truthful but now I see that this might not be."* (A2, Male, 42)

This is an important consideration when one considers the increased personalisation of online profiles by search engines and the impact of this in restricting access to certain types of information.

One respondent reflected an awareness that she applies a different standard to information she accepts as credible online which highlights the lack of selectivity when it comes to choosing sources on the internet.

"I wouldn't have thought of looking at the qualifications to tell if something is believable. It wouldn't have crossed my mind to check these. But now that I know this I'm wondering why it didn't occur to me before. I mean I'm not taking advice on how to do an assignment unless I know that person can give good advice so why would I not do the same with the Internet?" (C3, Female, 19)

A slightly different perspective on this was put forward by another respondent who spoke about an improved awareness that enables a more critical interpretation of a source and how to interrogate it further.

"It's that kind of awareness that lets you think 'you know what, I'm not sure about this I'm going to dig a bit deeper here.' So when you need to be sure about the information you have the tools to be able to deconstruct it even if you don't do it every time." (T1, Female, 40).

Skills & Behaviour.

Due to its limited duration, it was less likely that participants would have the same opportunity to develop specific skills or make long-lasting changes to their behavior that could be observed in this study. Despite this some respondents did indicate that they felt their skills in this area had improved.

In relation to a discussion on what skills the respondents will use or feel more confident in using because of the workshop one respondent replied:

"…I would find it easy to find dates on sites or to make a decision about what I think about a site. Now I can find evidence for these decisions and justify my choices… It's not difficult to understand but to put it into practice is difficult all the time. I think that it's important to know it and to

use it for somethings, like comparing sites and looking at the

qualifications, knowing how and why to do this is important." (T1,

Female, 40).

Being able to make effective decisions, compare information sources, and the skills to, as the respondent above says, justify choices, is an important element of being able to make effective evaluations of credibility. Being able to justify decisions especially, is an important aspect of the Evaluation cognitive domain in Blooms taxonomy. Although it must be said that this reference does not mean that the behavior of the respondent reflects this.

One respondent for whom English is not his first language referred to the value he sees in having the to use a new tool to help him make credibility judgments.

... being able to check a picture is very good. My English is getting better

but pictures carry information that is easy to see but it still can be

wrong...I can use the image search to check." (B7, Male 26).

In response to a question regarding how they might do things differently as a result of the workshop one respondent highlighted the extensive nature of the checking that she would engage in;

"I think in future if I'm going to be doing assignments or writing any sorts

of papers I'm going to be like a forensic detective! I'll be checking

everything to make sure… that what I'm saying is correct." (T1, Female,

40)

Another respondent reported an increased likelihood of modified behaoir as a result of the workshop.

"I use the Internet for looking things up for my own knowledge, so

learning a way to do this better is of use to me outside of my coursework.

I am more likely to check [credibility] than I was before." (R5, Female, 44)

As was said above these respondents reported on learning that they felt took

place but were not specifically related to the use of the five credibility indicators.

However, these are interesting in providing context and breadth to the

experience of the learners in relation to the workshop. The use of Search

Engines, Google in particular proved to be a popular topic in the workshop and

the participants' response to it is covered in the following section.

5.2.3 Theme 2: Search Engines.

A significant theme that emerged from the focus group was their perspective on

search engines, especially Google. Respondents reported a lack of

understanding in relation to how search engines operate. Google was the

default search engine that learners were familiar, with only one respondent

expressing knowledge of others.

Broadly the references to Search Engines in the transcript can be categorised

into the areas of:

- Search Engine operations

- Assumptions about Search Engines and Credibility of Results

- Learning on the topic of search engines.

Figure 5-7

Frequency of references to Search Engines.
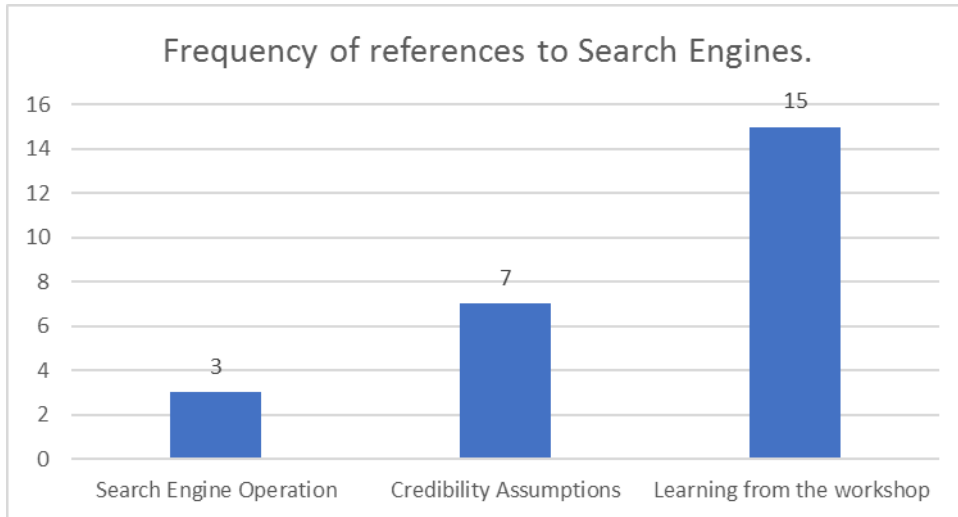
Search Engine Operation

Six respondents reported that they were unfamiliar with the personalised results based on an individual's profile, believing erroneously, that the same search terms would result in the same search results appearing.

> *"Some of the things I had thought about… like clicking into a site, say Google, if it comes up with a tick beside it I would have just thought its fine, a trusted site and I would have thought its ok."* (T1, Female, 40)
>
> *"I didn't actually realise that, you know, how narrow our search results are. I thought that was amazing.* (C4, Female 19).
>
> *"The session made me understand that google search always returns search returns based on our profile"* (A2, Male, 42).

Assumptions about Search Engines and Credibility of Results

The most prevalent assumption regarding search engines was that they operate a stringent and reliable form of 'quality control' over the results that they return. Respondents were surprised to hear that this is not necessarily the case .

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"I would have believed that the results from search engines, from Google would have been trustworthy because they would not give you the information unless you could believe it was true" (A2, Male, 42).

"…we trust that a search engine like Google will only give the right information." (B7, Male, 26).

"If it's the first thing you saw on Google you would have thought it's reliable." (C3, Female, 18).

Learning related to Search Engines.

The most significant category is the learning that respondents felt they took from the session and this was an area that respondents felt they most benefited from in the workshop. Out of all the topics covered in the workshop this one was the one that seemed to resonate the most with the group. Respondents were able to outline how they would use this knowledge to modify and improve their use of search engines in the future.

"Having different options at the search engines. Being able to ascertain if a picture is genuine like what it said it is" (F6, Female, 36).

"I found the use of google and how to change the search you do to give unbiased results good as I didn't know this was happening before" (T1, Female, 40)

"For me before I write down any information I make comparison. I will do more searches with more search engines, like maybe two or three other than relying on just Google." (R5, Female, 44)

5.2.4 Theme 3: Overarching Technological Context.

All the respondents, to a greater or lesser degree, offered comments on what can be described as the overarching technological context in which the workshop took place.

This superordinate theme was developed from emergent themes, which were

- The respondents' relationship with technology,

   o   An anthropomorphic view of technology,

- Information Literacy beyond credibility assessments.

A definition of this theme is difficult to capture as it has many aspects that extend well beyond the scope of this study, nevertheless, in the context of this research it may be defined as the interface where the lives of the participants intersect with technology as described by the participants. As such it is piecemeal and fragmented but important nonetheless as it provides a slight lens onto the environment that learners are operating in.

