



A comparison of the impacts of in-person and virtual conference attendance

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Abstract

Introduction. In-person conferences provide attendees with the opportunity to extend their knowledge, networks and sense of belonging in their field. This paper reports on an investigation that compared attendance at virtual and in-person conferences to identify differences in the impacts for delegates

Method. An online survey was distributed widely to attract responses from library and information professionals in Australia and internationally. The questionnaire was designed to gather data relating to in-person and virtual conference attendance. It included demographic questions, statements with Likert scale responses and open-ended free text. Quantitative and qualitative analyses were carried out on the data relating to 225 individual responses.

Results. The findings of the study confirmed previously identified impacts of in-person conference attendance and highlighted the primary challenge of virtual conference attendance, which was the networking aspect. Some advantages of virtual conferences were found to be the lower cost, better accessibility and diversity of delegates. However, these potential advantages came with challenges, including distractions and loss of focus in an online environment.

Conclusion. Despite their potential advantages of increased accessibility and lower environmental impact, virtual conferences lack opportunities for attendees to connect and socialise, which needs to be addressed to increase the impact of these events.

Introduction

Conference attendance plays an important role in professional development, establishing networks and enabling scholarly communication for library and information science researcher and practitioner communities. Dumbell (2019) writes that in the library profession, conference attendance is as important as ever, as conferences facilitate the exchange of ideas and practices and expansion of networks, allowing for innovation and best practice approaches to challenges. However, face-to-face conferences can be costly events to attend, involving travel, accommodation and registration, as well as time away from the workplace. It is the employer who often carries the costs of library professionals' conference attendance and value for money is an important consideration.

Traditionally, conferences are multi-day events held face-to-face. Although virtual, or online, conferences have existed for about 30 years (Wang, 1999), very few conferences were organised in this mode before 2020, because organisers found it difficult to adopt the virtual format (Remmel, 2021). Like many other aspects of our lives, the global COVID-19 pandemic had a significant impact on conference organisation by creating impetus for the up-take of virtual conferences. This shift coincided with the conception of the research reported here.

The study was designed to compare the impacts of virtual and face-to-face conference attendance using the findings of Dumbell's (2019) doctoral research into the impacts of face-to-face conference attendance as a framework. Like the doctoral study, this investigation focused on gathering data from library professionals to extend the earlier research for face-to-face conference attendance impact for that community. Those impacts are an important indicator of value to the individual and to the organisation that might be funding conference attendance. The study incorporated virtual conference attendance, a less costly exercise, to compare the impacts found for the two formats. While a global pandemic could never be described as fortuitous, it contributed to this study's feasibility because many more in the library and

information science community gained first-hand experience of virtual conferences. The research question asked: how do face-to-face and virtual conferences differ in relation to their impact on attendees?

Dumbell's doctoral research (2019) found that the primary impacts of face-to-face conference attendance were informational impact (exposure to ideas), social impact (expanded networks), and affective impact, which refers to attendees feeling more confident, inspired and valued after attending a conference. Some of the main barriers to practitioners attending face-to-face conferences are financial and time constraints (Dumbell, 2019; Raby & Madden, 2021; Roos et al., 2020). Virtual conferences have the potential to alleviate those barriers; however, it was unclear whether conference attendance impact is replicated in a virtual environment. By comparing face-to-face and online conference attendance, the study addresses this gap. It also identifies aspects of virtual conferences that may need attention to maximise the benefits of attendance.

For the purposes of this study, conferences are defined as events designed to facilitate sharing of ideas, professional development and networking between professionals in the field of librarianship. A conference usually lasts a full day or longer. The event does not need to be titled conference to qualify, but workshops with the aim of teaching specific skills do not meet the criteria. In-person conferences are hosted at an event space with attendees and presenters being physically together, whereas virtual conferences are hosted via the Internet, using different technologies allowing for audio and video transmission; screen sharing; asking questions; chat functionality; and break-out rooms, to name a few. Depending on the technology used, online conferences can vary in terms of the opportunities they allow for delegates to interact with each other, and with presenters. Hybrid conferences are a mixture of both formats, often held synchronously online and in-person. The focus of the study was on the impact of attendance for conference delegates rather than presenters. Although the survey instrument refers to virtual and face-to-face conferences, the terms virtual and online,

and face-to-face and in-person, are used interchangeably in this paper.

Literature review

The literature on conference attendance impact is sparse (Dumbell, 2019). This is true in library and information science as well as other disciplines. Although the COVID-19 pandemic has generated more work on virtual conferences, authors of recent works note that face-to-face and virtual conferences remain under-explored topics (Ahn et al., 2021; Chan et al., 2021; Engelbrecht et al., 2022; Stamelou, 2021). However, the value of conferences remains evident. In the context of library practitioners, Dumbell demonstrates the impact of conferences as facilitating the exchange of ideas and the expansion of networks, which in turn fosters staff engagement and innovation. Lopez et al. (2020) and Shawcross (2023) agree that conferences are important professional development for librarians, and researchers from other disciplines also confirm their value (for example, Engelbrecht et al., 2022; Wang, 2020).

