

“It’s Simply Integral to What I do”: Enquiries into how the Web is Weaved into Everyday Life

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ABSTRACT

This paper presents findings from a field study of 24 individuals who kept diaries of their web use, across device and location, for a period of four days. Our focus was on how the web was used for non-work purposes, with a view to understanding how this is intertwined with everyday life. While our initial aim was to update existing frameworks of ‘web activities’, such as those described by Sellen et al. [25] and Kellar et al. [14], our data lead us to suggest that the notion of ‘web activity’ is only partially useful for an analytic understanding of what it is that people do when they go online. Instead, our analysis leads us to present five modes of web use, which can be used to frame and enrich interpretations of ‘activity’. These are respite, orienting, opportunistic use, purposeful use and lean-back internet. We then consider two properties of the web that enable it to be tailored to these different modes, persistence and temporality, and close by suggesting ways of drawing upon these qualities in order to inform design.

Categories and Subject Descriptors

H.5.m [Information Systems]: Information Interfaces and Presentation – *miscellaneous*.

Keywords

Web activity, user intent, information need, routine, leisure, plasticity, persistence, temporality, diary study, field study.

1. INTRODUCTION

This paper presents findings from a field study of 24 individuals, who kept diaries of their web activities. Our aim is to understand how the web is intertwined with everyday life, and our work is grounded in a body of research that tries to understand what it is that people ‘do’ when they go online, and why it is that they do it. For example, surveys such as those conducted by the PEW Research Center [20] track the proportion of internet users that report doing a specific set of activities online, focusing on tasks such as emailing (92% of internet users reported doing this in May 2011), looking for health or medical information (83%), searching for a map or driving directions (82%), watching a video on a video-sharing site (71%) and using Twitter (13%). In more applied work, research into search engine use, and particularly the analysis of query logs, has led to categorisations of ‘user intent’. User intent is described as “the expression of an affective, cognitive, or situational goal in an interaction with a web search engine” [11], and has been classified as Navigational,

Informational and Transactional by Broder [3], and Navigational, Informational and Resource by Rose and Levinson [22].

Data like these can inform us about the domains of activity (such as medical, financial, shopping) that people engage with through the web, the applications that they use (such as search engines and social networking sites) and the form of data that they encounter (such as videos and maps); it even gives us an insight into what people might hope to do with web content once they have found it (acquire information or obtain some resource). Yet to say that someone uses the web for shopping could encompass anything from browsing an online shop to while away the time, to conducting in-depth enquiries and price comparisons, to performing a quick and regular transaction. Likewise, a user might watch a video to learn how to prepare a recipe, to be entertained, to keep up to date with the news, or as part of a research project. Building an awareness of these different types of activity, which cut across domain, media type and application, provides a different resource when designing for interactions with the web.

Accordingly, several researchers have put forward frameworks of ‘web activities’. In what follows, we describe prior work geared towards conceptualising web use in this way, and show how this grounded the rationale for our own study. We then suggest that the notion of web activity is only partially useful for an analytic understanding of what it is that people ‘do’ when they ‘go’ online. Instead, our analysis leads us to present five modes of web use, which can be used to frame and enrich interpretations of activity. These are respite, orienting, opportunistic use, purposeful use and lean-back internet. In discussing our analysis, we consider two properties of the web that enable it to be tailored to these different modes, persistence and temporality, in an extension of a previous characterisation of the web as plastic [21]. We close by suggesting ways of drawing upon these qualities in order to inform design.

1.1 Web Activities

Early attempts to categorise web activities include Rozanski et al.’s [23] analysis of click-through data from 2,466 users, and Morrison et al.’s [17] survey of web searches reported to have ‘significantly impacted some decision’. Rozanski et al. identify seven ‘usage occasions’ according to properties of web session such as length, time per page, category concentration and site familiarity. To describe these in brief, they comprise (i) Quickies, very short visits to two or fewer familiar sites, (ii) Just the Facts, longer sessions in which users find and evaluate related information from familiar sites, (iii) Single Mission, in which users complete a certain task or gather specific information (iv) Do It Again, longer sessions with ‘lingering’ views of favourite sites, (v), Loitering, leisurely visits to familiar sites, (vi) Information Please, longer sessions to build in-depth knowledge of a topic, and (vii) Surfing, wide but not deep exploration of sites

that capture attention. This focus on ‘session’ makes it difficult to tease apart the reasons why people use the web and the methods that they adopt. For example, Quickies encompass a range of activities, from sending an email to checking a stock quote, grouped together because of the speed and decisiveness with which they are performed. In contrast, Morrison et al. explicitly separate purpose and method in their analysis. Here, the purpose for a search is classified as (i) Find information, (ii) Compare/Choose across multiple pieces of information, or (iii) Understand a topic, and the method by which this is achieved is classified as (i) Explore (ii) Monitor (iii) Find a particular piece of information, or (iv) Collect multiple pieces of information.

Two further taxonomies focus on the purpose behind web activities more generally. Six basic kinds of web activities are proposed by Sellen et al. [25] and a similar four-category scheme is later proposed by Kellar et al. [13]. In Sellen et al.’s study, 24 knowledge workers kept diaries and were interviewed about two days of web use, allowing for an analysis of the different activities that they engaged in. Kellar et al.’s categories were based on a pilot study and focus group findings, and led to a study in which participants self-categorised their behaviour using a logging toolbar. This allowed for a detailed quantitative analysis of the activities they had earlier identified. In a related study [14], Kellar et al. add a further two web information tasks, communications and maintenance, making their taxonomy broadly consistent with [25]. For the sake of brevity, and in recognition of the overlap that is shown, we describe the activities categorised in these two frameworks together. These are: (i) (fact) finding, goal-oriented short sessions where the aim is to find some specific piece of information, (ii) information gathering, longer sessions where the aim is to research some broader topic, (iii) (just) browsing, self-contained and routine sessions where the aim is to be informed or entertained, (iv) transacting, routine visits where the aim is to secure or monitor some product or service, (v) communicating, routine visits where the aim is to keep in touch or monitor contact, and (vi) housekeeping/maintenance, which involves the upkeep of web resources and user profiles.