A perspective on the interrelationship of these themes is described by the following diagram. There is a hierarchy at work, and the object of this research study sits within these nested levels as in the figure below;

Figure 5-8
Nested concepts showing placement of credibility assessments
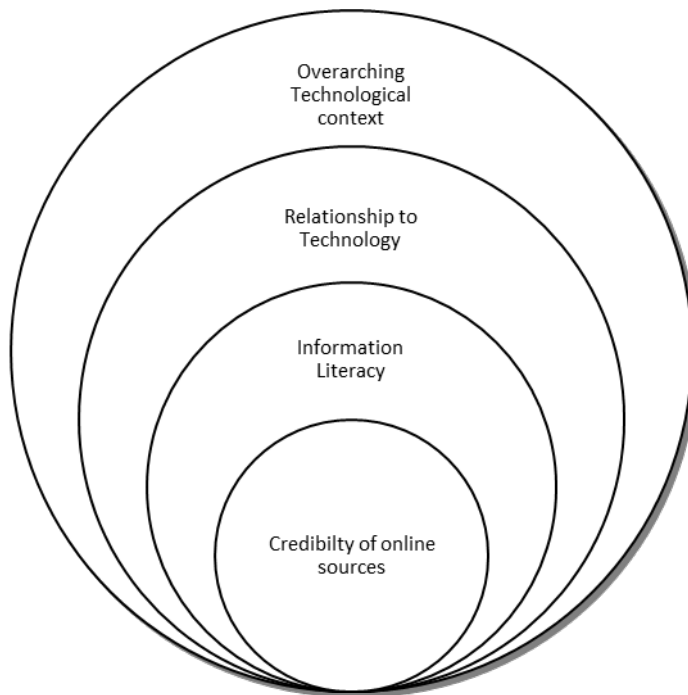
In terms of frequency of references to the three subthemes these are outlined in

the following table.

Table 5-5
Frequency of references to subthemes by respondent

Respondent	Relationship with technology	Anthropomorphic Technology	Information literacy not including credibility assessments
T1	9	10	2
A2	1	3	1
C3	0	3	2
C4	0	2	2
R5	0	2	1
F6	1	3	1
B7	1	1	0
Total	**12**	**24**	**9**

From this it can be seen that this theme has greatest resonance with

respondent T1. This is perhaps not surprising as this respondent reported the

highest incidence of technology use within the group. Yet even excluding this

respondent, the frequency of references to the overall theme, Overarching Technological Context, are significant enough to warrant this theme's inclusion for the group as a whole.

Sub theme: Respondents' relationship with technology

This theme developed through reflections offered during the interview on the expectations that respondents have of both the technology and their own understanding of it as well as insights into their habits and preferences and needs in using it. One respondent considered the 'price' paid in terms of personal information for the convenience that technology affords, yet that there is an expectation that certain technologies will be used for a variety of things including learning;

> *"It's like we trade our personal information for convenience, there's an expectation that we will use technology to do certain things…to stay in touch, to look for information."* (C3, Female, 19);

This was a view reiterated by the course teacher who highlighted that there is an expectation that students will use the internet in their research despite the lack of formal support in doing this properly.

> *"I think that the access and use side is more important for most students… but this event did highlight a gap, definitely a need for more understanding of how to use it safely and effectively."* (Class Teacher)

This is a theme that was elaborated further by a different respondent who viewed aspects of this trade in a negative light.

> *I suppose the information that's being kept on you is just immense. It's just scary like. Down to when you plan a holiday you put in your*

children's ages, they're getting your children's ages they're getting your

age, they're getting your bank details everything. So, we're giving away a

lot of our own information… don't know where that information ends up. I

don't know what it means for me. It's not something I'm comfortable

with." (T1, Female, 40)

This negative perception is one that potentially, education could address.

A slightly less emotive, yet still concerning perspective was taken by another

respondent who reflected that easy access to information can lead to learners

being less diligent in seeking out and analysing correct information.

"The technology in a way has made us really lazy, because we don't

think as much, we don't stress ourselves as much…. Doing an

assignment you can just get all of the information quickly, you don't

spend long looking for it. You just use the first things you get." (F6,

Female, 36).

A possible interpretation of this is that like any tool, there must be instruction in

how to use it effectively but this is something that is not easy for this group to

access.

Another respondent also offered an expedient view that summed up how many

in the group view their relationship with technology.

"I think it's something we take for granted… If technology does what we

need it to do then that's all we need but we don't know how much it can

do really. We don't fully 'get it' but because it does what we need it to do

we think that's it. We know all we need to know." (C3 Female, 18)

This is a reductive view and potentially limiting for respondents. As the pace of

technological change grows faster and technology becomes ever more

pervasive there is a danger that such views can leave individuals at risk from, in some cases, a technological divide caused by simple lack of, or lack of access to, relevant knowledge.

Subtheme: Anthropomorphic views of technology

This can be characterised as an aspect or even a lens on the preceding theme. Four out of the seven respondents described technology at various times during the interview as having 'human-like' characteristics. They variously described technology as 'watching', 'wanting', 'thinking', or 'giving'. This anthropomorphising of technology was most pronounced in references to Google but was also made in reference to the Google talk to text function, the Messenger app and mobile technologies by one respondent.

For example;

> *"It's like somebody's watching me…there was a time I wanted to send something to Nigeria and I just check DHL how much it is on the DHL website. After, I think a day after, I started seeing adverts from DHL. Initially I thought they were fraudsters but I realised that that's the way it is… based on whatever you search. Yes, it's like somebody is watching me."* (A2, Male, 42).

It may be that this is a linguistic issue or the result of using a particular idiom, especially as two members of the group have English as a second language. However, despite this, the strongest references (in terms of frequency) were made by a native speaker.

> *"It actually scared me when I was at home because Google text to talk that happened as well that evening… the phone hadn't been touched, it*

just switched itself on and said, 'Excuse me did you say something, can

you repeat that please' and I hadn't turned it on." (T1, Female, 40)

A potential explanation for these references suggests that respondents do not

have the technical language to explain the operation of certain technologies and

so the use this language as an explanatory short-hand. This was illustrated in

an exchange between a few respondents;

"C4: Maybe if you understood the basics…Like the theory behind

things…what it means if it says something is... I don't know, someone

give me a tech word

R5: Snapdragon.

Ch: What?

R5: I saw it on a phone spec. I don't know what it means.

C4: That's what I mean. There's a lot we don't understand but it's part of

making choices about using things." (C4, Female 18 & R5, Female 44)

This illustrates a knowledge gap, respondents are using technology without fully

understanding its effects and potential. Aside from this being a deeper issue

than simple semantics, it does possibly explain why some respondents describe

aspects of technology the way that they do. However, an exploration of this

phenomena was not part of this study's objective but such refences do,

potentially, denote a view of technology that may be interesting to investigate

further.

Subtheme: Information Literacy excluding Credibility Assessments

Respondents also touched on the need for wider information literacy support or

education, referencing the volume of information online that can feel

overwhelming when they are attempting to search for specific data. Two respondents highlighted how easy it is to become distracted as you search for specific information while another elaborated on this, remarking on the difficulties she faces if the information she discovers, changes the original questions that she started with.

> *"When I am looking for something I think I know what I want to find... the answer if it's a question but … you get distracted and you can find stuff that can… change the question you started with. Then you start looking for answers to that new question and so do you start all over again? Or do you keep going? I think if we were taught how to handle that sort of thing when it happens it would make it easier to use the internet more."*
>
> (C4, Female, 18)

Another reflected that there is a difference between searching for information for research purposes;

> *"…there's a type of searching that you need to do to find what you need, looking for information for learning is a different type of searching."*, (T1, Female, 40).

While another commented on the need to be selective, and choose good quality information from reliable sources;

> *"You know if it answers the question that's the important thing. But this made me think about more than just getting an answer. It's about the quality of the answer too."* (C3, Female, 19).

The teacher also referenced the wider technological context, specifically the Information Literacy competencies needed to operate effectively online.

> *"Making academic arguments means using information that fits your argument and is correct but with the internet, there's so much information there that finding something to support your point may be easier but you have to be able to justify using it, you have to be able to critique it."*
>
> (Class Teacher)

5.3   Section 3: Findings and analysis from the Teacher Interview

This interview was conducted ten days after the workshop. The teacher had been present for part of the workshop.

