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Web 2.0 tools and information literacy instruction in UK university libraries: Hype or reality?

William Shire, Assistant Librarian, Magdalen College, University of Oxford. Email: william.shire@magd.ox.ac.uk

Pamela McKinney, Lecturer, Information School, University of Sheffield. Email: p.mckinney@sheffield.ac.uk
Twitter: @ischoolpam ORCID: 0000-0002-0227-3534

Abstract

The literature reveals a clear debate around the use of Web 2.0 tools in information literacy (IL) instruction, with some commentators arguing that they effectively support pedagogy and others arguing that there is no sustained evidence for this. Instead, they argue that many librarians are reluctant to use the tools, hindering their overall adoption. This mixed-methods study incorporated a survey and interview to explore this debate. The aim of the study was to analyse the adoption and perception of Web 2.0 tools for IL teaching specifically within university libraries in the United Kingdom. The results revealed that there is initial evidence to suggest that a large proportion of librarians are actively using Web 2.0 tools to support IL pedagogy, but that there is also a smaller group that has a negative reaction to them and do not consider them beneficial.

This study provides new knowledge for researchers around the use of technology in IL teaching and librarians' perception of it, addressing a key gap in the literature around the UK university sector. Additionally, it is particularly useful for practitioners, as the issues it raises can improve the use of technology in IL teaching.

Keywords

academic libraries; constructivist theory; higher education; information literacy; technology-enhanced learning; UK; web 2.0

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1. Introduction

Information literacy (IL) teaching within university libraries in the United Kingdom has developed and expanded in recent decades and remained far from static. Instead, it has continuously altered to reflect pedagogical and technological developments (Bodleian Libraries, 2020; Cambridge Libraries, 2020; Sheffield University Library, 2020). Such developments can be seen in CILIP's recently updated definition of IL. As such, this study will define IL as 'the ability to think critically and make balanced judgements about any information we find and use' (CILIP Information Literacy Group, 2018).

Over time, the role of technology in IL teaching has continued to grow, with Pinfield et al. (2017) highlighting the importance of 'pedagogies supported by technology-enhanced learning' as a key developing trend within the sector (p.4). It has therefore been argued that these areas are mutually dependent. As technology and particularly the internet becomes increasingly important in our lives, it has been argued that IL teaching should adapt accordingly, helping to create 'a

more integrated learning environment' and to introduce support 'at the point of need' of students (Gersch et al., 2016, p.211).

One important aspect of this technology-enhanced learning has been the increasing use of Web 2.0 tools since their introduction. As this study focuses on the practical use of these tools by both IL teachers and students, it uses a broad definition of Web 2.0 as 'using the internet to provide platforms through which network effects can emerge' (Blank & Reisdorf, 2012, p.539). This broader definition of the tools encompasses several well-known and popular tools such as Twitter, Facebook, and YouTube, but also expands to other tools often used in a library environment. These include LibGuides, a tool that incorporates many Web 2.0 features by facilitating 'user-librarian interaction' (Bernier, 2010, conclusion, para. 1), and online quiz software that aims to create a similar networked interaction between student and teacher.

Due to its ability to aid users to generate their own content and communicate with each other over intuitive interfaces, Web 2.0 revolutionised the internet with several tools now considered 'ubiquitous' in society (Rose, 2011, p.35). Consequently, it has had a profound influence on pedagogy and in particular constructivist pedagogy. This influence can best be seen when the precise definition of constructivism is explored. It has been defined as a pedagogy that emphasises 'hands-on, activity-based teaching and learning' (Keengwe et al., 2014, p.888). As several of the Web 2.0 tools mentioned above incorporate features that support and facilitate dialogue between users, they can be considered as the perfect tools to easily implement and scaffold constructivism in the classroom by supporting interactive activities and increasing student engagement.

Since the introduction of Web 2.0 tools, however, there has been much debate on the role of these tools within IL teaching and the wider library sector. On the one hand, after their introduction Web 2.0 tools were embraced by several researchers who argued that such tools would revolutionise IL teaching (Farkas, 2012; McNicol, 2015). On the other hand, other commentators critiqued this initial enthusiasm, suggesting that their effectiveness has been hyped within IL teaching (Deodato, 2018; Godwin, 2009) and that the supposed benefits of technology-enhanced constructivist learning, such as increased levels of student engagement, are 'under-theorised' and 'only considered fragmentally in research' across the higher education sector (Bond et al., 2020, p.21).

This study aims to contextualise and revitalise this important debate within IL teaching in the United Kingdom, an area that has been under-researched previously. As a result of this, it not only addresses an important research gap, but also extends the knowledge base on university librarian opinions of Web 2.0 based pedagogical approaches to teaching IL. Furthermore, it is anticipated that interest in digital tools for teaching will continue to grow following campus closures caused by the coronavirus pandemic whereby traditional teaching became increasingly difficult, if not impossible (UNESCO, 2020).

To address this gap and to decide whether the use of these tools is hype or reality within IL teaching in the United Kingdom, the study had the following aim and objectives:

Overall Aim:

To study and analyse the adoption of Web 2.0 tools for IL teaching within university libraries in the United Kingdom.

Specific Objectives:

1. To discover which specific Web 2.0 tools are being used for information literacy teaching and hence gain a broader picture of their adoption.
2. To gain more information on how these tools are used in the classroom.
3. To analyse whether the use of these tools is linked to pedagogy.
4. To analyse teaching librarians' perceptions of these tools.
5. To analyse whether perceptions of these tools affect their overall adoption.

First the literature on the historical development and current practices of using Web 2.0 tools to teach IL in universities is presented. The mixed methods approach to the research is discussed, and the two data collection methods are detailed. The quantitative and qualitative results are presented, and then the data from both methods is discussed in relation to the literature. Finally, implications are drawn for IL educators seeking to use Web 2.0 tools in their own teaching.

