Jarosław kopeć

READING/WRITING IN *ICT*. HABITUAL ALLIANCES AND INDIVIDUAL STYLE

In the "fundamentally intertextual landscape" of the Internet, "reading processes and outcomes vary considerably".[1] Zhang and Duke have concluded that these processes are different for different aims that readers/users try to achieve.[2] Cho concluded[3] that even within the groups of people trying to achieve similar aims, the strategies of constructing meaning out of texts in the ICT (Information and Communication Technologies) environment vary considerably. The aim of the qualitative study presented in this paper is to explore how these processes may vary between individuals in task-orientated attempts undertaken by students of various fields. The main questions of this paper are: how these processes vary, why they may be so different in each participant's case, and what role the machines and software play in these processes.

The research is based on empirical data collected during and after the participants undertook given tasks to prepare written responses to questions given. The theoretical approaches employed during interpretation of the results are discussed in another part of the paper.

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1   B-Y. Cho, "Adolescents' Constructively Responsive Reading Strategy Use in a Critical Internet Reading Task", *Reading Research Quarterly*, vol. 48(4), 2013, pp. 329–332.

2   S. Zhang, N.K. Duke, "Strategies for Internet Reading with Different Reading Purposes: A Descriptive Study of Twelve Good Internet Readers", *Journal of Literacy Research*, vol. 40: 1, 2008, pp. 128–162.

3   B-Y. Cho, "Adolescents'...", op. cit.

Theoretical framework

CONSTRUCTIVELY RESPONSIVE READING COMPREHENSION

This study is an exploration study into strategies undertaken by readers/writers while conducting Constructively Responsive Reading Comprehension (CRRC) tasks. The term names goal-orientated attempts to construct meaning out of texts and includes a variety of skills necessary for doing so successfully.[4] Research on strategies employed for CRRC in the environment of ICT has already been conducted. The conclusion made by Byeong-Young Cho[5] was that readers use both traditional and novel strategies for reading online texts. Zhang and Duke[6] analysed the relation between aims of reading (one similar to CRRC was also taken into account) and strategies employed, concluding that the choice of strategies is different for different reading purposes.

The aim of this study is to describe strategies employed during CRRC in a more detailed way, investigate the possible causes of diversity of behaviour between individuals, and let non-human actors[7] "speak for themselves" about their role in the participants' processes.

The CRRC process can be recorded in laboratory conditions, and may be analysed and interpreted in the wider context of everyday practices of reading/writing online. As reading strategies are invisible, research aiming at understanding them must employ methods enabling a researcher to get reliable data about the decisions taken by readers.[8] In the case of this study, the data is gathered through screen-capture recordings of participants' processes of locating information and preparing written responses to questions given to them as a task to complete. Supplementary data used for stating hypotheses and building arguments about causes of certain behaviours is gathered in interviews with participants concerning their everyday practices of using the Internet for reading and constructing knowledge.

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4   P. Afflerbach, B.-Y. Cho, "Identifying and describing constructively responsive comprehension strategies in new and traditional forms of reading", in: *Handbook of research on reading comprehension,* S.E. Israel, G.G. Duffy (eds.), 2009, pp. 69–90.

5   B.-Y. Cho, "Adolescents'...", op. cit. B.-Y. Cho, "Competent Adolescent Readers' Use of Internet Reading Strategies: A Think-Aloud Study", *Cognition and instruction*, vol. 32(3), 2014, pp. 253-289.

6   S. Zhang, N.K. Duke, op. cit.

7   B. Latour, *Reassembling the Social: an Introduction to Actor–network theory*, Oxford, 2005.

8   P. Afflerbach, B.-Y. Cho, op. cit.

ACTOR-NETWORK THEORY AND SOCIALLY DISTRIBUTED COGNITION

It is impossible not to notice that the difference between novel and traditional strategies used for reading[9] is based on a type of non-human actor taking part in the network in which a human actor is reading. This is why employing the basic principles of Latour's Actor-Network Theory[10] is crucial for a better understanding of the processes in which both humans and non-humans take part. Whenever a person reads, he or she engages in a relation with non-human actors: books, newspapers, online texts, computers, computer peripherals, online applications, desktop applications, and many others. Pieces of content may also be treated as non-human actors. In this paper Latour's basic terminology is used to emphasise and interpret the role of non-humans in the processes of reading.