The questions for the teacher aimed to explore their perspective on the topic, any feedback that students may have offered as well as effects on the students' ability to assess credibility as observed by the tutor. It must be highlighted however that there was a relatively small span of time between the interview and the workshop therefore scope for observation was accordingly curtailed. The interview was fully transcribed and analysed for references to the themes that emerged from the focus group interview as well as insights from the teacher. Regarding the theme of learning, references were included if they were observed improvements or perceived improvements in the students' abilities in the areas of Knowledge, Insights, Skills and Behaviour.

Frequency of Reference to themes

In terms of frequency the teacher made most references to improvements in the students 'Knowledge' dimension, eight in total, however, most of these were described as overall improvements and only two were specific to knowledge,

specific to the use of particular credibility indicators; one accuracy and one behaviour

The teacher made three reference to improvements in learning about Search engines and was of the opinion that this was the aspect of the workshop that was most useful both to the students and to themselves. This led to a discussion on the need for Continuous Professional Development, (CPD) for teachers to ensure that they can provide relevant and up-to-date information to their students in how to access and use online research tools;

> *"…I'm still operating on what I learned about computers from years ago but lots of that has changed and unless you keep on top of the changes what you know, what you understand is out-dated. Then you teach that so… students are following incorrect information from the start."* (Class Teacher)

The teacher also saw the workshop as a valuable support for learners but suggested that it would be more effective if integrated into the programme structure overall and offered over a longer duration. Also, that a greater emphasis on the practical elements of the workshop would have given learners more opportunity to develop their analytical skills;

> *"…it probably could do with more integration, being more integrated with the class. Basing it round the information needed to answer specific topics, or to do the project assignment for example, it could work very well as a support to that kind of work."* (Class Teacher)

5.4 Section 4: Summary Analysis

Research Question 1: How are learners approaching the assessment of the credibility of sources?

Survey respondents reported that they place a high degree of importance on the credibility of online sources however their strategies and approaches to doing this were not particularly well developed and were focused more on the verification of information rather than an evaluation of the information source. The focus group also indicated that information corroboration is method most commonly used to assess credibility and that respondents use 'common-sense' approach to deciding on the reliability of sources which tallies with the findings from the pre-workshop survey. However evolving information environments requires that information users are also able to critique the effectiveness of their sources of information as well as the information itself, (Farkas, 2012). Furthermore, learner's habits and preferences also play a role in determining how they access information sources online. This is similar to findings by Head & Eisenberg (2010) who found that habit and familiarity influence the sources students choose to access.

Respondents indicated an awareness of the need to be able to perform different kinds of searching online, and they differentiate between sourcing information for research purposes and searching for 'fun'. Respondents also indicated that they feel they are expected to use the internet as a research tool and are aware that there are specific skills required to do this effectively but that this form of education is missing from their course at present. This opinion bears out the

findings of Heard & Eisenberg, (2010) and is also one that is acknowledged by the course teacher in this study.

From the focus group findings, it may be said that the workshop gave participants 'food for thought' on the topic of how they understand, address and check for credibility in online sources and in some respects their wider use of technology generally. Kim & Sin, (2011), found that students often lack the knowledge to effectively assess the credibility of sources. This seems to be the case with this group who indicated that they were not aware of simple techniques, such as checking the date of information on a site, or the credentials of the author that can have a bearing on the credibility of an online source.

Research Question 2: What are the effects of the inquiry based learning workshop on learner's abilities to evaluate the credibility of online sources?

As referenced by the course teacher and the focus group respondents there is an expectation that respondents will use the internet as a research tool. There is an awareness in both parties that there are specific skills needed to do this and they place a value on those skills and knowledge, but believe that opportunities to learn these skills are not included to a sufficient degree in their course at present. The development of such opportunities is hampered by a lack of expertise in this area among teaching staff. Allied to this is an awareness of the

In terms of effects on participants' abilities to perform these assessments, it could be said that the most significant benefit for this small cohort was on their level of knowledge of the importance of assessing for credibility as well as in

supporting them in forming new insights into the relevance of this information literacy ability. The workshop also facilitated a practical introduction to the tools that enable them to perform effective credibility assessments. Learners are also aware that there is work involved in following this process and that while not fool proof can enhance their chances of making an effective credibility assessment. Overall, however, the greatest improvement in knowledge seems to be in respect of the operation of Search Engines. The findings in relation to these bear out those of Leibiger, (2011) in highlighting the lack of understanding among these respondents of how these tools operate and the potential effects on the information sources they access.

It should also be mentioned that from the perspective of the researcher, the focus group session did more than simply provide a method for gathering data. It also provided an interpretive space where new knowledge could be discussed and perspectives shared among the group and the elapsed time between the workshop and the focus group also allowed time for reflection.

As a factor in consolidating and supporting the assimilation and accommodation of new knowledge this session was important in the learning context as well as the research one.

From a social constructivist point of view it facilitated dialogue and gave an opportunity for the participants to negotiate the learning experience and share their perspectives with the group.

6 Conclusions & Recommendations.

This study attempted to investigate the research questions below;

6.1 Research Question 1
How are Post Leaving Certificate students currently assessing the credibility of online sources?

The results of the pre-workshop survey indicated that there was a mixed approach to the assessment of credibility among the respondents. Despite a high level of importance being attached to the need to establish credibility of a site respondents reported a piecemeal approach to establishing this credibility. Credibility judgements among PLC students are being made most commonly based on an assessment of the informational content. Sources are not assessed for credibility in any strategic fashion and learners are unaware of some of the common methods for doing this. Despite this the participants who took part in all stages of the research process had a higher average score in relation to the number of times they assess for credibility across the five indicators when compared with the participants who took part in just the pre-workshop survey and workshop.

6.2 Research Question 2.
What are the effects of an inquiry-based learning workshop on these abilities.

From the focus group interview, the most significant effect of the workshop seems to be a positive improvement on their lower-order thinking skills in relation to students' knowledge and application of knowledge, especially in

relation to the function and operation of search engines. Learners also reported a positive impact in relation to their knowledge of the importance of establishing credibility of sources and of the approach to do this. Learners also referenced insights and better understanding of the concepts covered in the workshop. In relation to improving the higher order thinking skills i.e. enhancing abilities at the cognitive domain levels of Understanding, Applying and Evaluating as demonstrated by improvements in participants' skills and behaviour, this study was not widely successful.

The Inquiry-based learning format of the workshop did not seem to make a great deal of difference from the perspective of the learners although this may have been due to language issues.

6.3   General conclusions

Due to *'the problem of small-Ns'* (Gray, 2004, p.137), which is an issue of significance in this study, it would not be good practice to generalise from the findings. However, it may be argued that, in the context of the participants of this group, it is an accurate reflection of their perspectives and reflections. Therefore, as an exploratory case study this research has some merits, this topic is seen by the participants as having value and it has established that it would be worthwhile in providing learning opportunities on this topic for PLC students.

This is a view that is supported by the view from the class teacher. Further, that it may be possible to introduce this topic within the existing teaching structures

however some teaching staff may need to be supported in developing the relevant knowledge and skills through continuous professional development. From the teacher's perspective, which is supported by the literature (Breen & Fallon, 2005), this type of learning may work better over a longer period where it is integrated into a particular project or module.

6.4   Recommendations

Information literacy education is also situated within the wider context of participants' relationship with existing and emerging technologies. This study tentatively indicates that for this group of participants, work may need to be done in relation to improving their understanding of the operation and potential of technologies such as the internet, and mobile devices so that they may be used safely and optimally. This limited study shows that, potentially, there is an appetite for this type of learning at a local level that can be further developed.

In terms of future work, it would make sense to repeat this workshop and research process across several PLC classes, incorporating a quantitative survey in addition to the focus group in order to generate more in-depth data from which more substantial conclusions could be drawn.