Irrespective of the profession or discipline, three major reasons for attending conferences, face-to-face or virtual, have emerged (Ahn et al., 2021; Dumbell, 2019; Engelbrecht et al., 2022; Morton et al., 2019; Niner & Wassermann, 2021; Raby & Madden, 2021; Sá et al., 2019). These reasons are: for the content and ideas presented, for networking, and for fostering motivation and participating in a wider community. Corresponding to those reasons, Dumbell found three different kinds of impact of face-to-face conference attendance: informational impact (delegates are exposed to new content and return to their workplace with ideas); social impact (delegates interact with each other and network); and affective impact (delegates return to their workplace invigorated and feeling part of something bigger). These impacts echo earlier, smaller-scale studies in library contexts such as Adomi et al. (2006), Eke (2011), and Henczel (2016) and have been confirmed by a more recent study by Engelbrecht et al. (2022).

Dumbell (2019) showed the three impacts are connected. For example, delegates return to

their workplace feeling positive because of exposure to interesting content and people. The impacts of conference attendance were found to be stronger if delegates attend with colleagues, if they used social media, and if they have time to reflect on their conference experience. Their overall experience, their role, and them taking responsibility for impact also influenced the outcomes of conference attendance. Dumbell also points to the serendipitous nature of conferences: attendees rarely have full control over which ideas and delegates they will interact with.

Previous research has identified lack of funding and time constraints as the two main barriers preventing in-person conference attendance (Dumbell, 2019; Liu et al., 2023; Raby & Madden, 2021; Roos et al., 2020). Researchers also point to caring and family responsibilities (Lopez et al., 2020; Sarabipour et al., 2021) and other factors such as gender, social-economic status, geographical location, and career stage that make in-person conference attendance not equal for all (Morton et al., 2019; Niner & Wassermann, 2021; Sarabipour et al., 2021).

Given the barriers to in-person conference attendance, virtual conferences may be perceived as a good alternative. Before 2020, online conferences were rare, however, the COVID-19 pandemic caused major disruptions to the conference landscape and provided the impetus for many conference organisers to move their events online (Engelbrecht et al., 2022; Hofstädter-Thalmann et al., 2022; Kim et al., 2022; Roos et al., 2020). This has provided an opportunity to compare the impacts of conferences held online with those that are face-to-face. Some studies have used evaluation data gathered from face-to-face events and compared it to data gathered at the online equivalent, using quantitative and mixed method research approaches (Ahn et al., 2021; Chan et al., 2021; Engelbrecht et al., 2022; Hofstädter-Thalmann et al., 2022; Niner & Wassermann, 2021; Raby & Madden, 2021; Stamelou, 2021). Others surveyed attendees of a specific online conference (Kim et al., 2022), or revisited their experience of an online conference that has been running since 2015 (Roos et al., 2020). The existing literature,

however, focussed on a single conference held online and in-person, and does not compare general opinion and experience of attendees regarding the two different conference formats; a gap this study addresses.

In terms of informational impact identified by Dumbell, (2019), subsequent research found face-to-face conferences better suited to support learning (Chan et al., 2021, p. 67) and to improve opportunities for encountering content serendipitously (Engelbrecht et al., 2022; Sá et al., 2019). In-person events also made it easier for delegates to discuss ideas with their peers (Sá et al., 2019). However, Hofstädter-Thalmann et al. (2022) reported results that indicated a virtual conference delivers better content and quality.

Dumbell (2019, p. 164), in her discussion on the social impact of attending conferences in-person, speculated that virtual events would not provide the same networking opportunities. More recent research confirms that online conferences lack opportunities for attendees to connect, network, form relationships and interact with each other (Chan et al., 2021; Kim et al., 2022; Niner & Wassermann, 2021; Sá et al., 2019; Raby & Madden, 2021; Stamelou, 2021). Engelbrecht et al. found that the 'concern about the absence of social interaction' at virtual conferences was almost 'unanimous' amongst their research participants (2022, p. 8). Roos et al. (2020) rate enabling delegates to network as one of the greatest challenges in an online environment.

The findings of Dumbell's (2019) study showed that face-to-face conferences can have positive affective impacts on attendees. Attending a conference online, however, can feel 'much more like ordinary work, possibly just an extra activity to handle besides the daily routine' (Roos et al., 2020, p. 5). Research participants have found virtual events to 'lack warmth' compared to their in-person equivalent (Engelbrecht et al., 2022, p. 3) and that creating a sense of belonging to a community cannot easily be replicated in an online environment (Sá et al., 2019).

Clear advantages are that virtual conferences are more accessible, geographically and

financially (Ahn et al., 2021; Chan et al., 2021; Niner & Wassermann, 2021; Raby & Madden, 2021; Sá et al., 2019; Sarabipour, 2020; Stamelou, 2021). This results in more diversity in delegates (Engelbrecht et al., 2022; Sarabipour, 2020) and improves representation of groups that were 'traditionally underrepresented in in-person conferences' (Chan et al., 2021, p. 68). Specifically, virtual conferences are easier to attend for early career researchers (Sarabipour, 2020; Stamelou, 2021), delegates with caring responsibilities (Ahn et al., 2021), and delegates from a wider diversity of countries (Sarabipour, 2020). In this regard, Sarabipour summarises 'online conferences provide an unparalleled opportunity to increase representation' (2020, p. 2). On the other hand, Niner and Wassermann (2021) point out that not all potential delegates have 'access to the infrastructure and technology necessary for online participation' (p. 3). Engelbrecht et al. (2022) and Liu et al. (2023) add that time zone differences can be tricky, and the potential for distraction when attending a conference online is described as a disadvantage by Niner and Wassermann (2021) and Sá et al. (2019).