2. Literature Review

2.1 Introduction

Unsurprisingly, the increasing use of Web 2.0 tools society-wide has greatly influenced the literature. This review aims to both summarise and analyse this literature. It will argue that the discussion of Web 2.0 tools has been divided chronologically and in terms of advocacy. It will demonstrate that one group of commentators has extolled their use in supporting pedagogy whilst another has criticised this viewpoint as mere hype that has not influenced professional practice and ignored librarians' perceptions around their effectiveness. To demonstrate this fact, four key chronological developments in the literature are analysed: (2.2) the initial discussion of Web 2.0 tools, (2.3) their perceived pedagogical benefits for teaching IL, (2.4) the subsequent criticism and rejection of the use of these tools and (2.5) a recent resurgence of an important link between pedagogy and technology.

2.2 Initial discussion

The concept of Web 2.0 tools was developed in the United States, O'Reilly (2007) can be considered a seminal writer. In an influential article, he not only defined Web 2.0 but also focused on how Web 2.0 would influence future software development. After its publication, several library practitioners quickly realised the importance of this development on both IL teaching and the wider library sector. This fact is perhaps best demonstrated in Singh's (2015) literature review of Web 2.0 technologies in libraries, which reported that in 2008, 79 articles were written on Web 2.0 and librarianship in various journals, revealing a clear and immediate interest in the field.

Singh's research focused on the use of Web 2.0 tools across the entire library sector, but specific interest in teaching can be seen in other commentators. In the early stages of Web 2.0 adoption the literature reflects an experimental approach to the use of these technologies in libraries. Some had optimistic opinions about its future (Adolphus, 2009; Whittaker & Dunham, 2009) and Click and Petit) argued that librarians needed to use these tools 'to remain relevant' (2010, p.138). Other commentators, such as Joint (2010), although agreeing that Web 2.0 tools had the potential to be useful, also began to list worries of using such tools as librarians were

grappling with technology developed 'outside of the library world' (p.491). Likewise, concerns over privacy and data protection were also expressed (Deodato, 2018). Quickly, therefore, librarians realised the importance of these tools and actively began to consider their influence for the sector.

2.3 Pedagogy and Information Literacy 2.0

Subsequently, research then divided. On the one hand, some researchers including Nygaard (2015) and Favaro (2012) began to link Web 2.0 use with pedagogical practice and connected them increasingly to constructivist pedagogies. Others began to further explore these ideas from a theoretical perspective, arguing that Web 2.0 tools could support constructivist approaches and hence 'enhance student learning' (Bobish, 2011, p.63). To support this hype around these tools, terms such as 'Pedagogy 2.0' (Farkas, 2012, p.87) and 'Information Literacy 2.0' (McNicol, 2015, p.303) were coined to describe an expanded form of IL teaching that would utilise the collaborative nature of these technologies to turn students into 'information producers, creators, and co-creators' (Spiranec & Zorica, 2010, p.144).

This initial theoretical perspective was then explored by researchers favouring a case study approach to investigate the effectiveness of these tools in a classroom setting. McLoughlin and Alam (2014), for example, in a case study that used Web 2.0 tools to teach social informatics, found that they can support an effective constructivist pedagogy, but only if the use of tools is scaffolded appropriately with learners. Likewise, Funnell (2017) used a case study to demonstrate that a specific Web 2.0 tool, in this case an audience response system, can increase student engagement. Finally, Sachs et al. (2013) used the results of a case study to reveal that audio-visual Web 2.0 tools can support effective learning and increase student satisfaction.

An initial review of the available literature, therefore, provides some evidence that the use of Web 2.0 tools in IL teaching can and does support creative constructivist pedagogical approaches. It is equally clear, however, that McLoughlin and Alam (2014) and Sachs et al. (2013) provide isolated examples of their adoption in a non-UK context and focus on sustained and compulsory IL education, a form of teaching that is rare in the UK. Likewise, these isolated case studies cannot provide a picture of the uptake and use of these tools across the sector and may, therefore, just represent examples of best practice.

A more holistic approach was adopted by Luo (2010) in a pioneering study which employed a survey and follow-up interviews to ascertain the uptake and use of such tools within IL instruction in the United States. Key findings were that many librarians were using these tools and that they were supporting 'constructivism-oriented pedagogical approaches' (p.32). While this was a national level study in the US, it is over ten years old so may not represent the current reality of the use of Web 2.0 technologies for IL teaching in the UK. It is, therefore, important to conduct more research not only from a UK perspective, but also to invite librarians that do not use these tools to participate in a study on their use in IL teaching. Otherwise, it is impossible to discover whether use of these tools is hype, or the reality praised by their proponents in the case studies above.

2.4 Criticism

The lack of evidence of widespread effective use of Web 2.0 tools has prompted critique of the enthusiasm for these tools in IL teaching. Godwin (2009) had concerns that using Web 2.0 to

teach IL had been overly hyped. Other commentators argued that the technology was being used for the sake of it (Adolphus, 2009). In an excellently balanced article, Farkas (2012) also highlighted the potential problems of using Web 2.0 tools, arguing that they could be problematic for students that are unfamiliar with them in their personal life. Furthermore, Deodato (2014) established broad criticism of the tools, emphasising first that there was a crucial lack of 'techniques for assessing [their] use and effectiveness', and arguing that 'the transformative potential promised within the literature' simply did not materialise across the sector (p.753). Bond et al. (2020) have further supported this point by emphasising that the concept of student engagement – a supposed key benefit of Web 2.0 tools in teaching – remains 'an under-theorised concept'…'only considered fragmentally in research' (p.21).

Secondly, there has been critique of the idea that such tools are commonly used, with commentators arguing instead that negative perceptions by librarians may have reduced their uptake. Deodato (2018), for example, mentioned attitudes of librarians towards social media as a potential barrier to their successful use across the sector. He stated that their lack of effectiveness 'may have more to do with philosophical rather than technical limitations' (2018, p.1) and argued that this discourages them from using tools like social media 'to create or add value to library content' (p. 21). This viewpoint is further supported in an article by Gardois et al. (2012) on Web 2.0 services across libraries, who again highlighted that attitudes needed to change to ensure their success. Finally, Dobozy et al. (2015) pointed out that attitudes are important, as Web 2.0 tools should not be used 'based on [their] novelty' (p.8). It is clear from the literature, therefore, that many researchers believe that attitudes towards Web 2.0 tools may affect their adoption, arguing instead that the initial enthusiasm for their transformative potential was hype. Again, however, there is a lack of sustained holistic research. Some commentators, such as Yi (2014) have investigated attitudes towards Web 2.0 tools in Australia, and others, such as Wright Joe (2015) have suggested that library staff may not be able to add tools such as social media to their existing workload as they feel they are already too busy. It is clear, therefore, that there is a lack of sustained research around perceptions of these tools from librarians in the United Kingdom, so more research is required.

