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## Students' use of paper and pen versus digital media in university environments for writing and reading – a cross-cultural exploration

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### Abstract

This paper offers a summative cross cultural analysis of qualitative survey data collected to investigate the impact of digital media on writing and reading within universities from different countries. It addresses the particular aspect of the student's experiences of paper and pen versus digital media. This study is based on the results of individual qualitative research conducted in 10 countries in two continents by members of the COST Action FP1104, Work Group 1 – Customers and Users. The methodological approach used is qualitative content analysis of the reported research and analysis of the individual country surveys. The survey was conducted in the national language of each country using the same research questions. Various survey methods were deployed – online questionnaire; questionnaire and interviews or hand written essays. The principal results show that there are many similarities between the countries studied but that some use pen and paper less whereas others are more prepared to use hand writing, this may link to the availability and use of digital technologies as well as to personal preferences. Reading and writing competencies are changing with the use of digital technologies but students still see benefits of reading and writing with paper which they continue to use, especially to convey private emotions and intimate feelings. This study provides new learning about the contrasting use of paper and digital media within an educational rather than business setting. These surveys provided the basis for the design and analysis of a follow up quantitative study (not examined in this paper) and for further exploration of this important research topic within the countries surveyed, particularly in social sciences and pedagogical studies.

**Keywords:** computer, education, keyboard, paper, reading, writing

### 1. Introduction and background

This paper reports a summative analysis of a cross cultural transdisciplinary qualitative study comparing and contrasting the use of pen and paper and the use of keyboard and screen in 11 university educational settings: Italy, UK, Slovakia, Bulgaria, Hungary, Russia, China, Hong Kong China, Portugal, Finland and Germany. The study was conducted by members of COST Action FP1104 Work Group 1 Customers and Users (WG1) who explored the effect of the changing media use habits on traditional media within the context of new possibilities for print and media (see acknowledgements for further details of countries and members of the survey team).

Personal and business relationships, communications, and management of everyday life are increasingly mediated via digital technologies and the use of paper books and writing on paper appears to be at risk of declining. Smartphones, tablets, laptops and personal computers are at the heart of contemporary society enabling people to work and communicate in almost any loca-

tion. We learned from the work of Sellen and Harper in 2002 that, contrary to expectations, the arrival of computers did not result in a paperless office. Their study, based on business users, was conducted over ten years ago (Sellen and Harper, 2002). Our present study not only provides more contemporary research but it asks students in 10 different countries in a university environment about their preferences for pen, paper or digital for reading and writing. Do they still have a use for pen and paper or has digital literacy superseded writing by hand and reading on paper? Studies that research the comparative and contrasting use of paper and pen with digital technology are scant and tend to focus on e-reading versus paper books and on electronic substitutes for paper and pen, rather than also considering handwritten notes and letters (Dillon, 1992; Chen, Guimbretièrre and Sellen, 2013; Baron, 2015). Publications by members of the Survey Team are cited elsewhere in this paper. However, a psychological study of students (Mueller and Oppenheimer, 2014) has recently reported findings that students retained

more knowledge when they wrote notes with pen and paper, results that are complementary to our own findings. It is notable that prior to our study university students in educational settings have not previously been researched about their use of paper, pen, screen and keyboard for both reading and writing and thus our research provides opportunities for developing new knowledge in this area of study. Our aim was to understand whether paper and pen, especially when used for writing and communicating, still figured in the daily lives of the students whom we knew to be avid users of digital technologies via keyboard and screen.

In this paper the outcome of our unique study of 633 university students in 10 countries from Europe and Asia is reported. The students were asked about their use of writing and reading with pen and paper and keyboard and screen. Lead by the sociological approach outlined in Fortunati and Vincent (2014) the study includes contributions from graduate and postgraduate students in media and communications, chemical and metallurgy, linguistics, psychology, human computer interaction, design, computer sciences and paper science disciplines.