While the reader is likely to recognise many of the behaviours highlighted in these frameworks, the web and what it is used for has undergone substantial changes since they were devised. Developments in browser functionality, the uptake of internet-enabled devices, and the availability of broadband internet and Wi-Fi mean that content can be navigated in different ways and accessed anywhere and at any time. These developments suggest that a richer treatment of how web use is situated in everyday life is timely. Sellen et al.’s study was focused on use of the web by knowledge workers in the workplace, and Kellar et al.’s study was undertaken with university students, their web use being logged on a single computer. It is not clear how well these frameworks generalise to current web use; indeed, recent work points to the possibility that they could be usefully expanded. Cui and Roto [6], focusing on mobile web usage, suggest the emergence of a new activity: Personal Space Extension, which involves the maintenance and organisation of one’s digital content. Furthermore, a study of domestic web-based image use by Chew et al. [4] leads them to describe how images are used to ‘revisit the past’ and to ‘get a feel for a place’. Activities such as these are difficult to slot into existing frameworks, but have the potential to shift the way we think about designing interfaces to the web.

1.2 Rationale

This more recent work hints at the possibility that our understanding of web activities can be expanded and contextualized through new field research. The rationale for the work presented here was therefore to study web use in context, as a means of updating existing frameworks of ‘web activities’. Rather than being focused on a specific population (such as knowledge workers or students), device (such as mobile phones) or media (such as images) the present study was intended to enable an understanding of web use in general, and how this is entwined with everyday life. Our view was that reaching such an understanding would underpin an appropriate level of description of interactions with the web, which could then feed into design.

However, we wished to do more than simply categorise web activities in this research. Most of the research that we have described has one thing in common: the web is central in the analysis. Analysis of web logs means that usage is understood through the lens of the web itself; that users are online is taken as a given. Similarly Kellar et al.’s [14] analysis, as well as the PEW Research Center surveys [20], are predicated on asking users to categorise what they are doing *while they are online*. Only Sellen et al.’s [25] diary study attempts to interpret *what prompts users to go online* in the first place. We suggest that understanding the wider context in which web use occurs is key to informing design.

2. METHOD

In the study that we present here, we follow Sellen et al. [25] in asking participants to diarise their web use. Usage was recorded for all of the devices that were used to access the web, and in all the places where this usage occurred. These written accounts were then used to ground in-depth interviews with participants, our aim being to underpin an analysis of web use in context.

We deliberately recruited individuals ranging in age, gender and occupation for this study. Participants included a mechanical engineer, a product manager, a self-employed writer and director of theatre, an environmental protection officer, a facilities manager, a painter and decorator, a recent graduate working as a part-time barmaid, and a postgraduate student. We also included a stay-at-home mum, a full-time carer, a jobseeker, an individual who was unable to work due to mobility issues, and a retiree. The study was intended to be interpretive and we make no claims regarding the representativeness of the sample. Nevertheless, we did ensure that participants varied in terms of whether they left home for work, whether that work was mobile, whether it drew heavily on IT, and whether personal web use was freely accepted in the workplace. We recruited 13 women and 11 men, aged from 21 to 60, averaging 34.3 years. 12 of these had children, and in 10 of these cases the children lived at home. These included pre-teens (in seven cases), teens (in one case) and those in their early twenties (in two cases). Two participants were pregnant.

To collect rich and detailed information about the participants and their use of the web, we aimed to gather data representing web use in a range of circumstances. We chose to use a combination of diaries and interviews in working towards this goal. Participants were interviewed at home on two occasions, with interviews taking place at their main personal computer. For the first interview, the focus was on the participant’s general web use (at home, through mobile devices, and at work, where applicable) but also more broadly on their daily routines and how this varied across week and weekend days. Participants were then asked to diarise their personal (i.e. non-work) web use over four days,

including two work days and two weekend days. Specifically, participants were asked to record all instances in which they used the web for purposes other than directly for work, including any such use on their work computers (for example, as a means of taking breaks at work), mobile phones, computers that were publically available, and those belonging to others. They were asked to record details of what they did online, what prompted this, if any further action was triggered, which device was used to access the web, if any resources were utilised (printers, pen and paper, etc.), how long it took, when it occurred and where it took place. We asked participants to do this for each 'activity' that they used the web for. We asked them to distinguish between activity and session, in that one might go online for an hour-long session, and during that time engage in a range of 'activities'. We specifically asked them to record instances in which they used mobile phone apps that draw on the internet, but not the use of email clients that were not accessed through a web browser.

Please give a few details for each activity that you do, including those that you do more than once. Thank you!

Briefly describe the activity	What prompted this, what happened, and what happened next?	What did you look at?	What did you use?	When was this?
Look at street on Google Streetview	Comment from friend on Facebook (a response to a link I posted) about a plot we used to draw. Looked at street on Streetview for nostalgic reasons!	Google Streetview	<input type="checkbox"/> Home desktop <input type="checkbox"/> Home laptop <input checked="" type="checkbox"/> Work computer <input type="checkbox"/> Mobile phone <input type="checkbox"/> Mobile device (e.g. iPad touch) <input type="checkbox"/> Other	Time <input checked="" type="checkbox"/> Under 5 minutes <input type="checkbox"/> 5-10 minutes <input type="checkbox"/> 10-20 minutes <input type="checkbox"/> 20-30 minutes <input type="checkbox"/> 30-40 minutes <input type="checkbox"/> 40-60 minutes <input type="checkbox"/> Over an hour
Update spreadsheet of records for Sep. Read a book about America.	Finished a bit of work, so thought I'd spend some time updating our spreadsheet of houses for Sept. Did this by going thru link about online updating people do spreadsheet.	Google docs First Direct.com Leads739.com Smile.co.uk Allowe1a.co.uk	<input type="checkbox"/> Home desktop <input type="checkbox"/> Home laptop <input type="checkbox"/> Work computer <input type="checkbox"/> Mobile phone <input type="checkbox"/> Mobile device (e.g. iPad touch) <input type="checkbox"/> Other	Time <input checked="" type="checkbox"/> Under 5 minutes <input type="checkbox"/> 5-10 minutes <input type="checkbox"/> 10-20 minutes <input type="checkbox"/> 20-30 minutes <input type="checkbox"/> 30-40 minutes <input type="checkbox"/> 40-60 minutes <input type="checkbox"/> Over an hour
Read and email, EBay, Twitter, Facebook	Break in work - just finished something. Spent 2 mins looking thru Facebook, a bit. Did on phone because at work people can't see screen!	On phone: Email (mail) Twitter Facebook EBay	<input type="checkbox"/> Home desktop <input type="checkbox"/> Home laptop <input type="checkbox"/> Work computer <input type="checkbox"/> Mobile phone <input checked="" type="checkbox"/> Mobile device (e.g. iPad touch) <input type="checkbox"/> Other	Time <input checked="" type="checkbox"/> Under 5 minutes <input type="checkbox"/> 5-10 minutes <input type="checkbox"/> 10-20 minutes <input type="checkbox"/> 20-30 minutes <input type="checkbox"/> 30-40 minutes <input type="checkbox"/> 40-60 minutes <input type="checkbox"/> Over an hour