In summary, conferences play an important role because they facilitate sharing of ideas and networking, and have positive affective benefits for attendees. However, conference attendance impact remains an under-researched field, although Dumbell (2019) has reported her Doctoral findings for in-person conferences. COVID-19 caused a surge in online conferences, which have documented advantages such as ease of access for some delegate groups. More recent studies have compared online and in-person offerings of a specific conference, but none have researched the topic for library professionals, and none have investigated the topic more generally. The research reported here aimed to fill that gap by asking participants to rate positive comments about conference attendance in face-to-face and virtual formats in relation to the impacts identified by Dumbell. By taking this approach, the authors were able to identify differences between in-person and virtual formats and add much needed knowledge about the impacts of the two different modes of conference attendance.

Research design

The study builds on the first author's doctoral thesis (Dumbell, 2019), which used a socio-constructivist lens to investigate conference attendance impact. It focused entirely on in-person events and gathered data at four Australian academic libraries through interviews with library staff, their managers, and administrative staff. Dumbell's three key findings for conference attendance impact were used as a framework for this study, which extends her research by comparing in-person and virtual events and widening the scope to the library and information science practitioner community in Australia and internationally. The study aimed to capture as many opinions as possible, which meant an online survey was likely to be the most effective research instrument (Appendix A). The survey was designed with the Qualtrics software and gathered quantitative and qualitative data. This approach is commonly applied in library and information science (Connaway & Powell, 2010) and, despite some limitations, enables large scale data collection.

The authors created sets of statements that focused on the impacts of: (a) knowledge gained, (b) networking, and (c) affect. A five-point Likert scale ranging from Strongly disagree to Strongly agree was used as the response format for the fourteen statements. Each statement was repeated, asking about face-to-face conferences first, followed by the same statement for virtual conference attendance. Open questions inviting respondents to discuss their experience of face-to-face and virtual conferences were included after each pair of statements, and a final open question asked for any other comments. The open questions enabled the collection of rich qualitative data. Several questions relating to demographic factors formed the last set of questions in the survey.

Approval to conduct the study was granted by Curtin University's Human Research Ethics Committee in January 2021 (HRE2021-0356) and the survey was open and advertised widely from September 2021 to January 2022. Professional listservs, Facebook pages, and the authors' social media channels were the primary means

of recruiting participants. Colleagues outside Australia were also contacted with the project details and asked to distribute the invitation to participate on their home country's networks.

The data collected in the survey software was downloaded into an Excel spreadsheet, which was used for both the quantitative and qualitative analysis. Descriptive statistics were generated for the demographic data and the Likert responses to statements. In addition, t-tests and cross-tabulations were run on the Likert responses data to test whether the results indicated a significant difference between the two conference formats. A total of 343 participants commenced the survey, but only 225 provided responses to most of the questions. This variation in response numbers across questions is indicated with an n in the quantitative findings below.

The qualitative data for the six open-ended questions of the survey provided 446 answers from 151 respondents. The statements were read several times, assigned codes, and as data analysis progressed, codes were merged, separated and refined. The qualitative data were analysed into codes regardless of the question being responded to (Mason 2002). This process resulted in fourteen separate codes and four broad themes (ideas, networking, feelings, and general). The questions asked corresponded broadly to the informational, social, and affective impacts found by Dumbell (2019), and these themes formed the initial analysis structure. The authors actively sought to identify new or slightly different themes emerging from the data throughout the coding process, which had the potential to confirm or refute the earlier findings. The qualitative data analysis was performed by one author, with the second author undertaking random checking of the coding to ensure reliability (Westbrook, 2010).

Findings

Participant demographics

The online survey attracted 343 responses and 225 participants answered most questions. Despite the extensive efforts made to attract participation from library professionals located in many other countries, only fourteen

countries were represented in the data. Australian librarians accounted for almost half the respondent group (48.8%), followed by the USA (14.7%), Germany (9.6%), Indonesia (7.6%), and Sweden (6.6%).

The age of respondents reflects general trends in the profession (United States Department for Professional Employees, 2019), with most aged between 35 and 64 years (Figure 1).

Corresponding with the age of respondents is the length of experience in libraries. Over half the respondent group (53.3%) reported having worked in libraries for sixteen or more years, while newer information professionals (those with up to five years' experience) comprised just over 10%. The majority of respondents worked in academic libraries as shown in Figure 2.

