

Promoting Sustainable Paper Use in the Killam Library



Ramey Adams, Beth McAra, Anne Myers, Kayla Sheppard, Sara Withrow

April 13, 2004

Tarah Wright, ENVS 3502

Abstract

The project goal is to provide education on how to reduce, reuse, redirect and ultimately how to rethink paper use.

This project explored paper use at Dalhousie University, with the goal of raising awareness to promote practices aimed at supporting sustainable paper use. Current practices are meeting the need for paper by compromising the needs of our environment as well as the needs of the future. Unsustainable paper use is reflected in the damage being imposed on Nova Scotia's forests where the current annual rate of cutting is not sustainable. The Killam Library was the area of focus for the research conducted. Students, staff and faculty responded to questionnaire examining attitudes towards paper use within the Dalhousie community. Interviews were conducted to obtain information about paper purchasing, equipment (printers and photocopiers). Findings indicated that the majority of the Dalhousie community considers the current paper use practices wasteful and the major barriers to improving paper use are equipment, adversity to change and economical constraints. Our secondary goal to create a foundation upon which future students can continue investigating paper use at Dalhousie was completed successfully.

Table of Contents

Abstract	2
Introduction	4
Methodology	8
Boundaries	11
Geographical	11
Conceptual	11
Temporal	11
Sampling Techniques	12
Validity	16
Reliability	17
Results	18
Discussion	28
Bibliography	Error! Bookmark not defined.
Appendix A	37
Appendix B	40
Appendix C	42
Appendix D	45
Appendix E	48
Appendix F	49

Introduction

In 1999 it was estimated that Dalhousie University used approximately 43, 106, 813 sheets of paper¹. In 2001 Dalhousie University only used 31, 959,000 sheets of paper². Although this decrease in paper use indicates that Dalhousie University is taking measures to reduce paper consumption, paper use is still unsustainable. Most of the paper used at Dalhousie is produced from forests located in Eastern Canada and North Eastern United States.³ According to the Nova Scotia Genuine Progress Index “the annual growth rate of the province's forests, on the rate of seeding and planting in the past decade, and on changes in age structure and species composition, the current annual rate of cutting is unsustainable.”⁴ A nominal definition of sustainability as stated by the Brundtland Commission states that, “sustainability is development that meets the present needs without compromising the ability of future generations to meet their own need.”⁵ Even though students, staff and faculty at Dalhousie University are currently meeting their own paper needs, will they leave enough for students, staff and faculty in the future? We cannot be certain, however it is apparent through current consumption practices that we could be using paper more efficiently. Examples of efficient paper use are photocopying and printing double-sided, reusing post consumer paper and using recycled paper.

¹ Dalhousie University Draft Environmental Policy, p. 1. October 2003.

² Leanne Gardiner, An Investigation of Green Purchasing Policy and Strategy in the University Sector , thesis submitted in partial fulfillment of the requirements for the degree of Master of Environmental Studies at Dalhousie University, Halifax, Nova Scotia, 2001.

³ Ibid.

⁴The Nova Scotia Genuine Progress Index Forest Accounts Volume 1: Indicators of Ecological, Economical and Social Values of Forests in Nova Scotia Abstract. 2004. Retrieved www.gpiatlantic.org/publications/abstracts/forest-ab1.shtml

⁵ Our common Future: Report of the World Commission on Environment and Development. The Brundtland Report, 1987.

Current studies indicate that Dalhousie uses only 2.5% recycled paper and 97.5% virgin paper. The production of paper for use at Dalhousie in 1999 generated a loss of 3,657 trees, the use of 327, 612 liters of oil, 16, 726,563 liters of water and 1,266, 654 kWh of electricity; the production of 8, 105 kg of air pollution and the loss of 21, 474 kg/yr of carbon dioxide filtering capacity over one year. If the university were to buy recycled paper these figures would be greatly reduced. According to the U.S. EPA estimates, “every ton of post consumer paper saves 2, 000 kWh of electricity, over 11,000 liters of water, seven mature trees and prevents the emissions of 14 kg of air pollutants”⁶. If Dalhousie were to buy only recycled paper, our paper footprint would drop drastically. However, certain factors such as the price and quality of recycled paper as well as the inability of current photocopying and printing equipment to handle recycled paper discourages the use of recycled paper at Dalhousie.

In a life cycle analysis performed by Leanne Gardiner of Dalhousie University, it was found that the paper at Dalhousie manufactured by Domtar Inc. is from forests in Eastern Canada and North Eastern United States. Dalhousie receives two types of paper from this manufacturer, virgin copy paper and recycled copy paper. The virgin copy paper goes through a pulp bleaching process at a mill in Windsor, Quebec. This process involves the bleaching agent, chlorine dioxide which has similar toxicity to that of ozone or hydrogen peroxide. The recycled copy paper used by Dalhousie contains both virgin products and some post consumer waste such as corrugated cardboard. This product goes through a pulp bleaching process as well, which uses chlorine dioxide. From this mill, 90% of the solid waste produced is used as soil conditioner in agricultural businesses. Once paper is properly discarded at Dalhousie, it is transported to a collection facility in

⁶ Gardiner, p. 124.

Dartmouth, Nova Scotia. From there it is sent to Hantsport, Nova Scotia, where the used paper is transformed into egg cartons, trays, platforms, and paper plates⁷.

An estimate of Dalhousie's paper footprint conducted by Leanne Gardiner, accounts only for carbon dioxide and still serves as an important means of encouraging sustainable paper use. "In order to sequester the carbon released due to one year's consumption of copy paper at Dalhousie, approximately 380 hectares of wooded land would need to be dedicated as a sink for a period of 40 to 100 years."⁸

It is too costly for Dalhousie to purchase recycled paper, and although there are steps being taken to reduce our impact there are other practices students, staff and faculty could do to use paper more sustainably. These sustainable practices include photocopying and printing double sided as well as using post consumer paper. To investigate patterns of paper use by students, staff and faculty at Dalhousie our group conducted a study at the Killam Library. The Killam Library is a large consumer of paper. It houses a large number of printers and photocopiers with respect to other buildings on campus and it is accessible to all of the Dalhousie community. A large common area in the library such as the atrium and the learning commons also provided us with prime areas for conducting surveys. Surveys in the form of self-administered questionnaires were distributed to students, staff and faculty within the library and were instrumental in determining how they feel about paper use. The results were compiled and used to achieve the group's primary goal which was to promote sustainable paper practices.

To promote sustainable paper use within the Killam we made posters to educate students, staff and faculty. The posters were placed over printers, photocopiers and on

⁷ Gardiner, p. 152.

⁸ Ibid, p. 119.

notice boards. They include interesting facts that will hopefully make people think about how much paper they use. They also included information on how you can use paper efficiently. The facts included on the posters were generated solely from the research we did on paper use at Dalhousie, and the tips for sustainable paper use focused entirely on what students, staff and faculty can do within the Killam. Knowledge gained from the posters will hopefully be passed onto other students through the trickle down effect so more and more people will change their habits and begin to participate in sustainable practices.

Information on paper use at Dalhousie came from a variety of sources. Interviews conducted with Chris Duggan, Manager, of the Purchasing Department at Dalhousie, William Maes, Head Librarian at the Killam and David Doyle and Chris Connors from the Print Center located in the Life Sciences Building, helped the group to better understand the in flow of paper into the university, where it goes and how it is purchased and distributed. Literature reviews of “Dalhousie University’s Draft Environmental Policy” and Leanne Gardiner’s (a student from Dalhousie’s School for Resource and Environmental Studies) thesis entitled “An investigation of green purchasing policy and strategy in the university sector,” helped us gain knowledge on paper use at Dalhousie as well as within the university sector and Dalhousie’s goals to achieve sustainable practices.

The primary purpose of our project is to raise awareness of the University’s environmental impacts regarding paper use. Hopefully this purpose can be reached. By determining a definition of sustainable paper use at Dalhousie, we established that the current pattern of paper consumption was not environmentally sustainable. Our project

provided quantitative data concerning Dalhousie's paper use patterns and qualitative data regarding feelings toward paper use. Our secondary goal was to develop a foundation that may be used by successive Environmental Science students or another research groups to further study sustainable paper use on the Dalhousie campus.

Methodology⁹

The research for this project has met two purposes: Initially to learn to apply the skills and tools of interdisciplinary research and problem solving to current real-life problems involved in running Dalhousie and the broader community in which it is located.¹⁰ Secondly, to develop strategies so that the environmental stewardship actions will be tangible examples of how to operationalize the concepts of sustainable paper use and engage members of the Dalhousie community in the process.¹¹

The type of work that needed to be done to accomplish our goals included self-administered questionnaires, in-person individual interviews and a literature review. Looking to the future we have also put up a variety of educational posters (Appendix D) in the Killam Library to raise awareness about paper use on campus. Although due to time limitations this group did not have the opportunity to assess whether or not awareness was raised and if it was raised, to what extent. It is hoped that students in the ENVS 3502 course next year will use our data and the effect of promoting sustainability with posters to continue researching the problem of unsustainable paper use.

⁹ The term Methodology was used instead of Methods, as this is how Palys recommended that this section of a research paper be titled. p 414

¹⁰ ENVS 3502 Winter 2004 Syllabus.

¹¹ Sarah Hammond Creighton, Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions. (Cambridge: The MIT Press, 2001), pp. 3-4. The concept was taken from Hammond's text but the wording has been modified for the purposes of this paper.

The population of interest in this research is the students, staff and faculty at Dalhousie University and the correlation between how they feel about the use of paper, current and historical paper use, purchasing practices and the primary project goal—to provide education on how to reduce, reuse, redirect and ultimately how to rethink paper use.

Identifying the target population took this research in varied directions and used probabilistic as well as non-probabilistic sampling techniques coupled with qualitative and quantitative approaches to accomplish the project's goals. A literature review was also carried out in order to support the hypothesis, validate the findings and provide possible explanations for our observations¹².