Figure 1. Page from a diary completed by a participant.

The use of diaries in this way allowed us to gather data relating to web use across all devices that our participants used, including those that are difficult to log, such as work computers. They also allowed for aspects of web use that are difficult to otherwise capture to be recorded, such as the use of additional resources and the context of use. Finally, diaries enable participants to record details that cannot be captured through means such as computer-generated logs. For example, the diary entry in Figure 1 includes the entry 'Looked at street on Streetview for nostalgic reasons'. However, one of the potential limitations of diary records is that information may be insufficient, omitted, or difficult to interpret by a third party. To try to minimise such difficulties, we interviewed participants about their diaries as soon as was practical. The main purpose of the second interview was to support the collection of rich, grounded data. Participants were asked to explain what they had recorded in their diaries, and the researchers followed up for clarification where necessary. These interviews typically lasted for an hour and involved the participant going through each diary entry in turn and telling us about what had happened, with details relating to when and how it occurred, who and what was involved, and why the activity described had unfolded as it had.

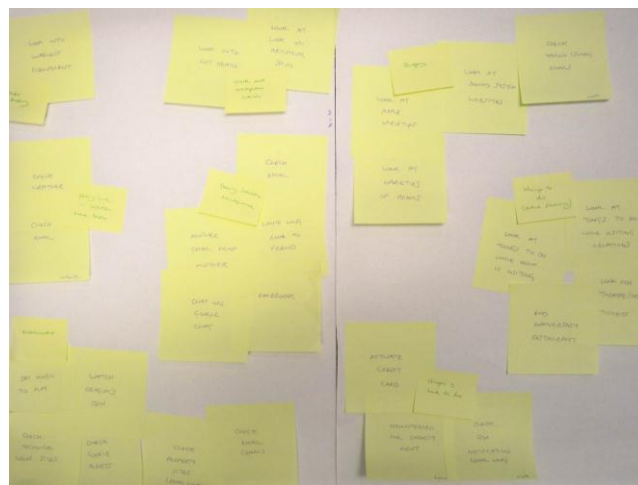


Figure 2. Example of an affinity diagram of activities created by a participant.

For each diary entry, the researchers wrote down each activity that was described on a separate post-it note. The summaries were elicited from participants themselves, by questions from the researchers such as, 'How would you sum that up in a sentence?' At the end of the interview, participants were asked to sort these post-it notes into categories, looking for points in common across the instances of web use that they had described. An example of an affinity diagram of this type is shown in Figure 2. This represents a departure from previous work, and was intended to underpin an analysis of 'web activities' while taking into account participants' own categorisations of their web use. In practice, it was a useful resource for eliciting further accounts of interactions with the web, and getting participants to think about the different reasons underpinning their web use. Notably, participants sometimes assigned what would appear to be the same activity to multiple categories. For example, one participant assigned checking email to the categories of 'passing time between tasks', 'shopping', 'family/relationship maintenance' and 'entertainment' (the latter exclusively associated with the workplace). Thus, visits to the same websites were accounted for differently on different occasions. The combination of affinity diagrams and interview helped us elicit these accounts.

3. ANALYSIS

The interviews were transcribed alongside the diaries and affinity diagrams, so that additional information from these resources could be included in the transcripts. Based on this, a single document was prepared for each participant, which included transcripts from the two interviews, extracts from the diaries and details from the affinity diagrams.

The rationale for this research was to expand and contextualise current frameworks of 'web activities', by grounding our data in people's own accounts and categorisations of their web use. The notion of 'web activities' was central to the design of our study and approach to data collection. However, despite our emphasis on this concept, asking participants to diarise 'activities' rather than 'sessions', for example, and then using these activities to ground user-generated categorisations, we found the concept of the 'web activity' to be somewhat problematic in analytic terms. Our participants too sometimes queried the term, noting that the

task of writing down ‘activities’ was difficult, and the concept itself not easy to get to grips with:

“I mean it [the web] is completely integral to my daily life ... I found the question, what prompted it, what happened next, very difficult, because it’s simply integral to what I do”.

Of course, this was not always the case; some instances of web use could easily be described as an activity (we say more about this in Section 4.4). But it was also apparent that web use was integral to wider practices, being at times peripheral to, interrupted by, layered upon, or interleaving with, other doings.

On the basis of these observations, we decided not to produce an updated framework of web activities. Our attempts to do so produced frameworks that were as much about the context of use as the activity itself, and that positioned instances of use that could easily be defined as web activities alongside others that were better defined as being layered upon or peripheral to other, concurrent, goings-on. As we have already noted, some participants put activities that would clearly be marked as the same, for example as ‘communicating’ in prior frameworks [14] [25], in different categories when producing their own affinity diagrams. Accordingly, we present in this paper a grounded analysis of the 24 documents that represent our participants’ accounts of their web use. These were inspected for themes and descriptions that were common or binding, and the analysis was iterated until no further themes emerged. Following techniques described by Strauss and Corbin [27], we identified and iterated around a core theme of ‘material qualities of the web’. This theme was central to understanding how the web was used and appropriated across different contexts, and also suggests a way forward in design.

4. FIVE MODES OF WEB USE

In the section that follows, we highlight key findings regarding what it is that people do when they ‘go’ online. First, we describe five modes of use that frame ‘activity’ and, without which, the notion of web activity makes little sense. These are respite, orienting, opportunistic use, purposeful use and lean-back internet.