2.5 Re-Emergence of link between pedagogy and technology

Finally, it is important to recognise a recent resurgence in research extolling a link between effective pedagogical practice in libraries and technology. Allen and Taylor (2017), for example, have argued that technology has become 'ubiquitous' in education (p.6) and cannot be ignored by librarians, especially as many higher-education courses have moved from a traditional classroom into blended or wholly online delivery that utilise Web 2.0 tools. The concept of Information Literacy 2.0, connected specifically to Web 2.0 has again featured in the literature (Rutledge & Lemire, 2017).

Other authors have linked the use of technologies such as Web 2.0 to the professional identity of librarians as teachers. Bawack (2019), for example, has used the term 'blended librarianship' to describe a librarianship of the future where librarians 'combine both the traditional skill set of librarianship with contemporary information technologies [including] Web 2.0 tools' in their teaching to become 'integral educational partners' (p.9-10). Likewise, Siwach and Malik (2019) have argued that formal training programmes must be advertised effectively and accompanied by 'online (self-help) tutorials' (p.21) to ensure that they are successful.

It is true that technology-enhanced learning is growing in importance; a fact perhaps best demonstrated in a recent review on the future of libraries that specifically highlighted 'connected

learning' focused on 'pedagogies supported by technology-enhanced flexible learning' as a key trend (Pinfield et al., 2017, p.4). The most recent literature, therefore, continues to discuss the importance of technology-enhanced learning and its pedagogical benefits, mentioning Web 2.0 tools that match O'Reilly's (2007) definition, even if the phrase Web 2.0 is not always used.

2.6 Summary

This literature review, therefore, has identified important gaps in the literature. Initial studies investigating the use and effectiveness of Web 2.0 tools when they were first introduced are followed by individual case studies. However, there is no study of the continued adoption and perception of such tools within university libraries in the UK, and only one comparable study of their early adoption and use in the United States. More research into the continued adoption and perception of Web 2.0 tools in IL teaching is therefore warranted.

3. Methodology

3.1 Methodological approach

Initial analysis of the aim and objectives revealed that varying types of data would be required to answer the research questions. Firstly, it was clear that research objectives focusing on specific Web 2.0 tools and how they are being used needed to be answered with measurable data, and as such quantitative research would be suitable (Bryman, 2012). Equally, however, it was also apparent that analysis of librarian's perceptions of Web 2.0 tools and whether their use is linked to pedagogy could not be adequately explored through quantitative data, as this would involve participants' thoughts and feelings around their teaching and the tools themselves. Instead, these objectives could best be answered with qualitative data, to reveal aspects of the participants' social world (Bryman, 2012). Finally, it was clear that measuring the impact of perceptions of the tools on their adoption would require both quantitative and qualitative analysis.

As both quantitative and qualitative data were necessary, a mixed-methods methodology was developed. A relatively recent development (Creswell, 2014), mixed-methods approaches have been linked to pragmatism as a research paradigm (Teddlie & Tashakkori, 2009). As such, mixed-methods approaches reject the dichotomy of qualitative and quantitative that are necessary in studies that are solely quantitative or qualitative and pragmatically realise that some questions can best be 'answered with information…in both narrative and numerical forms' (Teddlie & Tashakkori, 2009, p.8). Such an approach was beneficial for this study as it also provides more in-depth analysis as the two distinct forms of data are analysed together in one study (Creswell, 2014) and hence complement each other.

3.2 Data collection

3.2.1 Survey

The online SmartSurvey tool was selected to create the survey (SmartSurvey, 2019) which comprised thirteen questions. The initial questions were designed to collect demographic data such as age, years of experience, the form of IL teaching that participants delivered and the use of Web 2.0 tools. The last question then invited participants to a follow-up interview. If participants agreed to an interview, they listed their name and email address.

At the end of several questions, options were also given to provide more open-ended feedback. These open-ended boxes naturally provided qualitative data. They were, however, included to ensure that a wide range of qualitative responses were gained and to reduce the risk of having widely different sample sizes between the two forms of data in the convergent mixed-methods approach (Creswell, 2014). Due to time constraints, it was not possible to conduct more than a handful of follow-up interviews.

It was desirable to invite responses from librarians working in higher education nationwide, and data needed to be collected quickly and at low cost (Battaglia, 2008). As such, a link to the survey was distributed via email on relevant fora such as the LIS-Infoliteracy mailing list, and on Twitter resulting in a convenience sample of respondents. The survey was active for a total of two weeks between 13th and 29th May 2019 and was answered by 110 respondents (see Table 1).

Table 1: Summary of 110 Survey Respondent Demographics

What is your age?					
18-24	**25-34**	**35-44**	**45-54**	**55-64**	**64 and >**
2 (1.82%)	35 (31.82%)	38 (34.55%)	24 (21.82%)	11 (10.00%)	0 (0%)
How long have you been teaching IL?					
< 1 year	**1-3 years**	**3-5 years**	**5-10 years**	**10 years and greater**	
3 (2.73%)	23 (20.91%)	21 (19.09%)	19 (17.27%)	44 (40.00%)	
Who do you most often teach IL to?					
Undergraduates	**Postgraduates**	**Both**	**Other**		
28 (25.45%)	13 (11.82%)	58 (52.73%)	11 (10.00%)		
What is the format of your IL classes? (selecting all that apply)					
Formal credit courses	**Both credit and non-credit**	**Both credit and non-credit**	**Independent in-house workshops**	**Induction sessions**	
2 (1.82%)	70 (63.64%)	12 (10.91%)	86 (78.18%)	101 (91.82%)	
What is the delivery mode of your IL teaching?					
Face-to-Face	**Online**	**Both**			
57 (51.82%)	2 (1.82%)	51 (46.36%)			

The distributed survey is included as Appendix 1.

3.2.2 Interviews

The interview questions were designed to discover more information on perceptions of Web 2.0 tools, and whether this affected their use in teaching. A guided focused approach was adopted (Bell & Waters, 2014), where the interviewer did not attempt to control the entire interview process (as in a structured approach), but rather emphasised a framework of key questions which guided the direction and content of the interview.

