Received: 6 July 2022 | Revised: 3 November 2022 | Accepted: 30 November 2022

DOI: 10.1111/hir.12468

ORIGINAL ARTICLE

Health Information and Libraries Journal | CILIP | HLG | WILEY

Expert searchers identified time, team, technology and tension as challenges when carrying out supplementary searches for systematic reviews: A thematic network analysis

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Abstract

Background: Systematic reviews require detailed planning of complex processes which can present logistical challenges. Understanding these logistical challenges can help with planning and execution of tasks

Objectives: To describe the perspectives of expert searchers on the main logistical challenges when carrying out supplementary searches for systematic reviews, in particular, forward citation searching and web searching.

Methods: Qualitative interviews were undertaken with 15 experts on searching for studies for systematic reviews (e.g. information specialists) working in health and social care research settings. Interviews were undertaken by videocall between September 2020 and June 2021. Data analysis used thematic network analysis.

Results: We identified three logistical challenges of using forward citation searching and web searching which were organised under the global theme of 'tension': time, team and technology. Several subthemes were identified which supported the organising themes, including allocating time, justifying time and keeping to time; reviewer expectations and contact with review teams; and access to resources and reference management.

Conclusion: Forward citation searching and web searching are logistically challenging search methods for a systematic review. An understanding of these challenges should encourage expert searchers and review teams to maintain open channels of communication, which should also facilitate improved working relationships.

KEYWORDS

grey literature; library and information professionals; research, qualitative; review, systematic; supplementary searching

BACKGROUND

The use of supplementary search methods in systematic reviews focuses on the identification of studies not retrieved by bibliographic databases (Cooper et al., 2017; Mahood et al., 2014; Papaioannou et al., 2010). Commonly used supplementary search methods include checking reference lists, forward citation searching, hand searching journals, inspecting conference proceedings, and web searching using search engines and websites (Booth et al., 2020; Briscoe, Bethel, & Rogers, 2020; Briscoe, Nunns, & Shaw, 2020; Page et al., 2016). In some systematic reviews, especially those with diffuse bodies of evidence, supplementary search methods are akin to 'complementary' methods which have an equally important role to bibliographic databases in study identification (Booth et al., 2018; Cooper et al., 2018). In these scenarios, the ability of supplementary search methods to identify studies outside of commercially published journals, or to use non-text-based approaches to searching (such as citation links), can make supplementary searches more than usually effective at identifying relevant studies. The term complementary is used as an indicator of the increased value of these search methods relative to bibliographic databases for some topics or types of systematic review (Booth et al., 2018; Cooper et al., 2018).

Supplementary search methods pose both technical and logistical challenges to expert searchers on systematic review teams (typically, health librarians or information specialists). The technical challenges concern the step-by-step processes which are used to conduct and report searching, particularly with a view to ensuring that searching and reporting is systematic and transparent (Briscoe, 2018; Briscoe, Bethel, & Rogers, 2020; Cooper et al., 2017; Mahood et al., 2014; Rader et al., 2014; Stansfield et al., 2016). Logistical challenges concern how to integrate these additional search methods into the workflow of systematic reviews in such a way that is manageable for the review team (Cooper et al., 2017; Levay et al., 2016). Thus, whereas the technical challenges concern factors which are 'internal' to searching conduct, such as how to select and combine search terms, logistical challenges concern factors which are 'external' to searching, such as resource constraints.

The technical challenges of supplementary searching are discussed in an expanding literature base (Cooper et al., 2017) which forms the basis of detailed guidance (Booth et al., 2018; Centre for Reviews and Dissemination, 2008; Kugley et al., 2017; Lefebvre et al., 2019a, 2019b; Rethlefsen et al., 2021). The logistical challenges of supplementary searching are discussed by relatively few studies to date, and these discussions are typically limited to measurement of time requirements (Cooper et al., 2017) and challenges relating to reference management (Godin et al., 2015; Levay et al., 2016; Stansfield et al., 2016). These are also typically case studies (Cooper et al., 2018; Mahood et al., 2014; Papaioannou et al., 2010; Stansfield et al., 2014) or expert commentaries (Stansfield et al., 2016). What is missing from these studies is in-depth exploration of expert searchers' experiences of the logistical challenges of supplementary searching using qualitative methods. This would facilitate a more nuanced understanding of these challenges, taking into account the lived experiences of expert searchers in their naturalistic settings (Green & Thorogood, 2009). Forward citation searching and web searching are useful supplementary search methods to consider in this context, as they are commonly used in both aggregative reviews, which aim to search for studies exhaustively using all available methods (Lefebvre et al., 2019b), and configurative reviews, which use search methods more selectively to achieve the required sampling approach (Booth, 2016; Booth et al., 2013). Further detail on forward citation searching and web searching is provided in Table 1.

