
QnDReview: Read 100 CHI Papers in 7 Hours

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Abstract

In 2013, 392 research papers and notes were published in the CHI conference (The ACM CHI Conference on Human Factors in Computing Systems) and even more papers in the domain of Human-Computer Interaction (HCI) are constantly published in various conferences and journals. It is quite arduous, if not impossible, to read all of these papers. One approach to deal with this information deluge is to focus on skimming through lots of papers in a short period of time, so that one can more wisely choose what to read before investing time in them. In order to teach such a skimming technique, I have taught a technique, called “Quick and Dirty Review (QnDReview),” in a graduate-level HCI course. The method has been employed in the course for five semesters, and students’ responses were collected and analyzed. Results showed that students spent, on average, 4.3 minutes per paper and believed that they got the gist of each paper. However, the largest benefit I noticed is that students get the overall pictures of the fields while exposing themselves to various new ideas through this approach.

Author Keywords

Quick and Dirty Review; HCI Education; Skimming

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

Introduction

“Read 100 papers in a week.” This is the first homework assignment for a graduate-level human-computer interaction (HCI) research methodology course that I teach. I have assigned this homework for the last five years.¹ Expectedly, whenever the homework assignment was announced, I have seen students’ frowned faces. Such initial responses seem to be caused by students’ assumption that this homework is impossible to do within a week and will consume too much time without clear benefits or learning.

Surprisingly, for some students, the results were surprisingly positive. Some students loved what they learned. Some claimed that they would use the same approach for their own research. I also found that it had an interesting educational benefit. In this paper, I would like to share how it was possible for my students to read 100 papers in a week, and what lessons I have learned over the past five years.

Methods

Homework

The following is the the actual instruction that I used for the homework in Fall 2013. For brevity, I removed some detailed instruction regarding how to use ACM Digital Library (<http://dl.acm.org>) and Zotero (<http://zotero.org>) and how to submit the homework via email.

¹This course has been offered only in fall semesters.

1. Select 100 papers to read.

Visit the ACM Digital Library to search for any papers that are seemingly interesting to you. I recommend you to start with CHI full papers because CHI is known to be the premier venue. [A detailed explanation of how to find CHI papers using the filtering function of the ACM digital library.]

2. Review them all very quickly.

Use the template to make your own summary review. An Excel spread sheet for the quick and dirty review should contain the following information:

- Column 1: Paper citation
- Column 2: Interest rating: 1 (Worst) - 2 (Bad) - 3 (Neither good nor bad) - 4 (Good) - 5 (Best)
- Column 3: A single sentence that describes the core idea of the paper.
- Column 4: (Optional) Any new ideas that you have after skimming through this paper.

3. Email your summary

Email the complete review spreadsheet to the instructor by the due date with the following information in the body of the email.

- What is the overall experience?
- What is the notable trends in the papers?
- Which are the two most interesting papers you would like to read more deeply? (Provide the full citation with DOI number, so that I can find the paper later)
- How much time did you spend on this homework?
- What are the most difficult part of this homework?
- How to make the quick and dirty review better?

This homework was assigned five times in the fall semesters of years 2009, 2010, 2011, 2012, and 2013, and

the general structure of the five assignments have been more or less the same. However, I changed the details of the assignments over time in order to try something different and to reflect students' feedback. The variations among semesters are summarized as follows:

- 2009** Each student chose a journal or a conference relevant to HCI², and reviewed randomly selected 100 papers in that venue. RATIONALE: I wanted to cover diverse venues through this homework, so that different students would be exposed to different venues and learn from each other.
- 2010** The instructor preselected 50 papers from CHI 2010 for review. RATIONALE: In 2009, students felt that depending on venue, the length of a paper varies widely (e.g., papers in *Human-Computer Interaction* are relatively longer than papers in CHI), so it seemed unfair. I also lowered the number of papers to 50 to make this homework less burdensome.
- 2011** The instructor preselected 100 papers from CHI 2011 for review. RATIONALE: I wondered if students could handle 100 papers, and it turned out that students were able to.
- 2012** The instructor preselected 120 papers from three venues (49 per each venue) from CHI 2012, *IEEE Transaction on Visualization and Computer Graphics (TVCG)*, *Decision Support Systems (DSS)*. RATIONALE: I would like to expand the venues to other domains including two additional journal papers. In this semester, the topic of their

²Students chose venues, such as the proceedings of The ACM CHI Conference on Human Factors in Computing Systems (CHI), *Human-Computer Interaction*, *International Journal of Human-Computer Interaction*, and *International Journal of Human-Computer Studies*.

term project was combining visualization techniques to support decision making.

