

What's news?

Encounters with news in everyday life: A study of behaviours and attitudes

Sally Jo Cunningham, David M. Nichols, Annika Hinze, Judy Bowen

Department of Computer Science, University of Waikato, Hamilton 3240, New Zealand
sallyjo, d.nichols, hinze, jbowen @waikato.ac.nz

Abstract. As the news landscape changes, for many users the nature of news itself is changing as well. Insights into the changing news behaviour of users can inform the design of access tools and news archives. We analysed a set of 35 autoethnographies of news encounters, created by students in New Zealand. These comprise rich descriptions of the news sources, modalities, topics of interest, and news 'routines' by which the students keep in touch with friends and maintain awareness of personal, local, national, and international events. We explore the implications of these insights into news behaviour for digital news systems.

Keywords: news behaviour, qualitative research, digital news resources, news encounter, personal digital library

1 Introduction

The news landscape has changed considerably over the past decade with social media platforms creating new dissemination channels for information. For many users, the nature of news itself has changed. The social ecosystem of consumption, creation and sharing presents a complex landscape of news information far removed from just broadcast television news and print newspapers. Our understanding of these news interactions informs both the creation of access tools for current users and the design of news archive collections.

Studies of news behaviour are predominantly from the disciplines of journalism and communication studies. In contrast, work within the digital libraries field often focusses on new access mechanisms such as recommender systems and visualisations. In this article, we extend previous work on news behaviour [6] and integrate a news framework from the field of journalism [30]. To explore current behaviour regarding news, we analysed a set of 35 autoethnographies of news encounters created by students in New Zealand. These autoethnographies comprise rich descriptions of the news sources, modalities, and topics of interest. They give insight into the news 'routines' by which the students keep in touch with friends and maintain awareness of personal, local, national, and international events. We explore the implications of these insights into news behaviour for digital news systems.

This is the author's accepted version of an article published in the *International Journal on Digital Libraries*.

© Springer 2016. The final publication is available at link.springer.com.

<https://doi.org/10.1007/s00799-016-0187-1>

Cunningham, S.J., Nichols, D.M., Hinze, A and Bowen, J. (2016) What's news? Encounters with news in everyday life: A study of behaviours and attitudes, *International Journal on Digital Libraries*, 17(3) 257–271.

The following section gives an overview of related news interaction studies and news archival systems, including attempts to define news frameworks. We then detail our study methodology in Section 3, and present the study results (Section 4). In Section 5, we discuss implications for news access and archiving. Section 6 presents a re-analysis of our data using the news framework by Schröder [30] and refines the interpretation of our study. Section 7 draws conclusions and presents implications for future work.

2 Related work

In this section, we discuss news frameworks from the field of journalism, and present an overview of studies on news consumption. We briefly present an overview of existing news archival systems, and discuss methods for observing news behaviour.

2.1 What is news?

Studies in the journalism literature have attempted to define the attributes of news. In 1965 Galtung and Ruge [10] produced a highly influential twelve-point framework from the perspective of journalists, which included criteria such as unexpectedness, references to people, and elite nations. The latter category is likely a proxy for “large and powerful”, implying “people like us” (from a Norwegian perspective)—a signal that the interpretation of news is as bias-prone as the news itself. Harcup and O’Neill [13] provided an updated framework of ten items including the power elite, celebrity, entertainment, magnitude and surprise. Summarising these news frameworks, Armstrong, McAdams and Cain [3] claim that the “consensus within journalism education is that newsworthiness is demonstrated by the intensity and frequency (e.g., more is better) of these values in news content”. However, in their survey of university students “it appears that two traditional news values—timeliness and proximity—are not as important to audiences as they are to journalists” [3]. Their result is reflective of a larger shift in conceptions of news to include audience-driven preferences and the growth of social media as a channel for news discovery, discussion, and sharing. Costera Meijer and Groot Kormelink [4] summarise a broad conception of news as “everything that is new: from the developments in the personal life of your Facebook friends, opinions on Twitter to information on specific websites within your field”.

Schröder’s [30] news framework recognises the impact of social media on news-related behaviours with an explicit “participatory potential” category. Indeed, it could be argued that frameworks (and studies) that pre-date the widespread usage of social media such as Facebook and Twitter are of limited explanatory value in understanding current patterns of news consumption.

2.2 News Consumption

New consumption patterns have diversified along with the growth of online, mobile and social media. Schröder [30] includes a “situational fit” category to attempt to capture the idea that methods of news access are adapted to the properties of the user’s situation (e.g. network availability, social situations). We return to an extended consideration of this framework in Section 6. Users now often access news on an opportunistic and incidental basis [36]. Some adopting a “checking cycle” approach of scanning several sources (web, email, social media etc.) so that news is frequently intertwined with other genres of information [4].

Taneja *et al.* [33], using direct observation, report that media location and availability are the most useful frames to characterise (general) media consumption. Instead of genres such as news and sports, they derive the categories “media at home”, “media at work”, “media online” and “mobile media”. Schröder [30] also notes that news consumption patterns vary by location, with the most common modes being:

- computers at work and in personal space at home
- TV in communal space at home
- mobile devices while travelling

We see aspects of this breakdown in the analysis of Section 4.4.

Mitchelstein and Boczkowski [24] review news consumption studies and specifically criticise assumptions of:

- a division between print, broadcast, and online media
- a separation of media features and social practices

Taken together these results suggest that location, availability and social context are all interacting to influence news consumption patterns.

Nielsen and Schröder [25] report that there is limited understanding of the relationships between social media and traditional news channels as sources of news (in the traditional sense). Recent studies suggest that, despite the growth of social media, trusted legacy brands and platforms remain important news channels ([25], [34]). Social media has created a space where “consumers collaboratively create and curate news stories” rather than receiving news from a limited number of ‘authoritative’ sources [28]. Hermida *et al.* [14] report that these social channels are valued by users for the alternative filtering they provide but that social media use by “traditional” news sources (such as newspapers) is an important source of information. Social media can be both a contributory factor to information overload and can act as a filter to help users cope [28].

Meijer and Kormelink reflect the potential richness of social media-enhanced news interactions in the 16 types of news activity reported by their interviewees: reading, watching, viewing, listening, checking, snacking, monitoring, scanning, searching, clicking, linking, sharing, liking, recommending, commenting and voting [4]. These micro-activities are complemented by higher-level classifications of behaviour. Marshall [22] categorized study participants using a New York Times news reading application into three groups: “Reading primarily for relaxation and as a diversion; Reading

as a newshound, following the narrative of specific breaking stories or particular recommendations; Reading broadly to stay informed or to keep up with events of the day”. Van Damme et al. [34] categorize mobile news consumers as: *omnivores* (actively engaged using multiple channels), *traditionalists* (intensive but loyal to established sources such as TV) and *serendipists* (less of a news routine but digital when engaged).

Lee and Ma [18], using student survey data, suggest that social media news sharing is driven by several factors, including a desire to be part of a virtual community, status seeking, easing future personal item retrieval and as a means to create social relationships. Shared content persists in the platform as an archive that can be searched at a later date and can be more reliable than local storage [37]. Similarly, Marshall [22] notes that “a person’s daily encounters with the news should become a fundamental part of . . . a personal digital library.” The diverse distributed cross-platform multimedia nature of users’ news interactions suggests there are considerable technical and legal challenges to achieving that goal; especially for social media [37], [38]).

2.3 News-specific systems

News-based information systems include systems to access both current news and news archives. Though many of the systems discussed in this section do not explicitly style themselves as ‘digital libraries’, they include typical functionality of digital libraries in making news items available to users (sometimes by storing the news items within a collection, and sometimes by external linking to items in other news sources). Standard searching and browsing access mechanisms are common for both current news and archival news collections, and other digital library system tools such as clustering, tag clouds and temporal trends have also been adapted for news collections [35].

Accessing current news is an information overload problem, often addressed through recommender systems. Özgöbek, Gulla and Erdur (2014) claim that “recommending news articles is one of the most challenging recommendation tasks”, partly due to rapid changes in the relevance of items caused by the strong temporal nature of news. Leino, Rähkä and Finnberg [20] found that personal news recommendations are more effective, possibly because social media users have an implicit model of their friends’ preferences which pre-filters suggestions.

Location has been regarded as another key feature for accessing news—both the location of the consumer and the places referred to in news reports. For example, systems such as *NewsStand* [30] and *NewsViews* [9] attempt to extract geographical references from news reports to enable map-based interactions such as queries and visualizations. Similarly, time has also been used to create novel access mechanisms to news archives ([2], [21]).