Key Messages

- Logistical challenges of supplementary searching included time, team and technology.
- Challenges of searching could lead to tension in the review team.
- Communication within the review team is important for addressing these challenges.

AIM AND OBJECTIVE

This study aimed to understand the perspectives of expert searchers on the main logistical challenges when carrying out supplementary searches, in particular, forward citation searching and web searching. To this end, our objective was to undertake a qualitative study of expert searchers' perspectives on the logistical challenges of using forward citation searching and web searching. The findings of this study will form part of a larger study on how expert searchers develop and carry out supplementary searches for systematic reviews (Briscoe et al., 2022).

METHODS

Ethics approval

Ethics approval was obtained from the University of Exeter College of Medicine and Health Research Ethics Committee (project reference number: Jul20/D/250; date of approval: 1 July 2020). All participants returned written consent forms.

TABLE 1 Description and purpose of forward citation searching and web searching

Search method	Description	Purpose
Forward citation searching	Forward citation searching uses a citation index to identify studies which cite a 'source' study. Commonly used citation indexes include the Science Citation Index, Scopus and Google Scholar. Forward citation searching works on the assumption that studies which cite a study are likely to have similar content, thus the search method is commonly carried out on studies which meet the inclusion criteria for a systematic review.	Due to forward citation searching using links between studies rather than pre-identified search terms, forward citation searching is particularly useful for topics where it is difficult to identify an exhaustive set of search terms.
Web searching	Web searching involves searching websites and search engines which have multiple purposes other than hosting and retrieval of studies. This includes the websites of organisations which are topically relevant to a systematic review, such as charity and government websites, and general search engines, such as Google Search.	Web searching is often used to identify grey literature which is not indexed by bibliographic databases, but it can also be used to identify published studies.

Recruitment of participants

Participants were required to have at least 2 years' experience of searching for studies for systematic reviews, including using forward citation searching or web searching in this context. Recruitment used a purposive sampling strategy that aimed to recruit participants from a variety of settings with experience of both aggregative and configurative reviews. Potential participants were approached by email. The majority of people we approached were information specialists, although not everyone had this role title as there is variation in how the expert searcher role for systematic reviews is described.

Data collection

We undertook qualitative semi-structured interviews with 15 expert searchers working in health and social care research settings between September 2020 and June 2021 (see Appendix 1 for interview schedule). All interviews were undertaken using video-calling software by SB (either MS Teams or Zoom depending on the participants' preferences) and were between 45 and 70 min in duration. The video-calling software was used to record the interviews which were then transcribed by a professional transcription service.

Data analysis

Data analysis followed Attride-Stirling's approach to thematic network analysis (2001). We started by coding key words or phrases in the interview transcripts which referred to logistical challenges when using forward citation searching or web searching. Our definition of 'logistical' followed the *Cambridge Dictionary* as 'relating to the careful organization of a complex activity' (Cambridge Dictionary, 2022). In this respect our coding was based on pre-established criteria rather than data-driven, that is we approached the data with specific interests in mind (Attride-Stirling, 2001). The initial codes were collated into themes which were reviewed against the coded extracts. Once we were satisfied that these 'basic themes' sufficiently represented the logistical challenges described in the interview transcripts we arranged them into networks grouped around 'organising themes' (Attride-Stirling, 2001). The organising themes were then grouped around an identified 'global theme' supported by the basic and organising themes (Attride-Stirling, 2001). Following Attride-Stirling's (2001) appropriation of Toulmin's argumentation theory (1959), the global theme was conceptualised as a conclusion which was based on the data in the basic themes and warranted by the organising themes. Finally, we described and explored the thematic network through writing up the findings (Attride-Stirling, 2001). Supporting quotations from the interviews were tabulated and extracts from these quotations were included in a narrative summary of our findings. Coding was undertaken by SB and discussed with GJMT and RA as the thematic network was developed.