This study also highlighted the need for specific attention to the information literacy needs of learners whose first language may not be English. Although not explored in this research this was an emerging issue that warrants examination especially in the context of the diversity of learners that the further education and training sector caters for.

There is no doubt that this study has significant limitations. However, it does

have merit when viewed as a preliminary exploration. It has clarified some

possible research questions and outlined a potential approach that could be

explored in a study on a greater scale, both in terms of the delivery of the

learning intervention and in the gathering and analysis of data. As has been

outlined above, the exploration of these issues within the further education

sector is both timely and necessary.

7 Reflection & Evaluation

7.1 Researchers Reflection:

This reflection is loosely structured on Kolb's reflective process and is a short summary of the key learning for the researcher from this project

- **Experience**

This was a single instance intervention utilising the internet and Plickers technology in an Inquiry based learning format to try to effect a change in the abilities of PLC learners to effectively evaluate the credibility of online sources of information. Detailed information on the learning intervention has already been provided in Chapter 3 - Design.

- **Reflect:**

On the whole, the learners who participated in the workshop and the focus group were positive about the experience. Some of the aspects of the workshop that worked well included:

- Using the 'real' internet.

- Basing activities on relevant and current events, e.g. Climate Change, Donald Trump.

- Encouraging discussion on the content **and** structural features of online information.

- Asking students to compare what they believe or accept as true off-line and online.

- Providing a framework and a series of steps that can be used to make decisions.

Aspects that did not work well:

- The session was too short.

- There were too many activities.

- There was a need to spend more time introducing Plickers.

- In terms of the research element, a larger sample group would have been most useful

From the researcher perspective, it would have made more sense to have delivered this workshop over an extended period which would have maximised the time available for reflection within the workshop. The importance of this was clear from the focus group which aside from being a data gathering session also gave learners a chance to reflect on the process and consolidate some of their opinions on the process as well as discuss these with their fellow learners. This I believe deepened the learning for this group form the session.

There were also issues outside of the scope of the intervention that seemed to be impacting on some members of the group in relation to how they view, and how they use technology in day to day settings. If there is an acceptance of the ubiquitous nature of technology and its penetration into day to day life then there are questions to be asked regarding the level of support and preparation the further education sector is offering to learners. This is especially relevant if there is an expectation that these learners will use technology in their learning which seems to be the case.

This is a wider issue than simply supporting the acquisition of information literacy skills but the development of these skills is, or should be a focus given their importance in supporting learners in their engagement with online media, tools and information. It is also a place to start the wider conversation with further education and training learners around the context of technology in their lives.

There is limited research into information literacy education among further education and training learners even though this is a one of the largest cohorts of learners in the state. Moreover, further education and training courses have a practical focus and many aim to provide not just an access route into higher education but also a bridge directly into employment. With both of these options increasing requiring more complex information management skills it is timely that there is research into how these learners are being supported in developing these, where there are areas of good practice and how the sector can support educators and learners in this respect.

- **Future work.**

If this project was to be repeated it would make sense to contextualise it within a particular class such as Communications or Personal Effectiveness. It would also be more useful if it formed part of a suite of learning on the specific information literacy skills needed by further education and training learners to operate effectively in online environments.

7.2 Evaluation: Kirkpatrick Framework

The Kirkpatrick Framework (Dewhurst et al, 2015) for evaluating learning was used to assess the effectiveness of the learning intervention and the research process.

It is important to highlight however that the Kirkpatrick process framed the evaluation of the learning intervention, but did not to provide an in-depth analysis of the study. Realistically a full and rigorous application of Kirkpatrick would not be feasible given the shallow depth of data available. However, the framework is a useful objective lens through which to examine the data that is available as well as provide a structure through which the gaps and areas requiring further work may be identified and commented on.

I. Reaction to the learning experience

In the context of a learning intervention exploring the effectiveness of the exercise in meeting its objectives is an important consideration.

In order to explore their reaction, during the focus group learners were asked their opinion of the intervention and whether it was something that they would recommend to others. The response to this was largely positive with the respondents indicating that it had been a beneficial experience for them.

> *"Really interesting and well worth the short time it took. Enlightening."*
>
> (C4, Female, 19)

Others made recommendations as to when it should be done during the academic year:

> *"I would recommend that the workshop is taught at the start of the year as it will be very helpful for research and school projects."* (F6, Female, 36)

> *"It's important that students are introduced to this important information at the start of their course / education."* (B7, Male 26)

In relation to the inquiry based learning model used, participants gave generally positive but limited feedback that was more to do with the real-time use of technology during the class than the active learning model used.

This may have something to do with the language capabilities in the classroom. An exploratory model is more difficult for students who struggle with the language and who are expected to be able to perform their own research and over half of this group would have had varying issues with the language.

II.   Learning

As outlined in the themes above, learners expressed views that there had been a positive impact on their knowledge of how to approach credibility assessments and some of the tools that enable them to do this. Some highlighted aspects of the session that they felt were especially useful:

> *"The idea of using many different search engines is invaluable."* (A2, Male, 42)

> *"…the google image search, being able to check a picture is very good… pictures carry information that is easy to see but it still can be wrong. I can use the image search to check. That is a good thing"*, (B, Male, 26)

However, in terms of actual skills developed the workshop was less successful;

> *"My level of knowledge has* [improved] *but I would need more practice to say that I am confident in what I am doing."* (R5, Female, 44)

This is can be attributed in part to the single instance nature of the workshop which did affect the potential for concrete, long-term learning, effecting quantifiable behaviour change from taking place.

III. Behaviour

Behaviour was also impacted by the short duration of the workshop. Despite this some learners did give anecdotal evidence of behavioural change. However, this was limited and due to time constraints, there was no opportunity to revisit participants to offer further learning opportunities or data gathering sessions. When asked about observable behavioural change, the class teacher was not able to offer specific examples but alluded to references made by one of the participants who said they had changed some of their online behavior.

IV. Results

The most that can be said about this workshop is that it was a positive experience for the learners, provided them with relevant, new knowledge, that by their own and their teachers estimation has some value for their future learning. From the research perspective, this study could characterised as having an opened a door but not passed through it. However, it has given a glimpse of some areas that can be further developed both in terms of learning opportunities for students and areas for more in-depth research.

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9 Appendices

Appendix A

Thesis Research Project Information Sheet & Consent Form: <u>Portlaoise Institute of Further Education Principal</u>

TITLE OF PROJECT: Can a technology based workshop improve the skills of PLC students in evaluating the credibility of online sources of information.

LEAD RESEARCHER: Mary Connell

BACKGROUND TO RESEARCH: This project aims to investigate if a technology based workshop can improve the skills of PLC students in evaluating the credibility of online sources of information. Access to learning content has changed dramatically over the past ten years. The mass of information from online sites has presented challenges and opportunities to learners. Learners require more sophisticated information management skills in order to synthesise greater volumes of online content. Moreover, the quality of data from online sources is highly variable therefore having strategies to evaluate the credibility and trustworthiness of online information is crucial.

PROCEDURES OF THIS STUDY:

Students who decide to take part will be asked to participate in an information literacy workshop. This workshop will take approximately four to five hours during a school day in Portlaoise Instutute of Further Education and will consist of a number of practical activities using a range of websites to research content. The activities will involve working in small groups to analyse different types of online information and reorganise online content into new forms. Participants may benefit from accessing information and resources to support their learning. No class credit is attached to this workshop.

Students will be asked to complete a survey at the start of the research period. They will also be asked to participate in a voluntary focus group or one to one interview session where responses will be tape recorded and then transcribed into note form. The researcher is the only person who will have access to the recordings and all data gathered will be stored securely in a locked filing cabinet and will be destroyed after the research is completed. If quotations are being used from these recordings they will be verified to ensure they are not taken out of context.

Course teachers may also be asked to provide feedback on how effective they felt the exercise to be in improving the ability of learners to evaluate credibility of online information. All research gathering will take place in person and not online.