Many news archive systems are built on a single-media model (all newspapers (e.g. [2], [17]) or all news broadcasts from one TV station (e.g. [19])). The creation and maintenance of single media, or single-source, archives is simpler from technical, organisational and legal standpoints. The access points for such archives tend to be derived from within the main media type of the archive system (e.g. [16]).

In contrast, Spiliotopoulos et al. [32] describe a news system using multiple sources and integrating terms from social media as search facets, reflecting some of the diversity of sources revealed in the news consumption studies. Geo-location, as in *NewsViews* [9], is a common way of connecting archive contents to external representations (i.e. maps) but, in general, news archives do not reflect the variety of behaviours of news consumption. Wider archiving strategies that do include social media are limited by problems over ownership and authenticity [37].

2.4 Methodologies for studying news behaviours

Studies of interactions with news have been performed using several methods: interviews [28], surveys ([8], [20], [18], [25]), direct observation [33] and lab studies ([19], [26]).

Journals or diaries have been used in some studies although with other constraints: such as one publication-specific application [22] or only focussed on mobile consumption [34]. Laboratory-based studies suffer from the standard critiques of artificial environments and, often, unrepresentative participant sampling [15]. The lack of diversity in the methods used for understanding news-oriented behaviour has been criticised both as failing to reflect authentic behaviours and being vulnerable to self-reporting biases [4]. Mixed-methods studies—for example, combining news diaries with software logging [34]—have the virtue of supporting both qualitative, subjective interpretation with quantitative, objective summaries of news system usage. However, these studies are comparatively expensive to run and by their nature limit themselves to log-able news sources (e.g., excluding physical news, news encountered outside the usual physical devices being logged, serendipitously encountered digital news sources, and digital systems that offer both news and other information resources).

2.5 Summary

In summary, there has been a gradual shift from regarding news as being journalist-driven to being user-centred. The growth of the Internet, mobile technologies, and social media in particular has changed the nature of news consumption and also introduced new forms of news-centric behaviours. Key characteristics of news such as timeliness and location are used both to design new access mechanisms and as inputs to recommendation algorithms. Social media recommendations can be effective as they leverage existing models of users' preferences and are often innately timely. However, existing news systems are largely single-source archives with source-specific access mechanisms, which is in sharp contrast to the diversity of both sources and news seeking mechanisms employed by news seekers, as revealed by research on news consumption. We note that currently no single news digital library system supports all, or indeed the majority, of the sources and news behaviours discussed in this section. In Section 7 we return to the question of how to broaden the services and collections of news-focused digital libraries, taking into account research on changes in news format, content, and consumption activities.

Studies of news interactions have been criticised for a lack of methodological diversity and for not yet adapting to the new social media landscape. Research into news is inter-disciplinary (including journalism studies, media and communication studies, computer science and information science) although we find few citations across disciplinary boundaries. There are several calls for researchers to use multiple methods to better understand users' news behaviour across different media, locations and platforms (e.g. [24], [31]). In this paper, we attempt to study authentic news interactions using methods that complement the existing survey and lab studies.

3 Methodology

Our study is based on a set of autoethnographies gathered from undergraduate students in New Zealand. In this section we describe the context in which the autoethnographies were created, our analysis method, and the limitations of this study.

3.1 Data collection

The data collection for this study was performed using personal ethnography (incorporating the use of diaries, self-observation and self-interviews), gathered in a semester-long project in a third year university course on Human-Computer Interaction. The students were given the (deliberately broad and ambiguous) brief of designing and prototyping software to 'assist a person in accessing news'.

The first task for the students was to gather data on how people currently locate, manage, share or encounter news. To that end, they examined their own news-related behaviour by completing a personal diary during the course of their everyday lives over a period of three days.

The participants were provided with diary forms (see Figure 1) and asked to complete a diary entry each time they encountered a news item (the definition of 'encountering a news item' was anything that exposed them to a particular item, e.g. a friend telling them about it or choosing to watch a news programme on television etc.)

For each encounter with a news item, the participants recorded the date and time, the number of news items they were exposed to during the encounter, the source, type (international, national, local or personal), the topic, how they encountered it and how believable it was (on a linear scale). The students then summarized and reflected on their diary entries as a post-diary 'debriefing'.

The next step involved self-observation: the students observed and reflected on how they managed their exposure to news items by creating autoethnographies [5] that identified the strategies, applications and resources they used and then investigated what types of media they were using, topics they were accessing, and the activities they performed to actively locate news. They also observed any unexpected or chance encounters with news sources. Students were encouraged to reflect on their *actual* practices identified in the self-observation rather than attempting to force their behaviours to fit exclusively into the criteria above.

Time +Date:	No. of News Items:
Location:	
Source: (circle all that apply)	
Facebook Twitter News_Website Web Blog/Tumblr	
Forum TV Radio/Audio Phone_call Txt	
Email Newspaper Magazine Face-to-Face Skype	
Other: _____	
Type: International National Local Personal	
Other: _____	
Topic: Current_Events Politics Business	
Sports Health Entertainment Celebrity	
Other: _____	
Encountered by: 'looked for' 'ran across'	
Delivered to me	
Other: _____	
Believability: (mark a place on the line)	
Low _____ High	

Fig. 1. Diary form for recording news encounters.

3.2 Data analysis

The diary study summaries and autoethnographies for 35 students were retained for analysis, out of an enrolment of 103. As is typical of New Zealand Information Technology students, these selected participants are predominantly under 30. Though the majority of students in the course were male (84 M, 19 F), we selected a higher proportion of the female students' work for analysis so that the female news experience would be better represented. The course also included a significant number of international students (33 of 103); accordingly, we also limited our selection to students who were New Zealand citizens or permanent residents, as the experiences of international students could be expected to differ greatly by their country of origin.

Table 1 presents the demographic details for the 35 students whose work is analysed in this study. These students were assigned a unique label (i.e., P1, P2, ... P35), and are referred to by that label in this paper.

Table 1. Student demographic details.

Gender	Count (%)	Age at time of study	Count (%)
Male	22 (63%)	< 30 years	29 (83%)
Female	13 (37%)	30 – 46 years	6 (17%)

The diaries were retained by the students, and so cannot be analysed directly. Instead, we view the recorded behaviour through the diary study summaries and reflections. The entirety of the self-observation was available for analysis. These summaries and autoethnographies for the 35 students total over 200 printed pages. They were analysed qualitatively using Grounded Theory methods [12], an iterative, inductive approach that allows the participants' experiences, viewpoints, and conceptions to emerge naturally. Initial coding largely followed the categories included in the diary study summaries (Section 4), and further concepts emerged as these encounters were set in context by the autoethnographies (Section 5).

3.3 Limitations of study

Participating in a study is known to have the potential to alter behaviour. The students themselves recognized that undertaking the assignment introduced changes to their news behaviour, both to encourage and to discourage reporting of news behaviours in the autoethnographies ("I was more aware entirely of the news around me... sub-consciously listening out for news to include" [P22]; "I found myself not wanting to look at the news online as much since I would have to record it down." [P31]). The assignment brief acknowledges these issues. In mitigation, the diaries included the option to indicate news events that occurred but were not noted, and the students were encouraged to explore deviations from their usual news behaviour in the autoethnographies.

The contrasting temptation in filling out a diary is to give the teacher what the student perceives to be the expected 'right answer' (in this case, possibly a larger than normal set of encounters with an over-representation of traditional news as found in newspapers and other 'serious' sources). A desire to manage the presentation of self-image might also lead a participant to skew the accounts of news behaviours away from potentially embarrassing personal interests such as Hollywood gossip. We therefore reinforced the message during lectures, tutorials, and office hour consultations that their autoethnographies and diaries would be most useful to their final project if their work faithfully reflected their actual news behaviours.

We recognize that the students likely felt a greater sense of commitment to completing the diaries and creating the autoethnographies than is usual with study participants, given that these activities were assessed. Participation in this present study, however, was not required; a student could opt out of inclusion by emailing a third party to indicate this desire. The assessors for the course were not informed of these decisions until after the semester's grades were finalized.

We further stressed in the assignment brief and in clarifying lectures and tutorials that the study was not limited to the traditional news categories (Sports, Current Events, etc.). The students were encouraged to think as broadly as possible about what they and their social contacts consider to be news. The categories captured in Section 4.2 indeed reflect a diversity of topics and perspectives beyond the conventional categories derived from print newspapers and television evening news shows.

Given that this is an opportunistic study, we cannot claim to capture ‘typical’ behaviour in searching, browsing or encountering news over a broader population. As is characteristic of this style of study design, we instead build a rich picture of the news-related information behaviour for these students, from their own perspective [28]. We demonstrate in Section 7 how this rich picture can suggest directions to explore both in developing software support for these behaviours and in creating news archives.