RESULTS

Participants' characteristics

Twenty-eight people were approached of which 15 with relevant experience agreed to be interviewed. The participants'

characteristics are summarised in Table 2. All participants had experience of web searching and 14 had experience of forward citation searching.

Description and exploration of thematic networks

We identified three organising themes which relate to logistical challenges when searching for studies for systematic reviews using forward citation searching and web searching: *time*; *team*; and *technology*. These were grouped around the global theme of *tension*. Figure 1 shows the complete network of identified themes. Supporting quotations are presented in Table 3. In the remainder of this section, we narratively summarise the identified themes.

TABLE 2 Participants' characteristics

Characteristics	*n* (%)[a]
Gender	
Female	13 (86.7)
Male	2 (13.3)
Years of experience	
Mean (SD)	15.5 (SD 5.99)
Median (range)	14.0 (range 5.5–28.0)
Role titles	
Information specialist	10 (66.7)
Senior information specialist	2 (13.3)
Research fellow	1 (6.7)
Senior research fellow	1 (6.7)
Realist reviewer	1 (6.7)
Employment settings	
Charity	1 (6.7)
Government body	4 (26.7)
Independent consultant	1 (6.7)
Research consultancy	1 (6.7)
University	8 (53.3)
Main research fields	
Health care	6 (40.0)
Health and social care	8 (53.3)
Health services research	1 (6.7)
Countries of residence	
Canada	2 (13.3)
Germany	1 (6.7)
UK	12 (80.0)

[a]*n* (%) unless otherwise indicated.

Time

The participants described logistical challenges that related to the time required to carry out and screen the results of searches. Neither forward citation searching nor web searching was considered particularly difficult to carry out, but the resource needs for both were thought hard to estimate, making it challenging to subsequently contain searching and screening within the estimated timeframe. This was particularly challenging within the highly structured workflow of a systematic review, in which tasks require completion within a strict timescale to meet a funding or client deadline.

Allocating time

Participants noted that allocating sufficient time was a challenge due to the unknown quantity of studies that might be identified by searches and the screening labour that this created. This was particularly challenging for forward citation searching as this was often carried out using studies identified by bibliographic databases, the number of which was unknown when allocating time: 'If it's in the protocol you say that it will be the included studies on the expectation that it's not going to be too many [...] [but] you don't know what is going to happen in practice' (B, forward citation searching [hereafter, FCS]). A large number of included studies could correspond with a high number of citing studies to screen; and individual studies could be cited many hundreds of times. Participants also reported that either search method could return zero or relatively low numbers of studies to screen. Web searching presented additional challenges when allocating time due to the possibility of encountering many different websites on which the searcher would need to orientate themselves: 'If you encounter a website [...] for the first time, it does take you some time to orientate yourself and see what search methods are possible' (E, web searching [hereafter, WS]). This was complicated further by the basic search interfaces of web resources which made extensive searching time consuming. One participant reported that, on average, forward citation searching retrieved around 30 citing studies per study, which could be reliably used as a 'rule of thumb' for estimating the amount of time required for screening. However, allocating sufficient time still required knowing how many studies would be identified on which to carry out forward citation searching.

Justifying time

Some participants felt a burden to make a convincing case for the value of supplementary searches for clients and review teams. This was particularly the case for those in consultancy or government settings where there was a