A brief outline of our activities is found at the end of this section. This should be loosely established at the beginning of any research project then as the project goes forward the outline evolves concurrently as required. As we worked through the project we were frequently taken off course and found that by keeping a list of what our goals we were more apt to successfully complete each task.

The following discussion contextualizes the methodology used for this research project. Certain constraints restricted the scope of our research and were fundamental to how the project was designed and carried out. These constraints were either **limitations** that were externally imposed and over which our research group had no control or **delimitations** that our research group deliberately imposed on the research design.

Since Environmental Science 3502 is only a one-term course held January 6 to April 13, 2004, time was a limiting factor (this was mentioned previously as a constraint

¹² For a complete discussion of these techniques see Ted Palys, *Research Decisions: Quantitative and Qualitative Perspectives*. 3rd ed., (Scarborough: Nelson a division of Thomson Canada Ltd., 2003)

to conducting the self-administered questionnaires). Weekly readings and or assignments set the groundwork for this (the final project). Time was limited further due to a severe snowstorm that closed the University for several days. To work within this time-limiting boundary we surveyed students in the Dalhousie University Killam Library, specifically in the Atrium, Learning Commons and Reading Room. This location provided easy access to a large number of the Dalhousie community—the Atrium is where students, faculty and staff enter the library, take breaks, chat, relax and often meet or do group work. The Learning Commons and Reading Room house computer labs, photocopiers and printers that are used by students, faculty and staff.

We approached the project with the understanding that we were also limited to the Dalhousie University campus. However, in retrospect this may have been a misunderstanding. We should have clarified this and it is only upon completing the final paper that this was likely more of a delimitation than a limitation. The overall purpose of the project for this course was to deal with real-life problems involved in running Dalhousie University. That does not mean that we could not have researched outside of the University itself using the skill set learned in the course to find ways of creating a sustainable community within the University. In the conclusion we go into more detail about Chris Duggan’s suggestions for future study that would involve researching the quality of recycled paper vis-à-vis paper handling equipment and their respective manufactures and distributors. The reason for discussing this here is that we did not fully appreciate the constraints and it is important to understand that when doing research it is all right to question everything. Even when conducting the interviews—probe further. Ask “why”, “why not”, and “how” frequently. Be polite but you do not always have to

take “no” for an answer¹³. Also, if you think the answer you received could be wrong or biased do some additional research to ensure your data is valid. Then go back to the person you got the answer from originally to explain why you think this or that point needs to be changed. A research project’s constraints may be further increased through the research group’s own biases and or misinterpretations.

Boundaries

There were also geographical, conceptual and temporal boundaries that delimited how this project was conducted.

Geographical

Although we were (de)limited to Dalhousie University we set one of the geographical boundaries as the Killam Library. It is one of fifty-nine buildings on the Studley campus. It is a centrally located area with many resources making it a prime area for the Dalhousie community.

Conceptual

This constraint explored whether paper is over-used and/or misused, and how this problem can be resolved so that paper-use is reduced. Other conceptual boundaries included the amount of paper purchased, how it is used. We also focused on 8.5” x 11” bond paper. According to Chris Duggan, Manager of Purchasing this is the type of paper that is predominantly used on campus.

Temporal

The temporal boundaries of the project looked at whether this preliminary study can start a movement to reduce the amount of paper used on all of the Dalhousie

¹³ This was pointed out to our group (as a suggestion for future improvement) on April 6, 2004 by one of the invited guests who attended our presentation on that night. We were not sure who this individual was as we were not introduced to the guests.

campuses; can alternative sources of paper be used and can alternative mediums for exchanging information be used?

Sampling Techniques

Probabilistic Sampling

Simple Random Sampling was the method chosen to conduct the self-administered questionnaires (Appendix E). Simple Random Sampling, according to Palys¹⁴, is theoretically the best method to identify a representative sample; this way each element (student, staff, or faculty) in the population had an equal chance of being selected.

Since time constraints were a factor we could not survey the entire population of Dalhousie University. The Killam Library is a common area frequented by students, staff and faculty, and therefore provided access to a representative, cross-section of the Dalhousie University community and therefore was chosen as our sampling frame for the questionnaires.

To accommodate the schedules of our project team and to alleviate error, each of the five team members took two turns randomly administering 10 questionnaires over a one week period, at different times of the day so that in total 100 surveys were obtained. For each individual we approached we explained that we were conducting a survey on 'paper use' as part of a research project; that the questionnaire was voluntary, we gave each research participant a questionnaire to fill out and after a couple of minutes would ask them if they had any questions. They were encouraged to include their email address at the bottom of the questionnaire so we could send them a final copy of the research paper.

¹⁴ Palys, p 130

There were drawbacks to the manner in which we applied the sampling method and we may, just because of the luck of the draw, not have achieved good representation. This could also be considered a threat to the reliability of this research. Systematic error was seen in that we only surveyed people in the Killam Library and since we wanted to get the opinions of a wide scope of the Dalhousie community (students, faculty and staff) by focusing only on those who happened to be at the Killam during the time we conducted the questionnaires we may have systematically introduced a bias to the responses and had a disproportionate number of students (in retrospect we concluded that for the most part we approached more students than faculty and staff). The margin of error associated with this method can also be reflected in the vagaries of chance¹⁵. The relative size of the sample (100) was very small considering the size of only the Dalhousie student population is approximately 16,000 students¹⁶. However, time constraints limited the number of people we could survey and as a group we came to a consensus that using this sampling method was a logical way to select a sample of the population and generalize the results.

Future reproduction of this method (self-administered questionnaires) would be straightforward but results may also be skewed as an outcome of the educational information we have posted around campus. Although this may detract from the reliability of being able to reproduce similar results it could demonstrate a change in attitudes in the spirit of catalytic validity. Therefore the results from this year could be used to benchmark attitudinal behaviour vis-à-vis the impact of posting and creating or

¹⁵ Palys, p 130

¹⁶ Beth McAra in our group works in the Dalhousie University Student Accounts Office and it is her understanding from the material she receives that this is close to the current student enrolment.

improving awareness. A literature review was done on the effectiveness of posters to support our plan of creating posters for raising awareness.

The subject matter of the questionnaires included patterns of paper consumption and participants' feelings regarding sustainable paper use. An example of the questionnaire is given in Appendix E. Representational graphs of the questionnaire responses were created from the data.

Non-probabilistic Sampling

The scope of the sampling methods included three interviews with relevant staff at Dalhousie University as follows: Chris Duggan, Manager of Purchasing (Appendix A), David Doyle and Chris Connors, Print Centre (Studley Campus) (Appendix B) and Bill Maes, Head Librarian (Killam) (Appendix C). A member of our research group contacted each interviewee; they were given a synopsis of our goals and purpose of the research. The details outlining the information they were given, relative correspondence, and the respective questionnaires and answers are provided in the Appendices indicated above.

Non-probabilistic sampling was the method used to conduct the interviews. The first interview with Duggan would also be considered purposive sampling¹⁷ because he is the Purchasing Manager and as such is intimately knowledgeable about how paper and paper-handling equipment (i.e. photocopiers and printers) are purchased and distributed, how contracts are achieved and maintained, and who the suppliers and manufactures are. The Purchasing Department has the greatest amount of control determining paper inputs

¹⁷ Palys, p. 142, Purposive Sampling: People or locations are intentionally sought because they meet some criterion for inclusion in the study.

into the system. Duggan would be considered an experiential expert.¹⁸ These data provided deductive information by providing critical quantitative data about amounts and types of paper and other relevant facts such as number of impressions made in the Print Centre over a given period of time.

Inductively this interview also explored a qualitative perspective and took on an exploratory function.¹⁹ Although the Purchasing Department concerns itself with amounts and costs of material, how Duggan feels about environmental sustainability is an important factor; he is a core actor in this research on paper use. His views and ability to be a change agent could have him playing a fundamental role in developing environmentally sustainable purchasing practices.

The second interview was with David Doyle and Chris Connors of the Print Centre in the Life Sciences Building on the Studley Campus. The same method was used for this interview. Both Doyle and Connors are experiential experts and provided data that supported the outcomes from first interview with Chris Duggan.

The third interview was with Bill Maes, Head Librarian at the Killam Library. This interview was done through email correspondence. The responses from Maes pertained to current and potential sustainable paper use practices in the library in regards to printers and photocopiers. As well, he provided us with permission to display our posters.

Trial runs for double sided printing in the Learning Commons of the Killam Library were performed by two of the group members in order to understand the facility

¹⁸ Palys, p. 144.

¹⁹ Ibid, p. 143. We need to strategically sample particular individuals especially those who have the knowledge and experience to discuss issues surrounding paper use.

of this task. If this could be done then it could be promoted as an appropriate method to use less paper.

A literature review was also a component of the methodology and the details of the information reviewed are found in the introduction and conclusion of this paper. The purpose of our literature review was to place our work in the context of what has been done or is known.²⁰ Specifically we used the course text entitled “Research Decisions: Quantitative and Qualitative Perspectives” by Ted Palys. The text provided a practical guide to understanding research as a decision-making process, one that lead to knowledge that was liberating rather than oppressive in its formulation.²¹ This instructed us in how to choose and apply the methods we used for this project. Class notes (from the ENVS 3502 course) also informed and shaped our research.

Validity

The results obtained through this research supported our goals to learn about perceptions of paper use and if paper use at Dalhousie University is sustainable. Validity was upheld because we were able to measure what we intended to measure.²² In other words, we obtained an understanding of perceptions on paper use of Dalhousie community members through the survey. In addition, we learned about paper purchasing, suppliers and manufacturers as well as factors affecting sustainable paper use at Dalhousie, such as equipment limits and costs.

²⁰ ENVS 3502 class notes January 13, 2004.

²¹ Palys, p. 405.

²² Palys, p. 438.