In total, eight broad questions were developed for all interviews. They focused on participants' perception of Web 2.0 tools both in the past and present and whether any factors would improve

their perception of them. Under each broad question, several prompts were included to aid discussion. These prompts related directly to the themes raised in the survey data and were included to ensure that interview participants added to the existing data and provided richer qualitative data around them.

In total, three interviews were conducted, with participants selected from survey respondents. These participants were selected based on years of experience and seniority level (see Table 2).

Table 2: Summary of Interview Participants

Interviewee	Experience (years)	Seniority:
1	1	Low
2	3-5	Intermediate
3	5-10	High

All interviewees were female and in the age range of 20-50. The final interview schedule is included as Appendix 2.

3.3 Research ethics

This study naturally involved collecting data from human participants, so raised ethical considerations around the use, anonymity and storage of data. As such, several steps were taken to ensure that any ethical concerns were addressed.

Informed consent was sought for both data collection methods. Participants were made aware of the purpose of the research, the risks involved in participating and stated how data would be stored. Participants had to indicate their consent to access the online survey and were required to sign a consent form at the interview. The survey questions were designed to preserve anonymity, and participants only revealed their contact details if they specifically wanted to be included in the interview aspect of the study. After interview completion, all personal information was deleted, and any information that might personally identify an interviewee has been removed from the data reported here. Finally, all data was stored on a secure data drive.

This research received ethical approval from the Information School at the University of Sheffield.

3.4 Data analysis

Data analysis was completed in two stages. The quantitative data was analysed using descriptive statistics to ascertain appropriate mean, median and mode values. The second stage involved analysis of the richer qualitative data using the Interpretative Phenomenological Approach (Fade, 2004) which was chosen as it focuses on individual ‘human experience’ (Fade, 2004, p.647). The interviews were transcribed, then combined with the qualitative data from the surveys. This data was analysed thematically (Fade, 2004). These themes were then grouped into categories and compared to give an overall idea of the perceptions of Web 2.0 tools across the qualitative data.

3.5 Limitations

Although every care was taken to develop an effective methodology, it clearly contains certain limitations. To begin with, the convenience sampling used to attract participants was potentially biased. As Battaglia (2008) points out, convenience sampling 'does not allow the research…to have any sense of what target population is represented by the sample' (p.149). Although many responses were gained from librarians, the study cannot be deemed to be a representative sample of all teaching librarians. The respondents to the survey were self-selecting, and may disproportionally represent opinions of librarians who have engaged with Web 2.0 tools in their teaching.

Likewise, the survey assumed that the use of larger numbers of tools in multiple ways as greater adoption of the technology. Whilst this is undoubtedly correct, it does not take into account the fact that some librarians may be using only one tool in one complex way very effectively. More research is necessary to consider this individual usage.

Finally, the interview sample of three interviews is small. Although effort was taken to ensure that this sample was representative of librarians with different levels of teaching experience, three interviews cannot be taken to be representative. Likewise, all interviews were conducted with participants working in libraries located in South-East England, so there is a geographical bias to the results.

4. Results

The findings from the quantitative and qualitative data are reported separately below, before they are combined and contrasted in the final discussion section.

4.1 Quantitative results

4.1.1 Current use

Participants were asked to identify the tools they currently used for IL teaching in a UK context, and could select as many options as they liked (see Figure 1).

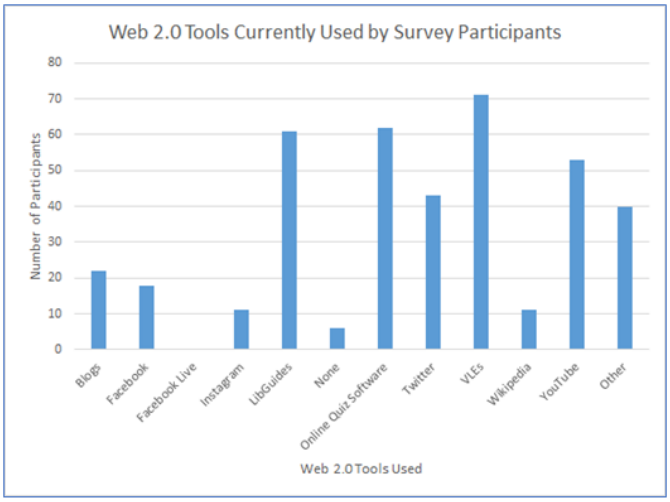

Figure 1: Current use of Web 2.0 tools

The mean number of tools used per participant was 3.8, the median was three and the mode was also three. Clarifications and examples of the Web 2.0 tools listed above were included in the original survey (Appendix 1) to aid participants.

4.1.2 Intended use

Additionally, survey data revealed that participants use Web 2.0 tools in several different ways for teaching purposes (see Figure 2), with improving student engagement (79.09%), facilitating course delivery (75.45%) and advertising courses (53.64%) being the top three answers (see Figure 2).

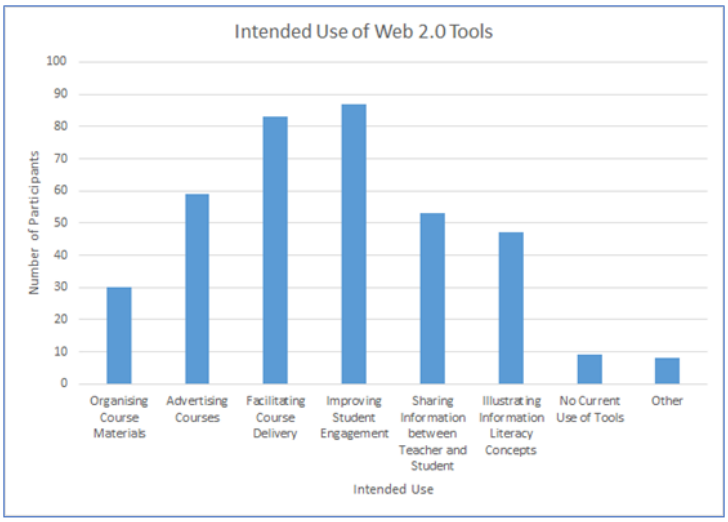

Figure 2: Intended use of Web 2.0 tools

4.1.3 Opinions of Web 2.0 tools

The survey also asked for current opinions of Web 2.0 tools, 48 reported them to be 'very useful' (43.64%), with 44 agreeing they were 'somewhat useful' (40%). Participants were asked if their opinions of Web 2.0 tools had changed over time, and 36 stated that they thought the tools had become 'more effective' (32.73%), whereas 61 stated that the tools had 'remained static' (55.45%). The quantitative opinion data from the survey, therefore, suggests an overly favourable attitude to the tools but suggests that this attitude has remained static over time for a large part of the overall survey population.