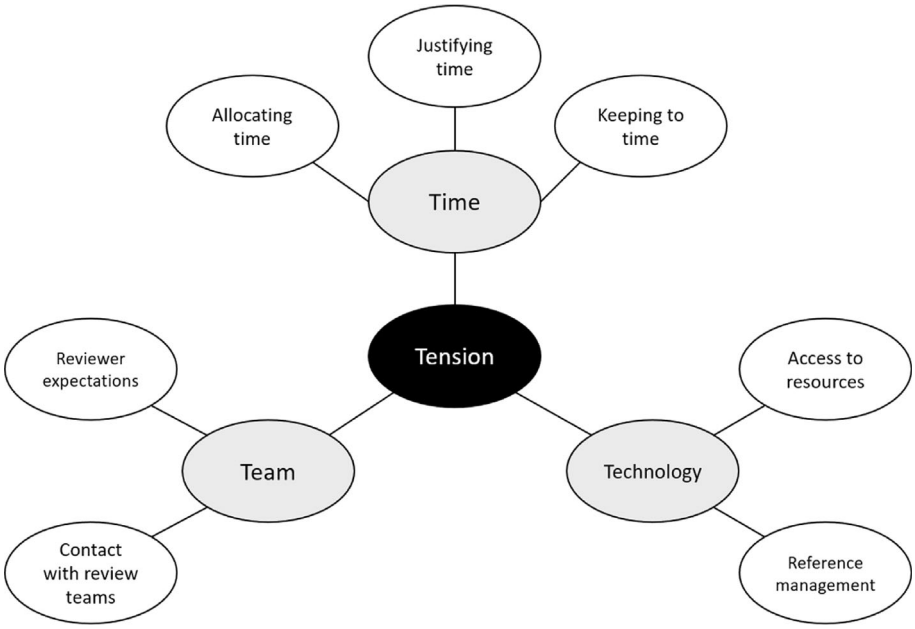

FIGURE 1 Thematic network of logistical challenges of forward citation searching and web searching

strong sense of the cost implications of supplementary searching, in terms of labour time required. If they failed to make a convincing case, even if time could be feasibly allocated and searching was manageable, the participants noted that searching might not be undertaken: 'When we start talking about websites, they're [i.e. the review team] like, "Why do I want websites? What on earth would I need those for? Just like complicating things with a load of evidence I'm never going to include"' (G, WS).

Keeping to time

Once supplementary searching was underway, the participants noted that unexpectedly high numbers of results could be challenging to manage and screen. Participants described how sometimes the planned approach to searching needed to change for this reason, despite what might be written into a protocol. When forward citation searching, this could mean reducing the source studies (i.e. those on which citation searching is carried out) from all included studies to 'key' studies, or selecting just one citation index rather than using multiple citation indexes. When web searching, participants described prioritising the most promising websites rather than searching a long list of sources, and limiting the screening process to the first several pages of results when using a search engine. The participants also described how they would become involved in screening for potentially relevant studies from the results of searches if the number of results was particularly high, thus dividing the screening labour between themselves and the review team: 'It just depends on the volume. Most screening teams are pretty exhausted by this time, so they elect for me to do a little bit of extra screening on their behalf' (N, FCS). Relatedly, manually adding references identified by web searching to reference management software was considered challenging within the available time (see also Reference Management section).

Team

Systematic reviews are undertaken by a team of researchers. The participants described challenges of managing the expectations of review teams with respect to the work involved in supplementary searching, and maintaining contact with a review team to ensure that supplementary searching was carried out as planned.

Reviewer expectations

Forward citation searching and web searching were sometimes undertaken when a review had progressed considerably beyond the initial bibliographic database searches and other review tasks were underway. Despite what might be written into a protocol, the participants described how a review team's immersion in other tasks could reduce their interest in additional screening generated by supplementary searching, or indeed their interest in identifying additional relevant studies. Participants also described how reviewers sometimes had low expectations of the value of supplementary searching. In these scenarios, the participants described how reviewers could