Latour also uses the words *collective* and *alliance* to name certain groups of actors (human or non-human) who act together after the phase of constructing this alliance is complete or at least temporarily complete.[11] My term *habitual alliance* is used to name such configurations of actors, which are constructed by human actors in some situations and recalled in similar situations. These habitual alliances are learnt and sometimes used unconsciously, like when one drives a car. He or she uses the steering wheel, gearshift, pedals, gets into relations with traffic lights and other cars. Whenever one finds oneself in a similar situation, for example in someone else's car, the way of constructing this alliance may be recalled and the same configuration may be used to manage the new task – both cars are similar, even when one's gearshift works differently or the steering wheel's response is a bit weaker. At this point the understanding of the term *habitual alliance* is similar to Afllerbach's and Cho's understanding of strategies as "skills under consideration".[12] The difference is that when one state of the alliance is recorded, a researcher can seek similarities in different situations. These alliances can "migrate".

My hypothesis is that it happens similarly with reading. The habitual alliances constructed in professional or academic life may be recalled in CRRC tasks given in a laboratory experiment, and they can be observed through the comparisons of participants' processes. If this hypothesis holds in the light of arguments presented in the further part of the text, it will be possible to conclude that there are individual habitual alliances, and habits of working with information. It will also be proved that non-human actors take part in the process and are an important actor on which the positive effect of CRRC in the ICT environment depends.

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9   B.-Y. Cho, "Adolescents'...", op. cit.

10   B. Latour, *An Introduction...*, op. cit.

11   B. Latour, *An Introduction...*, op. cit. B. Latour, *Politics of Nature*, Cambridge, 2004.

12   P. Afflerbach, B.-Y. Cho, op. cit.

Socially Distributed Cognition as understood by Edwin Hutchins and Tove Klausen[13] is a way of understanding cognition as an effort undertaken by a functionally extracted group, not just an individual. In this paper a method similar to the one employed by Hutchins and Klausen, in their paper on an airplane cockpit, is used to describe the structure of the "hive mind" of a reader/writer and all non-human actors taking part in the process, especially when it comes to storing information for further refinement.

SOFTWARE STUDIES AND REMEDIATION

Henderson and Card[14] described types of windows-based graphical user intefaces (GUIs) years before Windows 8.1 was developed and distributed to PC users. The participants of the experiment presented in this paper used, during the experiment, this modern operating system with its default user interface. Windows 8.1 enables its user to organize the space of the screen and to control the display in many ways. Users can choose which type of display fits them best. The typology of basic ways of organizing information in the limited space of a computer screen using a windows-based GUI, which I employ in this paper to discuss participants' individual styles of conducting CRRC tasks, comes from Card and Henderson. These are the four basic types they point out:

1. *Alternating screen usage* – a user can switch allocation of the screen from one application to another;
2. *Distorted views* – windows are minimized or distorted in order to remind a user of their existence, without necessarily taking all the screen;
3. *Large virtual workspaces* – the screen is treated as a "moveable viewport" for displaying parts of a bigger workspace;
4. *Multiple virtual workspaces* – there is more than one workspace, which is connected to another one, and a user can switch between both.

Microsoft Windows offers a flexible interface, which enables a user to choose how he or she wants to use it in terms of controlling the display. It is another moment when habitual alliances come into play. One can either switch between full-screen applications (1) or use certain ways of distorting views, such as minimizing and shifting between tabs in the browser, or one can use the screen as a large virtual workspace (3), the most similar parallel to the material desk. The different choices of organizing the space of the screen will be analysed within the categories pointed out by Henderson and Card in another chapter of the paper.

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13 Hutchins, Klausen (http://pl.scribd.com/doc/235402441/Hutchins-Distributed Cognition-in-an-Airline-Cockpit).

14 D.A. Henderson, Jr., S.K. Card, "Rooms: The Use of Multiple Virtual Workspaces to Reduce Space Contention in a Window-Based Graphical User Interface", *ACM Transaction on Graphics,* vol. 5, no. 3, 1986, pp. 211-243.