4.1.4 Effect of opinion on usage:

Finally, descriptive statistical analysis of the quantitative results revealed that there is a relationship between participants' expressed opinion of Web 2.0 tools and the adoption of increasing numbers of tools used in multiple ways. These results can best be seen in Table 3 below.

Table 3: Effect of Participant Opinion on Web 2.0 Usage

Opinion of Web 2.0 Tools	Average Number of Web 2.0 Tools Used per Participant	Average Number of Cited Uses of Web 2.0 Tools per Participant	Number of Participants with this Opinion
Don't use Web 2.0 tools	0	0	5
Not useful	N/A	N/A	0
Not very useful	2	2	1
No strong opinion	1.54	1.36	11
Somewhat useful	3.8	3.55	45
Very useful	4.5	4.08	48

This analysis demonstrates that librarians who find Web 2.0 tools 'somewhat' or 'very' useful are much more likely to adopt multiple Web 2.0 tools

4.2 Qualitative results

Qualitative data from both the survey and the interviews revealed several positive aspects of using Web 2.0 tools for IL teaching, and areas where there were concerns.

4.2.1 Positives

Increasing engagement

The benefit listed by the highest number of participants was the fact that they felt Web 2.0 tools could increase student engagement. In total, this benefit was mentioned 15 times in the qualitative survey and interview data with survey participants writing that that the tools 'are incredibly useful at getting engagement with students' and 'brilliant for interactivity'.

This theme was also further enhanced in the interviews. One interviewee, for example, praised the fact that Web 2.0 tools can help the library 'to connect to readers', saying:

> *It lowers the barriers [between library staff and students] …we try to keep teaching informal and Web 2.0 helps with that*

Facilitating delivery of content

A second positive theme from the qualitative data is the perception that Web 2.0 tools can help facilitate the delivery of teaching content to a wider audience. Several participants praised the fact that Web 2.0 tools allow them to deliver content 'at the point of need', highlighting that tools such as LibGuides and YouTube are particularly useful.

Varying teaching
A third key theme raised was that Web 2.0 tools also help librarians to vary their teaching. Six survey respondents highlighted their 'variety' and one mentioned they value the tools as they make 'teaching vary from the otherwise traditional methods used in students' academic study'.

Interestingly, respondents explained further pedagogical benefits of this variance, arguing that it helps them to support all types of students. One respondent highlighted that the variety of Web 2.0 tools improves IL teaching as they make the teaching:

> *...accessible in terms of ease of access, as well as accessible to people with learning support needs.*

Easier to use
Finally, participants revealed that they now have a more positive attitude to Web 2.0 tools because they have become easier to use, even for self-confessed 'non-techies'. Librarians reported in both the survey and follow-up interviews that they find tools easier to use now because their use in education has been further explored. One interview respondent wrote that their 'understanding of how [the tools] can be used in teaching' has improved massively.

4.2.2 Concerns
Need to use tools carefully
The most widely listed concern in the survey qualitative data was the opinion that Web 2.0 tools must be used carefully and that their incorrect use can have a detrimental effect on teaching. Survey participants noted that they should be connected to a specific pedagogy, writing that they can be useful if they 'fit the pedagogical approach' but that it is important to recognise that not all students either feel comfortable using Web 2.0 technology for either personal or financial reasons as they do not have consistent access to computers and/or smartphones.

These ideas were then further explored in interviews. One interviewee discussed this concern in depth, stressing that it is important for libraries to think 'logically' about why tools are being used and that you need to develop a plan for using them instead of 'just jumping into the deep end'.

Danger of appearing 'gimmicky'
Another concern was the perception that using them for the sake of it can have a detrimental effect and make teaching 'gimmicky'. One participant, for example, mentioned that such tools can be 'a bit cringe' and when used ineffectively can become 'uncomfortable and unappealing to your target audience'. An interviewee also completely agreed with this idea, saying:

> *If you try and get too gimmicky…it can cause students to take you less seriously and makes you look less professional.*

Lack of time and support
A third concern was the fact that many feel they receive inadequate training and support in using Web 2.0 tools effectively. One survey respondent, for example, highlighted that 'no local training' exists for library staff. Another respondent suggested that it would be beneficial to see 'good examples from colleagues and get help from experts' in their use.

Additionally, respondents stated they did not have enough support from senior management around the tools. One argued that they needed to 'have confidence...from managers to practise

and learn' and several others highlighted that the nature of their roles meant they did not have enough 'time to properly look into the full use of…Web 2.0 tools'.

Web 2.0 outdated

Finally, it is important to mention that a minority of respondents reacted negatively to the term Web 2.0 itself, reporting that they were surprised to see the term still used. One, for example, stated that they had not heard the term used 'for about 5 years' and another suggested that 'these tools are just a part of the standard web' arguing that 'they are just part of the natural workflow'. Instead, one respondent suggested that the term 'technology-enhanced learning' would perhaps be best. The fact that a certain part of the survey population reacted negatively suggests that future research in this area may need to be worded differently.

4.3 Summary

This study has produced interesting data around the central research aim. In the first place, the initial quantitative data provided much needed information on the use and opinion of Web 2.0 tools for IL teaching. It reveals one larger population that actively uses the tools and has a high opinion of them and a smaller population that avoids their use and has a negative opinion of them. The subsequent qualitative data helps to explain this reality. Librarians listed many positive aspects of using the tools, such as increasing student engagement, facilitating content delivery and varying teaching. Likewise, several concerns were listed, such as a need to use the tools carefully and a lack of time and support to use them effectively.