TABLE 3 Supporting quotations for thematic network

Global theme	Organising themes	Basic themes	Supporting quotations[a]
Tension	Time	Allocating time	If it's in the protocol you say that it will be the included studies on the expectation that it's not going to be too many [...] [but] you don't know what is going to happen in practice. (B, FCS)
			The main challenge [is] that it's time consuming, because you really have to consider different types of website, and I would say if you encounter a website [...] for the first time, it does take you some time to orientate yourself and see what search methods are possible. If they do have a search interface, how does it work? Can I use operators? Can't I? (E, WS)
			I have rules of thumb for how many references I'm going to get when I do citation searching on Web Science and it always works... well, it works out 30 articles per input article in both directions. So 30 forward citations, 30 backward citations. And I'm kind of basing my timings and what I do on, okay, if I input 30 articles I'm going to get 900 forward citations and 900 back. And it's not literally 30 every time. Some you get an absolute whale where it's 500 and sometimes you get like zero forever. But it seems to work out overall. (M, FCS)
		Justifying time	If we're going to do it it's because I've proposed it to the team and told them this is something they need to do. So I kind of have to be prepared to make that argument. So I think that's a bit of a challenge because you're always operating from a point of basically, you're requesting more time and more money to do this. (N, FCS)
			When we start talking about websites, they're [i.e. the review team] like, 'Why do I want websites? What on earth would I need those for? Just like complicating things with a load of evidence I'm never going to include.' (G, WS)
		Keeping to time	If you've got [...] a key paper that was written 20 years ago and has been highly cited, that's a real challenge to then go through all those citations and decide if [...] you haven't seen some of them before, whether they're relevant or not. So [...] it can be quite a substantial amount of work depending on the age of the papers you're looking for citations for. (C, FCS)
			Sometimes people say well, let's ... 'let's do a citation search' and I think they're assuming that we're not going to find that many hits [...] And they're quite surprised sometimes when we find hundreds or thousands of studies ... and then we've got to kind of go back and re-think the whole thing again. (D, FCS)
			I could either give them everything that had cited their study, or I could pick to create records for those records that I saw were relevant to the review. And it just depends on the volume. Most screening teams are pretty exhausted by this time, so they elect for me to do a little bit of extra screening on their behalf. (N, FCS)
	Team	Reviewer expectations	If I need to add 100 results [to reference management software] manually, that's pretty tedious, time-consuming task at the end, whereas what's quicker is if I just put stuff into a Word document, copy and paste the title and a summary in the link, and send them the Word document. But what that does is the reviewer says, 'I've got 5,000 results in EPPI, what's this Word file? I can't be bothered looking at that. I'll just do what's in EPPI.' (G, WS)
			inevitably the reviewers have moved on, and their deadlines are, you know, data extraction and everything. So I'm kind of conscious that if I leave it too late and I'm sending them more stuff it's not ideal for them. (H, WS)
			I think the citation searching can happen at a time where they think they've basically finished [...] [I]t's almost like an equivalent of an update search that they're doing [...] and [they] don't necessarily maybe want to find anything else ... [laughs] ... thank you very much. (K, FCS)
		Contact with review teams	I support some teams where [...] I don't really see it [i.e. the systematic review] much at all after the [bibliographic database] search until perhaps the write up and discover that they've ... they've gone off-piste, [...] they've done some extra things

TABLE 3 (Continued)

Global theme	Organising themes	Basic themes	Supporting quotations[a]
			and they've done some citation searching in a certain way and [...] the level of control is different sometimes. (B, FCS)
			I think sometimes when you've done the [bibliographic database] search and you send it off, if you don't have any further involvement, it's difficult to kind of keep track of what stage your review is at sometimes [...] Um, so the main challenge for me is having the agreement that it's going to be done... and who's going to do it. Because I think I've been neglectful in the past about maybe that I've not been clear. (K, FCS)
			A worst case scenario I've had has been [...] we've written [in the protocol] that we're going to do some citation searching and I've literally had an email from someone saying, um, "you know, you're a co-author, we're submitting this". And I've looked at it and thought, well ... [laughs] ... you know, apart from ... handing the [bibliographic database] search over, I've had no further involvement in this review. And I've said, "well, you know, did you do the citation searching?" They're like, "Oh, we did that" [...] It's almost my fault I think sometimes, for taking on too many reviews. Um, sometimes a review gets away from you. (K, FCS)
	Technology	Access to resources	When I was still working at [organisation name] I would be able to access Web of Science and Scopus, so I would usually search Web of Science. But now I don't have access to those resources so I'm searching Google Scholar and using other [...] tools like Publish or Perish to search Google Scholar and Microsoft Academic. (C, FCS)
			You can do it with Google Scholar. You can do it with Web Science. Now you can do it with Citation Chaser and Microsoft Academic. Time is a big factor and access to those databases. And even understanding coverage of like what's Web Science got in it? It's how does it overlap with PubMed? [...] There are so many things that you just don't know, and you can investigate all these questions but you'd never get anything done. (M, FCS)
		Reference management	I kind of copied and pasted everything into a Word document, using quite a few different macros and [...] kind of got it into a format which ... which is a RIS format and then import it to EndNote. So I do do that, I can do that; when I try and get my other information specialists to do that they go into a bit of a blind panic as if it's some sort of magic I'm wielding. But it's ... it's ... yeah, it's possible to do and if you've got a big enough ... big enough website full of records of information that you want that's going to take a huge time just to screen through then I think it's ... it's worth going through that process of ... of trying to create a RIS file out of it. (D, WS)
			A lot of manual downloading of references or even typing them into Endnote is necessary, and this is really a nuisance, I have to say. (E, WS)
			Challenges? Getting the results out in a way that is useful for the reviewers to be able to assess them. Very often we just cut and paste them into a Word document, and it's just hard to manage and then... then we think, 'should they be put into Endnote so all our records are together?', but then that requires a lot of research assistant time to input all the records in [...]. So we have that issue, the kind of logistics of managing them. (O, WS)