Reliability

Reliability was ensured in our project in that similar results could be obtained at different times or by different observers if the same procedure is followed.²³ However, as previously mentioned, because catalytic validity was also achieved in our project our reliability may be skewed. Our goal was to educate and increase awareness about sustainable paper use on the Dalhousie campus through our survey and posters. It is our hope that the survey and posters has increased awareness and changed the attitudes of many Dalhousie community members so that if surveyed again, the results would show a further increase in awareness and change towards paper use. An example may be an increase in double sided photocopying and printing as indicated by another survey. Therefore, as one intention of catalytic validity is to facilitate social transformation,²⁴ which we feel our project will achieve, our reliability as been altered, and for a greater good, an increase in sustainable paper use at Dalhousie.

Brief Outline of the Group's Activities

Date/Week of:	Tasks completed
January 13 th	Group formed, project created
January 20 th	Checklist 1 submitted
February 10 th	Checklist 2 submitted
February 16 th	Initial email interview with Maes, interview with Chris Duggan from Purchasing Department
February 17 th	Presentation of project proposal, project proposal and ethics form submitted
February 20 th	Interview with David Doyle and Chris Connors from Print Centre
February 23 rd -29 th	Trial tests to double side print
March 1 st -7 th	Surveys conducted, 20 each day except Saturday and Sunday
March 2 nd	Pilot test submitted

²³ Palys, p. 435.

²⁴ Palys, p. 424.

March 16 th	Checklist 3 submitted
March 22 nd	Follow up email with Maes
March 29 th	Final email correspondence with Maes
April 4 th	Project poster completed
April 6 th	Educational posters placed in library
April 6 th	Final presentation, poster submitted
April 13 th	Final report submitted
<p>Note: The group members met throughout this time period to discuss findings and plan next steps. The literature reviews were conducted as new information was acquired. This project was mostly a continual work in progress. Steps changed with respect to new findings and developments.</p>	

Results

The Killam Library printers are used by 69% of one hundred students surveyed, whereas 41% claimed they do not use the library’s printers. The photocopiers in the Killam are used by 69% of those surveyed. The other 31% responded “no” to using the photocopiers (Figure 1).

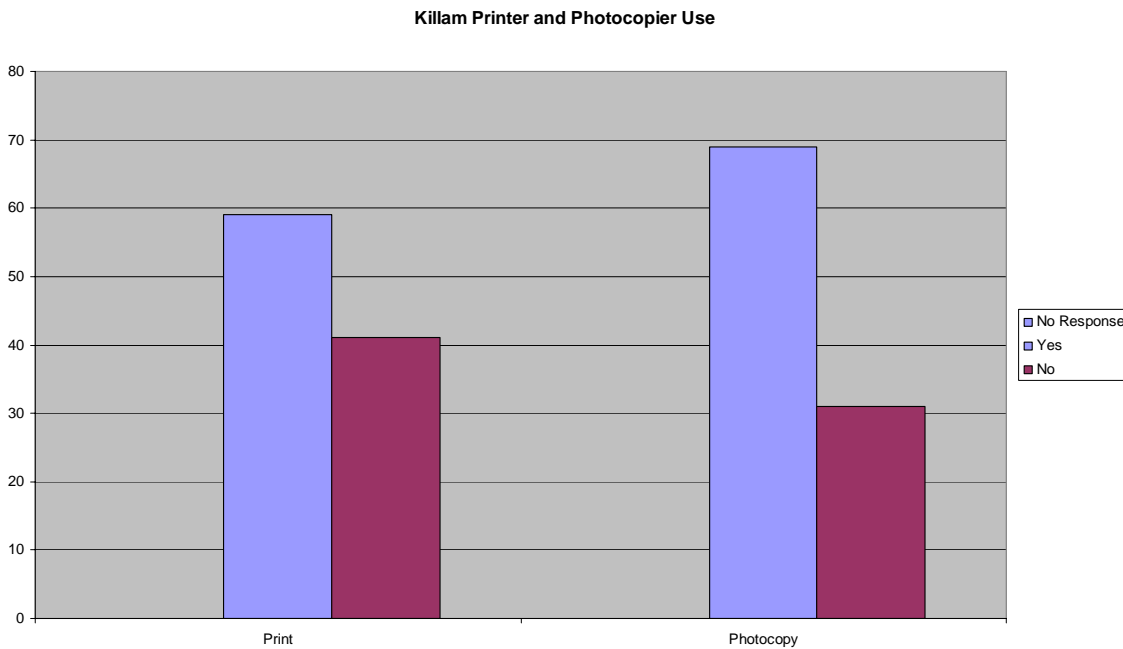


Figure 1 The percentage of respondents who use and do not use the printers and photocopiers in the Killam Library.

Hence, more individuals use the Killam’s photocopiers than printers, based on our survey.

Respondents were asked to gauge the amount of paper they use to print and photocopy in a semester. For printing, 32% use 20 or less sheets of paper, 16% use 21 to 40 sheets, 9% use 41 and 60 sheets whereas 43% use more than 61 sheets. Only 9% did not respond. For photocopying, 41% use 20 or less sheets of paper, 23% use 21 to 40 sheets, 10% use 41 and 60 sheets and 20% use more than 61 sheets. Merely 4% did not answer (Figure 2). The majority use more than 61 pieces of paper per semester to print. For photocopying, the majority use less than 20 sheets of paper per semester.

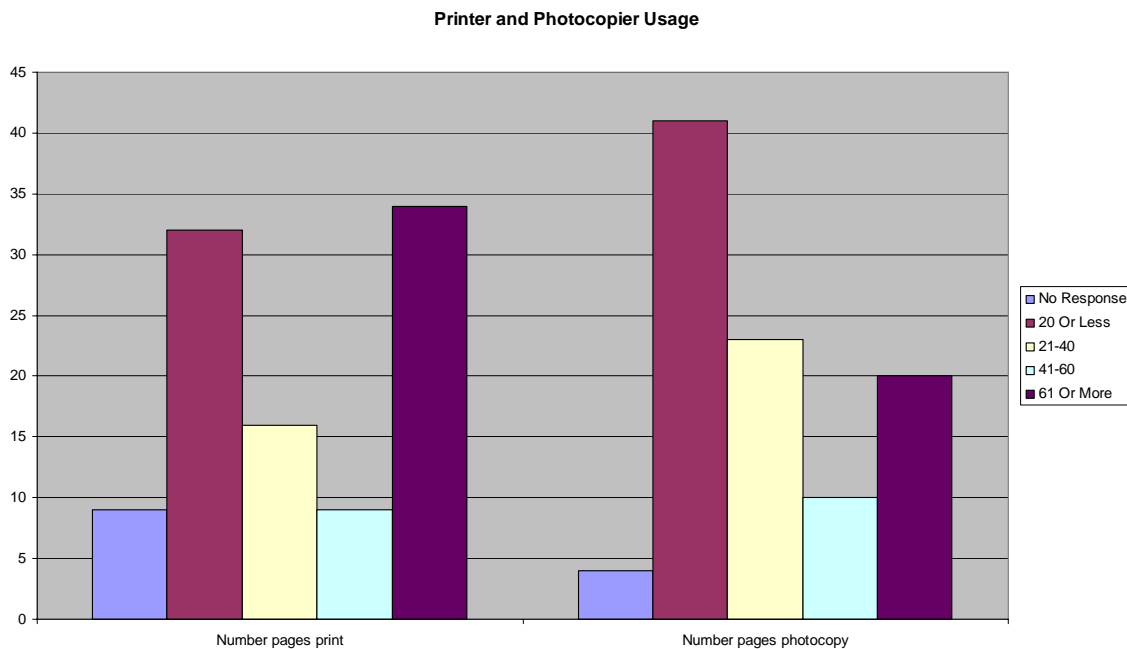


Figure 2 The percentage of respondents who use 20 or less, 21 to 40, 41 to 60 and 61 or more pages of paper per semester in printing and photocopying.

An astounding 76% use both sides of the paper when taking notes, whereas 17% do not and 7% did not respond. Only 15% print double sided, 80% do not and 5% did

not respond. Merely 10% said they photocopy double sided. The majority of respondents do not photocopy double sided, 80%, whereas 6% did not respond (Figure 3). It is important to note that this question implied printing and photocopying in general, not just in the Killam Library.

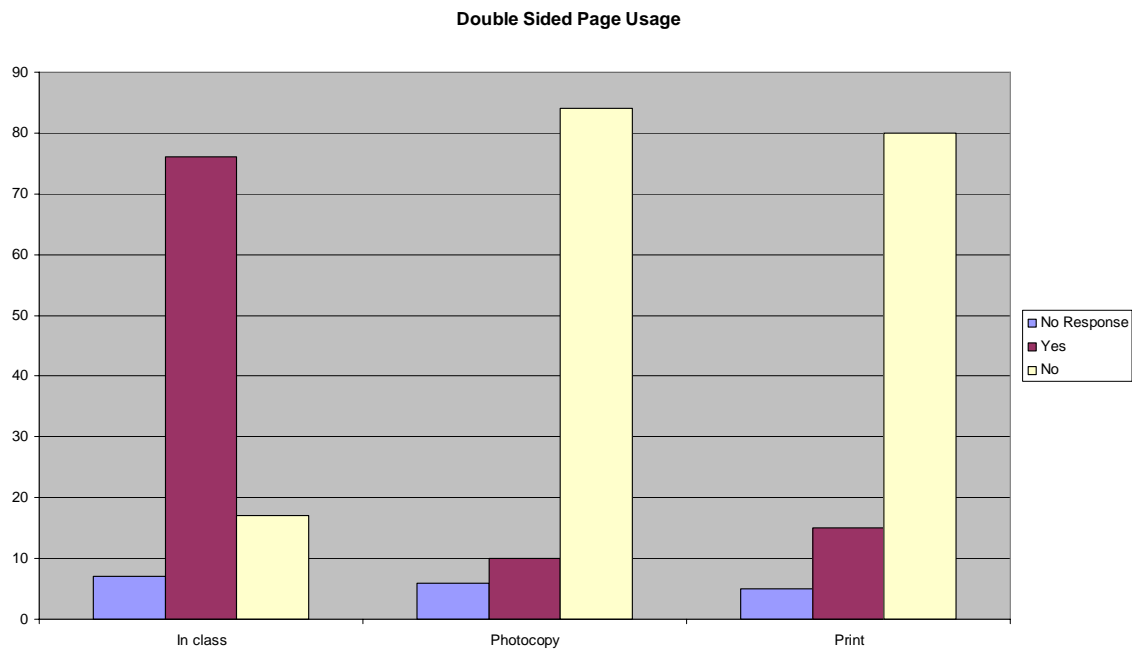


Figure 3 The percentage of respondents who do and do not take notes, print and photocopy on both sides of the paper. Also shown are the percentages who did not respond.