The foundational work for this study involving 24 graduate students was carried out by Leopoldina Fortunati at the University of Udine in Italy (Fortunati

## 2. Methods

The seminal paper by Fortunati and Vincent (2014) and their research questions and methodology formed the basis for an especially designed qualitative survey in 10 of the countries represented in the WG1 survey team. Note that a new group of undergraduate students was surveyed in Italy providing new data for this country. The members from Serbia and Ireland did not conduct the qualitative survey although they participated in the survey design and discussion of the findings. The same research questions were used in each of the 11 qualitative surveys (two surveys were carried out in China – in Beijing and Hong Kong) conducted in 2013 and 2014 but the data was gathered using some variations in method. The survey was not funded and thus the approach taken in each country reflected the method most suited to local circumstance. In Italy, for example hand written essays discussing the questions were submitted for course work; in most other countries (see Table 1) the survey was conducted on line and, in Russia and China, a structured questionnaire with some interviews were used. The responses were analysed by the survey team member and a report of the results was provided at the meeting of COST Action FP1104 in Ljubljana 4 November 2013. In some instances the country data was subsequently published in more detail in journal articles

and Vincent, 2014) and explored the research questions: how do students perceive the affordances of electronic reading/writing when compared to writing and reading with paper? And, have electronic writing and reading become richer experiences than paper writing and reading? These questions draw on theories and concepts regarding electronic writing (Ong, 1986) and media richness theory (Daft and Lengel, 1984). Contrary to expectations that paper and pen may have fallen out of use this cohort of Italian graduate students did, indeed, use this medium. They valued handwritten messages and letters for intimate communications as well as finding it to be integral to their research and learning processes. They were also voracious users of digital media, intertwining digital and paper note taking and reading in their academic work in particular. The Survey Team thus aimed to replicate this Italian study to ascertain whether or not there may be indications that the uses of pen, paper, and digital technologies were similar among countries in the European Union and in Russia and China.

Following this introduction and overview of complementary literature that frames this study, the next section outlines the methodology for the survey and a summary of participating Universities. This is followed by discussion of the findings articulated in five themes and finally the conclusions drawn from this research.

(Taipale, 2014; 2015; Kaputa and Paluš, 2013; Lasheva, Blazheva and Lasheva, 2014; 2015; Vershinskaya, 2014; Farinosi, Lim and Roll, 2015; Isaias, Miranda and Pifano, 2015). Additional analysis was reported and discussed at the WG meetings in 2014 to 2015 and in skype calls between survey team members. These country reports, journal articles and reflexive team discussion form the data used for this present article.

In the surveys university students were asked to freely write about their reflections on four themes articulated in three questions (Vincent, 2014). They were not given instructions on how to write about each theme because we were interested in their spontaneous thoughts.

- 1) Describe the differences you find when using a pen and using the computer. Furthermore describe what you like and dislike about both these modalities.
- 2) Describe which differences you find in reading paper and reading on a screen. Furthermore, describe what you like and dislike of both these modalities.
- 3) Think now of the gestures and postures you assume in reading and writing using paper and on a screen. Reflect and describe them.

*Table 1: Summary of Qualitative Survey Data Sources from Participating Countries  
(Source: COST Action FP1104 WG1 Survey Team)*