5. Discussion

Below, the results are discussed in more detail, in the context of the research literature, and are structured in relation to the research objectives of the study.

5.1 Ascertaining the use of specific Web 2.0 tools

Firstly, the initial quantitative data clearly shows that most respondents used at least one Web 2.0 tool in their teaching (94.55%) and that the mean number of tools used per participant was three. Moreover, the survey provided key information on the use and popularity of specific Web 2.0 tools, which can be directly compared to Luo's study. The specific tools mentioned corresponded with three of the tools mentioned in this study (Luo, 2010,) as it also revealed that YouTube, blogs, and Wikipedia are used for IL teaching in the UK. Published in 2010, the Luo study is now rather outdated, but it is the most recent comparable study available in the literature. These results, therefore, suggest that YouTube, blogs, and Wikipedia have continued to be relevant over time.

Regarding the wider significance of these findings, it is first important to recognise that these results are not representative of the entire teaching population as responses were gained through convenience sampling. Despite these limitations, however, these results do have wider significance within the literature beyond initial comparisons with Luo. The fact that such a large proportion of the survey population utilised at least one Web 2.0 tool in their teaching and the majority used several different tools supports Allen and Taylor's (2017) argument that technology has now become near 'ubiquitous' in supporting education (p.6). Likewise, these results can be taken to support Bawack's (2019) proposal of 'blended librarianship' (p.9–10), as the use of Web 2.0 tools is clearly widespread.

5.2 Use of Web 2.0 tools in the classroom

As demonstrated above, participants reported using Web 2.0 tools for several reasons, ranging from improving student engagement (79.09%) to facilitating course delivery (75.45%), advertising courses (53.64%), and illustrating IL concepts (42.73%). This study, therefore, has provided a snapshot of the variety of the uses of Web 2.0 tools by librarians in the UK.

It is particularly interesting that the most cited use of Web 2.0 tools was to encourage student engagement (mentioned by 79.09% of participants and the most cited use in qualitative data). This specific result, therefore, echoes the case study research on Web 2.0 tools that has revealed that Web 2.0 tools can increase student engagement (Funnell, 2017; Sachs et al., 2013) and demonstrates that there is wider interest for this aspect of the use of Web 2.0 tools than the limited case studies suggest.

5.3 Use of Web 2.0 tools and pedagogy

Discussion around the intended use of Web 2.0 tools naturally leads to discussion around whether these tools support librarians' pedagogical choices. This fourth objective was considered necessary as the literature review clearly revealed that many proponents of Web 2.0 tools believe them to be useful as technology can aid effective constructivist pedagogy (Bobish, 2011; Favaro, 2012; Nygaard, 2015). The results from this study reveal that this objective was mostly met. As respondents may not have been familiar with the term 'constructivism', question 9 of the survey was based on Luo's results to ascertain if participants were using Web 2.0 tools in a constructivist way or not. Luo (2010) developed three levels of increasingly complex Web 2.0 use and these levels were adapted for the survey, with each use listed in increasing complexity. The first uses suggested more basic use of the tools, and the later uses more constructivist use as they involved using the tools to scaffold teaching, encourage communication and support activity-based learning.

Analysis of the results suggests a complex relationship between the use of Web 2.0 tools and pedagogy. On the one hand, the results clearly suggest that not all tools are used to support a constructivist pedagogy. Of participants, 27.27% used the tools to organise course-related material and 53.64% of participants used them to advertise courses. These uses are not related to teaching activity and therefore do not create 'the hands-on activity-based teaching' that a constructivist pedagogy promotes, as highlighted in the literature review (Keengwe et al., 2014, p.888).

On the other hand, the results do demonstrate clear evidence of complex use of the tools by large numbers. As mentioned above, 79.09% of respondents use the tools to improve student engagement in lessons, which is related to a constructivist pedagogy that tries to build an effective dialogue between student and teacher. Likewise, the fact that 48.18% of respondents use them to enable students to share information and 42.73% to illustrate IL concepts suggests that many respondents are connecting use of the tools with a constructivist pedagogy, as they are involved in creating and enhancing not only a dialogue between student and teacher, but also getting students to create and share their own thoughts.

Finally, the fact that many respondents explicitly mentioned pedagogy in the qualitative data further supports the argument that there is evidence of teaching librarians connecting their use to pedagogy. One respondent, for example, stressed the importance of focusing on 'pedagogy…to use the tools effectively' and another highlighted that the 'tools should ideally fit the pedagogical approach'. Indeed, such librarians have clearly responded to the negative

arguments expressed by Dobozy et al. (2015) and Adolphus (2009) in the literature review that the tools should not just be used for the sake of it and because they are novel. The results, therefore, are again mixed. A smaller percentage of librarians are not using the tools to support pedagogy or in their teaching at all, but only for marketing and organising their teaching materials. The greater number of librarians that are using the tools in more complex ways and explicitly mentioning pedagogy, however, suggests that Nygaard (2015), Favaro (2012) and Bobish (2011) are correct to argue that the tools can support pedagogy, and particularly a constructivist one. More research will be required to ascertain whether this pattern is true across the entire population.

5.4 Perceptions of Web 2.0 tools

A plethora of opinions regarding the use of Web 2.0 tools were revealed. On the one hand, initial analysis supports some negative perceptions of the tools as highlighted in the literature review. Gardois et al. (2012), for example, suggested that librarians' 'attitudes' have needed to change and more positive ones adopted to 'effectively engage' with Web 2.0 users (p.92) and Dedoato (2018) suggested that many librarians may have negative attitudes to their use. Such negative perceptions are reflected in the qualitative results, as the most mentioned negative idea around the tools was the fact that many are cautious about using them. Likewise, participants reported that not all students can be expected to understand or embrace the use of technology, so it can be detrimental, which corresponds to the negative argument expressed by Farkas (2012). One interviewee is representative of this opinion, as they stressed that they do not add anything 'to pedagogical method' and used an anecdote of a student with a dislike of technology as an example of the need to use such tools cautiously.