An overwhelming 74% of respondents feel paper use in the Killam Library is wasteful. On the other hand, only 17% do not feel paper use is wasteful. The remaining 9% did not respond (Figure 4).

There were two qualitative questions on the survey. The first being, are there ways you feel paper could be used more sustainable in the Killam Library? Unfortunately, 41% did not respond. However, 21% said they felt double sided printing

and photocopying would increase paper use sustainability. Recycling was suggested by 6%.

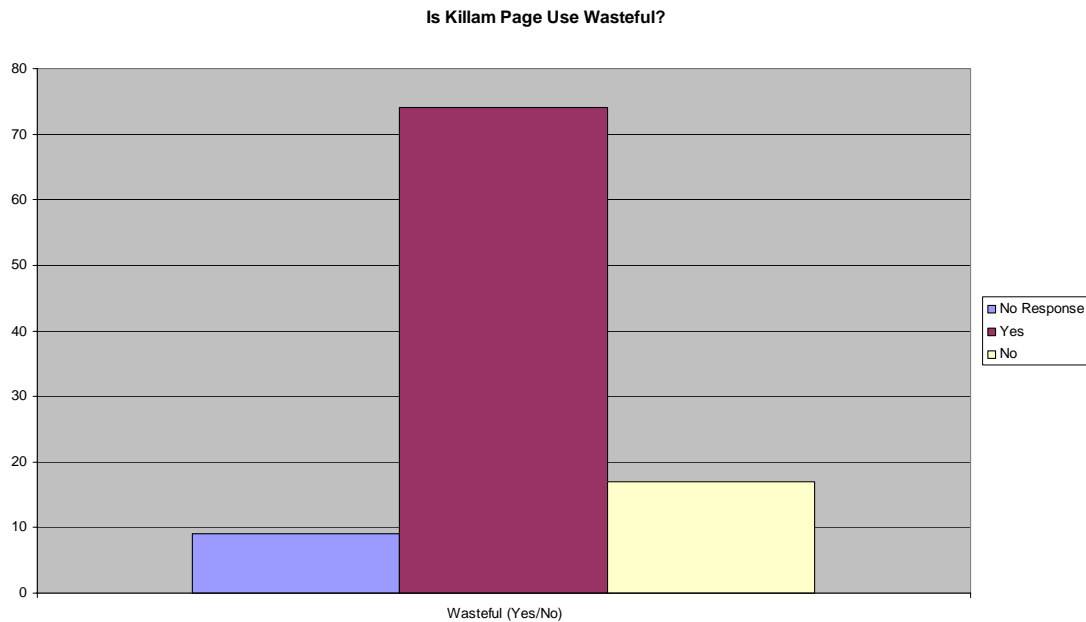


Figure 4 The percentage of respondents who feel that paper use in the Killam is wasteful or non-wasteful. Also included is the percentage who did not respond.

paper was suggested by 5% of the respondents. Education on how to print and photocopy on both sides was suggested by 4%. Other ideas include: look before printing, limit the amount of paper used per student, library staff could print and copy to reduce the amount of bad copies made and to use email and scanners.

The second qualitative question asked for further comments or suggestions. The top two suggestions are education, and printing and photocopying double-sided. Each is recommended by 7% surveyed. Using the extra paper for scrap paper was the response of 5% surveyed. There were numerous other comments: assignments could be submitted electronically and not in hard copy, individuals should edit and preview documents before printing to ensure efficiency of paper use, professors and teaching assistants

should accept assignments on recycled paper, double-sided and without a cover page—they could also use Web CT to post handouts, reduce the size of documents from the internet by cutting and pasting into a word processing application, decrease the number of garbage cans so people are forced to seek out recycling bins and last but not least, somehow make the photocopiers easier to use, (i.e. a grid to aid in lining up pages).

The first interview was with Chris Duggan, the manager of the Purchasing Department at Dalhousie University (Appendix A). Duggan explained that approximately a year and a half ago, the process for purchasing paper changed. The Purchasing Department is now responsible for all paper purchases at Dalhousie. The Print Centre in the Life Sciences Building is responsible for distribution of paper to all departments, including the Killam Library. The defunct Stationary Stores were responsible in the past. In addition, Duggan estimated that approximately 40 to 45 million sheets of paper are now purchased per year at Dalhousie. The types of paper include photocopy, three-hole punch and envelopes. The prominent form of paper used is 8.5” x 11” white bond.

Dalhousie is part of the Interuniversity Services Incorporated (ISI). Duggan explained that the ISI, which has existed for 24 years, is a consortium of the 17 Atlantic universities. As a collective, they are able to improve their purchasing power. There are approximately 80 agreements under ISI that involve paper, photocopiers and other forms of equipment. It is important to note that there are some areas on campus that are independent of this agreement.

The Print Centre is the source of the majority of printing on campus; therefore, Duggan went into detail about their present and future equipment. Currently all

equipment, i.e. printers and photocopiers, are analogue. Due to changes, improvements and demand in technology, the Print Centre will likely be converted to digital, multi-function and purpose machines. In other words, the printer, photocopier and fax will be one all-inclusive machine capable of interfacing with the network, compared to three individual pieces of equipment. This in turn will increase time efficiency and reduce the need for paper because of duplexing capabilities of the one machine. Unfortunately, the upfront costs of such a change over are at present the primary barrier to incorporating this technology. However, as analogue equipment is phased out, Dalhousie will have no choice but to keep up with the rest of the world in terms of equipment and 'know how' of staff.

Duggan explained that paper is purchased based on quality, price, service and reliability from manufacturers and suppliers. Domtar is the primary manufacturer used by Dalhousie. The top two suppliers are Unisource and Xerox. A third supplier, Paper House, is also used on occasion. Duggan went on to explain that the environment is taken into consideration when making paper purchasing decision, despite the current lack of policy.

According to Duggan, raising awareness is a key component to achieving sustainable environmental practices. He feels that the greater the number of people involved, the easier a transition to sustainable practices will be. He gave an example of how an administrator would print off the entire Dalhousie Notice for one article. Once the individual was shown how to cut and paste, their paper waste was reduced. Hence, education is another key factor. In addition, the development of a university environmental policy (via the Dalhousie Draft Environmental Policy) is also very

important as well as promoting environmental stewardship. Unfortunately this is still a “Draft” and not embraced yet as definite course of action.

Duggan also discussed the barriers associated with sustainable paper use at Dalhousie. He stated that getting people to change their ways is a huge barrier to implementing sustainable practices. Economics and budget are other prominent barriers. Duggan adds that a major factor associated with budget is supply and demand. Purchasing must meet the demand by supplying but doing so within the budget. The present equipment poses barriers to using recycled paper. The inconsistent quality and dust from recycled paper fouls the printer and photocopiers.

Duggan recommended that we talk to Mike Murphy of Facilities Management for information about waste management and recycling and Bill Louch of the Environmental Health and Safety Office. He also recommends we read the Draft Environmental Policy document from October 2003. The draft discusses the amounts of paper used and purchased by the University as well as goals and strategies for improving sustainability at Dalhousie. He said both Louch and Murphy have access to the policy, as it may still be confidential. In addition, Duggan suggested we look at Leanne Gardiner’s thesis. She was a student at the School of Resource and Environmental Studies (SRES). Her thesis was on paper use at Dalhousie and would be good background information for our project.

The last comment from Duggan involves future research on paper use at Dalhousie. If a similar project is done next year, or one that picks up where this one leaves off, the focus should be turned around. Rather than looking internally, the researchers should look externally because this focus has not been considered. The group

should talk to the suppliers and manufactures and ask them what they are doing to improve the quality of recycled paper. In addition, the group should talk to printer and copier manufacturers. They should inquire about what is being done to improve equipment to handle broader types of paper, specifically recycled.

The second interview was with David Doyle and Chris Connors from the Print Centre (Appendix B). Doyle and Connors provided further detail for the information previously stated by Duggan. Approximately 98-99% of the Print Centres clients are from Dalhousie. However, there are around 6 outside clients, such as the Scotia Association of Social Workers (who are affiliated with Dalhousie's Maritime School of Social Work), hospitals and other universities. The services available from the Print Centre include Fast Copy, Convenience Copy, offset printing with ink for brochures, envelopes, etc. and bindery services. They also supply paper and envelopes throughout the campus.

Fast Copy is used as the production unit. It consists of three large machines, two at the LSC location and one at the Sexton Campus location. These machines print large quantities at high speeds, 123 copies per minute. Convenience Copy uses a smaller machine, very similar to copiers found in offices. It is used for smaller photocopying jobs.

The common type of paper used is 8.5" x 11" bond. It is used in approximately 75% of the print jobs. In the initial interview Doyle and Connors estimated 6 to 7 million sheets of paper are used per year but later this was amended and we were advised that 34,471,000 sheets of 8.5" x 11" are used. There are 224 thousand sheets of 8.5" x 11" paper in a (metric) tonne. The volume of single and double sided printing could not be

determined. The information is embedded in the large Xerox copier, which is leased. Hence, they do not have ready access to some of the information contained by the copier. In addition, the Print Centre has taken over the duties of the defunct Stationary Store. It has only been a year and a half; therefore much historical information does not exist.

Doyle and Connors also discussed the cost incentives for double sided printing. It costs 4.2 cents to print single sided and 6.2 cents to print double sided. These prices do not consider folds, stapling, etc. The initial cost to copy double sided is more; however, the overall cost is less because less paper is used. Considering the millions of sheets that pass through the Print Centre the relative cost saving (economically) becomes apparent.