Abbreviations: FCS, forward citation searching; WS, web searching.

[a]Quotations are attributed to participants using anonymous alphabetical identifiers from A to O and labelled FCS or WS as relating to forward citation searching or web searching respectively.

be dismissive of supplementary searches, even if time had been allocated, or interpreted additional searching as more akin to 'update' searching (particularly, forward citation searching) which was non-essential:

> I think the citation searching can happen at a time where they [i.e. the review team] think they've basically finished [...] [I]t's almost like an equivalent of an update search

> that they're doing [...] and [they] don't necessarily maybe want to find anything else ... [laughs] ... thank you very much. (K, FCS)

Contact with review teams

Sometimes the participants were not in regular contact with the review teams they supported. For example, if they were working remotely (as was particularly apparent during the COVID19 pandemic, when the interviews for this study were undertaken), or if they were working with several different teams concurrently at different stages of the systematic review process. This could make it challenging to keep abreast of developments in a systematic review, which sometimes meant 'losing control' of the searching process:

> I think sometimes when you've done the [bibliographic database] search and you send it off, if you don't have any further involvement, it's difficult to kind of keep track of what stage your review is at sometimes [...] Um, so the main challenge for me is having the agreement that it's going to be done ... and who's going to do it. (K, FCS)

Some participants reported discovering that reviewer colleagues had carried out searches themselves, which could lead to substandard quality of work and a lack of clarity in the reporting of the methods. This meant that the participants' role in searching was reduced to 'signing off' on substandard work or without being sure of what had been done.

Technology

The participants described how the technology used for forward citation searching and web searching presented logistical challenges. Challenges centred around access to resources, particularly subscription-based citation indexes, and management of studies identified.

Access to resources

Participants described using several different citation indexes, but not all citation indexes were available to all participants. Specifically, Scopus and Web of Science, which are subscription-based, were only available to participants who worked at institutions where access was provided. In some cases, participants had previously worked at institutions where one or both of these were available, and then moved on to settings where they were not. This meant using alternatives, such as Google Scholar and Microsoft Academic, and participants also described using newer technological developments such as Citation Gecko (https://www.citationgecko.com/) and Citationchaser (https://estech.shinyapps.io/citationchaser/) (Haddaway et al., 2021). Limited access to citation indexes was challenging for participants, particularly as the functionality of freely available citation indexes was sometimes more limited than the subscription-based options, and could be more time consuming to use. In particular, Google Scholar was reported as having relatively basic features for exporting to reference management software and did not include abstracts. Participants also described challenges of knowing how to choose between resources, finding it difficult to know how citation coverage compared between resources.

Reference management

Participants described how web-based resources, including search engines and websites, and also web-based citation indexes, typically had limited – if any – export features. This meant that reference management when searching these resources was challenging. Typically, the participants described manually copying references out of web-based resources into Word documents. Sometimes they added references to reference manager software manually, but this was noted as particularly time consuming: 'A lot of manual downloading of references or even typing them into Endnote is necessary, and this is really a nuisance, I have to say' (E, WS). Using a Word document was faster than adding to reference management software, but some participants reported that review teams preferred to have all references in one library, and indeed could be reluctant to screen results in other formats. One participant described copying web search results into a Word document and using macros to create a file which could be imported as a RIS document into reference management software. They noted that other information specialists in their team did not have the skills to do this: 'When I try and get my other information specialists to do that they go into a bit of a blind panic as if it's some sort of magic I'm wielding' (D, WS).