4 Results

In this section we summarize the news sources consulted by the students, the news topics of interest to them, the characteristics of their common news behaviours (‘routines’), and online and physical platforms that they use to access their news.

4.1 News sources

The students encountered news from a wide variety of sources (see Figures 3 to 5), with an average of 4.4 significant news sources per student (see Figure 2).

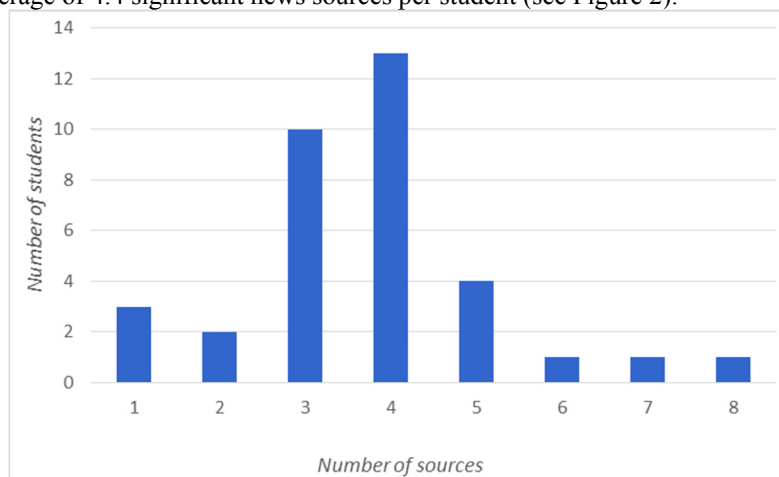


Fig. 2. Significant sources per student

Only three students relied on a single news source; it was acknowledged in the other 32 autoethnographies that multiple sources were necessary for topic coverage and convenience of access (e.g., “The 3 main ways that I access news [Facebook, email, mobile

news app] all have good and bad attributes and that's probably the reason why I don't just use one." [P17]).

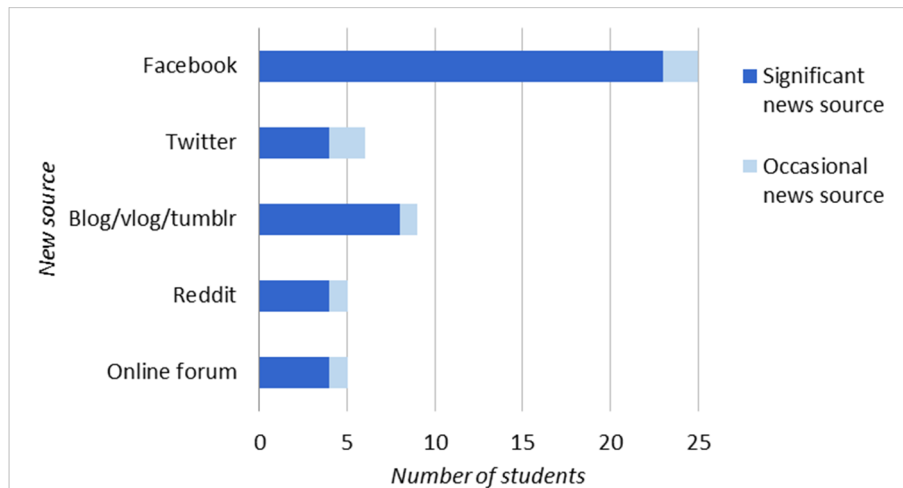


Fig. 3. Social news sources

Facebook is by far the most heavily relied upon news source both in social media and overall (Figure 3). Its use goes well beyond providing personal news from family and friends; it is also a source for ‘breaking’ news of all topics. Twitter can be a ‘Facebook lite’ for news (“Twitter is a more short form of Facebook where I look at various tweets posted from friends, random users and any company or news agency to find out the latest news.” [P1]). The blogs, vlogs, and forums were often focused on a topic of interest to the student, where use of Reddit and Tumblr was described as being more exploratory or serendipitous (“I never visit [Reddit] intending to encounter news but sometimes find myself reading or watching news after clicking on a link that grabbed my attention...” [P19]; “When I go to Reddit I am looking to find news and content which is relevant to my interests, but as not everything on the website is news ... I stumble onto news in subreddits. So when I am browsing Reddit I am both "looking for" and "coming across" news stories.” [P24]).

Interpersonal news sources (Figure 4) include face-to-face conversations (both with individuals and groups), SMS or instant messages, voice calls (via mobiles or voice-over-IP), and email. The latter source most frequently elicits contact by a commercial organization or from an interest-based mailing list, and more rarely messages from friends or relatives. Face-to-conversations are a significant news source for nearly half of the students, an unexpected result for both the students and researchers (e.g., P11 was surprised to report that, “In most cases when I was looking for news it was because I had a conversation face-to-face or overheard someone talking about news that I had a basic interest in or that shocked me.”).

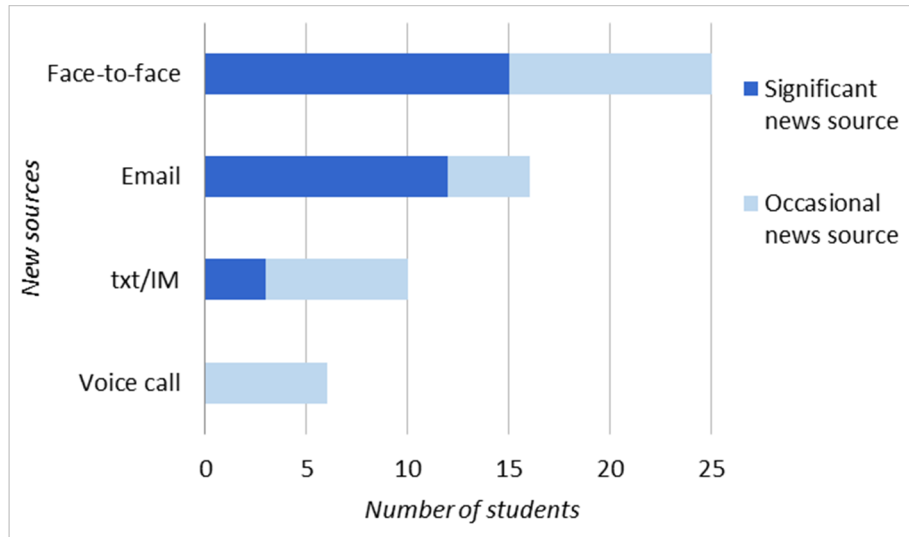


Fig. 4. Inter-personal news sources

'Official' news sources such as television or radio broadcast news and newspapers are encountered in both digital and physical formats (Figure 5).

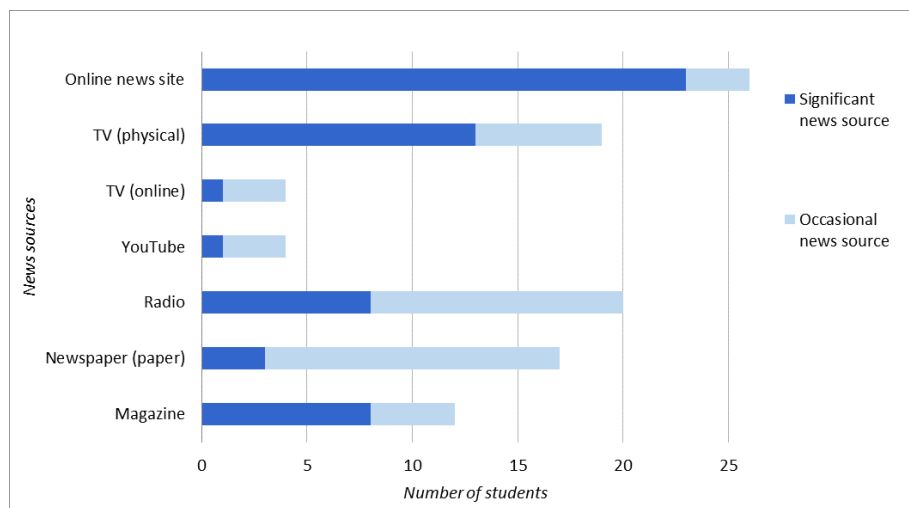


Fig. 5. 'Official' news sources

The online news sites consulted were primarily websites for the major New Zealand newspapers and the local news aggregator stuff.co.nz. These provide primarily text and still images. The physical (paper) newspapers and magazines were New Zealand focused and were either free (local weekly free papers, the university's student-run

weekly magazine) or were freely accessible (at work break rooms, parents' houses). Only one student reported purchasing a magazine subscription, and three reported occasionally purchasing a single issue of a magazine or newspaper if a story attracted their interest. The unexpected inclusion of YouTube in this category occurs because the specific videos referenced were re-posts, selected snippets, or expanded versions of videos from more conventional sources (e.g., sports news broadcasts or game highlights) or advertisements (e.g., movie and video game trailers).