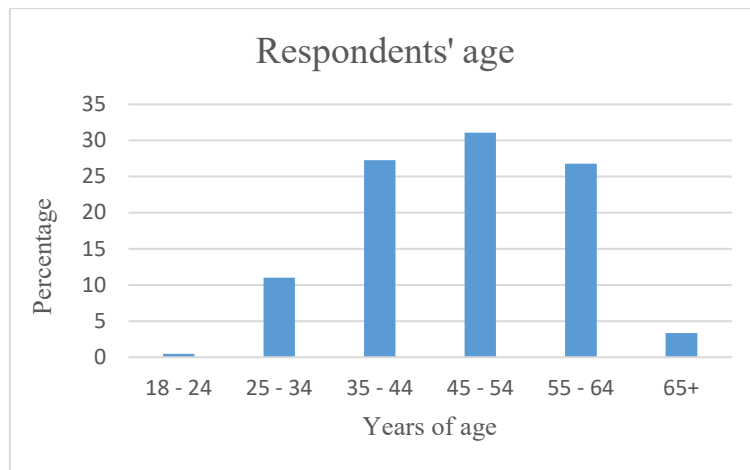


Figure 1. Respondents' age

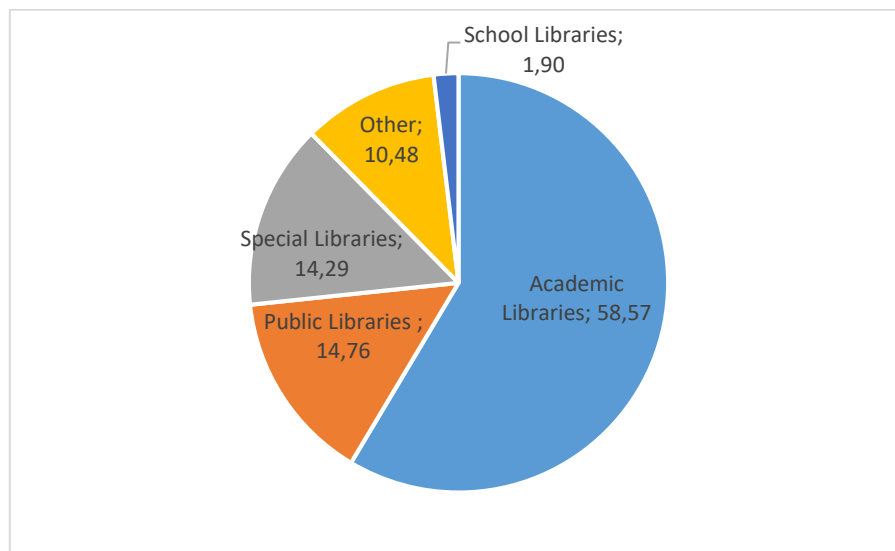


Figure 2. Library sectors represented

Respondents were asked to describe their role in a free text box and these answers illustrate the diversity that exists within the profession. The roles included library managers from all sectors, liaison librarians, e-resources

librarians, acquisitions and collections managers, research data managers, children's librarians, outreach and community engagement librarians, and systems librarians.

Informational impact at conferences

In the qualitative section of the survey, respondents were asked to comment on their experience with encountering ideas at face-to-face and virtual conferences. Some noted that exposure to ideas was very similar or the same for both formats, stating that ideas were able to be conveyed similarly well online or face-to-face. This was supported by the quantitative data gathered in Likert scale responses to questions that asked respondents to indicate

their level of agreement or disagreement with statements relating to encountering ideas. The percentage of respondents who agreed or strongly agreed with each statement was slightly higher for face-to-face conferences, but the difference was under 10% and for most statements it was closer to 5% (see Table 1). T-tests and cross-tabulations run for each of the statements relating to informational impact confirmed there is no significant difference between the two conference formats.

Statements	Agree/Strongly agree (%)	
	F2F	Virtual
I encounter original ideas	96.4	90.2
I encounter new perspectives on established ideas	96.9	94.2
I encounter affirmative content, which allows me to benchmark my own institution with others	87.1	77.8
I use ideas from ... conferences in my work.	92.9	90.2
I share ideas from ... conferences with my colleagues	93.3	89.3

Table 1. Agreement or Strong agreement with informational activities at face-to-face and virtual conferences (n=225)

In some cases, respondents thought that face-to-face conferences made it easier to understand content and easier to *retain and remember* ideas. Two respondents found it harder to *recall and remember* content from virtual conferences, and others stated that they *learn more, focus and reflect more*, and can *concentrate on ideas better* in a face-to-face conference setting. One respondent described encountering content during an online event as follows: ‘*You think about it whilst attending then when it’s over I hardly think about it at all.*’ Another compared being exposed to information during a virtual conference as similar to encountering content elsewhere online:

[Online conferences] *do the job on presenting information but are totally inadequate on delivering the face-to-face benefit of a conference. In fact if I wanted*

to see a presentation or learn about a topic I can seek out a video or article I don’t need to sit in a room on my own looking at a computer screen.