Remediation is understood as a representation of one medium in another medium.[15] This study concentrates on the users' behaviours; therefore a transposition of the term is required. In this paper the term *remediation* is used to describe such actions taken in relation with non-humans (hardware and/or software), which are incorporated into human-computer interaction from other interactions with non-digital non-humans, e.g. using a cursor to follow the lines of text displayed on a screen as if it was a pointer following lines of a printed codex. The diagnosis that a particular practice is remediated holds only when a reader did something similar in a non-digital environment, for example while reading a printed book. This is investigated using the supplementary material coming from the interviews. Remediation in this sense can be understood as a migration of a habitual alliance from non-digital to digital.

Method

The sample was purposive. There were eight participants. They were all students or alumni no more than a year after graduation. They came from various fields, from law and sociology to veterinary medicine and computer science. It was my intention to gather various academic fields, where none of the participants was equally competent in all the subjects used for constructing the task. In the text participants are addressed by nicknames given to them to let them stay anonymous.

The data was gathered in two phases.

During the first phase I gathered screen-capture recordings of the actions undertaken by the participants in order to complete the task given. The task was to prepare a written response to three questions (translated here from Polish):

1. *Weapons of mass destruction in Iraq* – what was the official cause of the American attack on Iraq in 2003? Have weapons of mass destruction been found in Iraq?
2. *Life on Titan* – what is the hypothesis about life on Titan – Saturn's moon – about? What is the mystery of the presence of methane in that moon's atmosphere? What do the observations of Titan bring to the discussion on abiogenesis?
3. *Algorithms for accessing information on the Internet* – how does the Google Search Engine decide what the answers to our queries are? How does Backrub work and is it still at the heart of Google Search? What is the hypothesis of *filter bubble* about?

The choice of questions was dictated by two principles. Firstly, they were supposed to cover three distinct areas of knowledge. Secondly, they were supposed to be deep or complicated enough to take more than an hour to answer (it was

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15   J. Bolter, D. Grusin, *Remediation: Understanding New Media*, Cambridge, MA, 2000.

tested in a pilot study before the experiment whether they were appropriate in this matter).

All participants were given 1 hour and 15 minutes to complete the task on a PC computer installed in the common room at the Faculty of "Artes Liberales" at the University of Warsaw. The computer was operating on Microsoft Windows 8.1, and had web browsers (Chrome and Firefox) and a word processor (LibreOffice) installed aside from the software preinstalled by the developer of the operating system (Internet Explorer, Notepad). Participants were instructed to either send their answer via e-mail to a given account or save them on the hard drive of the computer at the given directory.

In the second phase I conducted semi-structured interviews with the participants. These concentrated on participants' daily habits of reading online, using various non-humans for reading and organizing information. In the second half of the interview I jumped to asking them about the most interesting moments in their processes. I wanted them to first elaborate on their daily habits, and after that talk about what happened during the experiment. I intended to make them place the observations I made during the experiment in the wider context of their daily practices of using computers and other digital machines for reading.

Screen-recordings were compressed and transcribed into time logs accompanied by notes. The interviews were also transcribed and excerpts from them, translated into English, are quoted in the next part of the paper.

The analysis of the data was conducted both using visualizations of quantitative data and close reading and interpretation of the processes. The visualizations served only a supplementary role, so they are not addressed in this paper.

Results

Results of the research are presented in a threefold structure. The first subchapter is dedicated to strategies, tactics and manoeuvres used to locate useful sources. The second subchapter is dedicated to memory storage techniques employed by the participants. The third and last subchapter is dedicated to relations between readers/writers and GUIs.

LOCATING SOURCES

Participants undertook different strategies of locating sources necessary for preparing their written responses. Some of them concentrated on finding single authoritative sources that would let them answer at least a part of the given question. The others tried to gather lots of information from various websites and refine them into their responses.

Adrian belonged to the first group, especially when he was answering the first question. His actions were decisive and accurate. His first query addressed to Google Search was "Iraq war 2003". He entered Wikipedia (first result) and read

a part of the article. Doing that, he learnt that an official document by the US government containing the official causes of the Iraq War was voted in Congress on 11th October 2002. Another query addressed to Google Search was "voting us congress 11 october 2002". In the results he found a webpage containing this document, entered it and started shifting between the document and the word processor, exploiting the document until he had a complete answer to the first part of the question. The answer was found in a few accurate steps.