In the section that follows this one, we consider two material qualities of the web that enable it to be tailored to these different modes: persistence and temporality. We close by suggesting ways of drawing upon these qualities in order to inform design.

4.1 Respite

We begin by highlighting a pattern of behaviour that offers a clear contrast with notions of ‘activity’, ‘intent’ and ‘information need’ [7]. Indeed, our initial attempts to understand and categorise this type of web use as ‘web activities’ made it readily apparent that such categorisations are not able to capture the rich variety of ways in which the web is interleaved with everyday life.

These descriptions, of what we have termed web use as ‘respite’, could only be understood when contextualised by the wider set of activities against which they were framed. Examples of web use as respite include going online as a means of taking a break at work, or glancing at the web on a mobile phone to occupy oneself whilst waiting. Accounts of going online to take a break were frequently given by participants with office jobs where access to the web was liberal (in terms of both availability and the attitude of the workplace), and also by people who worked at home, or who were retired but undertaking work-like projects (such as writing novels). These visits to the web were sometimes described as a

means of rewarding oneself, but were also taken in the middle of tasks, as a way of having a ‘breather’:

“it’s not generally between tasks, in fact I’ll find that generally either I’m waiting for a response from somebody else or waiting for something else to happen, or I just kind of get to a point where something’s not quite flowing and I should be sitting there and going ‘hmmm’ about it, but instead I just switch a window for a second”;

“you’ve been concentrating on something and you need to take a break from whatever for a couple of seconds, and you know clear your mind”.

Respite comprised brief ‘flicks’ to a ‘hard core’ set of websites. These sites tended to be frequently updated but were not radically different on each visit; typical examples include news sites, social networking sites and webmail. Furthermore, it seems that participants did not want to discover something too unexpected, or that would require too much engagement, when in this mode:

“the work things will tend to be, I’m just kind of flicking over to it [my personal webmail] to you know find something to entertain myself in it, but in fact I find myself getting vaguely annoyed if I’ve got something real in there when I’m at work .. but when I’m checking it from home I’m hoping, I’m going oh yes I hope .. that my mother got back to my last message or whatever .. at work it’ll be flicking to the window but not looking for something in it”.

It seems then, that visiting familiar sites was a way of taking a break, rather than an opportunity for action or something that should require engagement, thought or consideration. Browser windows and tabs were appropriated so as to make this form of respite as easy as possible: participants did not describe searching for something to entertain themselves during these moments, nor did they browse within sites such as Wikipedia or YouTube. Instead, they moved instantly and habitually to webpages that were bookmarked or minimised, ready to be escalated momentarily before being placed back in the periphery. In some cases, ‘procrastination windows’ were curated, which could be called up, briefly inspected, and then minimised once more:

“having switched on my computer one of the first things I do, having loaded Outlook and everything and looked through my email, is open up Internet Explorer and it goes straight to the BBC page, and so I kind of look through the BBC page and opened up a whole load of [news] stories that just had interesting headlines but didn’t read any of them, so it was sort of, well I’ve put down that it took me about 5 to 10 minutes to sort of look through, and then open them to read later during the day”.

This example highlights how participants made web content secondary yet easy to bring to the fore, with interfaces being mindfully set up so that web content could be interleaved with other tasks in a way that was not too distracting or cognitively demanding. Participants set up separate windows when at work for personal use, they curated ‘to do’ lists of interesting content, and they minimised things that they could come back to later. These windows would be accessed on many occasions during the working day, but these occasions were always short and self-contained. Notably, the content that was deemed appropriate for perusal in these instances was trivial rather than engaging; content that was not ‘ticked off’ during the working day was typically not sought out later, when at home. Further, and as we have noted, significant messages were an unwelcome interference if one was checking one’s personal webmail account when in this mode.

While we have focused on web use as respite in the context of work here, other examples did include going online while waiting for something else to occur, such as a kettle to boil. In these cases mobile devices were typically used, so long as the bar to entry was sufficiently low. This sort of web use requires a rethinking of how we can design to support interaction with online content. Respite does not represent a need for information, nor can it be understood as a wish for engaging or entertaining encounters. Rather, web content is exploited as something that is peripheral but can easily be foregrounded, and that is sufficiently predicable to place few demands on attention. It can only be understood as being interleaved with other goings-on.

4.2 Orienting

The second mode of web use that emerges in our data represents doings that are associated with the rhythms [33] and transitions [2] [18] of everyday life. While most of the web use that we describe had a routine quality (for example, respite was typically habitual), some of it was particularly notable for being associated with what we are here terming ‘orienting’. We draw on Savolainen’s [24] distinction between orienting and practical information here. In a reflection of his 1995 analysis of information seeking in printed and electronic media, we found that our participants ‘oriented’ to the day by attending to information across a range of sources. In our analysis, these include websites such as email accounts, news sites and online banking, visits to which were strongly associated with certain points during the day. Savolainen notes that such behaviour cannot be accurately described as information seeking, observing that only a minor part of daily media use is triggered by a desire to satisfy some information need. Instead, he notes that watching the news on television, or reading the newspaper, become deeply embedded within, and constitutional of, everyday life practices.

In our data, orienting was particularly, but not exclusively, associated with transition points that arise during the course of the day. Thus, it also resonates with the concept of role transitions [2] [18], boundary-crossing activities that are engaged in when people exit and enter roles. As examples of this, participants who had a slow and solitary start to the day often spent about an hour online, ‘warming up’ by browsing the web, and flicking through content in a manner akin to ‘reading the morning paper’. Office workers often checked their personal webmail and the news before starting work, and the single mother in our sample checked her email and the news on her mobile phone, an activity that was easily interleaved with her children’s breakfast television:

“if I’m up in the morning the kids have always got their programs on so I sit there in the morning with my phone eating my breakfast and just check the news”.

Webmail and news checks were often also undertaken before and after lunch, and at the end of the day:

“I think when I’m coming back [from lunch] I’m still feeling like I want a bit of away time before I really settle in, so part of it’s getting settled back at my computer”.