PARTICIPATION: Participation in this study is entirely voluntary. Participants may withdraw at any time without penalty. Students are not obligated to participate in any way. They may choose to participate in some, all or none of the research process and/or activities. Participation is restricted to students aged 18 or over, on the PLC courses in Portlaoise Institute of Further Education.

ILLICIT ACTIVITY: In the unlikely event that illicit activities become known over the course of this research, these will be reported to appropriate authorities.

DATA RECORDING: The research survey is fully anonymous and doesn't require any personal information to be included. Information from the focus group and one to one sessions will be tape recorded but no names will be included. Participants can refuse to be recorded or have the recordings stopped at any time. No recordings will be made available in public or made available outside the research team.
An anonymous paper survey will be used and will be retained for the duration of the study in a locked cabinet and will be shredded at the end of the research period.

CONFLICT OF INTEREST: The researcher is employed by the Quality Assurance office of Laois & Offaly ETB, who manage the course provider. However, she has no direct contact with or knowledge of the students and is not involved in the teaching or assessment of these learners in the usual course of her work. The researcher does not work directly with any of the tutors teaching on these programmes in the normal course of her work.

DEBRIEFING ARRANGEMENTS: The researcher plans to meet with the student group in advance of the learning intervention to introduce herself and the premise of the research. Learners will be provided with this information sheet on the project can ask questions. The researcher will also provide opportunities for learners to speak or contact her privately if they so wish before and after the learning intervention. Tutors and teaching staff will be provided with the researcher's contact information as well as an information sheet and will have an opportunity to ask questions in advance and after.

PUBLICATION: The results from this study will be presented as part of the project work for a postgraduate degree in Technology and Learning (TCD) and may also inform the development of a Technology Enhanced Learning Strategy for Laois & Offaly ETB

PORTLAOISE COLLEGE OF FURTHER EDUCATION
PRINCIPAL CONSENT SECTION

DECLARATION:

- I am over 18 years old and I am competent to provide consent.

- I am the Principal of the Centre in which this research will be carried out

- I understand that all eligible students have been provided with information on this project and have been asked to provide informed consent.

- I have read, or had read to me, an information form providing information about this research and this consent form.

- I understand that the students' participation is fully anonymous and that no personal details about them will be recorded.

- I understand that it is a staff member of Laois & Offaly ETB running this study.

- I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I understand the description of the research that is being provided to me.

- I agree to student data being presented as part of the project work for the MSc in Technology and Learning Trinity College Dublin and the Technology Enhanced Learning Strategy of LOETB in a way that does not reveal students' identity.

- I freely and voluntarily agree to Portlaoise College of Further Education being part of this research study, though without prejudice to the centre's legal and ethical rights.

- I understand that the Institute may withdraw at any time without penalty.

- I understand that in the unlikely event that illicit activities become known over the course of this research, these will be reported to appropriate authorities.

- I understand that student data will be stored securely and deleted on completion of the study.

- I understand that the study involves viewing a computer screen and that if a student or anyone in their family has a history of epilepsy then they are proceeding at their own risk.

- I have received a copy of this agreement.

I _____consent to taking part in this research project.

Signature of Portlaoise Institute of FE Principal: _____ _____

Date:_____

Signature of Researcher (TCD):_____   Date: _____

Statement of investigator's responsibility:

I have explained the nature and purpose of this research study, the procedures to be

undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent. I undertake to act in accordance with the information supplied.

RESEARCHER CONTACT DETAILS: maconnel@tcd.ie

Thesis Research Project Information Sheet & Consent Form: <u>Course Teacher</u>

TITLE OF PROJECT: Can a technology based workshop improve the skills of PLC students in evaluating the credibility of online sources of information.

LEAD RESEARCHER: Mary Connell

BACKGROUND TO RESEARCH: This project aims to investigate if a technology based workshop can improve the skills of PLC students in evaluating the credibility of online sources of information. Access to learning content has changed dramatically over the past ten years. The mass of information from online sites has presented challenges and opportunities to learners. Learners require more sophisticated information management skills in order to synthesise greater volumes of online content. Moreover, the quality of data from online sources is highly variable therefore having strategies to evaluate the credibility and trustworthiness of online information is crucial.

PROCEDURES OF THIS STUDY:

Students who decide to take part will be asked to participate in an information literacy workshop. This workshop will take approximately four to five hours during a school day in Portlaoise Institute of Further Education and will consist of a number of practical activities using a range of websites to research content. The activities will involve working in small groups to analyse different types of online information and reorganise online content into new forms. Participants may benefit from accessing information and resources to support their learning. No class credit is attached to this workshop.

Students will be asked to complete a survey at the start of the research period. They will also be asked to participate in a voluntary focus group or one to one interview session where responses will be tape recorded and then transcribed into note form. The researcher is the only person who will have access to the recordings and all data gathered will be stored securely in a locked filing cabinet and will be destroyed after the research is completed. If quotations are being used from these recordings they will be verified to ensure they are not taken out of context.

Course teachers may also be asked to provide feedback on how effective they felt the exercise to be in improving the ability of learners to evaluate credibility of online information. All research gathering will take place in person and not online.

PARTICIPATION: Participation in this study is entirely voluntary. Participants may withdraw at any time without penalty. Students are not obligated to participate in any way. They may choose to participate in some, all or none of the research process and/or activities. Participation is restricted to students aged 18 or over, on the PLC courses in Portlaoise Institute of Further Education.

ILLICIT ACTIVITY: In the unlikely event that illicit activities become known over the course of this research, these will be reported to appropriate authorities.

DATA RECORDING: The research survey is fully anonymous and doesn't require any personal information to be included. Information from the focus group and one to one sessions will be tape recorded but no names will be included. Participants can refuse to be recorded or have the recordings stopped at any time. No recordings will be made available in public or made available outside the research team.
An anonymous paper survey will be used and will be retained for the duration of the study in a locked cabinet and will be shredded at the end of the research period.

CONFLICT OF INTEREST: The researcher is employed by the Quality Assurance office of Laois & Offaly ETB, who manage the course provider. However, she has no direct contact with or knowledge of the students and is not involved in the teaching or assessment of these learners in the usual course of her work. The researcher does not work directly with any of the tutors teaching on these programmes in the normal course of her work.

DEBRIEFING ARRANGEMENTS: The researcher plans to meet with the student group in advance of the learning intervention to introduce herself and the premise of the research. Learners will be provided with this information sheet on the project can ask questions. The researcher will also provide opportunities for learners to speak or contact her privately if they so wish before and after the learning intervention. Tutors and teaching staff will be provided with the researcher's contact information as well as an information sheet and will have an opportunity to ask questions in advance and after.

PUBLICATION: The results from this study will be presented as part of the project work for a postgraduate degree in Technology and Learning (TCD) and may also inform the development of a Technology Enhanced Learning Strategy for Laois & Offaly ETB.

<div align="center">

TEACHER PARTICIPANT CONSENT FORM

</div>

DECLARATION:
- I am over 18 years old and I am competent to provide consent.

- I have read, or had read to me, an information form providing information about this research and this consent form.

- I understand that my participation is fully anonymous and that no personal details about me will be recorded.

- I undertake to provide observations in line with ethical practices – no participant will be identified or personal details recorded.

- I understand that it is a staff member of Laois & Offaly ETB running this study but that no information in this study will be used to identify me.

- I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I understand the description of the research that is being provided to me.

- I agree to my answers being presented as part of the project work for the MSc in Technology and Learning, (Trinity College Dublin) and the Technology Enhanced Learning Strategy of LOETB in a way that does not reveal my identity.

- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

- I understand that in open question responses I must not name a third party.

- I understand that in the unlikely event that illicit activities become known over the course of this research, these will be reported to appropriate authorities.

- I understand that my data will be stored securely and deleted on completion of the study.

- I understand that the study involves viewing a computer screen and that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.