- 2013** The students were asked to select 100 papers from CHI 2013 relevant to his or her own interest and review them. RATIONALE: I wanted to provide students with some liberty to choose which papers to read.

Please note that the primary focus of this assignment was to provide high quality education, not to test the effectiveness of this approach. Thus, this was not a tightly controlled experiment.

Participants

A total of 57 students (27 females + 30 males; 2 undergraduate + 21 Master's + 34 Ph.D; 11 non-Industrial Engineering³ + 46 Industrial Engineering) at Purdue University submitted their homework. The submitted data are archived and analyzed, and the experiment was approved by the Purdue Institutional Review Board (IRB) (approval numbers: 1012010281 and 1302013324).

Results

Initial Responses

As expected, students always showed strong resistance toward this homework when it was announced. Even though students were just asked to write minimal summaries per paper (5-point Likert-scale rating, one-sentence summary, and optionally one-sentence idea that is generated from each paper), reviewing 100 or more papers per week (except for 2010) appeared to intimidate students. For 2010-2013 semesters, I even shared the

³These students include ones from Engineering Education and Electrical and Computer Engineering.

previous students' responses and their anonymized responses through a class wiki. Still, I had to spend time to explain the rationale of the homework assignment. I have not collected any survey responses about how they felt about the homework when they first heard of it. However, if another instructor adopts this homework, he or she should be ready to deal with initial resistance from students. I believe that this paper could be supporting evidence for the value of this exercise, which might alleviate the initial resistance.

Time Spent

Students self-reported how much time they spent for this homework. Though I have given students about one week to finish this homework, students have spent 2 to 20 hours to finish this homework (average: 6.76 hours, standard deviation (SD): 3.11 hours). Figure 1 shows the distribution of how much time each student reported to spend for this assignment. Though there are some exceptions, most students spent less than 10 hours for this assignment.

Since the number of papers to review varies (100 papers for 2009, 2011, and 2013; 50 for 2010; and 120 for 2012), the average time spent per paper (= a total time spent / number of papers to review) is separately calculated (average: 4.3 minutes and SD: 1.80 minutes). Note that there is one outlier who spent 20 hours in doing this homework. Except for this outlier, the average time spent per paper would be 4.17 minutes with an SD of 1.47 minutes. Figure 2 shows the details.

Sentiments

Students have been asked to answer the question, "What is the overall experience?" Students understandably do not want to offend the instructor, so they tend to be careful in their language (e.g., not explicitly critical in their

language). Thus, the students' responses in the question are rather critically analyzed through open coding. More specifically, I did not codify any general remarks (e.g., "It was a good experience."), which is not informative. Instead, more specific comments were categorized. After reviewing the responses in multiple iterations, the following themes emerged in students' responses.

It's so tiring. Quite a few students ($N = 26$) actually reported that it is time-consuming, boring, and tiring. Some excerpts are shown as follows.

At first I did not mind the reading at all, but I definitely became less interested as time went on. (P2012-3)

This was a pretty tiring experience. I found myself taking multiple breaks in order to regain focus and energy [...] (P2012-9)

Interesting idea, but I have done this before for my lit. review for my masters; Too many papers. The exercise became tedious after a while; [...] (P2011-8)

But, it gets better. One of interesting patterns in students' responses is that students ($N=13$) reported that they got better as they worked more even though it was challenging at the beginning.

Well, I need to say that this hw is kind of tough experience for me especially in the beginning. I spent much more time than I expected. But the more I did, the faster I read. [...] (P2009-4)

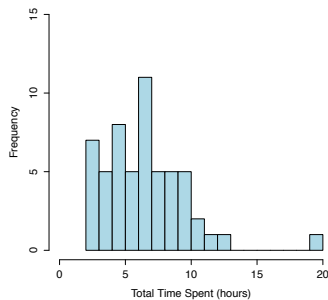


Figure 1: A histogram of total time spent.

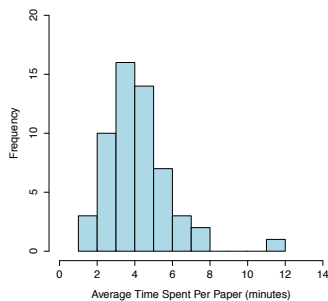


Figure 2: A histogram of average time spent per paper.