Despite this, the quantitative data revealed that most respondents had a positive view of the tools, as 84% of participants described them as either 'somewhat useful' or 'very useful'. The qualitative results further supported this finding, as several positive perceptions of the tools were also mentioned. These results, therefore, reveal that attitudes do not need to change across the entire sector. Indeed, further analysis of the negative perceptions identified from the qualitative data reveals that some key negative points mentioned in the preceding section could perhaps more accurately be described as frustrations, such as a lack of time and training. If anything, therefore, these results suggest that it may be the attitude of senior management towards giving staff time to experiment with new technology in teaching that needs to change, and not always that of practitioners themselves.

5.5 Perception and usage rates

Finally, this study aimed to discover whether perceptions of this technology may inhibit its usage in teaching. This issue is often raised in the literature, mentioned specifically by Deodato (2018), Gardois et al. (2012) and Godwin (2008). The quantitative data revealed that there is a relationship between the opinion of survey participants and their use of tools, with the groups that have a higher opinion deciding to use more tools in a wider variety of ways (see Table 3). It is first important to note that the large difference in sample sizes between the respective opinion groups in the results means that more research followed by more complex statistical analysis is required to determine a definitive correlation. Despite this important limitation, however, there is a particularly large increase between those participants with 'no strong opinion' of the tools and those that feel they are 'somewhat useful' or 'very useful', as both the number of tools and their uses practically double. It could be argued, therefore, that initial analysis of these results supports the arguments raised by previous research.

Further analysis, though, reveals that the reality is more complex. Indeed, perhaps the salient point from this table is the fact that there is clearly a much smaller increase in the number of tools used and the variety of uses between the group that finds them 'somewhat useful' or 'very useful'. At first glance, this is surprising as a higher use of the tools would perhaps be expected from those with the highest opinion if perceptions had such an important impact. This situation is where the qualitative data is perhaps most useful as it directly complements the quantitative data. As highlighted above, some of the negative perceptions of Web 2.0 tools mentioned in the qualitative data, such as time pressures and a lack of institutional support, can best be described as frustrations rather than negative perceptions per se. Consequently, the results suggest that these barriers to usage may also play an important role. The interview data also provides further credence to this argument. One interviewee reported that they would use the tools more if they had 'enough time' to experiment. Likewise, another suggested that their institution could also 'be a bit more proactive' at supporting Web 2.0 use within teaching.

This study therefore suggests that Deodato (2018), Gardois et al. (2012) and Godwin (2008) are correct to argue that perceptions can impact decisions to use Web 2.0 tools. However, results indicate that the focus should not necessarily be on negative perceptions inhibiting their use. There is initial evidence for this reality, but the combined results firstly reveal that most participants have a positive opinion of Web 2.0 tools for teaching and that this encourages them to use the technology more, and in ever complex ways. Secondly, the results also suggest that other factors, such as a lack of time to experiment with tools and senior management support, may also play a role in the ways that librarians interact with these tools for IL teaching. More research is required to explore the widespread effect of such barriers and whether this pattern can be considered representative of the entire country.

6. Conclusion

This research aimed to study the adoption and perception of Web 2.0 tools amongst librarians that teach IL at university libraries in the UK. Based on the analysis of the quantitative and qualitative data, it can be concluded that the adoption and perception of such technology across the country is mixed. As detailed above, however, further analysis reveals the following conclusions:

1.) That most of the participant group actively use Web 2.0 tools and suppositions from the data reveal that large numbers use them to support a chosen pedagogy, believing this usage to be beneficial for their teaching.

2.) That there is a smaller group with the opposite opinion, as they avoid using and actively dislike using the tools for teaching.

3.) That there is a third group that considers the tools to be beneficial but may not utilise them as much as they want due to other barriers, such as a lack of time and support from senior management.

4.) That there is a relationship between librarians' perceptions of these tools and their use, as librarians' reporting a higher opinion of the tools used them more and in wider ways in their teaching.

The results from this study, therefore, suggest that widespread complex use of Web 2.0 tools in IL teaching is neither hype nor reality in UK university libraries. Instead, the real use of Web 2.0 tools falls somewhere in between these extremes. In the data, there is evidence of complex use

amongst a large part of the study population and many librarians clearly have a positive opinion of the benefits they can have on teaching. On the other hand, however, it is clear that a smaller group of librarians have chosen to not use the tools and that many provide valid criticisms and concerns of their use in teaching, revealing that the most complex uses of the tools have not yet become reality across the entire teaching population.

6.1 Future research

The results from this investigation have only started to address what was an important gap in the literature. Future research, therefore, is required and should aim to address methodological issues. Firstly, a study using systematic sampling would aid these results significantly, as it would 'give the most reliable representation of the whole population' (Walliman, 2006, p.76). Secondly, as Robson and McCartan (2016) point out, observation of individual teaching sessions could be advantageous in future study, as 'interview and questionnaire responses are notorious for discrepancies between what people say they have done...and what they actually did' (p.320).

Additionally, the discussion suggested that other factors, such as a lack of time and support from management, could affect Web 2.0 usage. Future research could therefore aid this study by exploring these barriers in more detail. Likewise, the research revealed that the term "Web 2.0" has multiple meanings for different people, so future research could use updated terminology such as 'technology-enhanced learning' to expand the research scope further. Finally, the results of this study suggest a relationship between perception of Web 2.0 tools and usage, but future research could expand on these results by widening the number of survey participants and then performing more detailed statistical analysis to establish if a clear correlation exists.

6.2 Wider significance

Despite this need for future research, these initial results are useful for both practitioners and LIS researchers. Practitioners can firstly use the results to improve teaching, as they reveal the most popular tools and the most common uses. Likewise, the range of qualitative responses gathered on the perceptions of Web 2.0 tools is of interest, as they recommend that librarians carefully consider how they use the tools and connect them with an underlying pedagogy. Indeed, this study is particularly recommended for practitioners wishing to implement a constructivist pedagogy, as the study both introduces the concept and demonstrates practical ways that practitioners can use these tools to support this pedagogy, such as using them to enable students to interact with the teacher and each other, or using them to improve student engagement.