Additionally, some participants spoke of other activities that they customarily performed before leaving work:

“it’s the end of the day and I’m closing down .. I sort of close down all my work and once again look through Facebook and the BBC news and also generally at the end of the day I have a look at [an investment company’s] website and have a look at how much fund prices have kind of gone up and down during the day

... I’m not entirely sure why I do it but I end up always doing it at the end of the day ... everything had gone down and so I was mildly grumpy for no real reason, and that was it, I went home”.

Orienting can be characterised as checks to a habitually visited set of websites that are bound up with and constitutive of everyday rhythms. It gives a sense of setting up or being done for the day, and marks transitions across work and non-work spheres. Although the type of website visited during orienting is similar to that during respite, being frequently and incrementally updated, participants were more willing to engage with content, and could spend much longer doing so, when in this mode. They sourced content to be read later, dealt with emails, and journeyed across sites as well as across domains (such as communication, news and banking), in a pattern that was repeated on a daily basis.

4.3 Opportunistic Use

The third mode of web use that emerges in our data was bound up with going online during one’s leisure time. Elswiler et al. [10] draw on two studies of information behaviours relating to television watching and Twitter use, positioning these as a form of casual leisure [26]. They argue that Casual-Leisure Information Behaviours are highly context-dependent (e.g. motivated by ‘being in’) and characterised by under-defined or absent information needs. Our analysis of broader web use offers support for this view. Participants reported sessions in which they visited various sites ‘while they were there’ (i.e. on the computer), and completed various activities ‘that they had been meaning to do’. These were not occasions in which an information need came to mind that prompted the turning on of a computer. Rather, there was a casual element to this mode of use; participants were simply spending time ‘while the computer was on’, engaging in behaviours that were at times described as meandering, wandering, and being idle. Sessions were finished not when some activity had been resolved, but when it got ‘too late’:

“I’ll just feel .. I’ve really been on the computer long enough”;

“I realised it had got quite late and I had some work to do for the Monday morning”.

We have labelled this mode of use as opportunistic, because it seemed that the simple fact of being online prompted participants to embark upon a range of opportunistic doings. There is a sense that ‘being online’ might be a better way of thinking about the ‘activity’ in this case; participants were looking for something to do while they were there, calling to mind curiosities that were lingering or jobs that could be done. Consequently, this mode of use featured activities that were quite disconnected, with the sessions themselves being described as ‘grasshopper-like’:

“it was very scattergun about other things that had triggered it, and not one thing really leading to another, so for example you know looking out the window I could see that we’ve got a tree out there we mean to chop down and we want to pick a new apple variety, so there’s some searching on apples ... playing the internet radio also reminded me oh yes I do need to sort out my sound system in here so I was looking at audio websites, and ... thinking what is it I need, I probably need some sort of pram, what are the options and just kind of browsing around things like that”;

“I was looking at recipes as I do in my idle way”;

“the next thing I did was looking up mountain climbs to find out about budgets, fitness levels required, the different routes, cos one of my ambitions is to climb Mount Kilimanjaro in Tanzania one

day, but obviously I'm going to have to be really fit so I'm looking at maybe .. [the year] 2015 .. when I've quit smoking and sorted out the fitness levels".

Activities in this mode could be prompted by the corporeal or by digital prompts such as email notifications, and in some cases, participants appropriated web browsers to serve as visual reminders of on-going jobs:

"the Firefox I tend to use for things that I may want to keep up session to session, and so I know it's going to persist the session, on the other hand I've got enough tabs that I know are already being persisted in it that I know it's going to be slow to load up and take up a lot of my memory, so again kind of quick things Internet Explorer and kind of slow or longer term things I do tend to use Firefox".

In the absence of such prompts, participants 'ticked off their mental to-do list' or called to mind activities that they typically engaged in when online. As well as browsing recipes and researching long-term ambitions, these included seeking inspiration for home improvement projects and browsing within familiar frameworks such as Wikipedia and YouTube. As one participant noted, 'there's always something'.

Opportunistic use can be characterised as an unhurried means of spending time online that, for some participants, was an important part of leisure time. It can entail dealing with odd-jobs, satisfying curiosities or engaging in hobbyist activities. It tends not to involve visits to the same core set of sites, nor does it have the routine quality associated with the prior two modes of use. However, activities that are undertaken in this mode may be on-going; indeed, in some cases (such as collecting recipes) there is no sense that they would ever be 'finished'. For this reason, web tools are used to save content and even to create visual reminders, so that their continuation can be prompted.

4.4 Purposeful Use

The fourth mode of web use that surfaced in our analysis relates to instances in which participants specifically went online to get something done. This could involve 'firing up' a laptop or opening a browser on a mobile phone. We have labelled this mode of use as purposeful. Unlike opportunistic use, participants could easily explain why purposeful use was undertaken at a particular moment in time, when it was complete, and what happened next. Often the action of obtaining some information from the web, or performing some transaction, fed into a wider task within which purposeful use was situated: web access was necessary for the participant to complete some wider activity, feeding into an immediate decision, or adding some layer of information to the current situation that served to augment it:

"I wanted to check the Next Home in [a shopping centre to see] if I could actually take clothing back there even though they're a furniture store, but they said that was fine, so I used Google to try and find the [phone] number at first, didn't actually bring anything decent back, so then I logged onto Yell.com";

"I checked on IMDB cos we were watching a film and I was with [my son], and there was a voice that I recognised but I clearly didn't recognise it cos when I looked up who it was I didn't know anything else they'd been in, so that was that";

"at half time at the football I checked the scores in the other games just to see how the results were affecting my team".

This mode of use is most closely aligned to the notion of information need, although the information sought is in some

cases auxiliary rather than critical to the task in hand. Unlike other modes of use, a number of these instances were triggered by, and fed back into, the wider social context. The web was used to support or expand conversation, including with children, where online content could aid parents in answering the (sometimes challenging) questions put to them by their offspring:

"we've got the two children around, you can't sit and browse, you're only going on for a specific purpose .. and sometimes it's also to do with things that they want to find out, if they've come up with a particularly brilliant question then we might spend quite a lot of time browsing with them on the other computer .. he asked me how a baby turned into something in its tummy to something that came out so we found a really good 'week by week your pregnancy' on the BBC website which was 'oh look it's growing, now it's got eyes it's got a heart' .. that kind of thing".