- I have received a copy of this agreement.

I _____consent to taking part in this research project.

Signature of Participant: _____   Date:_____

Signature of researcher (TCD):   _____   Date: _____

Statement of investigator's responsibility:
I have explained the nature and purpose of this research study, the procedures to be

undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent. I undertake to act in accordance with the information supplied.
RESEARCHER CONTACT DETAILS: maconnel@tcd.ie

Thesis Research Project Information Sheet & Consent Form: <u>Participants</u>

TITLE OF PROJECT: Can a technology based workshop improve the skills of PLC students in evaluating the credibility of online sources of information.

LEAD RESEARCHER: Mary Connell

BACKGROUND TO RESEARCH: This project aims to investigate if a technology based workshop can improve the skills of PLC students in evaluating the credibility of online sources of information. Access to learning content has changed dramatically over the past ten years. The mass of information from online sites has presented challenges and opportunities to learners. Learners require more sophisticated information management skills in order to synthesise greater volumes of online content. Moreover, the quality of data from online sources is highly variable therefore having strategies to evaluate the credibility and trustworthiness of online information is crucial.

PROCEDURES OF THIS STUDY:
Students who decide to take part will be asked to participate in an information literacy workshop. This workshop will take approximately four to five hours during a school day in Portlaoise College of Further Education and will consist of a number of practical activities using a range of websites to research content. The activities will involve working in small groups to analyse different types of online information and reorganise online content into new forms. Participants may benefit from accessing information and resources to support their learning. No class credit is attached to this workshop.
Students will be asked to complete a survey at the start of the research period. They will also be asked to participate in a voluntary focus group or one to one interview session where responses will be tape recorded and then transcribed into note form. The researcher is the only person who will have access to the recordings and all data gathered will be stored securely in a locked filing cabinet and will be destroyed after the research is completed. If quotations are being used from these recordings they will be verified to ensure they are not taken out of context.
Course teachers may also be asked to provide feedback on how effective they felt the exercise to be in improving the ability of learners to evaluate credibility of online information. All research gathering will take place in person and not online.

PARTICIPATION: Participation in this study is entirely voluntary. Participants may withdraw at any time without penalty. Students are not obligated to participate in any way. They may

choose to participate in some, all or none of the research process and/or activities. Participation is restricted to students aged 18 or over, on the PLC courses in Portlaoise Institute of Further Education.

ILLICIT ACTIVITY: In the unlikely event that illicit activities become known over the course of this research, these will be reported to appropriate authorities.

DATA RECORDING: The research survey is fully anonymous and doesn't require any personal information to be included. Information from the focus group and one to one sessions will be tape recorded but no names will be included. Participants can refuse to be recorded or have the recordings stopped at any time. No recordings will be made available in public or made available outside the research team.
An anonymous paper survey will be used and will be retained for the duration of the study in a locked cabinet and will be shredded at the end of the research period.

CONFLICT OF INTEREST: The researcher is employed by the Quality Assurance office of Laois & Offaly ETB, who manage the course provider. However, she has no direct contact with or knowledge of the students and is not involved in the teaching or assessment of these learners in the usual course of her work. The researcher does not work directly with any of the tutors teaching on these programmes in the normal course of her work.

DEBRIEFING ARRANGEMENTS: The researcher plans to meet with the student group in advance of the learning intervention to introduce herself and the premise of the research. Learners will be provided with this information sheet on the project can ask questions. The researcher will also provide opportunities for learners to speak or contact her privately if they so wish before and after the learning intervention. Tutors and teaching staff will be provided with the researcher's contact information as well as an information sheet and will have an opportunity to ask questions in advance and after.

PUBLICATION: The results from this study will be presented as part of the project work for a postgraduate degree in Technology and Learning (TCD) and may also inform the development of a Technology Enhanced Learning Strategy for Laois & Offaly ETB.

STUDENT PARTICIPANT

DECLARATION:
- I am over 18 years old and I am competent to provide consent.

- I have read, or had read to me, an information sheet providing information about this research and this consent form.

- I understand that my participation is fully anonymous and that no personal details about me will be recorded.

- I understand that it is a staff member Laois & Offaly Education & Training Board running this study but that no information in this study will be used to identify me.

- I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I understand the description of the research that is being provided to me.

- I agree to my answers being presented as part of the project work for the MSc in Technology and Learning, (Trinity College Dublin) and the Technology Enhanced Learning Strategy of LOETB in a way that does not reveal my identity.

- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

- I understand that in open question responses I must not name a third party.

- I consent to being observed, by the researcher through note-taking, while completing the tasks associated with this project.

- I understand that in the unlikely event that illicit activities become known over the course of this research, these will be reported to appropriate authorities.

- I understand that my data will be stored securely and deleted on completion of the study.

- I understand that the study involves viewing a computer screen and that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.

- I have received a copy of this agreement.

I _____consent to taking part in this research project.

Signature of Participant: _____   Date:_____

Signature of Researcher (TCD):_____   Date: _____

Statement of investigator's responsibility:
I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent. I undertake to act in accordance with the information supplied.
RESEARCHER CONTACT DETAILS: maconnel@tcd.ie

Appendix B

Workshop Lesson Plan.
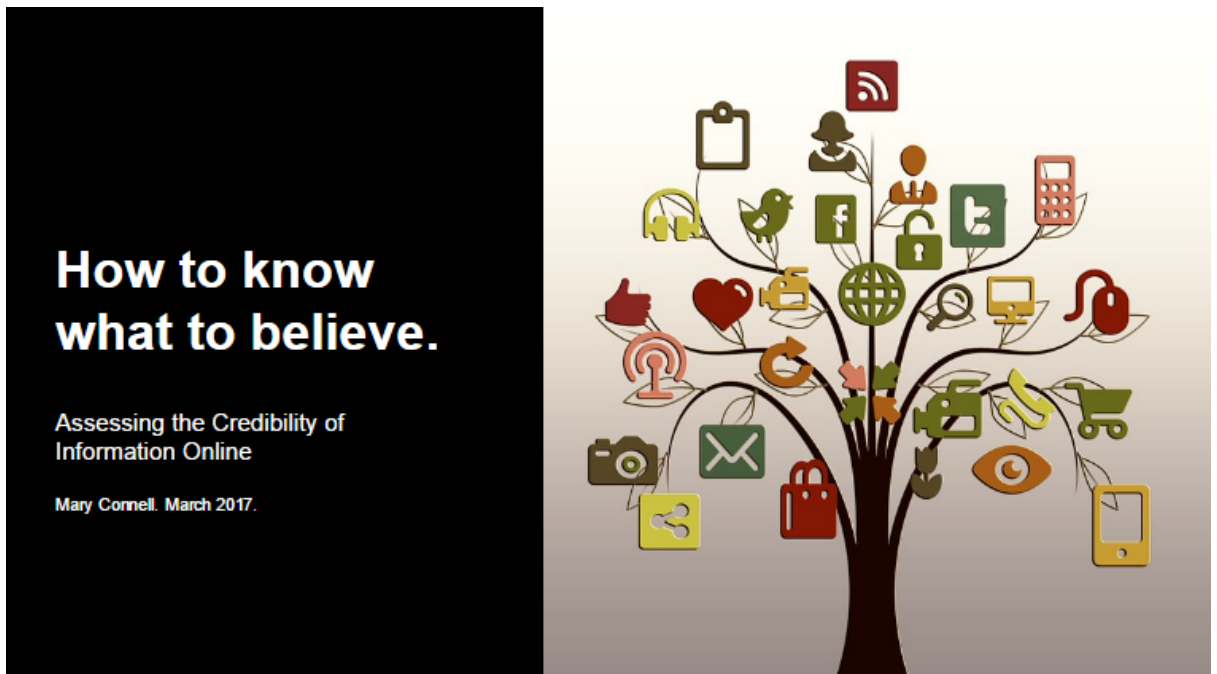
The workshop will provide a mixture of activities to explore each of these using a range of multimedia resources, including video, websites, presentations and traditional handouts.