4.2 News topics

Figure 6 presents an overview of the news topics that students reported to be of significant interest (i.e., they frequently sought out information on these topics) and of occasional interest (i.e., they infrequently sought out or encountered information of interest). These categories include both the topics listed on the diary study forms (see Figure 1) and additional topics that emerged from the more detailed descriptions in the autoethnographies.

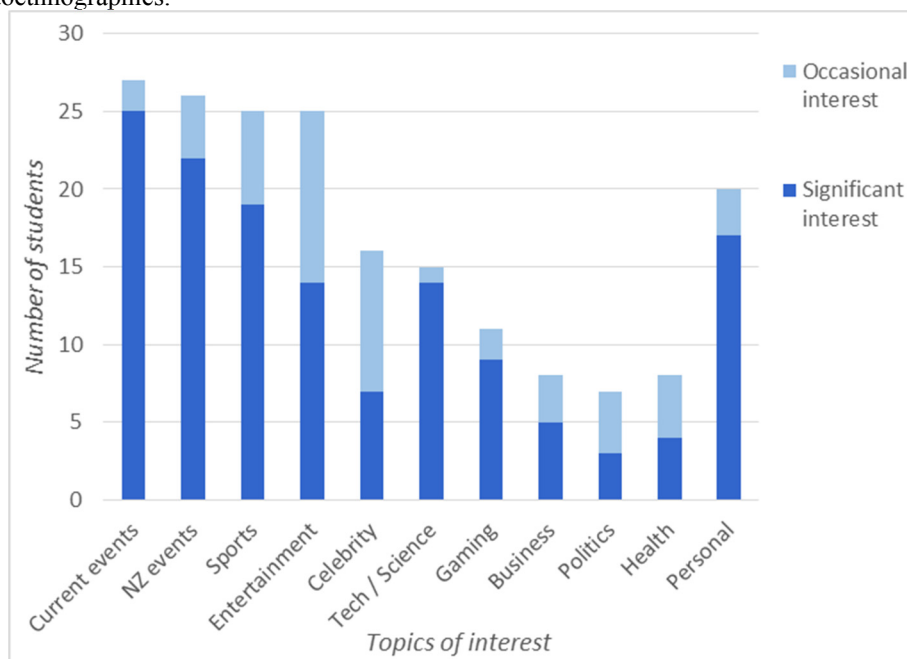


Fig. 6. News topics of significant and occasional interest

Each student held a significant interest in at least two topics (see Figure 7), with a median of four topics per individual (mean 4.05).

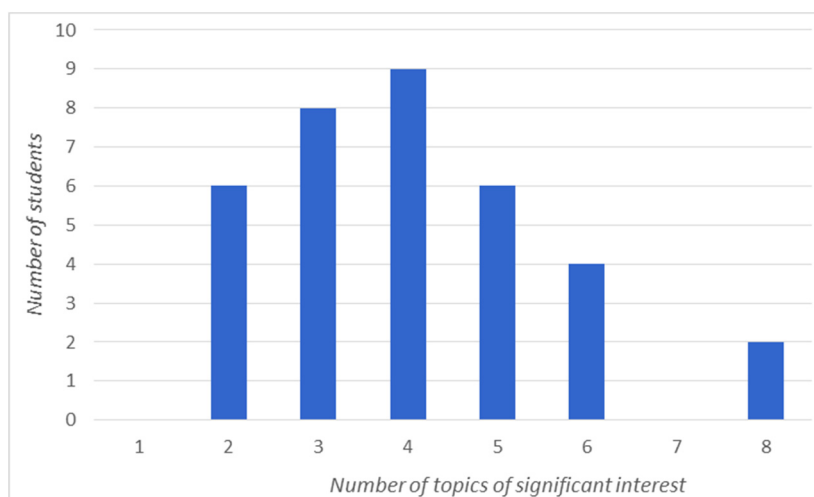


Fig. 7. Number of topics that students held a significant interest in following

Current events is a broad category encompassing a range of categories typical of those covered by newspapers (e.g. wars, natural disasters, elections, etc.); *NZ current events* have a specifically New Zealand focus. *Sports* includes international, national, and local sporting news. *Entertainment* news covers the gamut of TV shows, music, movies, and other performances (but excluding games and sports), while *Celebrity* news is focused on a particular well-known person (including New Zealand and international celebrities). It is not surprising that students enrolled in an upper level Computer Science course would have strong interests in *Technology and Science* (primarily ‘popular science’ events, and new hardware and software releases) and in *Gaming*. While *Business* included limited interests in conventional topics in that category (finance, banking, commercial trends), students’ primary concerns were with topics that directly impacted them—particularly notifications of upcoming local sales.

We note that significant international or local events influence an individual’s news interests. As the autoethnographies were performed during the 2012 Olympics, students reported a higher than usual exposure to sports news, sparking in some an interest specifically in Olympics-related news but not in sports news in general (P25: “Without these events [the Olympic games] happening, there is very little likelihood that sports would feature in any of my diary entries.”). Similarly, three students pointed out that they normally have little interest in politics, but “when election time comes up I make sure to check out the people I can vote for” [P23]. Further, an individual story in an uninteresting topic can capture interest if the student sees a personal link: “... I just get onto the NZ Herald web site and I see ... "Top lawyer guilty of misconduct". I do not like to read about politics because I find it boring, but I read about this because ... my sister is a lawyer ...” [P9].

4.3 News routines

The overwhelming majority—31 of the 35 participants—reported having a news ‘routine’. Some routines were simple: P14, for example, had arranged for a set of news feeds and email newsletters so that “The most common way that I encountered news was having it delivered to me.” Other participants had developed more elaborate routines that spanned their entire day: “...I view news is usually first thing in the morning, check Facebook see if any new news has appeared. Follow by checking to see the results from sports teams during the night. During the day I randomly check Facebook and occasionally see new items in trending articles. At night I check stuff [stuff.co.nz, a New Zealand news aggregation site] to see if anything interesting has occurred.” [P5]).

The news activities in a particular routine could vary by:

Time of day: Generally the morning and / or the evening are important points in news routines. News consumption can be helpful in waking up (on TV in the morning: “...it is a ritual I do when I wake up in the morning if I have a lot of time I’ll watch it while eating breakfast, otherwise ill [sic] have it going in the background while I get ready.” [P22]) and in relaxing after a day of study and work ([P20] reports “taking a good half hour to read through the news that has occurred over the course of the day while I wind down with a beer.”). These news sessions tended to be longer and to involve active searching / browsing for news on the part of the participant. During the day, participants reported frequent news ‘snacks’ [1] to fill in time and avert boredom; these tended to be shorter (e.g., to fit in with work breaks or periods before a lecture started) and to involve checking newsfeeds.

Day of the week: Those students who reported having routines typically differentiated between routines for days involving scheduled work or study, and their free days. A free day might involve fewer news encounters (“...my Mondays this semester are ... my lazy day at home. Because of this the amount of news I generally encounter on a Monday is typically low.” [P23]). However, if news encounters are motivated by relaxation or socialization, the number of encounters may increase (e.g., for face-to-face encounters, “on Saturday, the number of items each encounter yielded was greater. this could be related to the fact that on the weekends, my flatmates are all home, which allows us to have group conversation...” [P20]). A free day may also bring the student into contact with an additional source: for example, visiting the family home and finding “newspapers piled high in my parents’ house” [P35]).

Availability of the source: Consumption of several news sources were tied to their availability. While none of the students subscribed to a print newspaper, 17 cited it as a significant (3) or occasional (14) news source; these students regularly read the newspapers provided at work during a break, looked out for the university’s student-published weekly on its distribution day (“If I do read a magazine it is usually the Nexus [student paper] and it’s only once a week usually Tuesday afternoon during one of my lectures” [P5]), or watch TV news broadcasts only on visits to their parents (“As we don’t have a TV at our flat this is just when I’m home at the weekend.” [P26]). Radio news was most commonly serendipitously encountered while in a car, typically driving to/from university or work (“I listen to radio whenever I am in the car because I do not

have a CD player ...” [P9]). Only one student incorporated radio news into daily routine, with a radio in his bedroom (“The rock radio station wakes me up on my clock radio as an alarm, it is a source of news before I get up” [P4]).

4.4 News platforms

We identified three ‘platforms’ through which the students encountered news items: a standalone computer (desktop or laptop), a mobile device (tablet or handheld), and physical media (physical televisions, radio, newspapers, and magazines); see Figure 8.