<b>Country Lead Researcher</b>	<b>Number Surveyed Gender Breakdown Male/M, Female/F</b>	<b>Period of Survey</b>	<b>Undergraduate/UG Graduate/G</b>	<b>Range or average Age where known</b>	<b>Survey method</b>
Bulgaria Veska Laysheva Chemical Technology & Metallurgy University Sofia	38 24 F 14 M	April–June 2014	25 UG 13 G	19–26	Online questionnaire
China Yao Nie Peking University	40 unknown	2013	21 UG 18 G 1 Visiting Scholar	23	Questionnaire and interviews
Finland Sakari Taipale Jyväskylä University	26 23 F 3 M	Jan–Feb 2013	13 UG 13 G	27	Online questionnaire
Germany Joachim Höflich University of Erfurt	54 41 F 13 M	June–July 2013	46 UG 8 G	21.9	Online questionnaire
Hong Kong China Chung Tai Cheng Hong Kong Polytechnic University	28 14 F 14 M	June–July 2013	28 UG	unknown	Questionnaire
Italy Manuela Farinosi University of Udine	129 52 F 77 M	April 2011 to October 2012	129 UG	21	Hand written essay
Portugal Pedro Isaias Lisbon	98 unknown	2013	98 UG/G	unknown	Online questionnaire
Russia Olga Vershinskaya Russian Academy of Sciences Moscow	25 unknown	Sept–November 2013	25 UG	19–21	Online questionnaire
Slovakia Vladislav Kaputa Technical University Zvolen	100 unknown	2013	100 UG/G	21.5	Online questionnaire
UK Chris Lim University of Dundee	23 unknown	May 2013 to October 2014	13 UG 10 G	26.9	Online questionnaire
Hungary Rozalia Szentgyorgyvolgyi Óbuda University Budapest	72 unknown	Feb–March 2014	68 UG 4 G	23.6	Online questionnaire

The surveys were conducted in the national language of the respective country and the findings reported to the survey team were translated into English by the country representative. Table 1 shows a breakdown of the respondents by University location and the survey method.

Conducting these surveys in multiple countries simultaneously highlighted some challenges for implementing this research. Although the three core questions are the same the survey was variously set as a hand written essay or questionnaire, typed online question and answer survey, or structured interview. The student demographic was consistent but the gender split and courses studied varied. The students were a mix of graduate and undergraduate, with fewer graduate students overall. Some graduate courses are 4 years (e.g. UK) which means there is some inconsistency in the average ages of graduates and undergraduates. It was reported by Slovakia and Finland that fewer male students were willing to contribute to open ended questionnaires online, whereas the gender balance in Italy reflected the student cohort completing the survey as part of their coursework. Additionally there are nuances not explored: for example, differences between reading printed and hand written text; between reading a paper

### 3. Results

Delivering a detailed breakdown of results of all the studies according to each research question, and separated according to preferences for pen or keyboard when writing and paper or screen when reading, would be cumbersome and is not the purpose of this present paper. Furthermore, detailed analysis by some countries is already available as reported in Section 2. Instead the results are explored in this section by first providing a short summary overview, followed by a discussion of the findings according to themes identified by the author of this paper. These themes are illustrated by quotes taken from the individual survey reports.

Overall there were many more similarities than differences between the results reported from each country. The consensus of the Survey Team was that the discipline and level of study might be a factor in the choice of media used for reading and writing. Additionally some courses are conducted using mostly online reading material giving students no paper option and assumes they are digitally competent. It is noted here that there is already considerable debate on digital literacy and digital natives (Helsper and Eynon, 2010) and regardless of their competences university students are required to study within a digital learning environment. Furthermore, their institution is expected to provide and respond to their changing digital needs. As

or e-book and the size of the screen. Another limitation was that as this study was not funded it had to be incorporated into the everyday work of Survey Team members. Nevertheless, a set of rich qualitative material was obtained from these country surveys. Analysis of the material was conducted initially by the respective country researcher and subsequently by discussion in the survey team meetings at the COST FP1104 Work Group sessions, and in some online meetings.

In order to explore the data from a comparative perspective the data obtained from a qualitative survey would usually be coded and analysed using NVivo or similar qualitative software, and indeed some teams used this method for their country data (e.g. Portugal). However, as not all the surveys were conducted with an identical approach, comparative coding was not possible and instead the research was analysed on a country by country basis. The results were not compared until after this initial analysis. In this paper the data published by each country has been examined according to content analysis of the reported data and the outcome of reflexive analysis of the material in work group discussion. The following sections build on these survey results and discussion by examining the data in five themes.

this Hungarian student commented ‘Most of my school materials exist only in electronic form’. Nevertheless, students’ uses of paper books, pen and paper, and handwritten note-taking prevails alongside their digital equivalents. In the discussion below the results from the surveys are used to illustrate the contrasts and correlations between the student’s experiences of writing and reading with pen, paper, keyboard and screen; we use quotes from students to explicate the findings (Vincent, 2015). Names and ages of individual students are not shown but the quotes provided have been identified as exemplary of the findings from the relevant survey.