Recycled paper is rarely used at the Print Centre. A whole print job has never been done on recycled paper. The total use of recycled paper in a year is less than 1%. There are two factors affecting the use of recycled paper. The first is cost; it is more expensive than virgin paper. The second is machine sensitivity. The equipment is very sensitive and recycled paper can cause complications. In addition, service providers frown on using recycled paper because of the potential wear on the machines. Lastly, only a few departments request to purchase recycled paper.

Bill Maes, University Librarian at the Killam Library was also interviewed (Appendix C). He said that 20 pound multi-purpose paper is used in the Killam for printing and photocopying. Approximately 340 cartons of 8.5" x 11" (5000 sheets per carton) are used per year whereas minimal amounts of 8.5" x 14" and 11" x 17" paper are used per year. The separate quantities used for printing and photocopying were not available.

According to Maes, the printers in the Killam cannot print double sided documents. His reasoning was that double-sided printing is not intended for high-volume printers. Hence, there would be an increase in downtime due to maintenance issues if the current printers attempted to print double sided in large volumes. The Xerox Bookmark 35 public photocopiers found in the Killam Library are capable of manual feed double sided photocopying.

Maes feels that paper use in the Killam is probably not out of the ordinary compared with volumes in other libraries across the country. He also feels that because there is a charge for printing and photocopying, there is a collateral effect on the volume of paper usage. In other words, paper use is undoubtedly less because the library charges a fee to print and copy. Although the initial intent of the fee is to recover some costs. When asked if sustainable paper use could be incorporated into the talks librarians give to classes, Maes indicated that it would be possible. However, he added that student's sensibilities are already raised by the fact that the library charges for printing and photocopying.

A mixed response was received when our group first asked to place posters above printers and photocopiers. We sent examples of the posters we wanted to use along with our request. Maes however misunderstood our intentions. We originally wanted to put specific posters above the printers and photocopiers. Another set of posters that listed facts and statistics were to be placed around the library and possibly elsewhere on campus. Maes did not understand this at first.

We sent a second email clarifying our objective, which was met with some success. Maes approved the posters minus the text 'SAVE A TREE, Print Double

Sided!, See technical assistant for instruction.’ He felt the text would be misleading as double-sided printing is not possible for practical reasons such as cost and maintenance, as the library cannot supply new double-sided printing and copying equipment.

Therefore, it would be frustrating for users and staff who cannot provide the necessary equipment to double side print and photocopy. Hence, he did not want to encourage and endorse double-sided printing with the posters. He added that he felt it is good to make users aware of paper consumption and to encourage them to think about their paper needs. In addition, Maes stated that he supports our campaign to reduce paper use on campus.

Maes also offered further information in his response. He hopes that within the near future, double sided printers and photocopiers will be at a standard that they can effectively be employed in the library. The library is also currently looking at the feasibility of buying new printers for the fall. These printers may make double-sided printing more practical and less labour intensive.

To see how easy or difficult it is to print and photocopy double sided, two trials runs for each was conducted. Two members of the group on two separate occasions attempted to print double sided. They were successful and found it very easy to do. A trial test for photocopying double sided was considered. However due to time restrictions we were unable to carry out a trial.

Discussion

According to Chris Duggan, Manager of the Purchasing Department at Dalhousie University, 40 to 45 million sheets of paper are purchased for the university each year

(Appendix A). The majority of this paper is 8.5” x 11” white bond paper and accounts for approximately 34,471,000 sheets of the paper used at Dalhousie each year (Appendix B). The remaining types of paper purchased include recycled paper, photocopy paper, three-hole punch, envelopes, etc (Appendix A). With the consumption of such a large quantity of paper, and little of it recycled, Dalhousie has a significant paper footprint. To counteract this, the Dalhousie University Draft Environmental Policy has been created. The policy acknowledges “that it has a part to play in global, national and local environmental issues,” and “in recognition of this, Dalhousie has undertaken many significant environmental initiatives on campus and has endorsed a number of national and international environmental declarations.”²⁵ In Goal Three of the policy, Strategy One aims to “increase the understanding of the environmental implications of personal choices through educational training.”²⁶ Strategy Two seeks to “provide incentives for members of the Dalhousie community to make environmentally appropriate choices.”²⁷ Education and the implementation of incentives offer valuable tools in the process of making paper use at Dalhousie more sustainable. As a starting place for the improvement of sustainable paper use at Dalhousie, the Killam Library was selected for this study, as it is a major centre of paper use on campus.

The Killam Library, in which large numbers of students print and photocopy each day, uses approximately 1,700,000 sheets of paper per year (Appendix C). For this reason, the Killam Library is an important focus in the promotion of sustainable paper use. Currently, there is little educational information regarding sustainable paper use available in the library and there are no incentives for using less paper. The system for

²⁵ Dalhousie University Draft Environmental Policy, p 6

²⁶ Ibid, p 7

²⁷ Ibid, p 7

recycling and reuse of paper in the Killam is unclear. The recycling bins have instructions as to what type of paper should be placed in them, but the writing is so small that little attention is paid to it. No incentives are offered for printing or photocopying, so the same price is charged for double-sided printing one page as for single-sided printing two pages. Considering that 74% of students find paper use in the Killam Library wasteful (Figure 4), yet few students actually print or photocopy double-sided, it is deduced that the reason they do not use paper more sustainably is because of the lack of educational information and incentives. It is unfortunate that not more is being done to promote sustainable paper use, when there is a demand for more sustainable options. However, there are several factors that restrict such initiatives.

First of all, there are no printers in the Killam Library which can print double sided (Appendix C) automatically. According to Maes, “double-sided printing is not intended for high-volume printers,” as there is a chance of increased maintenance issues (Appendix C). He does not feel that promoting the fact that double-sided printing can be done with help from the technical assistant, and possibly offering incentives to do so, is necessary as he believes that “the fact that they do charge for printing and photocopying probably has a collateral effect on the volume of paper usage: it is undoubtedly less because they charge” (Appendix C). This may offer an incentive to use less paper to some degree, but from the feelings of the Dalhousie community it is apparent that more could be done to increase sustainable paper use in the library. Cost incentives for printing double-sided can have a significant impact on the amount of paper used. In the Print Centre they offer such an incentive, and 80% of the printing that is done there is double-sided (Appendix B). If a cost incentive were offered in the library, it is suggested

that a reduction in paper use would ensue. However, Maes has indicated to us that he feels at this time, double-sided printing requires more labour and offering such an incentive could make printing at a high volume printer a more complicated task. Therefore, educational information and cost incentives will not likely be offered until new printers can be purchased that print double-sided automatically. There is some hope as Maes has informed our group that the library is looking into the feasibility of purchasing new printers for next year (Appendix C).

Another factor that restricts the promotion of sustainable paper use in the library is the difficulties found with the use of recycled paper in printers and photocopiers. It is not preferable to use recycled paper in printers and photocopiers because, “the current equipment cannot handle recycled paper due to inconsistent quality and the amount of dust that comes off the paper—this fouls up the printers and copiers” (Appendix A). Recycled paper is also more expensive than virgin paper, which discourages its purchase (Appendix B). Despite these barriers, there are several initiatives that it appears have not yet been considered.

Through our questionnaire of students in the Killam Library, it was noted that almost 85% of students do not photocopy double sided, and 80% do not print double sided (Figure 3). But a much greater percent of students double side their paper when they take notes in class. For this reason it appears that when offered a choice the majority of students will double side their paper. So since very few students double side print or photocopy it is doubtful that they are aware of the option. From many of the students’ responses it is apparent that very few, if any, students are aware that they can print and photocopy double-sided. According to Maes, the Xerox Bookmark 35 photocopiers in

the library are “capable of manual feed double-sided copying” (Appendix C), but this is not useful to students who wish to use paper sustainably, if they are unaware of the fact. Although the printers do not print double sided automatically, it is possible to print double sided by manually loading the machine. Two group members in this study attempted to print double sided and found it very easy. They simply asked the technical assistant for instruction, and found them to be very patient and helpful. By simply educating library patrons of these methods of double-sided paper use, sustainable paper use could be greatly increased at Dalhousie. As Duggan pointed out:

Raising awareness is a key component to achieving sustainable environmental practices. Even though a formal policy may not be in place yet the more people on board the easier the transition will be. There are those who are already converted but there are many on campus who do not consider the impact of paper use. Sometimes it is only a simple reminder that will engender a change in attitude (Appendix A).

Since printing double sided did not appear quite as complicated as had been indicated to us by Maes, we believe such an initiative as placing educational posters over the printers and photocopiers could be a very effective method of educating students of sustainable paper use.

Our group designed posters to place over the printers that asked students to stop and think before they print, offered a fact about Dalhousie’s paper use, and instructions on how to double-side print. Such a poster campaign could educate students how to use paper in a more sustainable fashion. Our literature review of poster effectiveness showed over time and with increased exposure, the effectiveness of an advertisement decreases.²⁸ However, initial exposure may be enough to catch attention as well as make an impression, thus demonstrating that putting posters up or advertising can serve as a

²⁸ Pieters, Rik, et al.: Visual Attention to Repeated Print Advertising: A Test of Scanpath Theory. *Journal of Marketing Research*, 1999, p. 424.

method of raising awareness. When permission was sought from Maes to place these posters over the printers, he felt they were inappropriate because their instructions involve seeking help from the technical assistant, which he felt would just cause complication and frustration to both student and employee. So he asked us to remove the instructional text before posting them (Appendix C). Despite the fact that with the revised poster students will not be instructed on how to double-side print, our group feels that they can still be an educational tool as they provide information on Dalhousie's paper footprint. We hope that they will start a trickle-down effect, as people will see them and discuss sustainable paper use with their friends and so on, and this will spark a change in people's paper use habits.