Finally, research into the use of technology within IL teaching will continue to gain in importance into the future. Indeed, Web 2.0 technology is part of a wider trend towards the increasing use of technology-enhanced learning throughout university libraries (Pinfield et al., 2017) and the higher education sector (Dunn & Kennedy, 2019). As such, this study is particularly useful not only to researchers interested in Web 2.0 applications, but also to researchers interested in the ways that librarians interact with technology at a more general level. The fact that the use and perception of Web 2.0 technology is mixed is particularly useful for such researchers, as it can be compared with new technological developments as they arise. Librarians that teach IL will continue to face new technological developments – especially as the current coronavirus pandemic can close traditional classroom spaces and makes remote learning a necessity. This study, therefore, provides a sound introduction into the ways that teaching librarians have

reacted, and indeed continue to react, to the changes brought about by the Web 2.0 revolution.

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Appendix

Appendix 1: Distributed survey questions

Web 2.0 tools and IL Instruction in UK University Libraries: Hype or Reality?

Survey Questions

1. **What is your age? ***

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 64 years or older

2. **How long have you been teaching IL? ***

- ☐ Less than one year
- ☐ One to three years
- ☐ Three to five years
- ☐ Five to ten years
- ☐ Ten years or more

3. **Who do you most often teach IL to? ***

- ☐ Undergraduate Students
- ☐ Postgraduate Students
- ☐ Both
- ☐ Other (please specify):

4. **What is the format of your IL classes? (Please select all that apply) ***

- ☐ Formal credit courses that last a semester/term
- ☐ Non-credit sessions that are part of a formal course
- ☐ Both credit and non-credit courses
- ☐ Independent in-house workshops offered by the library
- ☐ Induction sessions offered by the library

5. **What is the delivery mode of your IL teaching? ***

- ☐ Face-to-face
- ☐ Online
- ☐ Both of the above

6. **Which Web 2.0 tools (if any) do you CURRENTLY use in any part of your teaching? (Please select all that apply) Use of Web 2.0 Tools could include their use when preparing or advertising sessions, delivering content online, or during a live teaching session. ***

- ☐ Facebook
- ☐ Facebook Live

- ☐ Twitter
- ☐ Instagram
- ☐ LibGuides
- ☐ YouTube
- ☐ Blogs
- ☐ VLEs (such as Blackboard or Canvas)
- ☐ Wikipedia
- ☐ Online quiz software such as Kahoot or Turning point
- ☐ None of the above
- ☐ Other (please specify):

7. **Which Web 2.0 tools did you use in any part of your teaching IN THE PAST, but no longer use? (Please select all that apply) Use of Web 2.0 Tools could include their use when preparing or advertising sessions, delivering content online, or during a live teaching session. ***

- ☐ Facebook
- ☐ Facebook Live
- ☐ Twitter
- ☐ Instagram
- ☐ LibGuides
- ☐ YouTube
- ☐ Blogs
- ☐ VLEs (such as Blackboard or Canvas)
- ☐ Wikipedia
- ☐ Online quiz software such as Kahoot or Turning point
- ☐ None of the above
- ☐ Other (please specify):

8. **When have you used any Web 2.0 tools? (Please select all that apply) ***

- ☐ 2007-2010
- ☐ 2011-2014
- ☐ 2015-Present
- ☐ Never

9. **What do you use these Web 2.0 tools for? (Please select all that apply) ***

- ☐ To organize course-related material for your own purposes
- ☐ To advertise courses to students
- ☐ To facilitate the delivery of content to students
- ☐ To improve student engagement
- ☐ To enable students to share information with yourself and classmates
- ☐ To illustrate IL concepts during teaching (such as using the problem of Fake News on Social Media to illustrate the importance of evaluating information)
- ☐ I don't use Web 2.0 tools in my teaching currently
- ☐ Other (please elaborate):

10. **How useful do you think Web 2.0 tools are? ***

- ☐ I don't use Web 2.0 tools
- ☐ Not useful at all
- ☐ Not very useful
- ☐ No strong opinion
- ☐ Somewhat useful
- ☐ Very useful

Why do you think this? Please comment below:

11. **Has this opinion changed in recent years? ***

- ☐ Now feel that Web 2.0 tools are much more effective
- ☐ Now feel that Web 2.0 tools are more effective
- ☐ Stayed the same
- ☐ Now feel that Web 2.0 tools are less effective
- ☐ Now feel that Web 2.0 tools are much less effective

Why do you think this? Please comment below:

12. **Is there anything else you would like to say about the use of Web 2.0 Tools to teach IL? This question is optional**

13. **Would you be willing to take part in a short follow-up interview?**
This follow-up interview will last 15-20 minutes and will include questions aimed to enhance the data you have provided in this survey and gain more of an insight into your perceptions of Web 2.0 tools and their effectiveness over time. *

- ☐ Yes
- ☐ No

If yes, please provide your name and email address:

N.B This information will only be used to invite you to interview. Once the interview has been completed, all personal data will be anonymised in the written report and deleted.

Appendix 2: Interview Schedule

1. What Web 2.0 tools do you use in your teaching?

2. Tell me about how you use web 2.0 tools in teaching.

Prompts:

- What has affected your decision to use or not use them?
- Are you using these tools more during teaching sessions?
- Or are you using them to help you prepare sessions?
- Are you using them to publish more content online as the internet becomes more prevalent in society?

3. What were your first thoughts when you first heard about Web 2.0 tools, either in your professional or personal life?

Prompts:

- Were you positive about these tools?
- Were you excited by them?
- Anxious?
- Did you feel they are gimmicky?

4. Now that these tools have existed for some time, has your opinion of them changed?

Prompts:

- Have mobile devices and the way students access digital content had any effect on your use of Web 2.0 tools?
- Do you think that these tools are now easier to use?

5. What barriers have you encountered in using Web 2.0 tools in your teaching?

Prompts:

- Do you have enough time to develop material that uses these tools?
- Are you confident using new technology?
- To what extent do you like to innovate your teaching?

6. Can you suggest any factors that would improve your perception of Web 2.0 tools?

Prompts:

- Do you think you need more support from senior management to use them?
- Do you think you need more training opportunities around these tools?
- Do you think you need more time to develop teaching material?
- Do you think that CILIP and/or the IL group should prepare guidance on the use of these tools?

7. Do you think that Web 2.0 tools are still relevant in 2019, or has their novelty worn off?

   Prompts:

- Do students expect you to use them?
- Or are students not interested in them at all?

8. Finally, is there anything else you would like to add about your opinion of Web 2.0 tools and teaching IL?