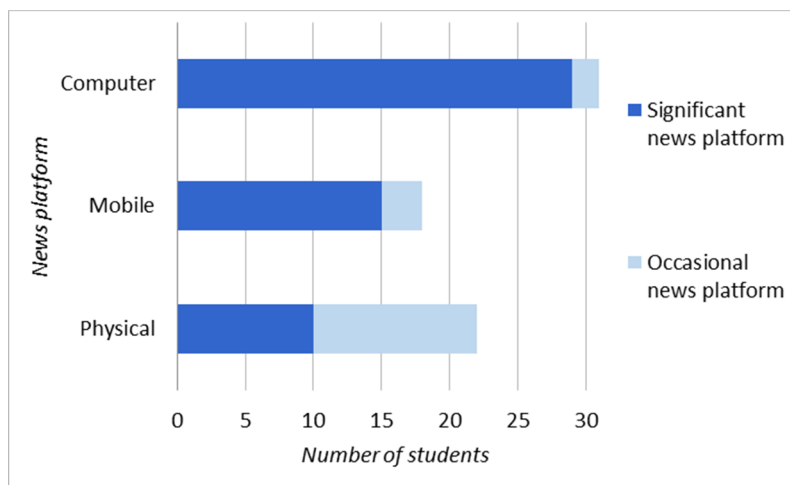


Fig. 8. Platforms for news encounters

Three of the participants did not differentiate between computer and mobile use, simply stating that they preferred to access news ‘online’. Of the remaining 32 participants, 30 used laptop/desktop computers as a significant news access platform, and 14 of those also described their mobile as a significant access platform. Only one participant described significant use of a mobile but not of a computer as well.

Physical news sources continue to see use, with approximately 60% of the participants identifying them as significant or occasional sources for news. No student reported physical sources as their sole significant access platform.

Online access to news sources has obvious advantages: “...as long as there is an internet connection, they are easy and convenient to access, since I don’t have to leave my bedroom to use them.” [P17] Indeed, as students spend more time online, their access to physical or face-to-face news sources declines (“I spend approximately 6 - 10 hours daily in front of my computer ... making the internet my only real source of information or news in any form.” [P19]).

5 Discussion

A clear mismatch exists between the students' news interests and the organization and presentation of news in the traditional media. The students' conception of what constitutes news goes beyond topics covered by traditional news media ("...the topics I find personally newsworthy are not necessarily the more traditional ideas of what news is defined to be." [P25]). Their news has a greater focus on the personal—activities of friends and family—and events or activities that impact them directly (e.g., grocery store sales, updates to their favourite game). The distinction between advertisements and news can be blurred; sales notices and game trailers, for example, may be sought out if they are relevant to the students' needs or preferences. This finding supports the broader conception of news expressed by Costera Meijer and Groot Kormelink [4].

News interests are more narrowly focused than the broad categories of traditional news media (e.g., specific genres of music, movies, and television). Further, broadcast media can be difficult or impossible to skim/scan to filter out irrelevant or 'boring' news. P8 points out that with TV news shows, even those viewable online, "It is hard to know if the news on TV will have anything I'm interested in."

The students' heavy use of non-traditional news sources (e.g., Facebook, blogs, forums) partly stems from this attempt to create a more personalized news information feed than is possible with conventional broadcast news. The desired degree of direct control over this feed varies. Participants P14 and P31 occupy opposite ends of this spectrum: P14 prefers news that requires little filtering ("I am someone who is very lazy in seeking out news. I like to utilize news sources that involve very little effort and are very easy to use. For example: TV, talking with friends, and Facebook."). By contrast, P31 is representative of the "newshound" category of news consumer who meticulously hunts down his news [22]:

When I go looking for news at home I load the following pages in different tabs, Stuff.co.nz, Engadget and ESPN Soccer.net. Then I'll open a few headlines from the first page in new tabs and close that news source. ... Once I've found a few good news items on the next page I'll open them in new tabs then go back to the other tabs I opened since they should have loaded now. I'll then read those news items... Then once I've finished the news items from the first source, I'll move on to the ones from the second source. ... I'll end up opening heaps of tabs then slowly work my way through them.

'Media multitasking' [23], or simultaneous information consumption from multiple sources, is a common behaviour. Here, news consumption is interleaved with other entertainment activities (watching non-news TV shows) as well as serious activities (such as university assignments):

My strategy is to keep checking my emails and go on to the internet two or three times a day. ... I have a little routine before I go to bed, that is have dinner; shower then I get into bed and have my bed set up like in the photograph ... Then I turn my laptop on and start checking my emails, Facebook, homework

and I like to watch television episodes as well for background noise and something to watch. I like to flick between Facebook, NZ Herald web site and working on my homework... [P9]

Media multitasking can be deliberate (as with P9), or it can occur unintentionally (“Since I have a widget on my phone constantly updating me with news I simply ‘ran across’ a news item while checking a text message that caught my eye.” [P1]).

While selected news items may be read or viewed carefully, students also engage in news satisficing behaviour—getting the gist of a text news item by scanning news headings, summaries, or snippets, or by overhearing/viewing bits of news in passing. P12, for example, follows the *New Zealand Herald* newspaper and CNN on Twitter, and will “normally just read the headline on their tweet” rather than the entire tweet, much less follow a link to the full story. We note that P12’s use of trusted legacy brands on new social media platforms is consistent with behaviour observed by Nielsen and Schröder [25], though in this case we see clarifying explanation of the differences in usage and interpretation of the old media content. News applications that more readily support text news satisficing by prominently displaying headers and snippets are preferred to older-style interfaces that direct the reader through topic hierarchies before arriving at the news summaries; P11, for example, resents having to “take time to read the headers and sub-headers of categories to find the information you want”.

Searching for news related to a specific event (in contrast to encountering news on the event from existing feeds or browsing news resources) is often in reaction to exposure to a news snippet. When the snippet is encountered from face-to-face conversations or glancing at physical media, the most common response is to search online news sources for further details (rather than, for example, purchasing the magazine or newspaper). When the snippet is encountered online, the student may simply retrieve and read the text associated with the snippet, or may search additional sites for alternative viewpoints or updates. Social media such as Facebook or Twitter are more likely to be consulted when the event is in an early stage, to find the most recent reports (“... posts on the latest earthquakes in Christchurch came up on Facebook well before the news sites had any information on them.” [P12]).

While physical newspapers and magazines are not regularly purchased or read by the students, the physical media still serves as a serendipitous provider of news. In the diaries, students reported scanning headlines at grocery check-out lines or spotting newspaper hoardings: “During every day events like shopping, driving or even going down to the dairy [local store] will often have some areas of news displayed to draw attention and bring in customers... billboards and posters are scattered throughout.” [P28] Sadly for print publishers, these views rarely result in a purchase or in online searches for further details as the students generally are satisfied by these headline summaries (“I usually only read the covers on shelves as I am looking for something else because that is usually enough to gather the information I would like.” [P22]).

The students wrestled with issues of trust in news media and the believability of particular news items. There was no consensus on a set of sources that were more trustworthy than others; for example, P6 points to newspapers as “a great source of trustworthy news”, where P3 prefers informal “online sources” because “online sources follow-up is often possible to find the original news source and establish if a news item is

actually true”. Personal news as encountered digitally (via Facebook, SMS, Twitter, etc.) may not be accurate because “friends always boast or exaggerate” [P7]. It is easier to evaluate the believability of personal news delivered by “someone who is face-to-face, you can often tell with their body language and tone of voice whether or not what they are saying is true.” [P11] In general, the believability of news in most topics depends on the trustworthiness of the source, with the single exception of celebrity news—a topic panned as being “not very believable but still very entertaining”. [P22] This entertainment factor led one participant to deliberately seek out sources known to be unreliable when pursuing news stories based on celebrities: “[I] would be looking for a website source such as *PerezHilton.com*, *ok.com*, *eonline.com* or *hollywood-life.com*. As I know the story is gossip, I am more likely to select a less believable source [i.e., so as to find the most outrageous version of a story] ...” [P34].

Six students raised additional issues affecting believability of a news item: bias on the part of the author or sharer of that item, ‘spin’ or deliberate inaccuracies in the presentation of the item, and perceived manipulation of the reader to view or share particular news items. As noted above, personal news is particularly prone to biased presentation, as the people involved in a story may also be reporting it. However, the problem of bias on social media sharing runs deeper, as the external stories ‘shared’ in an individual’s Facebook page are part of that person’s social image--and posters may be liable to skew their nature and topics (“... people tend to make an effort to post articles about things they feel are likely to provide “Likes” or discussion among their friends and are wary when posting controversial content.” [P19]).