There was consensus of views and responses across all the countries covering a variety of topics relating to the functionality and status of digital technologies in society and old and new ways of doing things. The findings from the research are explored through discussion of 5 themes cross-cultural differences: aesthetics and emotions, ease of use, costs, and corporeal comfort.

#### 3.1 Cross-Cultural Differences

Cross-Cultural differences were discussed by WG1 Survey Team members at their meetings. Drawing on the overall results from their surveys this reflexive team discussion highlighted that there were many more

similarities and fewer differences between countries than had been expected. Vershinskaya in her report of the Russian survey comments:

‘The first rather astonishing result is that there are lots of coincidences in opinions of Russian, Italian and other countries’ students which show how great the influence of globalization is. It needs further research.’ (Vershinskaya, 2014, p. 1).

Overall, the conclusion from the Portugal study sums up the similarities in the findings across all studies: ‘While the computer is seen as a fast and effective tool, the paper provides increased concentration levels and a more sensorial experience’ (Isaias, Miranda and Pifano, 2015, p. 143). In contrast, the cross cultural differences were more nuanced. For example, Bulgaria and Finland showed a proclivity towards a more wholly digital experience than others. Possible reasons for this discussed in WG1 suggested it was do with the domestication of digital technologies in university, within society generally, or it may be influenced by the discipline or subject matter studied by the respondents. In his analysis of the Finnish results Taipale (2014) addresses this point by comparing findings from Finland and Italy (Fortunati and Vincent, 2014) in the context of the theory of technological frames in which ‘people are inclined to approach the new in terms of their pre-existing technological frames’ (Orlikowski and Gash, 1994, p. 191). In Finland the high penetration of use of digital technology is such that digital writing was the frame of reference for Finnish students whereas the Italian respondents, answering in hand written essays deferred to the older technique of hand writing when considering digital writing. Taipale also notes, however, that this difference does not extend to reading and the responses to digital reading are framed by experiences of reading paper books in both countries (Taipale, 2014, p. 16).

### 3.2 Aesthetics and Emotions

The aesthetic of the chosen medium is a deciding factor for many; the haptic qualities of the interaction; the touch, feel and smell, as well as the emotions elicited by the encounter were noted by numerous respondents in all countries. As one might expect there was strength of feeling for all modes of reading and writing but it was the use of a pen and paper for hand writing that generated the most keenly felt responses. Pen, paper and paper books are treated with affection and nostalgia as in these examples that express emotions regarding the use of paper and writing by hand:

*Handwriting is slower and impractical, but at the same time more personal and enjoyable. Writing with a pen also relates to the joy of chirography. My chirography is unique and it often catches other people's attention. I feel that it says*

*something about my persona and perhaps because of this I want to cherish handwriting.* (Finland)

*The taste of browsing something material is priceless! I like very much to enjoy the scent of the book through the fragrance of the paper.* (Italy)

*Writing by hand is much more personal, more subjective. This allows us to bring up all of our emotions: happiness, sadness, nervousness. Based on the features of the texts we can understand how the writers felt at the time of writing.* (Italy)

*I use paper to write on when I have to write important messages, with passion, because in my opinion, your own handwriting makes the message very personal.* (Italy)