A priority in the design of the workshop is the space for discussion and reflection. The questions to inform these spaces are reflective as reflection is an important aspect of developing the critical thinking skills necessary for information literacy.
(Paul 1990)

Students will be asked to complete a brief research survey before the workshop starts.

Learning Objectives:
After the workshop learners will
  ● Understand the importance of assessing the credibility of online information sources.
  ● Be aware of when they are making judgements based on assumptions.

- Understand the credibility issues attached to different forms of online information sources.
- Be able to demonstrate the skills required to assess the credibility of online sources.

Introduction & Context.
- Explanation of the research.
- An overview of the workshop
- Define credibility in the context of this workshop.

To do:
- Divide class into groups of 3 or 4 depending on numbers and get them to decide a group name. They will use this group name to tag their work. Ideally there should be one person in each group with good computer skills who will be responsible for the technical parts of the work.
- Hand out the Plickers cards and explain the technology.
- Give overview of the aims.

Introduction

1. ACTIVITY Icebreaker- Introduction. Introducing the idea of credibility. How we decide what's true. Setting the tone. (and Plickers calibration)

Funny questions using Plickers. Present a range of true and false questions about the facilitator to be answered by the group using Plickers:
- I excel at disco dancing
- I'm 22 years old.
- I have two pet dogs.
- I can swim a mile
- I'm a stand-up comedian in my spare time.

Discussion:

What criteria did they use to make the conclusions they arrived at. Credibility is a judgement based on a variety of factors that we may not even be fully aware of.

2. ACTIVITY: The search tool used affects your sources.
Relates to credibility as the sources you get will be affected by how you search for them

To illustrate how the search tools you use will affect the results you get. This is based on a straightforward keyword search in different search engines gives variation in the results obtained.

Instructions: Each group will be allocated a different search engine to each group and to look for **Migrant Crisis**
Each group to post a screenshot of their results to the Group Google doc tagged with their group name.

Point to note: That source evaluation starts with understanding how to access sources and the implications of how you search for them.

Continuation: Introduce the concept of Google operators and explore how these affect their search.
Activity: Redo the **Migrant Crisis** search on Google using search operators and compare results among the groups.
Discussion on the implication of the gatekeeping role of Search engines and how this is relevant to credibility. The objective is to introduce search operators as a way of focusing search results.

3. ACTIVITY.
Different Types of online information in learning.
Overview of the different types of information online: Blogs, V-logs, Websites, Discussion boards etc.

Instructions: Using Plickers answer multiple choice questions on the most appropriate forms of information are to use in learning.

Introduce Wikipedia and the aspects of this site that can be ethically used in learning.

Introduce Eli Pariser Ted Talk: Filter Bubbles and how to avoid them. https://www.ted.com/talks/eli_pariser_beware_online_filter_bubbles
Initiate discussion on the use of non traditional sources of information in learning.

4. ACTIVITY
Video: Metzgers 5 Indicators of Credibility: Authority, Accuracy, Objectivity, Coverage and Currency.

Overview of examples of what constitutes credible online information.

Get each group to do a credibility comparison on three websites presenting contrasting views of the topic of climate change?

Report back to the class group.

Discussion: what are the factors affecting the process of establishing credibility for online information. Is it straightforward? Are all the indicators present all the time? Does the question you are trying to answer affect the level of credibility you expect from a source? E.g. will you accept your news information from Waterford Whispers? Why / Why not?

5. ACTIVITY: Testing Trumps Tales.

Each team will be given a statement made by Donald Trump and will use online sources to explore the accuracy of the statement. The sources used should be assessed for credibility using the tools and approach covered in the workshop.

Each group should create a short presentation (3 -5 mins) and should present their work to the class. Sources can be mixed media as long as students are confident and can demonstrate that they have assessed them for credibility. :-)

Groups will have 40 minutes to source their information and create their presentation.

All participants can speak at the presentation which should cover:

1. Whether or not Donald's statement was correct and the information found to support or disprove his claim.
2. A description of at least 3 examples of the types of sources used, e.g. news articles, science journals, blogs, etc
3. How the skills from the workshop were used to assess these sources for credibility.

Students can use any presentation software they are comfortable with e.g. Google slides, google sites, PowerPoint etc.

Rounding off discussion.

Appendix C

Testing Trumps Tweets: Group 4

Healthy young child goes to the doctor, gets pumped with massive shot of many vaccines, doesnt feel good and changes -Autism
Donald Trump. 28th March 2014.

―――

Is it true?

We looked online and found a study that said Vaccines do not cause autism.

It was peer reviewed and in a medical journal and it looked credible. It wa also quite recent. Published in 2013.

http://www.jpeds.com/article/S0022-3476(13)00144-3/pdf?ext=.pdf

Verdict:
We do not agree with president Trump.

Testing Trumps Tweets

Remember, new environment friendly lightbulbs can cause cancer. D.Trump 17/10/2012

We found that this was somewhat true but not in all cases and only under some circumstances.

This is not about cancer but it does mention that the health risks from the bulbs are minor.

"if left unattended for 24 hours, a broken bulb will release from 0.04 to 0.7 milligrams of mercury. The researchers found that it would take weeks for the amount of mercury vapor in the room to reach levels that would be hazardous to a child"

National Geographic are a credible science source and the article is from 2014.

http://energyblog.nationalgeographic.com/2014/01/08/separating-myth-from-fact-on-cfls-and-leds-five-concerns-addressed/comment-page-1/

Appendix D

Pre Credibility Workshop Survey.

This survey is to gather information on how often a student checks the credibility or trustworthiness of online information. There are no right or wrong answers. It would be very helpful if you could answer all questions as honestly as possible.

Thank you!

Are you: Male _____ Female_____   Age: _____

1. Please select from the choices below how important the credibility of a site is to you when it comes to acting on, or using information from it?

1	2	3	4	5
Very important	Important	No opinion	No important	Not at all important

2a. Please write a brief description of how you currently check the credibility of online sites.

2b. Rate of activity. Please circle how often you perform the following activities when selecting online information.
Note: 1= never, 2 = rarely, 3 = occasionally, 4 = often, 5 = always.

	When I select online information I…	Note: 1= never, 2 = rarely, 3 = occasionally, 4 = often, 5 = always.				
1	Check to see if the information is current and up-to-date.	1	2	3	4	5
2	Consider if the views represented are facts or opinions.	1	2	3	4	5
3	Check to see what other sources and sites link to the site.	1	2	3	4	5
4	Seek out other sources to confirm the information is accurate.	1	2	3	4	5
5	Consider the author's goals/objectives for posting information.	1	2	3	4	5
6	Check to see who the author of the website or web page is.	1	2	3	4	5
7	Look for an official "stamp of approval" or a recommendation from a source I recognize or trust.	1	2	3	4	5
8	Check to see whether the contact information for that person or organization is provided on the site.	1	2	3	4	5
9	Check that author has the qualifications and credentials to provide the information.	1	2	3	4	5

Thank you!

Appendix E

Interview Protocol
Course tutors

Project: Can a technology based workshop improve the skills of PLC students in evaluating the credibility of online sources of information?

Date: _____   Time: _____   Location: _____

Interviewer: Mary Connell

Interviewee Gender and Number. _____

Consent form signed: _____

Notes for interviewee:
Thank you for your participation. This interview aims to gather feedback on the effectiveness of the activities your PLC students have participated in developing the skills required to evaluate information literacy among PLC students. There are no right or wrong answers and I would be grateful for your honest opinions and insights. With your permission I will tape record this interview and I will be the only person with access to this recording which will be destroyed on completion of the research.

Confidentiality of responses is guaranteed.
Approximate length of interview is 20 mins.

Interview questions for tutors.