Later Adrian tried to behave similarly, but in the beginning he could not find a way to get such reliable and accurate sources. Looking for a source that would tell him something about the life on Titan hypothesis, he read a general article about the problem on Wikipedia. Having done that, he got back to the search results and visited another page. He did not get anything reliable from it, and went back to the general article on Wiki. He verified the webpage he found earlier and learnt that it was not a professional source (a visit to the "about" page). He decided to write on the basis of Wiki. While working on another part of the question – concerning methane – he found a webpage of NASA. This was his source for the greater part of the answer to the question about Titan.

It seems that Adrian tried to locate a precise source, but was not able to do that, either because the question was not as simple as the previous one, or because he was not fluent in the topic (he studied foreign policy and Arabic studies, but had no experience in astrobiology). During the interview, when asked about it, Adrian said that the first question – about the official causes of the Iraq War – had a single answer. There was no discussion, no need to compare opinions. He said he knew that there was a document, which would be "the source", and that there was no need for supplementary sources. He only had to locate it. This dictated the course of his process.

Patryk knew where to look for the answer to the question about life on Titan. He used a search engine within the website of "Nature", and composed a huge part of his response based on the abstracts of the papers he found there. During the interview, he said that he is interested in life sciences. He studies veterinary medicine and follows a number of Facebook fanpages dedicated to science in general. That's how he learnt that "Nature" is reliable and available to use in a limited form for free. One of the webpages he follows seemed most interesting in the context of Patryk's search strategy:

> Q: Have you read anything online recently?
> A: Yes. [...] I read about the discussion on whether the dinosaurs were warm-blooded or not.
> Q: You found it on Facebook?
> A: Yes, I found a link to their website ["I f*****g love science"][...] and I followed it. I read the article and the sources, and after that I went to other things.

Q: Are these articles that they publish long?
A: No, you can read every piece in 5-10 minutes, it's a short article, and after that you can find lots of sources linked, you can, if you want to go deeper, you can easily access an interesting part.
Q: And there were links to the places where you could read more?
A: Yes. It said who, what, when, where and footnotes to longer texts, for example from "Nature", or other journals.

When Adrian was looking for a source on weapons of mass destruction in Iraq, he also used a search engine other than Google Search. It was Google Scholar – an application he used extensively in his academic work, as he declared during the interview. This leads me to think that alliances with narrow search engines constructed for professionals are built into academic and non-academic practices related to gathering knowledge on issues interesting for a reader/user. As it was observed in the experiment, these habitual alliances may migrate to CRRC tasks.

Other participants did not use any search engines other than Google Search and Wikipedia's internal search, but only one of them had an academic background in the field to which one of the questions was related. This was Jurek, who studied computer science and had some expertise in search algorithms. He declared that in his field, Wikipedia is often enough. "It's about the type of information. You can't lie about a mathematical equation. In such cases Wikipedia is reliable enough".

Roman was a participant who followed a similar strategy to Adrian's. His work was clearly structured. One of the things he did in the beginning of his process was dividing the questions into sub-questions. He wrote them down as lists of numbered items and tried to answer one after another. He tried to locate single sources for each sub-question, but he did not look for them in such an accurate manner as Adrian did while answering the first question of the task. Roman opened a number of websites, scanned them and looked for the one to use as "the source". Once, while answering the question about Titan, he adopted a tactic more similar to Adrian's. While reading some background texts, he came across a piece of information about a scientist who worked on the life on Titan hypothesis. Knowing his name, Roman addressed a specific query to Google Search: "chris mckay life on titan". Having done that, he found a precise source on a webpage administrated by the academic staff of John Hopkins University. For him it became "the source" for this question. This procedure was similar to Adrian's.

Other participants – the second group – behaved more like gatherers than hunters, if we use a simple analogy. They visited numerous websites and collected pieces of information. They did that either by collecting quotes in the word processor (Franek, Julia; more on information storage in another part of the paper) or by keeping the sources open in background tabs in the browser and jumping from one to another (Franek). This was most clearly visible in Julia's case. Having

typed in the query ("usa attack on Iraq 2003 official cause"), she opened a number of websites given as results in the background tabs, and then typed in another query ("usa attack on Iraq 2003 bush cause") to open more websites. She did not even look at what she had found with the first query. Having opened a number of pages, she collected quotes from websites in the word processor, and having gathered enough, switched to editing her response (more on that in another part of the paper).