Sociological studies of the use of information and communication technologies by Vincent and Fortunati (2009) has highlighted the electronic emotions that are lived, re-lived and created when using machines. With regard to using pen and paper no machine is involved (although one can argue it is a form of ICT) but it is clear from the student’s experiences that the smell of paper, for example, evokes strong emotional responses but particularly with regard to the olfactory properties of paper. The smell of a laptop or other devices was not mentioned as a reason for preferring it. Perhaps, following Taipale (2014), we have hitherto taken for granted the emotional ways we express ourselves in hand written notes and communications. Is it only now, with the interplay between digital and these more traditional ways of communicating, that the importance of the aesthetics and the emotions as well as the content and modalities of all communications media are worthy of note. Further findings from our qualitative research show that it is not simply a matter of being digitally literate, and ‘doing things digitally’ but there are sometimes special conditions that mean digital technologies do not work. The sentiment of the communication cannot be communicated unless expressed in hand written form. For example, Yao Nie in her analysis of the survey conducted in China reported: ‘Chinese characters are not just an information carrier, but also a culture carrier. Aesthetically, calligraphy is more concerning handwriting itself than the concrete information the characters bear’ (Yao Nie, WG1 2013). Emotional differences in the expression of national identity through the characters of chirographic script were also noted by some Hong Kong respondents who are more able to express themselves in the strokes of hand written characters than in coded form on the computer.

### 3.3 Ease of Use

The choice between digital or paper based reading and writing was greatly influenced by the amount of dexterity the affordances of each medium offered to the students. The practical qualities of easy search and cor-

rection is judged by many respondents to only be possible with computers and despite problems of posture and tired eyes, writing and reading online is usually more practical in the education setting.

Most students are not wholly paper or digital but combine paper and digital to suit their particular needs. For example when drafting notes and writing them up, printing out work and annotating it, and most often using hand written notes to quickly record ideas. The flexibility of working online (e.g. writing up course work), however, is favoured by many when there is no substitute to the particular features such as hypertext; multiple simultaneous texts and so on. This refers also to the ease of correction, neatness and legibility of their work.

*I am so used to hypertexts that I miss this application when reading texts on paper.* (Germany)

*The text is easier to edit on a computer afterwards, so it is more likely that all ideas will come out, while when writing on paper you sort of have to manage with what comes to your mind at that particular moment, and thus the outcome is easily unclear and inconsistent.* (Finland)

*I used to write essays by hand at high school, it would annoy me how much paper and time we would waste having to re-write the same essay over and over again until there were no mistakes and it looked neat.* (UK)

There is another reason to favour handwriting, however, and this is the role it plays in learning and retaining knowledge. Many of the students in our study found making hand written notes leads to greater retention of the data than if it is typed and there is a firm belief that retaining new knowledge is more likely to be successful when writing notes during the learning process than when reading or listening online.

*If you get prepared for an exam, no information is left in your head if you use a keyboard. Writing with a pen allows you to remember what you write.* (Russia)

*In printed form the school-work is more transparent, and easier to remember. Digital display flickers and disorders.* (Hungary)

*Some respondents felt that writing using paper strengthens memorization because Chinese handwriting requires you to write by stroke so that you might be more concentrated.* (Hong Kong China)

Our findings are borne out by Mueller and Oppenheimer's (2014) research in which they conducted psychological tests on 142 students to determine the effectiveness of long hand or computer note taking; the long hand note taking was the more successful for memory retention.

This usefulness of hand writing is further highlighted by challenges posed by representing mathematical symbols or graphic symbols online:

*It is easy to write lectures on the computer but to write down formulas it is much easier to use a pen.* (Russia)

*Graphs or complex formulas are not easy to input while writing on screen.* (China, Beijing)

Additionally, when writing by hand, students often make personalized use of spatial layout or annotation markers:

*I use white space and the positioning and grouping of notes on a page to aid understanding. This is a rapid process which cannot be achieved on screen.* (UK)

*What I like most about a pen, is that it is quick to add notes, comments, and all kind of drawings in the text and on the side. For example, for me drawing arrows is easiest by hand.* (Finland)

*On the other hand, a great thing in pen writing is a possibility to write on different parts of a paper sheet, in different directions and with different coloured pens, use text of different size, and insert this and that here and there. Making a mind map with a computer is, in principle, much more difficult, and requires efforts to a different extent.* (Finland)

There was recognition that computer mediation can be a distraction as it can fragment thinking and it was noted in Hong Kong most respondents emphasized that reading and writing using paper encourages them to treat these as a complementary behaviour, whereas using a screen makes them experience reading and writing as separate units. In Portugal students underlined the difference between the formality of the computer and the flexibility and informality of the paper and in Russia age matters. The hypothesis suggested by the Russian survey, (Vershinskaya, 2014) is that the younger the student is the less accustomed to handwriting and to reading books he/she is: *Using a pen becomes more and more obsolete. I learned to print quicker than to write.* (Russia). It is clear that students have experienced different learning practices and acquired different reading and writing skills from their early use of computers such as explained by this UK student.