A common theme was the ability to discuss ideas with other attendees at face-to-face events, and the lack of those opportunities at virtual conferences. Of the sixty-three respondents who answered the question ‘Please add any other comments about your experience with encountering ideas at face-to-face and virtual conferences’, about half described the ability to discuss ideas with other delegates as an advantage of face-to-face events. They wrote, for example, that at face-to-face events they could *sit next to someone and discuss some of the pros/cons of the ideas presented*, and they liked that they could *follow up with speakers*. They commented on the advantages of having *hallway conversations*

with attendees, talking to people between sessions to gather more ideas and continuing the conversation into the breaks. Some respondents noted that they came away with more ideas because of those informal conversations, stating that there was a higher chance of encountering ideas in informal talk and that ideas come from conversations with other delegates. One respondent summarises the thoughts of many others as follows:

Informal meetings between talks, presentations, etc., often provide the best opportunity to exchange ideas and information on what is currently happening in my work environment.

In contrast to the huge benefit and immeasurable impact provided by face-to-face conferences to discuss ideas as reported by some respondents, virtual conference attendance did not enable those interactions in the same way. Respondents preferred to discuss original ideas with colleagues face to face and said it was easier to talk further about ideas that I find interesting when I meet people in person. Two respondents described interactions with ideas during online events as follows:

I encounter ideas, but I cannot discuss these with others in virtual mode, the ideas are born dead.

Virtual conferences can try to replicate this [discussion of ideas during face-to-face events], but nothing beats an in-person meeting of the minds.

However, a small number of respondents commented positively about the opportunities virtual conferences provide in terms of exposure to ideas. The ability to catch up with recorded content after the conference was noted as an advantage, although one person stated that they don't watch the recording as they never seem to find the time to. Some respondents preferred the virtual environment to engage with ideas as they are less distracted so they lean more or find it easier to recall new ideas from virtual conferences. Others liked that they can skip sessions they are not interested in, that a virtual conference is shorter, sharper, often more focussed and that they can more easily expand their professional knowledge in the virtual environment.

Networking impact at conferences

In the second set of statements, respondents were asked to comment on networking activities at face-to-face and virtual conferences. The quantitative analysis of these statements suggests participants saw significant advantages for networking at face-to-face conferences compared to virtual conferences. Table 2 presents these findings.

Statements	Agree/Strongly agree (%)	
	F2F	Virtual
I meet delegates with similar interests	92.2	36.0
I interact with a diverse group of attendees	86.6	28.6
I catch-up with delegates I already know	91.2	34.1
I expand my professional networks	91.2	30.0

Table 2. Agree or Strongly agree with networking activities at face-to-face and virtual conferences (n=217)

Despite the sizeable difference between the percentage of Agree or Strongly agree responses for face-to-face and virtual conferences, a significant difference between the findings was not indicated by t-tests and cross-tabulations calculations. A notable difference for networking activity responses at virtual conferences, which did not occur for the informational and affective activities, was a high number of Neutral responses. This acted as a balance between the affirmative and negative responses, so that when the sum of the Agree or Strongly agree and Disagree or Strongly disagree responses were compared for the four networking statements at virtual conferences, only the second statement showed a difference of over 6.5%. The total agreement for 'I interact with a diverse group of attendees' at virtual conferences was 28.6%, compared to disagreement at 43.8%.

The qualitative data gathered through open text responses reflected the same trend, with a substantial number of participants (90 of 151 responses) reporting that face-to-face conferences provide better opportunities for networking compared to virtual events. One participant wrote *you really need face to face to interact with people* and another described face-to-face networking opportunities as *more fun, providing more interaction and opportunities to chat*. Another stated that *being able to network and interact is fundamentally missing from virtual sessions*, and a fourth commented they *have not received any networking benefits from virtual conferences*. Respondents also referred to networking attempts at virtual conference as tending to feel *forced, perfunctory and less meaningful* and being a lot more formal if they occur at all. Additional comments also point to online networking requiring a lot more effort:

The online virtual environment is so much harder to interact with delegates. It's quite

disheartening to finish an online conference and just click on Leave Meeting then silence.

Much more work (on the side of the organisers and the attendees) must go into the networking aspect of online conferences, this can be quite mentally taxing.

Only four respondents found that face-to-face and virtual conferences provided the same opportunities to network with other delegates, and six thought it was easier to network online. Seeing delegates' names was perceived as an advantage of virtual events and *chat boxes and audio chat rooms make networking more accessible to the shy, disabled and neurodivergent*. For two respondents, networking was not important, with one writing *not really interested in networking at conferences* and the other *attend[ed] to learn*.

Affective impact of conferences

In the survey participants were asked to respond to five statements relating to the affective impact of conference attendance. Agree and Strongly agree responses to these Likert scale questions were analysed to determine the differences, if any, between face-to-face and virtual conference attendance. Although the differences were less pronounced than for the networking questions, the results indicate that face-to-face conference attendance is more likely to have positive affective impacts on delegates. For statements 1, 3, 4, and 5 (see Table 3) the difference between the impact of face-to-face and virtual conference attendance was over 20% in favour of face-to-face conferences. However, t-tests and cross-tabulations found no significant difference between the conference formats for the statements. The percentage of Agree/Strongly agree responses for the five statements are presented in Table 3.