- How would you describe the ability of your students to assess the credibility of online information before the workshop?
- Have students given you feedback on any aspect of the workshop that you can share?
- Have you noticed any change or difference in how your students are planning, and researching information, for their assignments?
- Have you noticed any change of different in how students are using online information socially?
- If so can you give example of how these things have changed?
- Is this attributable to the workshop in your opinion. Why / Why not?
- Any other observations.

Interview Protocol
Workshop Participants

Project: Can a technology based workshop improve the skills of PLC students in evaluating the credibility of online sources of information?

Date: _____   Time: _____   Location: _____

Interviewer: Mary Connell

Interviewee Gender and Number. _____

Consent form signed: _____

Notes for interviewee:
Thank you for your participation. This interview aims to gather feedback on the effectiveness of the activities you have participated in developing the skills required to evaluate information literacy among PLC students. There are no right or wrong answers and I would be grateful for your honest opinions and insights. With your permission I will tape record this interview and I will be the only person with access to this recording which will be destroyed on completion of the research.

Confidentiality of responses is guaranteed.
Approximate length of interview is 30 mins.

Interview questions for workshop participants.

- Had you ever thought about credibility in online information before?
- What did you think about the five aspects that we examined sites for?
- Did anything in the workshop surprise you?
- Will anything you learned change how you use the internet in learning?
- Will anything you learned change anything in how you find or use information?

Workshop & Technology
- Was a single instance workshop an effective way of teaching this topic?
- What did you think about the technology that was used in the session? Was it relevant? Was it effective?

Appendix F

Focus group respondent profiles

Respondent T1, Female, aged 40.

This respondent is an avid user of social media by her own admission. She uses apps such as Messenger to keep in touch with her family and would also use Google as the primary search engine when looking for information online. However, she was unfamiliar with the operation of search engines and was intensely surprised at the fact that search results, using the same search terms differed from person to person. She was also taken aback at the volume of personal information on habits, preferences and likes that certain sites could track during her day to day use. This was highlighted in the transcript in passages where she used emotive language such as 'scary', 'freaky' and 'creepy'. She also acknowledged concern regarding the lack of objectivity that could result from information bubbles created through personalised results and was able to identify specific skills that are necessary for locating and evaluating information and online sources.

Respondent A2, Male, aged 42.

This respondent is originally from Nigeria and so was fluent in English, however cultural variations in expression did require clarification from time to time. He was extremely practical in his focus both on the day of the workshop and in the focus group. His objective was to learn practical skills that he believed would be useful to him. Like T1, A2 was also unfamiliar with the operation of search and when asked what the most beneficial aspect of the session was for him he replied, "*Search Engines. Knowledge is power".* His answers to questions were usually objective specific however in relation to reflective questions he did

express insights in relation to how habitual behaviour or expectations online can cause problems in assessing credibility.

Respondent C3, Female aged 19,

This respondent was one of the youngest and least vocal of the group and often had to be prompted to speak. However, her responses were very reflective and generally considered. She was capable of summarising points and bringing instances of information together for the group and some of the topics she touched on led to dialogue and conversation among the others. She was objective about the use of the strategy to assess for credibility, observing that it was not a fool proof method but did increase the chances of making an effective judgement regarding the credibility of an online source. She also reflected on the practicality of implementing the strategy commenting that she found it difficult to apply all the criteria but that the act of consideration led her to think more critically about the information she was looking for.

Respondent C4, Female, aged 18.

This respondent was the youngest in the group and the most enthusiastic. Like respondent A2 the practical aspects held most appeal for her, commenting on tools referenced in the session, such as Google scholar as being something she would use. C4 also commented directly on the use of two heuristics in assessing credibility; Self-confirmation: *"We may have an opinion or a thought formed of a certain topic and if we see something online that kind of agrees with us we think oh, it must be right."* She also referred to the reputation heuristic in the comment, *"Like if someone is known for telling lies or even making lots of*

mistakes in what they say you will be checking what they say. If they have a reputation for being honest you are going to believe them. But if you think they don't always tell the truth you aren't." C4 also saw value in the workshop and commented that she had been passing the information from the session onto friends and family.

Respondent R5, (Female, aged 44)

In common with A2 this respondent is also originally from Nigeria and the same issues regarding clarification of comments existed.

This student highlighted the effect that technology seems to have had on individual's information search behaviour. She commented that, *"For example if I want to know about you or your profile I just put in your name and everything will appear on the screen. Whereas if I didn't have the internet I would find out the information form the person themselves."* In other word that there is a greater inclination to click instead of asking and running the risk of accessing misinformation. Similar to C3 this respondent was also aware of the limitations of the approach to establishing credibility and took a balanced view in mentioning that mistakes can happen with information providers with no malice intended. She seemed to retain more of the substance of the workshop than the others and commented on the value of it in that she had been encouraging her children to use the indicators in their own searches.

Respondent F6, Female, aged 36.

English was these respondents second language and this at times did hamper her participation, although from the researcher's perspective her language skills

were better than the student herself thought. Like C3, this student did reflect on the questions and provided considered answers, especially in relation to the effects of technology on behaviour, commenting *"The technology in a way has made us really lazy, because we don't think as much, we don't stress ourselves as much. We think that if we use Google that the information must be correct."* In common with the other students it was the information and exercise in relation to the search engines that made the greatest impression on this student.

Respondent B7, Male, aged 26.

This respondent was also a student for whom English was the second language. This had not been a consideration for the researcher before the session and it was this respondent's perspective to the introduction of the Google reverse image search function that highlighted the additional difficulties that ESOL students can face in accessing data that is not easily understandable and the benefits in being able to use and verify an image.

Appendix G

T: Some of the things I had thought about, some of the things I had thought about but I would have never, like clicking into a site say google if it comes up with a tick beside it I would have just thought its fine a trusted site and I would have thought its ok.

Chelsea: Not really...

Chloe: You would have thought it's reliable, it's the first thing you saw on Google you would have thought it's reliable.

Bradley: And with myself I usually think like that if you rely on pdf formats, that's the ones I look at it would make the source to be reliable other than looking on other search engines for the information. (Query re PDF and reliability)

Adelaja: You go to the places online that you are used to going and because you are used to them you think that they are truthful but now I see that they might not be. I had believed that the first results you get in google would be truthful. I didn't know how the search engine worked.

R: So you kind of, you had some, would I be right in saying you had some ways of checking for credibility but you didn't have all the ways?

Reply in the affirmative from all participants.

Ad: yes, I would have believed that the results from search engines, from Google would have been trustworthy because they would not give you the information unless you could believe it was true.

RE: Yet we know that there is a lot of misinformation online?

Bradley: But we believe.. we trust that a search engine like Google will only give the right information. I did not know how it worked.

Ruth: Yes.. it is trusting that you get correct information but without checking how can we know? Sometimes I would check on other sites but not all the time. Like Bradley I too thought that if it is on Google it must be correct.

Chels: I didn't know there were so many search engines. I knew about Bing and Google but i didn't know about the Duck one or the Dogpile.

RE: What do you think the implication of this is.

Funbi: Well if you stick to the one search engine then you can find it difficult maybe...I don't know...You end up just getting the information it wants you to have, not the information that perhaps you need....

R: Do you think it's important to be aware of this kind of information regarding online credibility and why you should check.

Reply in the affirmative from all participants.

Why?

T: Because we're taking information and we didn't know if it was true or not or how old the information was and there could be more up to date information out there that we could use.

Chelsea: And we could be passing that information onto more people and then everything else was getting mixed up. At least we know if we find a source that its reliable, that its right, its certified. (point re perpetuating misinformation)

2

Memo.

10/4/17

Look for Appearance as a code?
Appearance of a site scored highly
in the friendship test.

Could a poorly designed site with
accurate information fare less well
in a credibility judgement than
a well designed site with inaccurate
information.

[Include a
Heuristic Code]

* Confirmation bias in the friend-
ship survey is strong. 9 out
of 14 agree / strongly agree
that they trust online info if
it confirms what they know/ feel.

↳ Dangerous — review in light
of the two variable