*When I was little I used to play text adventure games on my dad's computer. As the games used a command line interface I had to write out actions and there was no tolerance for misspelling commands. I'm pretty sure that both my reading and writing improved through playing these games while reading physical storybooks only really made me more confident with reading.* (UK)

### 3.4 Corporeal Comfort

Corporeal comfort refers not only to the physical comfort regarding the effects on the body when using different media but also to an individual's perceptions of what are the better tools for them for reading and writing. These are expressed in terms of competences such as eye strain, weight of books and speed of reading which in turn affect body postures and the practicalities of holding open a book or reading in bed.

*Until last year I was mostly a paper reader but I slightly evolved so that now I think I'm equally competent as a paper and online reader. I used to print articles if they were longer than 10 pages but nowadays I manage to do that online. I got used to it but I also got this application to write notes on a PDF file so that I can act on online documents as much as I would do on paper.* (Finland)

*I like digital more, because it is more [easy to] mobilize if I have the appropriate book/manual on my laptop, instead of many, many books to carry.* (Hungary)

*When I travel I do not want to carry extra weight (books) with me.* (Hungary)

The strain of the weight of books is mentioned as well as the strain on the eyes of reading screens. This latter point was often mentioned and expressed with frustration and anxiety.

*There is nothing like reading [hard copy]. Not only is reading more comfortable for the eyes but also reading is giving you the feeling that the content is more tangible.* (Germany)

The posture usually adopted when reading was important when deciding whether to read hard copy or from a larger screen as indicated by the research from Portugal and Finland.

*The computer requires a specific posture, while a book, for example, can be read in numerous positions and locations.* (Portugal)

*When reading from a screen, your hands are free. You can, for instance, lean on them or just mess about with something else. It is not very good, if you have, say, a scab or the like that you shouldn't scratch. On the other hand, if your hands are free you can also take down notes. But a [printed] book won't stay open by itself.* (Finland)  
(Taipale, 2015, p. 773)

Although eyestrain was an uncomfortable outcome of using a computer, hand cramps when writing was also reported by this student from Germany:

*I suffer cramps after long periods of handwriting.* (Germany)

In concluding his analysis of the Finnish qualitative survey Taipale highlights the different approaches students have with regard to their bodily practices depending on whether they are doing coursework or just using a digital device for social media:

'Students reflect their bodily practices predominately in relation to their coursework, which includes the reading and writing of longer factual texts. It is obvious that in their spare time they use portable digital tools for reading (e.g. news feeds and social media streams) and for writing shorter texts (such as emails, social media status updates, tweets, etc.), and in a much more flexible and innovative manner.' (Taipale, 2015, p. 774).

### 3.5 Costs, Appropriateness and Sustainability

The range of options for reading and writing are manifold and students actual behaviours may be at odds with their preferences when cost of use, or the appropriateness of particular media for the task at hand are considerations.

How much books weigh, how awkward books or computers are to use may influence the student's choice of media for reading and writing, but so does the cost of printing a long document.

*Reading for me is easier when not staring at a screen for hours but when papers are 15 pages long and you have about 30 to read, it's not economical to print them all off.* (UK)

Issues regarding the cost and volume of electricity consumption for sustaining digital technologies further highlight some new challenges and opportunities for future research. It would appear that students will continue to use, adapt and shape the technology most appropriate to their affordable needs be it paper, pen, keyboard, screen, e-book or paper book but they still have a demonstrable need for all to be available for their use in the University setting.