Statements	Agree or Strongly agree (%)	
	F2F	Virtual
1. Attendance at ... conferences makes me feel inspired and enthusiastic about my work and the profession	90.7	68.2
2. Attending ... conferences makes me feel more confident as an information professional	79.0	68.7
3. Attending ... conferences makes me feel more motivated as an information professional	87.9	67.8
4. Attending ... conferences makes me feel part of something bigger	88.3	58.9
5. I feel valued if my institution sponsors me to attend ... conferences	91.1	70.6

Table 3. Agree or Strongly agree with affective activities at face-to-face and virtual conferences (n=214)

When asked to enter comments about the affective impact of face-to-face and virtual conference attendance, twenty-three respondents answered that face-to-face events had a greater impact. They described face-to-face conferences as making them feel *motivated, inspired and part of something*, they referred to them as *fun* and a *richer experience* than online conferences. They also talk about the energy, *buzz*, and sense of belonging felt when attending a face-to-face conference:

I just love the energy I get from casual conversation with other librarians at face-to-face conferences. This has yet to be replicated at any of the virtual conference I have been at.

The professional and personal 'buzz' from a face-to-face conference cannot be underestimated, nor can the value of inspiration from talking to others about their work and ideas.

Virtual conferences are overwhelmingly a solitary experience (even though it's nice to 'see' people online from the solitude of your own space). The impact of virtual conferences is not 'magnified' by the feeling of being part of a group and shared experiences; hence less memorable.

One respondent stated that they don't *really immerse* themselves during virtual conferences, and others reported feeling *somehow disconnected* and that it is *much more difficult to get enthused*. On the other hand, eight respondents spoke positively about the affective impact of attending virtual conferences, writing that they feel *more involved* and *less overwhelmed* compared to face-to-face events. Two respondents pointed out that for them, virtual conferences are a *more level playing field*, and are *more welcoming*; *people seem to speak their minds a little more, because there is less to lose*. Seven respondents reported no difference between face-to-face and virtual conferences in relation to affective impact, stating that both formats can be inspiring and motivating.

General statements about conferences

The open-ended questions at the end of each set of statements and the survey gave participants the opportunity to enter additional comments about conference attendance. About a third of respondents who answered the open-ended questions of the survey pointed out that face-to-face conferences cost money and take time, highlighting this as one of the disadvantages of the format. Online conferences were perceived as being more accessible to a wider audience, as they tend to be cheaper or free of cost and present no need

to travel to a conference location. Respondents regarded this ease of access of virtual conferences as a *huge benefit*, which makes them *available to more professionals across a larger geographic region*. A respondent commented that virtual library conferences offer the opportunity to participate in meetings that would be impossible to attend in person, either because of financial or time restraints. A few others suggested that increased accessibility of virtual conferences also increases the diversity of delegates, stating for instance that virtual events *encourage a more diverse group of attendees to be able to participate*. Another advantage of virtual conferences raised by two respondents, was their smaller impact on the environment, as there is no need for delegates to travel. From an Australian perspective, a respondent pointed out that the virtual format does not make it necessarily easier to attend, as they felt the distance either way. *So many international conferences are not in our time zone. The new jetlag is 2am conference slots for 3 nights in a row.*

A substantial number of respondents stated that being distracted was one of the drawbacks of attending a virtual conference. Many of them remarked on how difficult it was to stay focussed and engaged during online presentations, stating that they were *distracted throughout* or that they *struggle with not getting distracted while sitting for too long on their own*. Others described how they performed regular work tasks at the same time as attending a virtual conference:

I don't feel I truly get to shut out work. It is more like I have to still go to work and also go to the conference.

I tend keep working while listening to presentations - it's tempting to keep checking emails etc.

When travelling for a face-to-face conference, it is easier to focus on just the conference without day to day work responsibilities interfering - that is, you are away. Virtual conferences have to fit in with ordinary work life.

The opportunity to interact with vendors and the trade exhibitions during a face-to-face conference was noted as another advantage of this format. Respondents stated for instance that *exhibition spaces and opportunities to meet with vendors are among the most valuable parts of library conferences*, and that meeting vendors and building relationships with them *simply can't happen in any real sense at virtual conferences*.

The survey instrument asked respondents to compare face-to-face and virtual conferences regarding certain themes such as ideas or networking, and also in more general terms. However, twenty-nine respondents found that the differences between conferences were not always linked to their format (face-to-face compared to virtual), because conference impact can depend on other factors too. For instance, previous experience in the industry and of conference attendance, as well as networking skills, can make a difference to the impact of a conference, irrespective of its format. In the virtual environment, the software used to host the event and its functionality, Internet connectivity performance issues, or camera problems can also change the outcomes for delegates significantly. Respondents highlighted how the theme of the conference, or whether it was more generic or more specialised, also made a difference in this regard. One respondent felt that virtual conferences should not be called conferences at all, as they are *a different beast entirely - I feel like there should be a term other than 'conference' to describe what these virtual events are*.