News can be slanted through its presentation or its content, and this ‘spin’ can be difficult to uncover. For example, P19 checked five different sources for a single breaking story, to identify potential bias in the reporting of the event (“I found that most articles had the same main points however some reporters attempted to put spins on these points...”). De Waal et al. [7] point out that in traditional newspapers, journalists “convey a rank order of what is socially relevant, suggesting to their readers that these are topics they should be aware of as involved citizens, even if they are not personally interested in them.” This sort of ‘expert’ direction is either absent or diluted in the online news sources that the students use—and indeed, as P19 explains above, it may be experienced as a form of ‘bias’ or an attempt to sell them something rather than to nurture them as ‘involved citizens’.

P11 points a cruder source of bias: the presence of “imitation style websites that make up stories or fake events that people can often mistake for reality”. It can be difficult to differentiate between ‘real’ and ‘imitation’ news sources—hence the importance of identifying trustworthy, believable news sites and feeds. However, even those trusted sites may include dubious stories; of the 11 students who identified *stuff.co.nz* as a site that they frequently used, none recognized that it often re-publishes stories from other sources of variable reliability.

The final issue affecting believability—perceived manipulation of the reader’s attention—is an ongoing issue for both social media and commercial news sites. In social media sites such as Reddit, users can attempt to attract greater attention to a news item by “provoking inflammatory responses from other readers” [P20] in the comments

threads or attempting to “blackmail” [P12] users into sharing a posted image by attaching an emotionally manipulative caption to it. Commercial online news sites manipulate news choices by introducing “advertiser links, pop up boxes and a plethora of tricks and techniques that divert my attention from where I was hoping to go to where someone wants me to go.” [P35].

6 Worthwhile news

As outlined in Section 2, Schröder identified seven factors or functionalities of worthwhile news [31]. They describe worthwhileness as “a multidimensional phenomenon”. The dimensions or factors are “acquired by individuals as part of their media socialization, enter into what we may call the ‘worthwhileness equation’, which determines why some news media and not others are chosen to become parts of an individual’s news media repertoire.” The seven identified factors are: *time spent* (whether the source is worth the time spent to consult it), *public connection* (“any news content which helps maintain relations to one’s networks and the wider society”), *normative pressure* (degree to which usage of a news source is acceptable or expected by peers), *participatory potential* (the ease with which one can contribute to the news stream), *price* (both affordability and value), *technological appeal* (incorporating “smartness”, convenience, and appeal), and *situational fit* (suitability for use in context of both time and place).

With these seven factors in mind, we went back to the data described in Sections 3 and 4, and further explored whether the participants had mentioned any of these criteria. We do acknowledge that none of these factors had been originally asked about, and therefore distinguish between explicit participant statements regarding one of the factors and implied linkage from the context of the data. As participants were not asked to comment on these factors, references may have been made that are relevant but not explicitly about the factor.

Figure 9 summarizes these new results: in dark blue, we indicate how many participants had explicitly mentioned a fact as relevant for their news consumption, and in light blue we indicate the student who had talked about the aspect without ever mentioning it explicitly. For 25 of the 30 participants, situational fit was an important factor. Other aspects mentioned often were public connection (21), time spent (11) and price (10). Of lesser importance were seen normative pressures (7), participatory potential (4) and technological appeal (3). We discuss these findings in more detail below.

The most common method of accessing news exhibited is via the internet, either directly from news media websites or TV-on-demand news programs, or indirectly from news feeds appearing in social media, gaming pages, search pages etc. The two dimensions that mostly affect this are *situational fit* and *public connection*. As the students spend large parts of their day either in labs using computers, in lectures using tablets and mobile phones, or at home browsing the internet it is not surprising that this is where/how they encounter most of their news. 23 of the participants directly stated that the convenience of accessing news while they were doing other things in the course of their daily life was a crucial aspect for them; three others suggested it was important. Similarly, given the age and course of study for these participants it is not surprising that *public connection*, primarily via social media, is also a strong factor for

them. Both they, and most of their friends, use social media for far more than just staying in touch; it is a mechanism for finding out new things, sharing information and forms the basis of much of their communications. Only one participant had strong opinions about not using social media: “One major example is Facebook; I do not and will not use it, I see it as an invasion of privacy” [P15]. P15 was one of the older participants in the study whose primary source for news was traditional print media and television news programs and as such he may be considered an outlier in the group.

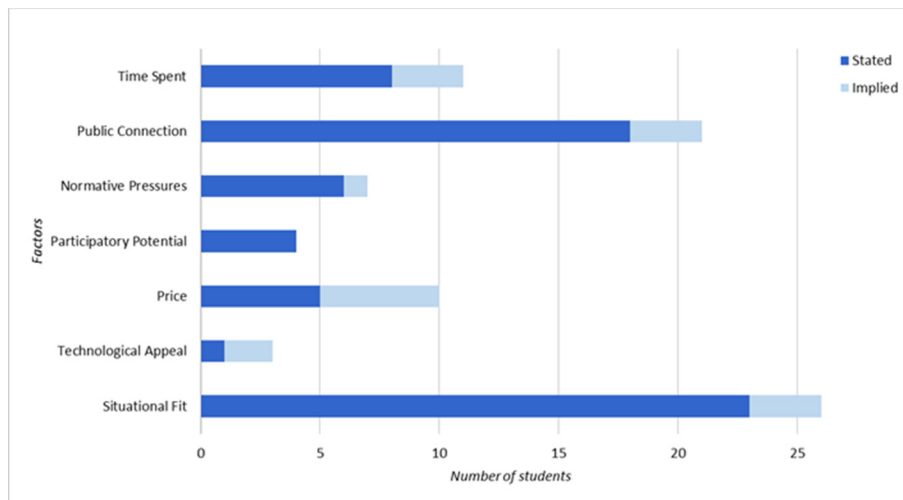


Fig. 9. Seven factors of newsworthiness

Of most surprise was the fact that *technological appeal* was hardly mentioned (only one participant directly mentioned it and two others implied it). This is primarily because it was not an aspect they were asked to focus on as part of their study. So while it may be true that they are early adopters of new forms of technology or new social media platforms this was not something that could easily be elicited from their reports.

Just over a quarter of the participants were concerned with *time spent*, with another three participants implying it was a factor. Mostly this was to do with getting drawn into following multiple links for a story of interest which had the effect of taking them down a rabbit hole, which could be time consuming. Only one participant felt that watching traditional television news was problematic timewise: “The news on TV is often only the important news at the start and less important news near the end... The problem with this is that I am often interested in seeing the news that they deem less important. This means I have to wait till nearly the end of the news to see something that I’m interested in” [P8].

Price was mostly considered as a news source being either free or not, so those who did mention it typically did so in the context of choosing online resources over paid resources, mostly along the lines of: “As I am a student it wasn't surprising to find that none of the news which I encountered directly cost me money to access. I didn't choose

to go out and buy a newspaper, instead I chose to use the internet to get updates on news all over the world. There is a lot more news to access on the internet than could ever be fit into a single newspaper so I felt it is not something worth using my precious dollars on.” [P24]. There were also some conflicting comments about whether or not purchasing magazines or newspapers was also worthwhile: “... and at no particular time did I think about going out and buying a newspaper or magazine even if the content I was looking for was in either of those medium.” [P36], and “On one day I had an accidental encounter with a newspaper while shopping at the supermarket and ended up buying the newspaper because the headline interested me” [P7]

Normative pressures were strongly related to public connection. Participants seemed to belong to particular social networks because their friends and family do. This enables them to not only stay in touch, but also to share items and have a common view of what is happening in the world. Although most of the Internet-based news mechanisms provide the ability for greater participation (in terms of the ability to comment on, share, repost etc.) this was not mentioned much. This might be due to the participants not being asked directly to comment on it and the assumption may be that this is implied by the use of particular platforms.

We now briefly compare our results with those of Schroder’s study [31], in which Danish users rank news media and genres according to worthwhileness. They had found the Internet and TV both to be the seen as the most worthwhile news medium, which seems to be confirmed in our study (see Figure 5). However, their observation about high-ranking in-depth news sources (TV for female and national daily newspaper for male) is not matched by the results of our study, in which a diversity of online resources stands against the mostly occasional use of print media. Overall, the participants of our study seem to have a much wider notion of news and use a wider variety of electronic resources.

7 Conclusions and Implications for Future Work

This article addressed the implications of a changing news landscape for access tools and news archives. To gain insights into the changing news behaviour of users, we analysed a set of 35 autoethnographies of news encounters. We compared the study results with a news framework from the field of journalism, and explored the implications of these insights into news behaviour for digital access tool and news systems.