Information sourced from the web could also feed into planning and decision-making that was undertaken in a group context:

"that was with friends again because she'd been talking about what she wanted to do for her birthday party, and we decided we wanted to do something quite fun, something running around, so I googled and then followed links to compare the relative merits of laser quest and paintballing .. just to see what was near .. and how much it cost ... they were sitting around and I was doing all the typing and filling them in as I went along ... they'd be saying ideas, talking about what they want to do".

Unlike opportunistic use, where curiosities prompted by prior conversations might be satisfied, in purposeful use information gleaned from the web was directly related to the current context and was fed back into or served to enhance it. To illustrate this, contrast the following two examples:

"[my daughter] is trying to psyche herself up to do her driving theory [test], and she was finding the hazard perception really difficult, and she said 'have you actually tried it Mum' which of course I hadn't, and I thought oh it's bound to be a free version that I can do and see what it's like ... I did find one ... on YouTube, and it seemed to be completely impossible";

"whilst my daughter was watching the DVD she suddenly asked me what's the largest and loudest animal in the world, and so I went to Wikipedia, Wiki Answers and Yahoo ... I went to Google and I said what is the largest animal in the world and what is the loudest animal in the world and they happened to be one and the same according to which answer you looked at, which is the blue whale".

In the first account, a conversation leaves a mother with a lingering curiosity that is followed up the next day, but divorced from context and not used to ground further discussion ("it was born out of me thinking can it really be that hard, and ended with me thinking yes it really is that hard and I'm just very glad I haven't got to take a driving test"). In the second description, we see how the web is used to answer a question in the moment, and serves to enrich the interaction.

We therefore characterise purposeful web use as being prompted by and feeding into or otherwise enhancing the current context. It is associated with opening up a web browser specifically to address some issue in the moment and has a clear point of completion. This mode of use is not routine and tends to involve seeking out new content. Accordingly, it can feature the use of search engines, sites that collate specific types of information such as Yell and IMDB, and sites from which one can turn to in search of a particular type of content, such as child-friendly information.

As purposeful use requires access to the web in the moment, users may choose to use devices with the lowest barrier to entry, such as mobile phones, especially if the activity is straightforward. However, more complex tasks or those that require more bandwidth may necessitate the turning on of a computer.

4.5 Lean-Back Internet

As a final mode of use, we saw a number of instances in which participants used the web simply as a means of channelling content such as video and radio. On these occasions, web browsers were a conduit through which online content was streamed, and in some cases a television or radio set could have been used in exactly the same way:

“after doing that I set some music to play, I just couldn’t be bothered to actually get up and play it on a radio”

This type of use was fairly passive and in some cases extremely habitual; for example, some participants who did not own television sets used the web to support television viewing. In these cases web streaming was part of the daily routine, with television being watched while eating one’s evening meal, for example. In other instances, streaming was undertaken as a form of entertainment when friends were visiting:

“procrastinating really, my boyfriend was around I was showing him some funny things on the internet, so we looked at a couple of comedy websites that I’d been meaning to show him, and I listened to a song a few times ... we usually have the internet on in the background, talking, somebody will say oh I have to show you this, and then we’ll end up just on and off the internet for an hour”.

We describe this mode of use as lean-back internet, as it resonated with the way in which other types of media, such as film and music, are consumed. It shows some overlap with purposeful use as well as with orienting; however, we consider that turning to the web in order to inactively consume content is somewhat different to using the web to feed into some task or to settle in at work, for example. In particular, the fact that the web use is somewhat peripheral to other on-going activities makes this mode of use somewhat distinct.

5. MATERIAL QUALITIES OF THE WEB

Much of the analysis that we have presented relates to certain properties of the web. For example, the web is available across time and place; it features frequent, incremental and predictable updates; it can be placed in the periphery but easily escalated; it can be structured across windows and tabs and these can be made to persist; it can be accessed through a range of devices, which offer different experiences of use... In short, it can be tailored to suit a range of purposes and contexts. Rattenbury et al. [21] have highlighted this aspect of the web, arguing that the metaphor of ‘plastic’ captures the ways in which computers have become integrated into the ‘heterogeneous rhythms of everyday life’. They suggest that by shrinking and expanding so as to fill gaps, ‘plastic technologies harmonize with and support daily life’. Further, they propose that ‘Internet browsing is the ideal plastic activity’.

We certainly saw instances of ‘plastic use’ of the web in our data. Rattenbury et al. [21] highlight the notion of unplanned time, time that is spent until it is interrupted, and time that features multitasking and that cannot be characterised as either productivity or leisure, all of which resonate with our own analysis. We expand on the notion of plasticity here, suggesting that when users engage in ‘plastic use’ they are doing more than

filling ‘the cracks between other types of time’. The web was at different moments constitutive of a brief distraction (respite), a means of settling in at work or at home (orienting) and of supporting a meandering and leisurely approach to getting things done (opportunistic use). In moments of respite and orienting in particular, accessing online content seemed to be bound up with managing one’s own internal state. In respite, participants sought a distraction from work but were not looking for much in the way of engagement elsewhere. They were not willing to search for interesting content to fill these gaps, nor did they wish to encounter anything ‘real’ in their inboxes. Instead, and somewhat ironically, respite seemed to require a distraction that was not too distracting. Orienting and its role in warming up, winding down and settling in, might also be understood as a way of managing one’s level of alertness and orientation to the current context. In contrast, opportunistic use seemed to be related to the spending of time by engaging with content; for the single mother in our sample, web use in the evening was in itself constitutive of her ‘leisure time’.

This leads us to suggest that the plasticity of the web is not simply a matter of it being suitable for activities that could take two minutes or two hours. An important component of its flexibility is that it can be used to support different levels of engagement, from a quick and predictable flick to a frequently visited site, to an exploration of content in order to solve some problem or experience something new. The web can be appropriated to underpin both non-distracting breaks and the active seeking of engaging experiences.