In terms of incentives for printing double-sided, by implementing an initiative in which the cost was slightly lower for using only one sheet of paper, rather than two, awareness of sustainable paper use could increase. According to Maes, such an incentive is not necessary as "students' sensibilities are already raised by the fact that they charge for printing and photocopying" (Appendix C). Our group would beg to differ as almost 35% of students print 61 sheets of paper or more per semester, and 20% of students photocopy 61 sheets of paper or more per semester (Figure 2). However, there are other places on campus, which do offer incentives, such as the Print Centre. In order to photocopy double sided there it costs 6.2 cents, while one sided page costs 4.2 cents and this does not consider stapling and other services (Appendix B). We hope that if new printers that print double-sided automatically are purchased, such an incentive will be put in place. An initiative like this is simple and effective in raising awareness of sustainable paper use.

Another initiative that could be taken to raise awareness is the incorporation of a sustainable paper use discussion into the library orientation. A brief description of how to use paper sustainably presented to first year students could greatly alter the current paper use patterns in the Killam library. When this was suggested to Maes, he replied “that would not be a problem although as mentioned students sensibilities are already raised by the fact that we charge for printing and photocopying” (Appendix C). Our group disagrees, believing that the library orientation is a prime time to educate students of sustainable paper use.

This project has only examined the proximate problem; there are several other projects that could explore it on a greater scope. One such project could examine the paper manufacturers and forestry practices from which the paper Dalhousie uses is received. This could be the fundamental problem, changing people’s attitudes at the source of the problem. If a type of 100% recycled paper could be created that would not cause malfunctions in printers and photocopiers, maybe it would be in higher demand.

Another possible project could examine the consortium among the Canadian Atlantic Universities. Since Dalhousie is one of the largest universities in the group, it could have a great influence on what type of paper is purchased by all Atlantic universities.

In conclusion, our group has discovered that paper use at Dalhousie involves much more than clicking print or pushing a button. The amount of paper that is used reflects the types of paper used as well as the equipment. In addition, the attitudes towards paper and paper use vary within the Dalhousie community. Nonetheless, we feel that a common desire to be more sustainable with respect to paper exists among students,

staff and faculty at Dalhousie. The results of our goal to educate and raise awareness through posters will be unknown unless a follow up study is conducted but could be incorporated into a project next year. We have realized our secondary goal of creating a foundation for future studies on paper use. We have created a solid package of information that will aid future researchers in pursuing paper use issues at Dalhousie. In addition, Chris Duggan has stated his enthusiasm for and keenness to participate in future projects on this subject. Lastly, Dalhousie is on a path towards increasing sustainable paper use through the creation of the Dalhousie University Draft Environmental Policy as well as through the enthusiasm of individuals like Chris Duggan. Our project has also contributed to sustainability in that we have potentially raised the awareness and increased the education of the Dalhousie community on sustainable paper use. Together, the Dalhousie community armed with ideas and enthusiasm will hopefully share the common goal of sustainability. Awareness will inspire change and in the words of Victor Hugo, “Nothing else in the world...not all the armies...is so [sic] powerful as an idea whose time has come.”²⁹

²⁹Victor Hugo. *Historie d'un crime*. 1852
<http://www.quotationpage.com/quotes.php3?author=Victor+Hugo>

Bibliography

Dalhousie University Draft Environmental Policy. October 2003. (Provided by Dr. William Louch, Director of Health and Safety at Dalhousie University).

Environmental Problem Solving II: The Campus as a Living Laboratory. ENVS 3502, Class Notes. 2004.

Gardiner, Leanne. An Investigation of Green Purchasing Policy and Strategy in the University Sector, Dalhousie University, Halifax, Nova Scotia. September 2001.

Hammond Creighton, Sarah. Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions. Cambridge: The MIT Press, 2001.

Hugo, Victor. Historie d'un crime. 1852
<http://www.quotationspage.com/quotes.php3?author=Victor+Hugo>

“Indicator of Ecological, Economic and Social Values of Forests in Nova Scotia Abstract.” The Nova Scotia Genuine Progress Index Forest Accounts, Volume 1, 2004. (<http://www.gpiatlantic.org/publications/abstracts/forests-ab!.shtml>). Retrieved (April, 4th, 2004)

“Our Common Future: Report of the World Commission on Environment and Development.” The Brundtland Report, 1987.

Palys, Ted. Research Decisions: Quantitative and Qualitative Perspectives. 3rd ed. Scarborough: Nelson a division of Thomson Canada Limited, 2003.

Pieters, Rik, Edward Rosbergen, and Michel Wedel. Visual attention to repeated print advertising: A test of scanpath theory. Journal of Marketing Research, 36: 424-438, 1999.

Appendix A

Interview with Chris Duggan, Manager, Purchasing Department, Dalhousie University

1. Could you explain how paper purchasing works on campus?
 - Purchasing is now in control of purchasing paper. Since it was only recently that Purchasing has taken over buying paper for all the departments there is not a lot of historical data.
 - About 1.5 years ago there was a major change in how paper was purchased. At one time it came through Stationary Stores (a now defunct department at Dalhousie). Now, the Killam Library purchases paper though the Print Centre located in the Life Sciences Building.
2. How much paper is purchased?
 - There are approximately 40 to 45 million sheets of paper purchased per year.
3. What are the types of paper purchased?
 - Photocopy paper, three-hole punch, envelopes, etc.
 - 8.5” x 11” white bond is what is most used.
4. How does the systems contract work?
 - Interuniversity Services Inc. (ISI) is a consortium of all the 17 Atlantic Universities that have come together to improve purchasing power. This has been in place for about 24 years. Through ISI, Purchasing has around 80 different agreements, one of which is photocopiers, another paper and so on.
 - The ISI information can be found on the Web.
 - Currently all the photocopy equipment in the print centre and in the “fleet” is analogue. It is likely that we will be able to switch to digital, multi-function/purpose equipment. This means instead of having a photocopier, printer and fax—there would be one machine (i.e. in a department) capable of interfacing with the network. These would be very high speed and therefore be more efficient and would have duplexing capabilities. There are barriers to this kind of technology and one of the biggest barriers is the reluctance of people to change. Other barriers include up front costs for changing our current equipment. However, since technology is marching on when it comes time to purchase new equipment we may have to purchase digital and that may be all that is available. It is essential to have a workforce that is adequately trained so that they can take advantage of the new technology.
 - Fast Copy of the Print Centre: Equipment has a 7-year contract that will expire July '04.
 - Convenience Copy of the Print Centre: Equipment has a 5-year contract that will expire around August '05. Keep in mind that these contracts sometimes are negotiated outside of these dates if the need arises.
 - Throughout the campus many offices also have other bits of equipment that are not directly part of the fleet. However, for the most part all of the paper purchased through the Purchasing department is bought through the Print Centre for all of the departments. So even though the equipment is not part of the maintained fleet there is still an overall amount of paper that can be used as data.
5. Where is most of the photocopying done?
 - Almost 99% is done at the Print Centre in the LSC. Of the 99% of photocopying 50% is done in the Print Centre and 50% is done at the Convenience Copier. Also, the Print Centre consists of the Life Science Centre and the Sexton Campus

6. How much of it is double sided:
- At Fast Copy 20% is single sided and 80% is double sided.
 - Also there are incentives for double sided copying. In the “Fast Copy” side of the Print Centre (this is the equipment used for printing material such as readers etc) where 20% of the paper is printed single sided and 80% is printed double sided. This may not sound like it would make much of a difference until you look at the numbers of impressions being made. To use round figures this is how it would look (keep in mind that in 2002/2003 the annual figure was 17,717,463 not 20,000,000)
 - 1. If we made 20,000,000 impressions single sided this would mean 100% of the paper was printed single sided and we would have used 20,000,000 pieces of paper.
 - 2. However, of the 20,000,000 impressions, 20% or 4,000,000, is single sided. The other 80% or 16,000,000 is actually double sided so only 8,000,000 plus 4,000,000 = 12,000,000 sheets are used—not 20,000,000
- There are financial incentives for using double sided. For example (and these figures are just used for example) if a single-sided impression cost 5 cents and you copied two pages and the paper cost 1 cent per page. Then the cost would be 12 cents for the two-page document. However, if you double sided, then instead of it costing 5 cents for each impression it only costs 4 cents the document would only cost 9 cents because you are given an incentive discount for double-siding and you are charged less for using less paper. Even though this does not give the exact costs it is a useful example. Costs for this are quite complicated as you have also to take into account staples, folds, etc.
7. What informs your purchasing decisions?
- Purchasing decisions are based on quality, price, service and reliability.
8. Who are the paper suppliers?
- Domtar manufactures the paper.
 - Unisource and Xerox are the major distributors. Paper House is also a distributors but smaller than the other two.
 - We do not typically deal with other small suppliers but there are exceptions from time to time.
9. Are there environmental (purchasing) practices currently in place?
- Raising awareness is a key component to achieving sustainable environmental practices. Even though a formal policy may not be in place yet the more people on board the easier the transition will be. There are those who are already converted but there are many on campus who do not consider the impact of paper use. Sometimes it is only a simple reminder that will engender a change in attitude. There is an administrator on campus who prints off the entire Dal Notice for just one article—however, once this individual was shown how to cut and paste the portion he wanted, he now just prints what he needs.
10. If so, can you tell me what they are?
- Although Dalhousie doesn't have an official environmental policy in place, many are working toward sustainability and doing a great deal of good work to promote environmental stewardship. He is involved with developing university environmental policy (via the Draft Environmental Policy). But says to keep in mind that financial barriers are prevalent. There is a need for up-front investment to initiate a cost feasibility study. Pressure could be put on the VP of finance (Bryan Mason) to come up with the finances necessary to implement the steps in the draft.