Franek's process deserves separate attention. He also behaved like a gatherer, but a bit more chaotic. His whole process may be divided in two general phases. During the first one, he learnt some general knowledge about the issues he was going to tackle. He addressed queries related to every topic, but read almost only (except one page) Wikipedia. Having learnt general knowledge about the topics, he started again from the beginning, this time collecting excerpts from his source pages. Having done that, he switched to editing his responses. During the interview, asked about problems with losing attention while multitasking, Franek declared he does not experience any difficulties with keeping concentrated. He is used to that. Working as a translator, he says, it's crucial to work quickly. Otherwise it's ineffective. There is no time for deep research. He had to learn to limit himself to just scratching the surface. This was why he used Wikipedia almost exclusively.

In order to complete their tasks, all participants traversed the Web in different ways. The general difference between the two highlighted groups leads me to think that habits related to gathering and operationalizing knowledge form habitual alliances with search engines, internet encyclopaedias and particular types of sources, and online readers/writers are inclined to employ these alliances in CRRC tasks. Also, the paths they choose to traverse the web are related to their previously acquired habitual alliances.

INFORMATION STORAGE

When information is found, there is a need to store it for the purpose of editing a written response. Participants took different measures to do that. They used both their own memory and computer memory, in various proportions. A digital computer with Windows 8 installed offers a number of possibilities to assist human memory.

Adrian, having found "the source", depended on the web browser displaying an open webpage until the user closes it. He kept shifting between the word processor and the browser, memorizing small bits of information, and then editing parts of his response. He used alt-tab (a keyboard shortcut used for switching between open windows), and continued this series of manoeuvres for over 18 minutes. When he finished switching, the response to the first part of the question was completed. During this period he shifted over 50 times, without visiting any other website.

At the same time Błażej worked differently. Having found a series of webpages containing parts of information necessary for his response, he was reading, memorizing, and shifting to writing, having all the pages open in background tabs. From time to time he went back to webpages and looked for specific bits of information, to then return to writing and add another sentence or two. Having completed a part of his task, he closed the tabs kept in the background and started working on another question with a clean browser. He used Google Docs instead of LibreOffice, so he could not use alt-tab. Instead, he navigated using the mouse. The difference between him and Adrian can be attributed to the differences between their seeking strategies, but the choice of Google Docs can also be important, because it does not allow a user to use the default shortcut used for switching, and it leads him to navigate through tabs instead of windows. But the basic method used for information storage (in an open browser) was similar for both Adrian and Błażej.

Julia behaved differently. Just a moment after starting her task, she minimized the browser and opened a word processor, as if she knew that she couldn't proceed the way she wanted without LibreOffice in the background. While gathering information through a series of search engine queries and jumping between websites, Julia was copying and pasting excerpts from the webpages she wanted to use while writing her response. Having done that, she switched to editing her response based on excerpts pasted into the word processor. During this phase, she did not leave word processor. One of such phases took her more than 7 minutes. She did not always proceed in a linear manner. It was observed that she switched between parts of her answer. Having completed a part of her note, Julia added links (through copy-pasting) to her sources and started gathering quotes for another part of the task. She changed this strategy just once, for 2 minutes, but got back to her previous tactics right after the failure of the new method.

Franek's process followed a different path. He shifted between topics, gathering general knowledge, and then got back to them to focus on the questions given. During the second phase he used copy-pasting as Julia did, and then edited his responses on the basis of collected excerpts. He also used the word processor for storing information for further refining. But he employed other tactics too, like editing parts of his response on the basis of information he remembered without writing them down first (similar to Błażej and Adrian).

The basic difference between the two groups of participants – Julia and Franek on one side, and Adrian, Błażej and Roman on another – lies in the choice of actors used for storing information required for editing the responses (temporary storage). Julia's group wanted to have everything on one screen, so they used the same application for storage and for writing. Adrian's group shifted between pages and a word processor, and stored small bits of information in their own memory and in the browser's open tabs.