We can liken this flexibility to media such as television, which has been noted as supporting different types of viewing at different points in the evening. Taylor and Harper [30] have argued that the way in which television is watched, and the degree of decision-making that underpins this, differs from when one arrives at home from work, to later in the evening. When coming home, consumers are fairly uncritical in terms of what they watch, ‘switching on to switch off’. In contrast, mid- and later-evening periods involve the viewing of regularly watched programs (viewing by appointment), followed by those that are deliberately and more carefully selected. These different types of television watching are associated with varying levels of engagement and habit; sometimes consumers fall back on what is easy, at other times they make the effort to select something interesting. While the web is less driven by scheduling than television (and especially television in 2003, when this work was published), it does have other features in common with it: it supports habitual interactions with content through revisitation, it supports different levels of engagement with content, it can be interleaved with the social context of the home, and it can be tailored to one’s own, solitary, interests. Our analysis suggests that, just like television, web use can be understood as more than slotting into the gaps in leisure time, but as framing and at times constituting it.

In the discussion that follows, we consider two additional properties of the web as a ‘digital material’ [29] that, we suggest, underpin the flexibility that enables it to be appropriated for different modes of use. We then use these properties as a lens to open up the design space for web tools.

5.1 Persistence

The first quality of the web that we wish to highlight is that of persistence. Our data include examples of participants minimising web content so that it could be easily escalated, using particular web browsers to support on-going tasks, and curating collections

of web content to be returned to later (in some cases, much later). This persistent quality of the web was bound up with respite, where web sites needed to be easily found and to show a degree of predictability; orienting, which was also associated with habitual revisitation; and opportunistic use, which often featured on-going projects and long-term activities.

In some cases it was only necessary for content to persist for a timeframe as short as the working day, for example, through the curation of sets of news stories, which could then be ‘ticked off’ during periods of respite. In other cases, technologies were appropriated to support activities with a longer time-frame, to which participants expected to opportunistically return at some later date, but without knowing when. Some participants assigned dedicated browsers to these tasks, such as Firefox, which can automatically reopen the previous web session’s tabs. This strategy was especially useful for on-going activities with a practical goal and clear end-point, not only because it negated the need to bookmark resources that would only be useful for a limited period of time, but also because it served as a reminder of where one was previously at within these activities.

Participants also collected materials when there was no decision to be made or question to be answered. This behaviour is most akin to the web activity of information gathering, characterised as involving the pooling of resources in order to answer some open question or undertake some piece of research (e.g. [25], [14]), except that in some of these cases there was no real end-point to the activity. Some of these uses might be better understood as a means of seeking inspiration, for example one participant who had aspirations to improve her home downloaded images relating to interior design from the web and organised them in a folder on the computer itself, “sort of like a mood board”. In other cases, this type of use might be better understood as a form of hobby; content was collected from the web as an end in itself. As an example of this, the participant who described herself as ‘idly’ collecting recipes was surprised to discover, when prompted during the interview, that they could not be located (“*I’ve been busily saving recipes and thinking oh that would be nice to make sometime, and they’ve all vanished*”). Leaving the usability of bookmarking tools aside, this suggests that the act of browsing and collecting recipes *in itself* was valued by this participant, rather than any regular revisitation of them. This echoes Elswailer et al.’s [10] analysis of ‘Causal-Leisure Information Behaviours’, in which it is emphasised that the experience of finding is more important than the information found.

If we follow Elswailer et al. [10] in positioning web use as an act of leisure, then the behaviours described by our participants can be seen to resonate with all three forms of leisure described by Stebbins [26], on whose framework Elswailer et al. draw. Stebbins identifies ‘casual leisure’ (immediately and intrinsically rewarding, short-lived pleasurable activities; e.g. reading), ‘project-based leisure’ (short-term, moderately complicated, one-shot or occasional creative undertakings; e.g. decorating the living room), and ‘serious’ leisure (amateur, hobbyist or volunteer core activities that are systematically pursued; e.g. mountain climbing). These three forms of leisure vary in their longevity and raise different implications relating to the persistence of web content. For example, when seeking inspiration for a home improvement project, users may appreciate ways to store snippets of content rather than entire webpages, and view this as a collection rather than as a folder of bookmarked links. In contrast, if content might be returned to in years rather than months, such as in the case of

training to climb Mount Kilimanjaro, it may be more important to ensure that some version of that content can be revisited even if it is no longer available, or to highlight elements within it that have changed [32]. As a final point worth mentioning here, one participant built folders of bookmarked content when planning holidays, which he then returned to in the context of reminiscing about these events. Use like this suggests that in some cases, one may wish content to be up-to-date when planning for an event, and then fixed after a particular point in time. Previous research has investigated how tools can support users in collecting and organising web content [8], resume the context associated with on-going tasks [16], and revisit previously viewed content [31]. We suggest that designing around the notion of persistence, by giving users more control over when to fix content, offers a different approach in this space.

It is interesting to consider how casual leisure fits into this discussion. While Stebbins [26] views this as an immediate and short-lived form of leisure, it is nevertheless true that the activities he describes can be undertaken regularly, and sometimes repeated exactly (e.g. reading books, listening to music, watching films). Further, resources may be acquired in order to support this repetition (e.g. books, CDs, DVDs). Collections of resources like these frame casual leisure activities, give a sense of what has been experienced and provide a mechanism for those experiences to be shared with others. We can speculate that the act of collecting recipes, even if these are not, in practice, revisited, performs a similar function. Providing a means of visualising these, in the same way that one can display other, more tangible, collections, presents an interesting opportunity for design.

5.2 Temporality

The second quality of the web that we discuss here is its temporality. While the web is not generally thought of as having a tempo (although see e.g. [15]), the fact that the web routinely and predictably changed was essential to underpinning some of the modes of use we have described. Participants followed blogs that were expected to be updated once a day, as in the example of diary entries from ‘Scott’s Last Expedition’ to the Antarctic, which were posted each day on Twitter (see <http://twitter.com/#!/scottslastexp>), they participated in online competitions with deadlines, and they used the web as part of the build-up to and fall-out from sporting events, as well to access commentary and discussions about those events as they unfolded.

More importantly though, a predictable tempo was essential to routine use of the web. It has been noted elsewhere that revisitation is bound up with change [1]. Respite and orienting were associated with websites that delivered news and social networking services, which were regularly, albeit incrementally, updated in such a way that revisitation could easily become habitual. While this type of revisitation is often conceptualised as monitoring [12], we suggest here that use of such sites is as much a reflection of habitual use, grounded in the fact that small but regular changes occur, as it is a need to be alert to change.