11. What are the barriers to incorporating environmental practices? (Note: Question 4 also discusses barriers)
 - Currently we are using very little recycled paper. One of the barriers is that the current equipment cannot handle recycled paper due to inconsistent quality and the amount of dust that comes off the paper—this fouls up the printers and copiers.
12. Do you have any historical data regarding paper purchasing at Dalhousie that you can share?
 - Historical volume data from the Print Centre in the LSC regarding equipment and number of impressions from 2000 to present correlates with paper supplier amounts and costs. The amounts and costs are only relevant for a current time frame. The graphs for Fast Copy and Convenience Copy cannot be used as an appendix but the information they contain can be extrapolated and included to support this research.
13. How are the financial exchanges recorded and stored?
 - Financial Records are kept electronically. For example, the fleet of printers is all IKON. The department secretaries are notified by email to advise IKON of the number of copies used in a certain period (the copier keeps track of this and is shown in a digital readout). The secretary emails the figures to IKON; they in turn send invoicing details to Purchasing for payment.
14. Budget considerations?
 - Combined volumes may or may not have an impact on price. The major factor is supply and demand.
15. Is there anyone else on campus we should talk to about purchasing paper?
 - Mike Murphy, Facilities Management, for information about waste management and recycling. His contact information can be found on the Dalhousie website.
 - Bill Louch, Safety Office, both Bill and Mike have access to the Draft Environmental Policy document from October 2003. This document may still be confidential. It discusses amounts of paper used/bought by the university.
 - Leanne Gardiner, SRES student did a paper on ‘paper’ 1 to 2 years ago would make for good background information.
16. Would you like a copy of our report when it has been completed?
 - Yes
17. If a student group chooses papers as their Environmental Problem Solving research project next year would you prefer that they not repeat this kind of fact finding mission?
 - If a similar project is done next year—or one that picks up where this one leaves off—the focus should be turned around and rather than look internally we should look externally. This focus has not yet been used. Talk to the suppliers and manufactures. Ask them what they are doing to improve the quality of recycled paper. Ask the photocopier/printer suppliers to determine what is being done so their equipment can reliably handle a broader range of papers. Perhaps fewer parts would mean a reduced likelihood of breakdowns.
18. Can I quote you for the purpose of this project?
 - Yes

Appendix B

Interview with David Doyle and Chris Connors, Print Centre, Life Sciences Building, Dalhousie University

1. What services does the Print Centre offer on Campus?
 - Fast Copy is the production units and is three big machines (two at LSC on the Studley Campus and one in the Print Centre on the Sexton Campus) that print large quantities quickly @ 123 copies per minute
 - Convenience Copy is a smaller copier and is similar to the other copiers found in offices etc. Basically it is a convenient place for places to get smaller photocopying done.
 - Offset printing with ink for brochures, envelopes, etc.
 - Bindery services
 - Supply paper and envelopes throughout campus
2. Who are your clients?
 - 98 – 99% is from Dalhousie but there are around 6 others. For example the Nova Scotia Association of Social Workers (this is affiliated with Dalhousie’s Maritime School of Social Work), hospitals and other universities.
3. What types of paper are most commonly used?
 - 8.5” x 11” bond
4. What percentage of the paper used is 8.5” x 11” bond?
 - Approximately 75% which is an educated guess.
5. How much paper is used by the Print Centre over a one year period?
 - At the Studley Campus about 6 to 7 million sheets. However, we will check this again and also with Brian from the Sexton Campus Print Centre.
 - March 29th: David Doyle has responded again to this answer and has determined that in fact Dalhousie University uses approximately 34,471,000 sheets of 8.5” x 11” bond
6. Could you also provide historical data about the amount of paper used?
 - We will try to find out how many single sided and double sided have been copied. However, this information may only be available as embedded information in the large Xerox copier. This equipment is leased and we do not have ready access to some of the internal information such as this.
7. How do you calculate cost savings to your customer for double sided copying?
 - Very simplistically the cost is 4.2 cents pr page for one sided and 6.2 cents per page for double sided. This does not take into consideration folds, stapling, etc.
8. We have already interviewed Mr. Chris Duggan, Manager of Purchasing. He says very little recycled paper is purchased. Do you get many requests for recycled paper?
 - Very little recycled paper is purchased although there are a couple of departments that request it from time to time. There has never been a whole print job done with recycled paper.

9. If yes, what percentage of paper over a one year period is recycled?
 - As an educated guess—less than 1%.
10. Are there reasons why recycled paper may not be used frequently by your clients?
 - Cost is a factor. Recycled paper is more expensive.
 - The equipment for printing is very sensitive and if it breaks down our service provider could attribute recycled paper as the cause of the malfunction.
11. Do you know how many sheets of 8.5” x 11” paper are in a (metric) tonne?
 - 224 thousand
12. Do you have any quantitative data regarding paper us that you can provide?
 - Not really. Other than the Fast Copy and Convenience Copy volume data that you already have we do not have a lot of historical data yet. The Printing Centre has only been distributing paper for about 1.5 years. It used to be the function of Stationery Store but that department is now closed.
13. Would you like a copy of our report when it is complete?
 - Yes

Appendix C

Interview with Bill Maes, Head Librarian, Killam Library, Dalhousie University

February 11, 2004

1. What kind of paper does the library use for photocopying?
 - 20 lb multi-purpose
2. What kind of paper does the library use for printing?
 - same as above
3. How much of this type of paper is used per year?
 - approximately 340 cartons of 8.5" x 11" (5000 sheets per carton) minimal amounts of 8.5"x 14" and 11" x 17" paper
4. How much is used for photocopying?
 - No Response
5. How much is used for printing?
 - No Response
6. Do any of the photocopiers in the Killam Library copy double sided?
 - Yes, the Xerox Bookmark 35 public machines are capable of manual feed double-sided copying.
7. If not, then what is preventing double sided copying?
 - No response
8. Do any of the printers in the Killam Library print double sided?
 - No
9. If not, then what is preventing double sided printing?
 - Double-sided printing is not intended for high-volume printers and we would see an increase in down-time due to maintenance issues.
10. If the current photocopiers cannot copy double sided then are there any considerations being given for obtaining double sided copiers?
 - n/a
11. If the current printers cannot copy double sided then are there any considerations being given for obtaining double sided copiers?
 - See #9 above
12. How do you feel about paper use in the Killam Library?
 - Paper use in the Killam is probably not out of the ordinary compared with volumes in other libraries across the country. Although the intent is simply to recover some costs the fact that we do charge for printing and photocopying probably has a collateral effect on the volume of paper usage: it is undoubtedly less because we charge.
13. We are aware that an orientation is given to inform students on how to use the library. Would you be willing to incorporate into your talk information about:
 - a) paper recycling
 - b) where paper recycling bins are located
 - c) how to print double sided
 - d) availability of paper for reuse

- That would not be a problem although as mentioned students sensibilities are already raised by the fact that we charge for printing and photocopying.

Other Comments

I can't come up with an exact break down of the amount of paper used for printing as opposed to photocopying. During our busiest times however Circulation tends to go through at least 1 box of paper a day for the photocopiers.

March 24, 2004

Mr. Maes,

It's ok that we didn't get a chance to meet with you. We were able to acquire a lot of the information we needed from a Master's Thesis that was done by Leanne Gardiner several years ago. However, we were wondering if we can have permission to place posters over the photocopiers and printers. Attached to this email is a file including the draft posters we would like to put over the printers. The posters which we hope to post around campus are not done yet but will include similar information. Our project is almost completed and if you wish to receive a copy of our project just let us know. If you could get back to me sometime soon that would be great. Thanks for everything.

Kayla Sheppard

March 24, 2004 (Reply)

Dear, Kayla

I like the idea of the posters but wonder if the message is not somewhat misleading. The posters ask people to consider using double-sided printing and photocopying but as you are aware for practical reasons (costs, maintenance) the libraries are unable to invest in new double sided printing and copying equipment. The advice therefore will be frustrating to the users as well as the staff who can not supply the appropriate equipment. Certainly, it would be good to make users aware of the amount of paper consumed and to think more carefully about their paper needs. At some point in the future hopefully, the double-sided photocopying and printing equipment will be up to a standard of reliability that we can employ it effectively in the libraries.

Cheers,

Bill

P.S. Would appreciate a copy of your team's report if it is available for wider distribution.

March 31, 2004

Mr. Maes,

Thank you for your reply to my colleague, Kayla's, email. I am afraid that you have misunderstood our intentions with the placing of posters over the printers in the library. Although the purchase of new printers that can print double sided automatically would be beneficial in decreasing paper use at Dalhousie, we understand that this is not economically feasible at this time. For this reason we are focusing on increasing sustainable paper use in the library with the resources currently available. With assistance from the technical assistant in the library, it is very easy to print double sided. Through a survey we have conducted with students in the library, we have discovered that very few are aware that printing double sided is an option. Our sole purpose of the posters is to inform students that if they so desire, they can print double sided. I have attached the posters, which we would like to place over the printers with your permission. I hope you will reconsider the importance of education in promoting sustainable paper use on campus.

Thanks very much,
Anne Myers

April 1, 2004 (Reply)

Ms. Myers:

Although I fully support your campaign to reduce paper use on campus, as I have already mentioned, it is not technically nor economically feasible for us to endorse and encourage double-sided printing at this time.

We are looking at the feasibility of purchasing new printers for the fall which might make double-sided printing practical and less labour intensive.

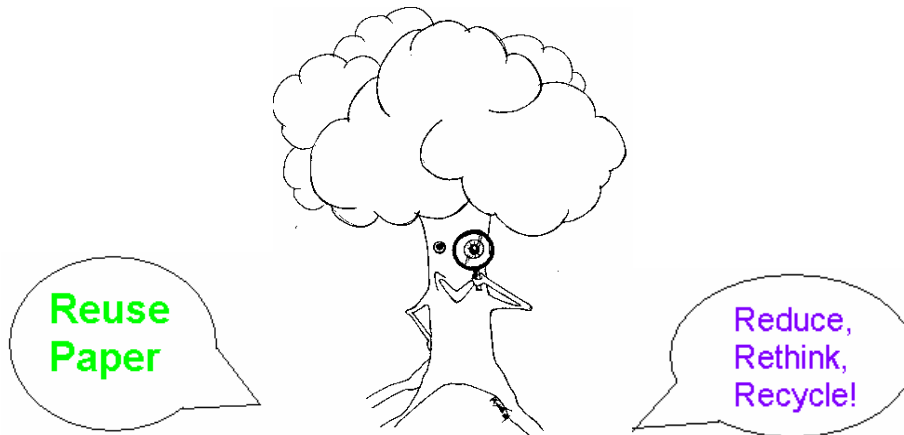
In the meantime, I would be perfectly happy to have your posters placed over our printers minus the text:

SAVE A TREE
Print double-sided!
See Technical Assistant for instruction

Regards,
Bill

Appendix D

Posters for Notice Boards in the Killam Library



Did You Know?