Tension

The participants described how the logistical challenges of time, team and technology sometimes created tension between the expert searcher and the wider review team. Tension was typically evident through a sense of exasperation amongst the participants, for example, at trying to convince review teams to reserve time for supplementary searching or trying to ensure that searches were carried out to the required standard. The participants perceived

that dismissive attitudes or resistance to the search methods amongst review teams was based on several different factors which we describe in the basic themes. These included uncertainty about the value of searching, the use of relatively low-tech approaches such as reading through Word documents, and immersion in other tasks when supplementary searching was carried out. On other occasions, the participants reported not being consulted about how to carry out a search method, which led to substandard searching and reporting which searchers were reluctant to accept but had no or limited opportunity to rectify:

> I support some teams where [...] I don't really see it [i.e. the systematic review] much at all after the [bibliographic database] search until perhaps the write up and discover that they've ... they've gone off-piste, [...] they've done some extra things and they've done some citation searching in a certain way and [...] the level of control is different sometimes. (B, FCS)

DISCUSSION

This study identified three logistical challenges and one 'global' theme when carrying out forward citation searching and web searching for systematic reviews: time, team, technology (logistical challenges) and tension (global theme) (Attride-Stirling, 2001). The findings contribute to existing literature on the logistical challenges of using these search methods by developing a more nuanced account, based on expert searchers' experiences in their naturalistic settings (Green & Thorogood, 2009). The main focus in studies to date is time, which is reported as a quantitative measure of how long searches take to carry out (Eysenbach et al., 2001; Godin et al., 2015; Levay et al., 2016; Papaioannou et al., 2010; Wright et al., 2014). Levay et al.'s (2016) study of forward citation searching also reported the cost of searches based on the time taken. Cooper et al. (2017) reviewed case studies which describe and evaluate a wider selection of supplementary search methods, including contacting authors, forward citation searching, hand-searching, searching trials registries, and web searching. In addition to studies of forward citation searching and web searching, Cooper et al. (2017) found that studies of hand-searching also reported the time taken to perform. The use of qualitative methods in the present study has facilitated exploration of different dimensions of the logistical challenge of time, including allocating time, justifying time and keeping within time. Furthermore, the findings show the limited value of reporting time on a case-by-case basis for prospective planning, in view of variables which are unknown when allocating time such as number of studies used for forward citation searching, and variability of search interfaces and functionality for managing references when web searching.

The use of a qualitative approach also enabled a more adept exploration of the dimension of team working, which to date is little explored. The importance of logistical planning for web searching is discussed by Stansfield et al. (2016), including the value of allocating someone with the required expertise to the task. The findings of the present study add weight to this finding, particularly in view of the challenge of maintaining contact with review teams to ensure that searches are carried out to the required standard. The present study also extends this finding by drawing attention to expert searchers' perception that their reviewer colleagues sometimes dismiss forward citation searching and web searching as relatively unimportant. This meant that expert searchers were additionally concerned that left to their reviewer colleagues these search methods would not be undertaken with due care and attention. A small number of studies which explore team working between expert searchers and reviewers more widely, that is not limited to supplementary searching, support this finding on the importance of communication (Nicholson et al., 2017; O'Dwyer & Wafford, 2021). One such study reports survey data on 'interpersonal challenges' arising between library-based expert searchers and review teams (Nicholson et al., 2017). This identified managing reviewer expectations of time and effort required for reviewing tasks, and keeping in touch with review teams after initial searches are completed, as frequently reported challenges (Nicholson et al., 2017). Commentary on how expert searchers work with review teams notes the challenge of 'resistance [from researchers] to including grey literature', which in part manifests itself as reluctance to carry out web searching (O'Dwyer & Wafford, 2021). Studies also report the technical challenge of managing references, both from web searching (Godin et al., 2015; Stansfield et al., 2016) and when using web-based citation indexes (Levay et al., 2016).