As is typical for qualitative work, the contribution of this study is to create a rich description of news behaviours, the reflection on which can point to future directions in research and development. Specifically, we consider issues for systems supporting both news consumption as the news unfolds (Section 7.1) and news archiving systems (Section 7.2, whose users may be separated widely in time from the actual occurrence of the archived events), and conclude by positing the merging of these two development strands (Section 7.3).

7.1 Creating personal news systems

Here we consider a news digital library system as an aggregator of current news; the collection itself would undergo rapid renewal as ‘new’ news is identified, indexed, and made available to users, and ‘old’ news is removed from the active system (perhaps to an archival system, as considered in Section 7.2). The news behaviours described in Sections 3–6 raise a number of issues to be considered in designing these personal news consumption systems:

Supporting news consumption over multiple platforms, media, and sources: the students gather news from a wide variety of sources, some of which are dedicated news feeds (e.g., online newspapers) and some of which mix traditional news with other information (e.g., YouTube, Facebook). These news stories may be in text, audio, video, or a combination of media; using desktop, laptop, and mobile devices (Section 4.1). It is a challenge, to say the least, to design a single system that will provide a seamless news experience encompassing all of these access possibilities. Alternatively, we might tailor the news experience to take advantage of the different affordances of the platforms/media/sources. For example, small-screen mobiles are inherently well suited to ‘news snacking’, while desktops/laptops offer the screen real estate to support ‘news-hounds’ [22] interested in tracking down the minute details of a story without getting lost in the process (e.g., “I can sometimes find myself attempting to find out exactly how far the rabbit hole goes, and end up exactly where I started several hours later.” [P20]).

Personalizing the news experience: A personalized news consumption system has two conflicting goals: to present the user with only the news likely to match his/her interests, and to support the user in encountering novel topics (Section 4.2). Modelling a given user’s interests is problematic, as the students’ preferred topics tend to be narrow and idiosyncratic (e.g., an interest in specific games but not necessarily gaming in general, or even all new games within a genre). And, of course, interests change over time; the change may be ongoing (e.g., a sustained interest in a new game genre) or short-lived (e.g., an increased interest in sports only during the Olympics). Further, an individual’s interest in a particular story may be based in a personal, idiosyncratic connection to the event (e.g., “I was shocked to hear that a criminal escaped and was assumed he was hiding in Westfield Queensgate ... I was worried one of my sisters was in danger ... After I read the article I called my sister and found out she was OK and she did not even know it happened at the time.” [P9]). News sources as well as topics are also in a constant state of flux; how can emerging, relevant sources be brought to the attention of users—and which existing sources will the new ones replace? Even the youngest of these students could reflect on sources that they once relied on but now rarely use. The personalization is more complex because it must support the consumption over multiple platforms, media, and sources, and also needs to support the narrow focus of interests.

Active support for news routines: Many of the students report a “checking cycle” [4] of strategies and sources regularly employed to keep on top of their news interests (Section 4.3). These routines range from the simple and opportunistic (e.g., “...when I am at work on a break the newspaper is there...” [P1]) to elaborate strategies involving multiple sources and platforms. There is little or no external support for these routines: the students themselves must remember the updating strategies and track emerging stories (primarily by simply attempting to remember these details). Some routines are reinforced as part of morning wake-up or evening relaxation ritual—where again it is external factors that prompt news-seeking rather a news system proper. How can we model and support these behaviours as they vary across times of day, days of the week, and the location of the user?

Challenges in news story organization and presentation: One striking finding is a desire for ever-briefer summaries and snippets, to gain the gist of a story as efficiently as possible (Section 5)—to the extent that one participant, P12, will “normally just read the headline on their tweet” rather than scanning a larger snippet. Other students report a similar impatience with having to navigate topic hierarchies or separate updates from duplicates for an ongoing news event. Video or audio news presentations (e.g., as part of a televised news program) can be particularly annoying in that it may be awkward to skip to a given story—or even to know whether an upcoming program will include interesting news. These issues in news summarization, presentation, and organization provide significant challenges to news providers.

Recognizing that news consumption can be fun: Given that news consumption can be a significant relaxation and entertainment activity (Section 5), how can we make news encounters more enjoyable? Is it possible to make them more attractive, more pleasant to engage with, more ludic in nature? The present formal news services (e.g., news aggregators, online newspapers) tend to ‘serious’ presentation and organization of stories (and, as above, also are perceived as relatively inefficient to use). Informal news sources such as Facebook and other social media can be more engaging but the stories themselves may be less trustworthy, less timely, and of limited scope. Perhaps a system designed for playful, enjoyable news consumption would be most appropriate for supporting “news snacking” [4], a common behaviour to fill in spare bits of time or to procrastinate (e.g., “I have an established habitual process of reviewing ScrollDit [a front end to Reddit] at least [once] a day, personally I use it as a method of distraction from study, work, etc.” [P18]). Alternatively, users may desire system support to assist themselves in getting back on track after a brief news diversion: P20, for example, extracts himself from Reddit by “[setting] a timer to toggle an entry in my systems “hosts” file to block my attempts to resolve the domains after a set amount of time.”

7.2 Creating news archives

While (personal) news consumption systems are primarily designed to support users who are seeking contemporaneous stories, archival systems must be designed for users who are temporally distanced from the news events. At present, digital news archives

focus on preserving and presenting the news as reported in traditional news media (primarily collections of historic newspapers and magazines; see, for example, the Papers Past¹ archive of New Zealand newspapers published 1839 and 1948). These archives present a reasonably full picture of the *public* news as it would have been experienced at the time—where we here make the distinction between public and personal news (that is, news of interest only to the individuals involved, that would today be shared in email or private social media circles). The archives are able to present the stories within the full context of their original print organization and appearance: we can view online (and even print out new physical copies!) the exact appearance, form factor, and positioning of the news stories to experience them as the original readers would have.

There were, of course, other possibilities for experiencing, encountering, or interpreting news during these periods: some informally published (e.g., advertising ephemera, political flyers, religious tracts, etc.) and some unpublished (e.g., entries in private diaries and letters referring to then-current events). Where these are still in existence and available for digitization, they could be included in historic news archives, though this inclusion is rarely straightforward enough to be cost-effective and the documents are rarely numerous enough to add significantly to an archive. Current archives entirely lose the sense of how news was transmitted orally (through public or private discussion), how the physical display of news-stands may have supported the transmission of news as passers-by glanced at newspaper hoardings or overheard the newsboy calling out the headlines, or how a purchased newspaper was passed along within a family, to friends, or left out on public transportation for others to find and read. However, the stories themselves are captured in these historic archives, to allow present-day users to gain an understanding of the news as potentially available to people at that point in time: a sort of ‘ground truth’ of their understanding of their news.

In contrast, consider the problem of creating an archive of today’s news. Even restricting our archive to newspapers and magazines is problematic: do we base our archive on digitized copies of the print version of the publication, or on the digital stories as presented online? The former has the advantage of showing the individual stories in context with the other stories in that edition, but of course this view is available to the minority (and shrinking) pool of print subscribers. The latter is the version that is currently more widely available—but it typically does not capture any information about the context in which the news items were originally viewed by the readers. The appearance of the original digital stories (which varies greatly by platform and presentation application) is typically also lost.

But the traditional news sources, while still important to our students, are increasingly not their primary sources or means of encountering news. To archive their news milieus, we would need to identify and preserve their news as embedded in blogs, social media posts, tweets, YouTube videos, Reddit comments, etc.—where the news is interleaved with other content, resources come and go, and the definition of what constitutes news can be personal and idiosyncratic. Paradoxically, as more and more news content is born digital, it becomes more difficult to identify the news, corral it into an archive, and make it available—particularly in context—for future use.

¹ <http://paperspast.natlib.govt.nz/>

7.3 Digital Libraries as personal news consumption systems integrated with archives

With existing news archives often being restricted by type of news source or provider interests, this may provide both a challenge and opportunity for the development and use of digital libraries. Tools will need to be developed that better capture the original layout variations of the digital news items within the digital library. Here, work on capturing historic manuscripts ([1], [11]) as well as the text and layout variations of different editions may provide a first stepping stone. Existing information models (e.g., FRBR [27]) may need to be extended beyond a focus on the material towards inclusion of reader context. Capturing of reader context, access platforms and modes of distribution are just some of the aspects that would need to be supported.

The apparent difficulties of collecting all these varying news-related data into a single archive highlight the need for openness, semantic enrichment and interaction between different digital libraries. This challenge is particularly obvious with the kind of news information discussed in this article, but most likely applies for other kinds of archived information as well.