Dalhousie uses 40-45 million sheets of paper every year!

75% of Dalhousie students think paper use at the Killam Library is wasteful!

Each year Dalhousie's paper consumption is equivalent to 3657 trees!

The amount of paper used at Dalhousie each year could fill the Killam atrium 24 times!

Don't Killam
Save' em!



THINK BEFORE YOU PRINT!

Did you know?
Dalhousie uses
40-45 million
sheets of paper
every year?



THINK BEFORE YOU PRINT!

Did you know?
75% of Dalhousie
students think paper
use in the Killam
Library is wasteful?





THINK BEFORE YOU PRINT!

Did you know?

Each year Dalhousie
paper consumption
is equivalent to 3657
trees?



THINK BEFORE YOU PRINT!

Did you know?

The amount of paper used
at Dalhousie each year
could fill the Killam atrium
2.4 times?



Appendix E

QUESTIONNAIRE

Paper Use and Waste: Raising Awareness
Questionnaire

1. Do you use the printers in the Killam Library?
YES NO

2. Do you use the photocopiers in the Killam Library?
YES NO

3. How many pages do you print per semester?
 - 20 or less _____
 - 21 to 40 _____
 - 41 to 60 _____
 - 61 or more _____

4. How many pages do you photocopy per semester?
 - 20 or less _____
 - 21 to 40 _____
 - 41 to 60 _____
 - 61 or more _____

5. Do you use both sides of the paper?
 - a) in class YES NO
 - b) photocopy YES NO
 - c) print YES NO

6. Do you feel that paper use in the Killam Library is:
Wasteful or Non-Wasteful

7. Are there ways you feel paper could be used more sustainably in the Killam Library?

8. Would you like to provide any further comments or suggestions?

If you are interested in receiving the results of this questionnaire please write you email address below

SUMMARY OF PROPOSED RESEARCH

1. Purpose and Rationale for Proposed Research

Briefly describe the purpose (objectives) and rationale of the proposed project and include any hypothesis(es)/research questions to be investigated.

- The purpose of our project is to study paper use in the Killiam Library and to educate students, staff and faculty about sustainable paper use.
- By educating students, staff and faculty about paper consumption we hope to reduce the amount of paper used not only in the Killiam Library but in other buildings on campus and in the surrounding community.

Our hypothesis is that paper consumption in the Killam Library is not environmentally sustainable.

Some research questions we hope to address are:

1. How much paper is used in the Killiam Library?
2. Do students use both sides of the paper?
3. Are people currently aware of sustainable paper use?

2. Methodology/Procedures

a. Which of the following procedures will be used? Provide a copy of all materials to be used in this study..

- Survey(s) or questionnaire(s) (mail-back)
 - Survey(s) or questionnaire(s) (in person)
 - Computer-administered task(s) or survey(s)]
 - Interview(s) (in person)
 - Interview(s) (by telephone)
 - Focus group(s)
 - Audiotaping
 - Videotaping
 - Analysis of secondary data (no involvement with human participants)
 - Unobtrusive observations
 - Other, specify
-

b. Provide a brief, sequential description of the procedures to be used in this study. For studies involving multiple procedures or sessions, the use of a flow chart is recommended.

- An interview will be conducted with the Head of Purchasing for Dalhousie University, Chris Duggan. It will provide us with information about how much paper is purchased on campus.
- A second interview will also be conducted with the Department Head in the Killam Library, Sandra Dwyer. We hope to learn about paper use and possible sustainable practices

- Our questionnaires are set up to obtain information from students, staff and faculty who use the Killiam Libraries print centres and photocopiers. Information obtained from the questionnaires will include where students tend to use the most paper and whether or not they feel they are being wasteful with paper consumption.
- Research primarily from Internet sources will inform us about ways to implement sustainable paper use within the library.
- Once we have analysed the data we will incorporate it into educational posters promoting sustainable paper use.

3. Participants Involved in the Study

a. *Indicate who will be recruited as potential participants in this study.*

- Dalhousie Participants: Undergraduate students
 Graduate students
 Faculty and/or staff
- Non-Dal Participants: Children
 Adolescents
 Adults
 Seniors
 Persons in Institutional Settings (e.g. Nursing Homes,
 Correctional Facilities)
- Other (specify) possible paper suppliers and recycles

b. *Describe the potential participants in this study including group affiliation, gender, age range and any other special characteristics. If only one gender is to be recruited, provide a justification for this.*

Students, staff and faculty who use paper in the Killam Library.

c. *How many participants are expected to be involved in this study? ~100*

4. Recruitment Process and Study Location

a. *From what source(s) will the potential participants be recruited?*

- Dalhousie University undergraduate and/or graduate classes
 Other Dalhousie sources (specify) _____
 Local School Boards
 Halifax Community
 Agencies
 Businesses, Industries, Professions
 Health care settings, nursing homes, correctional facilities, etc.
 Other, specify (e.g. mailing lists)
-

b. Identify who will recruit potential participants and describe the recruitment process.

Provide a copy of any materials to be used for recruitment (e.g. posters(s), flyers, advertisement(s), letter(s), telephone and other verbal scripts).

- Telephone
- Verbal Scripts

5. Compensation of Participants

Will participants receive compensation (financial or otherwise) for participation? Yes [] No [X]

If Yes, provide details:

6. Feedback to Participants

Briefly describe the plans for provision of feedback and attach a copy of the feedback letter to be used. Wherever possible, written feedback should be provided to study participants including a statement of appreciation, details about the purpose and predictions of the study, contact information for the researchers, and the ethics review and clearance statement.

Note: When available, a copy of an executive summary of the study outcomes also should be provided to participants.

At the end of each interview or questionnaire the research participant will be given the opportunity to receive an email of our research results.

POTENTIAL BENEFITS FROM THE STUDY

1. Identify and describe any known or anticipated direct benefits to the participants from their involvement in the project.

Increase awareness about sustainable paper use.

2. Identify and describe any known or anticipated benefits to society from this study.

- They will benefit from an environmentally sustainable campus.
- They could take this information and apply it to other aspects of society.

POTENTIAL RISKS TO PARTICIPANTS FROM THE STUDY

- 1. For each procedure used in this study, provide a description of any known or anticipated risks/stressors to the participants. Consider physiological, psychological, emotional, social, economic, legal, etc. risks/stressors**

No known or anticipated risks
Explain why no risks are anticipated:

Minimal risk
Description of risks:

Greater than minimal risk
Description of risks:

- 2. Describe the procedures or safeguards in place to protect the physical and psychological health of the participants in light of the risks/stresses identified in Question 1.**

N/A

INFORMED CONSENT PROCESS

Refer to: <http://pre.ethics.gc.ca/english/policystatement/section2.cfm>

- 1. What process will be used to inform the potential participants about the study details and to obtain their consent for participation?**

Information letter with written consent form; provide a copy
 Information letter with verbal consent; provide a copy
 Information/cover letter; provide a copy
 Other (specify) Verbal Consent

- 2. If written consent cannot be obtained from the potential participants, provide a justification.**

N/A

ANONYMITY OF PARTICIPANTS AND CONFIDENTIALITY OF DATA

- 1. Explain the procedures to be used to ensure anonymity of participants and confidentiality of data both during the research and in the release of the findings.**

We will not be asking the names of questionnaire participants therefore it will remain anonymous.

We will ask for permission from interviewees as to whether or not we can use their names and comments in our project.

2. Describe the procedures for securing written records, questionnaires, video/audio tapes and electronic data, etc.

It is not necessary to secure our information because the interviewees will not be providing us with confidential information.

3. Indicate how long the data will be securely stored, the storage location, and the method to be used for final disposition of the data.

- Paper Records
 - Confidential shredding after 1 years
 - Data will be retained indefinitely in a secure location
 - Data will be retained until completion of specific course.

- Audio/Video Recordings
 - Erasing of audio/video tapes after _____ years
 - Data will be retained indefinitely in a secure location
 - Data will be retained until completion of specific course.

- Electronic Data
 - Erasing of electronic data after _____ years
 - Data will be retained indefinitely in a secure location
 - Data will be retained until completion of specific course.
- Other

(Provide details on type, retention period and final disposition, if applicable)

Specify storage location:

ATTACHMENTS

Please **check** below all appendices that are attached as part of your application package:

- Recruitment Materials:** A copy of any poster(s), flyer(s), advertisement(s), letter(s), telephone or other verbal script(s) used to recruit/gain access to participants.
- Information Letter and Consent Form(s).** Used in studies involving interaction with participants (e.g. interviews, testing, etc.)
- Information/Cover Letter(s).** Used in studies involving surveys or questionnaires.
- Parent Information Letter and Permission Form for studies involving minors.
- Materials:** A copy of all survey(s), questionnaire(s), interview questions, interview themes/sample questions for open-ended interviews, focus group questions, or any standardized tests used to collect data.

SIGNATURES OF RESEARCHERS

Signature of Student Investigator(s)

Date

Signature of Student Investigator(s)

Date

Signature of Student Investigator(s)

Date

Signature of Student Investigator(s)

Date

Signature of Student Investigator(s)

Date

Signature of Student Investigator(s)

Date

Signature of Student Investigator(s)

Date

FOR ENVIRONMENTAL PROGRAMMES USE ONLY:

Ethics proposal been checked for eligibility according to the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans

Signature

Date