Differences between respondent groups

As indicated above, almost half the responding participants were located in Australia and nearly 60% were academic librarians. The heavy weighting to Australian library professionals is understandable given that both authors have developed their strongest networks in Australia. It is less clear why the majority of respondents worked in academic libraries, although this is the sector in which both authors have most experience. The demographic information was examined more

closely to determine if these larger cohorts were likely to produce unreliable results. The numbers of Australians working in the different sectors was not greatly different to the full respondent group. That is, 49% of the Australian cohort worked in academic libraries (compared with 58%), 19.8% in public libraries and 20.1% in special libraries (compared with 14.7% and 14.3%, respectively). When the academic librarian cohort was examined, eleven of the fourteen countries were represented.

Additional analysis to test the influence of the larger cohorts was conducted on the quantitative data from the Likert scale responses to the informational, networking and affective statements relating to attendance at face-to-face and virtual conferences. With a focus on the networking statements responses, because that was where the greatest differences were found for the full dataset, t-tests were carried out on the responses from participants outside Australia ($n=122$) and participants working in sectors other than academic libraries ($n=87$). None of these tests found significant differences between the two conference formats and all were comparable with the results found for the full respondent group.

Discussion

Attendance at face-to-face conferences has been shown to have a positive impact in terms of encountering ideas, networking, and affective qualities (Dumbell, 2019). This study set out to compare the impacts of face-to-face and virtual conferences for library professionals, using a framework based on the face-to-face conference attendance findings. It found that the positive impacts for attendance at in-person conferences did not transfer well to the virtual environment. In particular, the social and networking experiences at a face-to-face conference are extremely difficult to replicate in an online environment.

While encountering new ideas and content in the two conference formats did not show strong differences in the results, it is the opportunity to reflect on and discuss those ideas with other delegates that is missing at a

virtual conference. This finding demonstrates the interwoven nature of the impacts of conference attendance. That is, the impact of ideas encountered at a conference is enhanced by in-person encounters. At face-to-face conferences, there are many informal opportunities to discuss the content of presentations with peers, which in turn encourages reflection, sense-making, and situating those ideas in individual workplace contexts. In doing so, conference attendees are also inadvertently improving their learning (Chan et al., 2021). Aspects of learning, such as 'context-dependent memory' and 'elaboration learning' (Hofstädter-Thalman et al., 2022, p. 2), can occur in the social realm of conferences as attendees discuss presentations and consider how ideas connect with their own experience and knowledge. These social encounters can also lead to attendees hearing about ideas beyond the conference programme, further contributing to the potential informational impact of face-to-face conference attendance. The results of this research indicate that virtual conferences are not yet geared towards creating such learning experiences for delegates. In fact, the greatest difference found between the impact of in-person and virtual conference attendance was for the networking component of the study.

A substantially higher number of respondents agreed or strongly agreed with each of the statements relating to networking at face-to-face conferences compared with virtual conferences. While it is not a surprising finding and supported by many other studies (see for example, Engelbrecht et al., 2022) the disparity between networking opportunities is concerning. Almost certainly, virtual conferences will continue to be offered as an alternative or replacement for face-to-face events and there is strong agreement in the literature that conference organisers need to focus on improving networking opportunities if they wish their conference to have high impact (Engelbrecht et al., 2022; Kim et al., 2022). Roos et al. (2020) have provided ideas of how such networking prompts could work in a virtual environment, but the present study shows that for library and information professionals, this is not happening yet.

The affective impacts of conference attendance include a sense of being part of a bigger community, increased motivation and enthusiasm, and feeling valued by the workplace. While the differences in responses to face-to-face and virtual conference attendance were not as marked as for networking, the results showed a clear preference for face-to-face conferences to experience these positive impacts. Responses included the terms *energy*, *buzz*, *fun*, and *richer experience* to describe in-person conference attendance, while *solitary* and *disconnected* were terms used in relation to virtual conference attendance. Similar results are found in other studies (for example, Engelbrecht et al., 2022; Roos et al., 2020; Sá et al., 2019) in the descriptions of virtual conferences lacking warmth and being like everyday work.

One of the main advantages of virtual conferences noted by respondents is the lower financial burden of attendance. The ability to attend virtually can result in increased accessibility and diversity of delegates, acting as a leveller for the profession. Sá et al. (2019) write that virtual conferences allow for 'communication across time and space', which has the potential to facilitate access and interaction for library workers globally. However, this potential remains just that because access to technology and Internet are a prerequisite for attending a virtual conference, which puts some groups at a disadvantage (Niner & Wassermann, 2021). Time zone differences can also influence decisions

about attending and engaging in a virtual conference.

A further disadvantage of attending a conference online is the risk of being distracted. Respondents related this to attending a virtual conference while at work and sitting alone, comparing it with the ability to focus when attending in person. These findings are supported in a study by Kim et al. (2022), who reported that virtual conference attendees frequently join an event from either their place of work or from home, making it more likely that they are distracted or interrupted, and making it more difficult to concentrate on the conference itself.

The negative environmental impact of face-to-face conferences was raised only by a few of the respondents in this research, however, the impact on climate that face-to-face attendance can have is an important consideration. Previous studies have explored this issue and reported that the online equivalent of a face-to-face conference had only 1% of the carbon footprint (Raby & Madden, 2021), and that virtual and even hybrid conferences reduced the carbon footprint by 94% (Tao et al., 2021).