Julia declared that how she worked during the experiment was how she usually works with information. Writing a scientific paper, she arranges quotations

from other authors in order, and they are used to structure her texts. "Sometimes I even print quotes, cut them with scissors and arrange them on the floor in my apartment", she said. This is a clear example of a *habitual alliance*, followed even outside the digital environment, or remediated from non-digital to digital. During the interview, when asked about using social networks and synchronization (a term, which I have borrowed, used by Jurek to describe his habit of visiting several news sites to get an overview of what is happening in the world) with everyday news streams, she said she did not pay much attention to what appears on the news sites or social networks. She tries to keep away from information overload, calling it "a waste of time". This seems to go along the strategy of a clear division between the phases of gathering information and editing her responses. She did not want to lose attention while writing. She finds it important to stay away from the chaos of too much information.

Franek declared something contrary. Although he gathered excerpts as Julia did, his process was less structured. He did not complete one task after another. He was more chaotic. During the interview he said that it's because of the habits he constructed while working as a translator:

> Q: During the experiment, it was difficult to find in your process a clear division between gathering information and editing the response. Is it normal that when you're online, you constantly shift between windows and tabs?
> A: Yes.
> Q: Do you try to get rid of this? Does it disturb you?
> A: No. I don't think I lose attention because of that.
> Q: Applications that keep you from shifting – do you need them?
> A: I didn't even know there are such. In my work it's important to understand lots of contexts. Without doing that [shifting] it would take too much time.

This might be the underlying difference between Julia and Franek, who both used copy-pasting, and constructed collages of excerpts which were later used as a basis of their responses. While Julia tries to keep away from the noise of the Web, Franek does not. He dives into it and is used to limiting the depth of the research to what he can do in a certain time. "Sometimes I use Google Books to find certain phrases and check the contexts they are used in in different books", he said. It sounds like a way to grasp the surface of the problem very quickly. He does not read the whole books – he just scans them, using a basic text-mining tool (keyword search). He sees it as a requirement for the kind of job that he does. As for managing information overload, he said: "I have a filter 'built-in'. When I enter Onet [Onet.pl – a Polish web portal], where I have my e-mail account, I don't read news. It's the same with Facebook. I don't browse the news feed, I click something only when it hits me on the top of the stream".

He also added something about libraries:

> Q: Do you go to libraries?
> A: Yes. It's connected with work, I go to check quotations from
> Polish translations, it's still impossible to find many of them on
> the Internet. Mainly classics [...].
> Q: Do you sit there and work or take them away?
> A: I try to take them away, but smaller things I go through in the
> library. I do not like to stay there long.

The examples of Julia and Franek show that the ways in which CRRC is conducted may be connected with everyday practices of using the Internet – from self-exile to traversing the Web bravely, on one's own rules, managing the information overload to work for one's own profit, exploiting it when necessary.

As for Adrian and the tactics he chose, they seem to be dictated by the choice of strategy for gathering sources. He followed a principle of finding "the source" best fit for the questions asked, so he did not have to collect quotes. One webpage stored in a browser was enough for him. During the interview he declared that when he works on a longer paper and has to use multiple sources, he reads everything he needs first, and then writes, switching between documents in a similar way – he tries to use one at a time. He also declared that he is very familiar with *alt-tab* and uses it extensively, which reinforces the belief that this is the way he usually behaves in such situations.

During the interview, Błażej said that when he works on something bigger, something requiring multiple sources, he likes to lay everything – printouts, books, notes – on a desk and have everything in his field of vision. What he did during the process – keeping everything in tabs one next to another – seemed to be a remediation of such behaviour:

> A: When I do stuff related to reading or writing, when I have lots
> of external material, some printouts, I like to lay it all down on the
> desk, and be able to see everything at once. But when I don't need
> such material, I do it in bed.

ALLIANCE WITH THE GUI

Jurek didn't copy-paste quotations to store them in the word processor, nor did he shift between windows or tabs. He used Notepad – a very simple application for editing text – and put it on a layer above the browser. He was writing with the browser seen in the background. He did not switch Notepad to full-screen. During the interview he declared that the decision to proceed in this manner was dictated by the operating system:

Q: For the greater part of the recording you had a page open in the browser, and Notepad over it, where you were writing. Is it your standard way of doing similar things?

A: Yes, but it also depends on the operating system. When I'm on Linux, I can easily switch between workspaces, desktops. When I can have a word processor in full-screen, the article and programming environment open at the same time, then I don't do that [Notepad over browser]. But in Windows, especially without additional software, it's impossible. It's much easier for me to compose stuff on the screen so that where I get the information is in the background, and where I write – on the front, preferably so that one does not cover the other, to have both things in front of me and not have to use alt-tab.