I have never read so many papers. Its definitely a big challenge for me. At the beginning, its hard for me to skim each paper in 4 minutes. However, I think I gradually know how to get the core idea of the paper in 4 minutes. [...] (P2010-3)

It was not easy in the beginning when I started to read the papers, especially when encountering some special terms which I didnt know before. I spend over ten minutes when read the first paper and it was quite frustrating. I read the abstract first and then went through conclusion and experiment design. [...] After that, the more paper I read, the faster I can find the main point. At this time, these papers became much easier for me to read and enable me to see the whole picture although there were still some terms I did not know. I think I have acquired some know-now with literature review from this "unique" experience. (P2010-4)

You know what? It's actually good. A substantial number of students (N=44) also reported that it was a surprisingly enjoyable experience at the end. They reported that they were able to understand the big picture or trends of HCI (N=20), felt that QnDReview would be useful for their future research (N=15), and that the homework was actually quite enjoyable (N=15).

At the beginning, I thought the task was impossible to complete in such a short time. I had to force myself to stop reading within 4 minutes. Gradually I became comfortable with

this kind of quick review method. I began to enjoy reviewing so many interesting topics and was surprised by the diversity of the research. This activity helped me get familiar with the HCI area. Some research topics and design were pretty insightful. (P2010-2)

The overall experience of the QnD review is surprisingly fantastic. Stimulated by the average time spent by students in 2009, I became extremely effective in reading all these articles because I did not want to "lose." Abstracts generally convey enough message about the paper and in most cases, I can understand the research objectives and follow part of the solutions in the paper. The most valuable experience in this review activity is that I now have a general sense of what has been recently researched and how the whole field of HCI is partitioned. Even without the headers in each paper that indicate what research strand the paper belongs to, I can still easily categorize each paper. I think it is because I skimmed the articles so quickly that only essence of each paper remained and hence the review process tended to yield understandings of breadth rather than depth. I divided the reviewing workload into four periods: 15-15-10-10, simply because I needed to catch a breath from time to time. However, I still experienced a noticeable drop in time efficiency during the last two periods. (P2010-10)

I have to say it is unexpectedly pleasant process to do the quick and dirty review though I've exposed to positive comments from former students. The standing-out feeling the moment I finished the review is, I learnt a lot! But all of these doesn't come very easily and fluently for me, which I will discuss in the time spent part. Overall, it is interesting to find so many topics covered in HCI field that I've never imagined, even regarding politics, peace and gender study. (P2011-13)

I think the overall experience of this project was good because it helped me learn how to quickly understand an area of research and to survey different types of research ideas within a particular field. I think I will definitely use this approach in my own research studies to especially before I write a literature review. I also really liked learning how to use Zotero and I think that is a great app to write papers with. (P2013-4)

Discussion

Overall experiences

The most interesting outcome is that students actually skimmed through 100 papers within generally a short period of time. After the assignments were submitted, students and I shared how they handled this challenging task. Many students shared that they quickly realized that the role of the abstract section, and some reported that figures and tables are often self-explanatory to provide the main idea of the paper. Some reported that they relied more on the conclusions section than the introduction

section to get the gist of the papers. They also learned how to ignore many details while skimming through papers in a short period of time.

Obviously, this approach should not be used to replace real literature review activities, which require careful and critical reading of a manuscript. However, given the fact that one cannot read all the papers in the field of HCI, this experience certainly taught the students that "Selecting papers to read" is as important as, if not more than, "Reading papers."

However, such learning did not come easy. Some students failed to grasp the idea of skimming through many papers (e.g., P2013-3 who spent 20 hours). Some students are naturally detail-oriented, so they reported that it was quite painful and did not make sense to skim through many papers without understanding the details. For those students who spent more time generally reported that their overall experiences were negative. Based on the data collected, I cannot make any definitive conclusions about which individual characteristics influence such dichotomous differences. I speculate that there might be differences in learning styles. I also speculate that the difference between the two groups might be predicted by some personality test as well (e.g., Sensing vs. iNtuition in the Myers-Briggs Type Indicator (MBTI) test [8]).

Suggestions to Improve QnDReview

The following is several suggestions that students made to improve the experiences of QnDReview:

- "Cut down the number of papers to review to 20 - 50 papers.": I think that reading 100 papers in a week is definitely a painful experience, so some students suggested these ideas to diminish the

burden. I actually tried this approach in 2010. However, I returned to 100 papers in later semesters because I wanted to make sure that students covered sufficient varieties.