Also worth commenting on, the fact that this tempo supported routine visits to a ‘hard core’ of sites [21] meant that the web was a surprisingly ‘small’ space when visited in the context of daily life. Participants tended not to do much in the way of exploration; even opportunistic browsing was typically undertaken to satisfy some curiosity and done in the context of familiar frameworks such as YouTube and Wikipedia. This suggests a space for design whereby the discovery of new websites might receive better support, especially in the context of opportunistic browsing, when

web users are open to such discovery. Indeed, one participant commented: *"sometimes I feel you kind of miss out on discovering new websites ... I do browse but not to try and find new types of websites, usually just to find information"*. Technologies that have been designed to change the way we browse include tools such as StumbleUpon [28], which allows the user to journey through the web, and the now defunct Mystery Google [9], which directed users towards websites searched for by others. These examples suggest how it is possible to develop tools that interpret the search box in new ways, or remove it altogether (StumbleUpon simply features a 'stumble' button).

However, while sites like these are based on the premise that it is entertaining to be taken somewhere unexpected, neither one provides much in the way of context, nor a sense of completion, regarding the journey that is constructed. It is interesting to contrast this with respite, orienting and opportunistic use, all of which did give a sense that one was working one's way towards some end-point. Opportunistic use was bound up with some question or curiosity, with websites being visited to satiate this. Orienting and respite were associated with the browsing of a familiar and routinely updated set of sites. Both of these involved navigating through a sequence of frequently visited websites, sometimes by explicitly 'ticking off' of tabs:

"if anything that was sort of what finished a session, that you've kind of ticked them all off and back to, so sort of reading the news, you sort of tick them all back off back to the main page, and right now go on to something else".

We suggest that in order to open up the design space surrounding browsing, it is desirable to support the construction of meaningful journeys that offer a sense of completion in the manner of respite, orienting and opportunistic use. Tools that take users on voyages that combine a feeling of familiarity and routine, by designing around the idea of temporality, could offer a way forward here.

6. DISCUSSION

We began this research with the aim of updating existing frameworks of web activities [25] [14] and putting them into context, in order to reach a richer understanding of how the web is interweaved with everyday life. Our data has led us instead to propose five modes of web use, which tell us something about why it is that people 'go' online. These modes of use can, on the one hand, be interleaved with web activity frameworks, as a way of accounting for the different ways in which similar things are done. For example, visiting one's personal webmail account, which has previously been conceptualised as 'communicating', is shown here to be undertaken for a number of reasons, from offering a brief distraction to being part of warming up for the day. Beyond enriching our understanding of web activities, however, we suggest that an appreciation of the broader context in which the web is used, be it as a form of respite, a way of settling in at work, a means of spending time, or a well-articulated information need, can serve to open up the design space for web technologies. We have started this process here, by highlighting two qualities of web content that enable it to be repurposed for the different modes of use that emerged in our analysis: persistence and temporality.

These qualities illustrate how we can think about designing for online experiences that are not bound up with information need or search. In particular, we have considered how the experience of routine, familiarity and a sense of completion might be applied to tools that support browsing, and we have noted the potential for web tools to offer richer and more flexible ways to save and fix online

content. By considering these qualities, we can extend our understanding of the web as plastic [21], not only in terms of its expansion to fit different time slots, but also in terms of its suitability for different levels of engagement in use. By being always available, featuring a predictable degree of change, and sitting in the background yet being easy to escalate, the web can be repurposed to suit a variety of modes, from not-too-distracting habitual use to being the focus of one's leisure time. The modes of use we have described could also frame design thinking in other ways. One example would be to consider how to design web content to sit in the background; another is to support the transfer of web content from a computer to a mobile device, where it can support some further action. Indeed, a recent innovation in the Beta version of Chrome for Android [5] allows users to send pages from their desktop Chrome browser to a smartphone or tablet with a single click.

The design of tools that can be appropriated by users is in itself an important recommendation that comes from this study. With the exception of lean-back internet, our participants made use of the tools they had for interacting with the web in a number of interesting ways. They did not simply consume content, but sorted, triaged and manipulated it. They placed it in the periphery, they called it up when needed, they ticked it off, they 'persisted' it, and when they did not wish to encounter this persistent content, they took strategies to avoid it. While web browsers are becoming increasingly minimal, these results suggest that a suite of tools, that enable the web to be moulded to purpose, would better support a range of interactions with online content.

As a final comment, we have said little here about how device drives web use. Others have reported how mobile phones are used instead of a computer for reasons of speed and convenience, even when those users are at home and with access to a computer [19]. Findings from the current study seem to resonate with this, with mobile phones featuring in accounts of purposeful use, but also in respite and orienting for those participants who owned smart phones. In some cases, the need to 'fire up' a laptop was prohibitive, and if a smart phone was available, it would be used instead. It is interesting to note though, that opportunistic use was very much bound up with *being* at a computer. None of our participants described extended periods of time in which they opportunistically explored the internet via a smart phone. Whether this is due to our small sample, or a feature of mobile use more generally, is an open research question. We suspect though, that the affordances of tablet computers lend themselves very well to the opportunistic use that we have described here.

7. CONCLUSION

We have presented findings from a field study of web use, with a view to understanding how this is entwined with everyday life. While our initial aim was to update existing frameworks of web activities, such as those described by Sellen et al. [25] and Kellar et al. [14], our data have led us to suggest that the notion of 'web activity' is only partially useful for an analytic understanding of what it is that people do when they go online. Instead, 'going' online can at different times be understood as a means of respite, as orienting to the day, as the opportunistic spending of time, as practically-orientated, or as underpinning the passive consumption of content. We build on Rattenbury et al.'s [21] characterisation of the web as plastic, proposing that it can be moulded to suit these modes not only because it can be cultivated to fit different expanses of time, but also because it can underpin different levels of engagement. By exploring the qualities of the web that sustain this

plasticity, we can think afresh about how to design tools for users that enable them to appropriate web content for their own purposes; to weave it into the everyday.

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