When asked about his standard software environment, Jurek mentioned La-TeX, which he uses for editing his master's thesis. He clearly separates the functions each operating system installed on his personal computer is used for: Windows for office work, videogames, for recreation, chatting and watching movies. Linux for programming and using dedicated, specialized software connected with graph analysis and networks, which is a part of his academic field. It goes along with a distinction between two parts of his career: a journalist (on Windows) and a computer scientist and programmer (Linux).

Jurek is a well-informed user of the personal computer, also having an academic background in computer science. The decision he made when forced to work on Windows is interesting. During the experiment he made the GUI work as a *large virtual workspace*.[16] When he wanted to see the whole page stored in the browser in the background, he moved the Notepad window partially outside the screen frame, and then brought it back to write something. At the same time, during the interview he said that the way he works preferably is *alternating screen usage*. Although multiple workspaces would also be a suitable term for describing a feature (common among Linux distributions) enabling a user to use more than one desktop and switch between one and another, it wouldn't be in Jurek's case. He said he used this Linux feature to have multiple full-screen applications open at the same time. It is more similar to *alternating screen usage* than *multiple large workspaces* – there is always just one application open in full-screen. It seems that the easiest and the most comfortable way of emulating such a display on Windows would be using alt-tab to switch between full-screen applications, but Jurek said that it's good that he "doesn't have to use alt-tab".

It seems that a small change in the ecosystem of non-humans, such as a different shortcut used for allocating different programs to the screen in full-screen view, can be enough to make a reader/writer depart from his/her habitual alli-

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16   D.A. Henderson, Jr., S.K. Card, *Rooms...*, op. cit.

ance. The alternative he chooses is radically different from the default.

Błażej is another interesting case. He used Windows' GUI as a *distorted views display* (multiple tabs which he could allocate to the greater part of the screen with one click). Earlier in the paper I pointed out that this can be interpreted as a remediation of papers arranged on a desk. He did not try to use the Windows GUI as a *large workspace*, the display closest to papers arranged on a desk. This might have been due to the fact that Windows' default GUI is fixed. Błażej couldn't move the viewport as described by Henderson and Card. The operating system he uses at home, which is Mac OS, also does not support that. It seems that *distorted views* is the closest approximation to a cluttered desk – a display favoured in his daily routine – he could get.

At the same time both Adrian and Julia adopted *alternating screen usage* display. They shifted between the browser and the word processor, both in full-screen, even though they used different tactics to store information until it was refined.

All the described examples suggest that there are different ways of organizing displays in a modern, flexible operating system GUI. It is more difficult to trace *habitual alliances* in this matter than in the previous ones, mainly because the flexibility of a modern retail operating system's interface is technologically limited. But the differences between individual approaches are clearly visible.

Conclusions

It has been shown that there are important differences between the strategies undertaken by the participants of my experiment to complete the CRRC tasks. The differences were found in locating information, storing data for preparing written responses, and organizing work with the graphical user interface.

It was also shown that certain decisions taken during completing such tasks may be remediated from participants' relations with non-human actors other than computers connected to the Internet. It has also been proved that certain habitual alliances may follow users/readers from one situation to another and influence their behaviour when completing a CRRC task on a PC.

The results of this study suggest that non-human actors play a significant role in the process of constructing meaning from dispersed online texts, and that individuals use them in various ways and for different purposes. They choose their allies from a wide variety of possibilities, including a number of search engines, ways of arranging displays, and applications used for temporary information storage.

Although the results of this study are not representative of the whole population, I believe they may inform researchers conducting studies in the field that reading online is not only vastly different between individuals due to the types of content they engage with, but also due to the non-humans such as web browsers, keyboard shortcuts, operating systems, and habits of building alliances with them, which may be built into various situations. I believe these results show where the links between reading strategies and individual variables describing particular

readers may be found, and I hope it will spark more quantitative research which will determine the statistical significances of various correlations I have recognized here in a non-representative manner.

SUMMARY

This article discusses the notion of strategies users/readers employ for reading/writing in the environment of information and communication technologies. By triangulating video recordings of particular actions undertaken by participants with semi-structured interviews concerning their habits of working with information, it proposes understanding reading/writing in ICT as managing *habitual alliances* formed within and outside the environment of ICT