- “Review only relevant papers.” I only adopted this approach in 2013 because I believe that selecting relevant papers might introduce some biases, which could diminish the students’ opportunities to expose themselves in a variety of topics. What I found in 2013 was that some students spent too much time in the selection processes (e.g., P2013-2 reported that the student spent 2 hours in selecting papers and 8 hours for reading them) before they knew what kinds of topics they were interested in. This element made the homework even more challenging, so I think that preselecting a set of papers to read is not necessarily an inferior approach.
- “Do not include journal articles.” I found that some journal articles are longer, and the students found that it was more challenging to understand the gist of each paper. If the target subject domain is HCI, I believe that limiting the paper pool to CHI conference proceedings is not a bad idea.

How to Measure Success?

The definition of “success” has changed over the five semesters. When I initially designed this homework in 2009, I hoped that students could select a handful of papers out of many because it is impossible to read all the papers in the field. Though I noticed that some students reported that they found papers they wanted to read later through this homework, I do not think that just one cycle of QnDReview is sufficient for this purpose. When students do not have sufficient background knowledge and

experiences about a certain topic, it is still challenging to predict the quality and relevance of a paper based on skimming. However, the bigger benefit of QnDReview, I believe, is that they grasp the overview of the field of HCI and see how diverse the field is. I think that it is a more important goal even though it is somewhat challenging to objectively measure whether the goal is achieved or not through the self-reported survey. Additional investigation regarding how to measure overall understanding would be necessary.

Impacts of Demographic Background

Unfortunately, the IRB approvals for this study do not cover demographic information (e.g., age, native language, nationality, and ethnic background), so I cannot report such information in this paper. However, I have not observed stronger complaints from students whose native languages are not English. I speculate that while they skimmed through papers, students were able to rely on non-linguistic, visual cues (e.g., table and figures) to locate the important information. Thus, a lack of linguistic proficiency may not be a big hurdle. I also observed that some international students did enjoy the assignment and generated interesting insights.

Related Work

The explosive amount of papers to read is a common problem in many different scientific domains [7], and there are many different bibliographic tools out there to support more efficient search for relevant articles, such as Google Scholar. Some other tools, such as EndNote (<http://endnote.com/>), Zotero (<http://zotero.org>), and CiteULike (<http://www.citeulike.org/>), support bibliography management as well. These tools help search and organize the most relevant articles in the field. However, as the sheer amount of articles continuously

increases, the number of selected articles through these tools could be also large. In addition, when one, especially a novice researcher, does not have a clear idea of what to study, these tools might have limited value.

Regarding skimming and its comprehension, some studies [4, 5, 1] showed that skimming is obviously less effective in terms of reading comprehension than reading at normal speed, but additional studies show skimmed text [3, 2] can still be understood and remembered. These findings are generally in line with what I reported in this paper. However, I would like to again point out that the role of speed reading (skimming or QnDReview) is not substituting reading at the normal speed. One of the common responses that students reported in my class is about understanding the big picture of the field, which cannot be quickly gained through reading at the normal speed. I was not able to pinpoint an article to explicitly discuss this educational benefit.

Conclusions

I think that QnDReview is an interesting exercise for a novice researcher who would like to understand how various topics are dealt in the field of HCI. It is certainly painful especially if it is not compatible with a student's learning style. However, it is a worthwhile activity when one is jumping into a new domain of the study. The bottom line is that we cannot fully read all the papers in the field, so we should be selective. I strongly believe that many researchers, especially experienced ones, already exercise it.

However, the contribution of this paper is to provide the data collected through a graduate-level HCI course, so that students and instructors can be informed about this approach. Knowing that other students take about 4.3

minutes to read a paper and their experiences are quite positive would be helpful for them to try this approach.

Obviously, this is not a controlled study, and the collected data are the results, or more precisely by-products, of pedagogical activities. Thus, I do not want to draw any definitive conclusions out of this study. The collected data will be more useful as a case study. Particularly, the data analyzed are all self-reported, so some level of Hawthorn effect could be observed (i.e., students might want to impress the instructor by saying positive comments). However, regardless of these limitations, I believe this paper has some worthwhile information to share.

The natural next step would be to figure out what would be most effective way to teach skimming. As many students reported, QnDReview (i.e., reading 100 papers in a week) is certainly painful. However, it is unclear whether such pain is necessary or not. I need to collect more data to optimize the proper homework load. In addition, for some students whose learning styles are not compatible with this approach, a different educational approach should be suggested.

I hope that this paper would be an inspiration to other educators and researchers, so that we collectively accumulate more data regarding QnDReview or skimming as an educational technique for novice HCI researchers.

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handbook chapter [6] that we co-authored. While reviewing all the articles in a single night in a library at Georgia Institute of Technology as a junior graduate student, I realized that skimming many papers in a chronological order could be enlightening.

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