In general, the findings of this research suggest that face-to-face conferences will result in stronger informational, networking, and affective impacts. Table 4 summarises the main points of difference between face-to-face and virtual conference attendance identified in this study. Green cells indicate an advantage of the format, and grey a disadvantage.

Impact of in-person versus online conference attendance		
Impact	In-person conferences	Online conferences
Informational impact	Opportunities to discuss and reflect on ideas with other delegates increases informational impact.	Often limited or no opportunities to discuss and reflect on ideas with other delegates, which can decrease informational impact.
Social impact	Traditional in-person conferences provide many opportunities for networking which can increase social impact.	Often limited or no opportunities to network and formally/informally socialise with other attendees.
Affective impact	Opportunities to socialise with other attendees can increase positive affective impact.	Limited or no opportunities to socialise with other attendees can negatively influence affective impact.
Cost, accessibility and diversity of delegates	Often costly; location can favour some delegates which reduces accessibility and diversity.	Often cheap or free of charge, which can increase accessibility and diversity of attendees.
Risk of distractions and loss of focus	Minor risk - in-person format increases likelihood of immersion; easier to eliminate distraction at a different physical location.	Higher risk- being online increases chances of distractions; delegates might be required to work while attending.

Table 4. Summary of study findings: Advantages (green) and disadvantages (grey) of face-to-face and virtual conference attendance

Technology is a key factor in the organisation of conferences, regardless of format. The potential for improved access and diversity, and the positive effect on the carbon footprint that comes with virtual conferences are compelling reasons for re-considering how informational, networking and affective impacts can be realised to the same degree as face-to-face conference attendance. When comparing the two formats, Ahn et al., (2021, p. 2) write ‘in-person conferences involve a complicated array of activities that are both formal and informal, structured and unstructured, synchronous and asynchronous. No single communication technology has the capacity to effectively recreate all of these activities online’. Some authors have suggested that hybrid conferences should be explored further (Ahn et al., 2021; Niner & Wassermann, 2021; Roos et al., 2020). Hybrid events combine features from both conference formats to provide a richer experience for all attendees with synchronous and asynchronous events as well as opportunities for delegate to engage and contribute online. An important question is left unanswered, however, which is, will online attendees of a hybrid conference have the same

experience as in-person attendees or even a better experience than they have had to date?

In hindsight, the survey instrument could have included questions about hybrid conferences, as this appears to be an area that deserves further investigation. In addition, it is difficult to generalise the findings due to the sample size, a large part being from Australia and academic libraries, and the qualitative nature of some of the results. It is likely that delegates’ experiences vary widely especially when attending online conferences, as the technologies used affect interactivity and opportunities to connect. However, the findings of this study are useful for library and information professionals, conference organisers and library and information institutions, as they are likely applicable and valuable in this context.

Further research could build on the findings of this study by applying an information seeking behaviour lens, for instance examining how delegates’ curiosity levels or their willingness to reciprocate information they receive influences the impact of conference attendance (Cattlin &

Given, 2024). The strong and weak network links model has been suggested as an avenue to further explore knowledge acquisition and communication at conferences (Dumbell, 2019, p. 66), as has Johnson's (2004) exploration of weak ties and their effectiveness when accessing and exchanging information.

Conclusion

This research set out to answer the question how face-to-face and virtual conferences differ in relation to their impacts on attendees. Using Dumbell's (2019) impacts of face-to-face conference attendance as the framework for the research, the findings clearly show that attendees experience stronger positive impacts at face-to-face conferences. Although weaker differences in informational and affect impacts were found in the quantitative data, the qualitative data highlighted the importance of networking across all impacts. This social component of conferences influences the degree to which attendees reflect and learn from the ideas they gain at a conference and contributes to how attendees respond emotionally (affect) to conference attendance. Given that networking is central to the impact of conference attendance, it is this component that requires attention by conference organisers and indeed attendees themselves.

The advantages of virtual conferences (less time and cost, better access, and reduced climate impact) are excellent reasons for creating an improved conference experience for online attendees. However, technological improvements to enhance networking

opportunities are likely to exacerbate existing barriers relating to access. Therefore, conference organisers will need to be mindful of finding a balance that realises the potential for greater diversity across the attendee cohort while providing the means for improved networking activities.

As the results of this study and previous research demonstrate, there are disadvantages of virtual conference attendance that lie outside networking and technological challenges. Distraction or the inability to focus fully on a virtual conference is a common thread. To some extent, employers have a role here. If they are serious about providing conference attendance support for their staff, then those staff need to be given the time to engage as fully as possible with the conference. Significant savings to the employer are made by avoiding travel and accommodation, so it seems reasonable that virtual conference attendees are not expected to work in that time as well.

The strengths of this research are its focus on library and information professionals, the international recruitment, and that respondents were asked about their experience of face-to-face and virtual conferences generally, rather than gather data related to a single conference. The combination of quantitative and qualitative data collection enabled some insights into how the informational, networking and affect impacts interacted and where future efforts should focus to improve the impact of virtual conference attendance.

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