*E-books are sometimes necessary in modern life, they became affordable. You can find a digital copy of a rare or very old book. So I use both forms.* (Russia)

*Paper and pencil are always available, and do not need electricity; such as when having a sudden inspiration in bed.* (Germany)

*Printing is expensive, I need to bring with me a lot of papers and paper stacks.* (Hungary)

But there are other situations when only digital technologies will do. In Bulgaria all respondents reported that they extensively use computers in everyday life, learning and work, and cannot imagine life without them (Lasheva, Blazheva and Lasheva, 2014). In Slovakia the



value of the internet is highlighted for staying in touch when apart, writing letters would be so much slower with less certainty they would be delivered.

*Internet simplifies the communication: my husband (professional soldier) took part in missions in Afghanistan a couple of times so I cannot imagine my existence without having contact with him for some months.*  
(Slovakia)

#### 4. Discussion and conclusion

In considering the contribution of this summative study to the body of knowledge on students reading and writing practices one might ask why publish these qualitative results and not wait until the outcome of the follow up quantitative study is complete? To answer this I note first the unique breadth of countries explored in this paper. Five of the university studies reported in this paper did not participate in the quantitative survey (China, Hong Kong, Germany, Finland, Portugal) and the findings from their research would be under-reported in a future analysis. Secondly, it is clear from these initial surveys that new knowledge regarding student reading and writing practices is emerging and further research is certainly needed. The respondents in this study are extensive users of digital technologies but using pen and paper for writing and reading as well as, and combined with, digital technologies remains part of their normative practices. Motivations for using paper and pen are influenced by the haptic qualities of reading and writing – the feel and the smell of the paper and the grasp of the pen, the turn of the page, and extend also to the practical usefulness of note taking and writing in margins while reading. Conversely the use of hypertext and automatic error correction in online writing are making the use of keyboard and screen more compelling. Issues of multi-tasking, chirographic skills, intimacy of paper versus digital, interleaving of using digital and printed text as well as problems of eye strain and posture were identified.

There is no doubt that students have embraced the use of digital technologies in the educational setting of their university with enthusiasm but they have also found that the affordances of chirographic writing and the use of paper have special qualities that cannot be matched by digital media. In the Russian study, Vershinskaya, comments that ‘Speed of [technological] change is very quick. Gadgets are becoming smaller and lighter, making the weight of the bag you carry to the university less

In this example we return again to the emotional aspects of communication when regardless of cost keeping in touch is the priority by whatever means is necessary to achieve this. This gives a clue to the conundrum faced by students and their choice of paper, pen or digital media as in many instances they must find the most cost efficient and convenient mode that suits their immediate need, and this might not be their preferred choice.

heavy. That makes students below 20 more attached to computers. The age matters.’ (Vershinskaya, 2014, p. 4). This raises further new research questions regarding the impact of age on student’s preferences and the impact of the pace of technological change. Maybe new gadgets will be developed that satisfy some of the sentimental and practical reasons given for retaining paper books and chirographic skills.

The new learning from this study, which is the first to examine the topics of both reading and writing in the educational setting of universities, has benefits for the academic and pedagogic communities some of whom place strong emphasis on digital literacy and less on the quality of handwriting skills and the continued use of paper books. The normative practices of students show that there is still a demand for pen and paper as well as keyboard and screen and that in some instances the use of paper is preferred.

There are many new questions raised by our study and further research is required to explore the topic in more detail and with greater statistical validity. However, it is clear that we live in an historical period of strong hybridization between print and digital technology and the technologies of writing and reading they convey; furthermore the political debate on print and eBooks in schools and universities lacks clarity and would benefit from more detailed analysis. In this paper the research conducted by the COST FP1104 Survey Team has delivered a body of new knowledge about the media practices of nearly 650 graduate and postgraduate students in Europe and Asia. It is anticipated that new funded research will now be developed on the basis of this foundational knowledge leading to a transfer of specific knowledge to policy makers about the lived experiences of reading and writing technologies on which the world of education, information and organisation in all aspects of life is based.

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COST Action FP1104 Work Group 1 Survey Team Group members:

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