The present study further extends the insights of existing literature through the identification of the global theme of tension using thematic network analysis (Attride-Stirling, 2001). We suggest that the interconnectedness of the organising themes via the global theme indicates that addressing challenges in one part of the network might have benefits across the network, perhaps noticeable through reduced tension in the working relationships of expert searchers and reviewers. What is less clear is how to address the challenges, particularly those challenges that are outside of the review teams' control (such as time and technology). However, we suggest that

improved communication and closer working-relationships between expert searchers and review teams might help to address team-based challenges. This could include allocating people to specific tasks and ongoing communication about when tasks should be completed, and a shared awareness of technological limitations, and of uncertainties of time required to carry out searching and screening tasks. These measures are supported by Wafford and O'Dwyer's 'toolkit' for facilitating collaborative working between expert searchers and researchers, which recommends establishing regular communication throughout the review process (2021). Similarly, survey data on interpersonal challenges experienced by expert searchers who support systematic reviews found that clear and frequent communication with reviewers, and clarification of roles, were the most frequently used strategies for addressing these challenges (Nicholson et al., 2017). There is also the potential for challenges posed by technology, such as limited access to resources and basic export features, to be addressed through technological development. For example, technological advances in web searching, such as web-scraping software (Haddaway, 2015) and automated citation searching tools (Haddaway et al., 2021) might alleviate some of the challenges we describe by making processes faster.

Strengths and limitations

This is the first qualitative study to explore logistical challenges of supplementary searching for systematic reviews. The sample of participants included a diverse selection of expert searchers with a wide range of experience, and the use of thematic network analysis was helpful in showing how the data we collected coalesced around the global theme of tension (Attride-Stirling, 2001). The data was limited on solutions to challenges, but the identified importance of communication appears to be a valid inference from the data and supported by existing studies (Nicholson et al., 2017; O'Dwyer & Wafford, 2021; Stansfield et al., 2016; Wafford & O'Dwyer, 2021). We suggest that future research on how to mitigate the logistical challenges of supplementary searching could usefully focus on technological solutions, such as web-scrapping software (Haddaway, 2015) and automated citation tools (Haddaway et al., 2021). Given the importance of team work and communication, it might also be helpful to undertake evaluation studies on how systematic review teams work together.

CONCLUSION

Forward citation searching and web searching are logistically challenging components of a systematic review. An understanding of these challenges should encourage expert searchers and review teams to maintain good communication between each other, which should also facilitate improved working relationships. Furthermore, this could improve the quality of searches if expert searchers subsequently have more opportunities to carry out searches at latter stages of reviews.

ACKNOWLEDGEMENTS

The authors would like to acknowledge Rob Anderson and Sue Whiffin at the University of Exeter Medical School for their support in arranging the transcription of interview recordings.

FUNDING INFORMATION

The author(s) received no financial support for the research, authorship, and/or publication of this article.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

Data are available on request from the authors.

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How to cite this article: Briscoe, S., Abbott, R., & Melendez-Torres, G. J. (2022). Expert searchers identified time, team, technology and tension as challenges when carrying out supplementary searches for systematic reviews: A thematic network analysis. *Health Information & Libraries Journal*, 1–13. https://doi.org/10.1111/hir.12468

APPENDIX 1

INTERVIEW SCHEDULE

Forward citation searching questions

Topic	Guiding questions	Follow up questions
Initial decision	How do you decide whether to carry out forwards citation searching for a systematic review?	Are there particular types of review or review topics that influence your decision? What do you hope that forward citation searching will add to a review? What is the value of forward citation searching?
Approaches to conduct	How do you decide what approach to take to forwards citation searching?	What factors influence your approach? What are some of the approaches that you might take? Snowballing? Iterative citation searching? How do you decide which resources to use? How do you ensure that your approach is systematic, if at all?
Challenges	What are the main challenges that you face when conducting forwards citation searching?	Does the technology you use pose any specific challenges? How do you approach the practical issue of time and resource constraints?

Web searching questions

Topic	Guiding questions	Follow up questions
Initial decision	How do you decide whether to carry out web searching for a systematic review?	Are there particular types of review or review topics that influence your decision? What do you hope that web searching will add to a review? What is the value of web searching?
Approaches to conduct	How do you decide what approach to take to web searching?	What factors influence your approach? What are some of the approaches that you might take? How do you decide which resources to use? How do you ensure that your approach is systematic, if at all?
Challenges	What are the main challenges that you face when conducting web searching?	Does the technology you use pose any specific challenges? How do you approach the practical issue of time and resource constraints?