From a digital libraries perspective, addressing these challenges appears worthwhile for archive users—the ‘future users’ of current news—but the benefits are less readily apparent for present-day news consumers. News is, after all, only interesting and relevant to a user when it is novel and timely; once the event recedes into the past or the story is read, it becomes ‘olds’ [29]. But that point of view ignores basic features of both the nature of news—that each individual story is based in the context of previous news stories, which may have to be explored by the reader so that s/he can more deeply interpret the current news item—and the desire of present day readers to trace through potential bias in current reports (Section 5)—where that bias may be detected through exploration of the history of the author, publisher, or background to the story.

At this point, the distinction between present and future users of a news archive / digital library appears arbitrary: from an individual’s point of view, the most effective news consumption service would include a news archive, and the most effective news archive would allow the user to trace old news topics to their current manifestation.

References

1. Agosti, M., Ferro, N. & Orio, N. (2005). Annotating illuminated manuscripts: an effective tool for research and education. *Proceedings of the 5th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL '05)*. ACM. 121-130.
2. Alonso, O., Berberich, K., Bedathur, S. & Weikum, G. (2010). Time-based exploration of news archives. *Proceedings of the Fourth Workshop on Human-Computer Interaction and Information Retrieval (HCIR 2010)*. 12-15.
3. Armstrong, C.L., McAdams, M.J. & Cain, J. (2015). What Is News? Audiences May Have Their Own Ideas. *Atlantic Journal of Communication*, 23(2), 81-98.
4. Costera Meijer, I. & Groot Kormelink, T. (2014). Checking, Sharing, Clicking and Linking: Changing patterns of news use between 2004 and 2014. *Digital Journalism*, 3(5), 664-679.

5. Cunningham, S. J. & Jones, M. (2005). Autoethnography: a tool for practice and education. *Proceedings of the 6th ACM SIGCHI New Zealand Chapter's International Conference on Computer-Human Interaction (CHINZ 2005)*. ACM. 1-8.
6. Cunningham, S.J., Nichols, D.M., Hinze, A. & Bowen, J. (2015) Digital news resources: An autoethnographic study of news encounters, *Proceedings of the 19th International Conference on Theory and Practice of Digital Libraries (TPDL 2015)*. LNCS 9316. Springer. 84-96.
7. De Waal, E., Schönbach, K. & Lauf, E. (2005) Online newspapers: A substitute or complement for print newspapers and other information channels? *Communications* 30(1), 55-72.
8. Diddi, A. & LaRose, R. (2006). Getting hooked on news: Uses and gratifications and the formation of news habits among college students in an internet environment. *Journal of Broadcasting and Electronic Media*, 50, 193–210.
9. Gao, T., Hullman, J. R., Adar, E., Hecht, B. & Diakopoulos, N. (2014). NewsViews: an automated pipeline for creating custom geovisualizations for news. *Proceedings of the Conference on Human Factors in Computing Systems (CHI '14)*. ACM. 3005-3014.
10. Galtung, J. & Ruge, M. (1965). The structure of foreign news: the presentation of the Congo, Cuba and Cyprus crises in four Norwegian newspapers. *Journal of International Peace Research* 1, 64–91.
11. Gladney, H.M., Mintzer, F., Schiattarella, F., Bescós, J. & Treu, M. (1998). Digital access to antiquities. *Communications of the ACM*, 41(4), 49-57.
12. Glaser, B., & Strauss, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Chicago.
13. Harcup, T. & O'Neill, D. (2001). What Is News? Galtung and Ruge revisited, *Journalism Studies*, 2(2), 261-280.
14. Hermida, A., Fletcher, F., Korell, D. & Logan, D. (2012). Share, like, recommend: Decoding the social media news consumer. *Journalism Studies*, 13(5-6), 815-824.
15. Hopfgartner, F., Kille, B., Lommatzsch, A., Plumbaum, T., Brodt, T. & Heintz, T. (2014). Benchmarking News Recommendations in a Living Lab. *Proceedings of the 5th International Conference of the CLEF Initiative (CLEF'14)*, 250-267. LNCS 8685. Springer.
16. Ichiro, I. D. E., Kinoshita, T., Takahashi, T., Katayama, N., Satoh, S. I. & Murase, H. (2012). Efficient tracking of news topics based on chronological semantic structures in a large-scale news video archive. *IEICE Transactions on Information and Systems*, 95(5), 1288-1300.
17. Lanz, D., Zarndt, F., Boddie, S., Powell, T. & Salgotra, V. (2009). The new Papers Past: an international collaboration between New Zealand, India, Germany, and the United States, *OCLC Systems & Services: International digital library perspectives*, 25(4), 287-294.
18. Lee, C.S. & Ma, L. (2012). News sharing in social media: The effect of gratifications and prior experience. *Computers in Human Behavior*, 28(2), 331-339.
19. Lee, H., Smeaton, A. F., O'connor, N.E., & Smyth, B. (2006). User evaluation of Fischlár-News: An automatic broadcast news delivery system. *ACM Transactions on Information Systems*, 24(2), 145-189.
20. Leino J., Räihä, K.J. & Finnberg, S. (2011). All the news that's fit to read: finding and recommending news online. *Proceedings of INTERACT'11*, Springer-Verlag. 169-186.
21. Luo, D., Yang, J., Krstajic, M., Fan, J., Ribarsky, W., & Keim, D. (2012). Eventriver: An event-based visual analytics approach to exploring large text collections with a temporal focus. *IEEE Transactions on Visualization and Computer Graphics*, 18(1), 93-105.
22. Marshall, C.C. 2007. The gray lady gets a new dress: a field study of the Times News Reader. In *Proceedings of JCDL '07*. ACM, New York, NY, USA, 259-268.

23. McDonald, D.G., & Meng, J. (2009). The multitasking of entertainment. In: Kleinman, S. (ed.) *The culture of efficiency: Technology in everyday life*. New York: Peter Lang. 142-157.
24. Mitchelstein, E. & Boczkowski, P.J. (2010). Online news consumption research: An assessment of past work and an agenda for the future. *New Media & Society* 12(7), 1085–1102.
25. Nielsen, R.K. & Schröder, K. C. (2014). The relative importance of social media for accessing, finding, and engaging with news: An 8-country cross-media comparison. *Digital Journalism*, 2(4), 472-489.
26. O'Brien, H. L. and Lebow, M. (2013), Mixed-methods approach to measuring user experience in online news interactions. *Journal of the American Society for Information Science and Technology*, 64(8), 1543–1556.
27. O'Neill, E T. (2011). FRBR: Functional requirements for bibliographic records. *Library Resources & Technical Services*, 46(4), 150-159.
28. Pentina, I. & Tarafdar, M. (2014). From “information” to “knowing”: Exploring the role of social media in contemporary news consumption. *Computers in Human Behavior*, 35, 211-223.
29. Prachett, T. (2001) *The Truth*. HarperTorch,
30. Samet, H., Sankaranarayanan, J., Lieberman, M.D., Adelfio, M.D., Fruin, B.C., Lotkowski, J.M., Panozzo, D., Sperling, J. & Teitler, B.E. (2014). Reading news with maps by exploiting spatial synonyms. *Communications of the ACM*, 57(10), 64-77.
31. Schröder, K.C. (2015). News Media Old and New, *Journalism Studies*, 16(1), 60-78.
32. Spiliotopoulos, D., Tzoannos, E., Cabulea, C. & Frey, D. (2013). Digital archives: Semantic search and retrieval. In *Human-Computer Interaction and Knowledge Discovery in Complex, Unstructured, Big Data* (pp. 173-182). LNCS 7947. Springer Berlin Heidelberg.
33. Taneja, Harsh, James G. Webster, Edward C. Malthouse, and Thomas B. Ksiazek. (2012). Media Consumption across Platforms: Identifying User-Defined Repertoires. *New Media and Society*, 14 (6), 951–968.
34. van Damme, K., Courtois, C., Verbrugge, K. & Marez, L. (2015). What's APPening to news? A mixed-method audience-centered study on mobile news consumption. *Mobile Media & Communication*, 3(2), 196-213.
35. Vydiswaran, V.G.V., van den Eijkhof, J., Chandrasekar, R., Paradiso, A. & St. George, J. (2011). News Sync: Enabling scenario-based news exploration. *Proceedings of the American Society for Information Science and Technology*, 48, 1-10.
36. Yadamsuren, B. & Erdelez, S. (2010). Incidental exposure to online news. *Proceedings of the American Society for Information Science and Technology*, 47(1), 1-8. doi: 10.1002/meet.14504701237
37. Zhao, X. & Lindley, S.E. (2014). Curation through use: understanding the personal value of social media. *Proceedings of the Conference on Human Factors in Computing Systems (CHI '14)*. ACM. 2431-2440.
38. Zimmer, M. (2015), The Twitter Archive at the Library of Congress: Challenges for information practice and information policy. *First Monday*, 20(7), 6 July 2015. doi:10.5210/fm.v20i7.5619