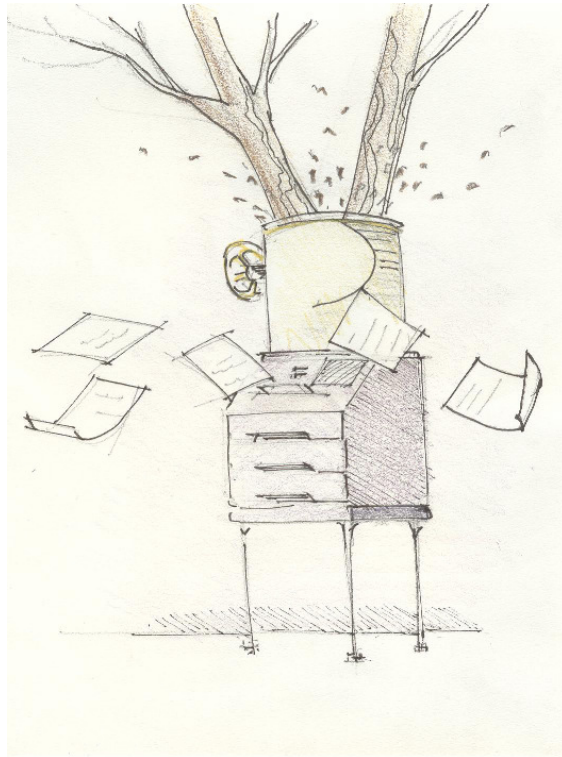


ENVS 3502: Greening the Campus Project

## **The Feasibility of Double-Sided Printing in the Learning Commons**



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## **Abstract**

The manufacturing of paper destroys millions of hectares of Canadian forest every year, as well as contributing greenhouse gases to the atmosphere and chemicals to our water and soils. Educational institutions are mass consumers of paper and paper products, and Dalhousie is no exception. The Killam Learning Commons at Dalhousie University is a hub of student activity as well as the largest computer lab on campus. 160 computers feed into 2 high-volume printers that use \$20,000 worth of paper and toner per year. This research project investigates the current printing behaviours of students, staff and faculty, and evaluates the feasibility and implications of having double-sided printing as the default option on these 160 computers. The research is conducted through the use of questionnaire, interviews and observational data.

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## **1.0 Introduction**

### **1.1 Greening the Campus Movement**

The 'Greening the Campus Movement' has been around for decades with the goal of making our educational institutions more environmentally sustainable. The objectives of this movement include increasing environmental awareness and action on campus. Many different projects and action oriented groups have been slowly changing how our educational institutions function. Since 2004, Dalhousie University has incorporated this movement into their curriculum. Paper use uses vast amounts of natural resources, inputs toxins into the environment and emits large amounts of greenhouses gases in the air through production and distribution. Currently schools such as Acadia University, Mt. Allison University and St. Francis Xavier University have reduced paper consumption through the implementation of double-sided printing and paperless courses (INSERT REF HERE). Dalhousie University is falling behind in greening the campus initiatives.

### **1.2 Past Projects**

Previous Greening the Campus Movement projects done at Dalhousie have focused on paper use at the Dalplex and Killam Library. The Dalplex study focused on the use of virgin paper in the Dalplex. Not only was the focus on the usage of 100% non-recycled paper, but also the extent of use in the facility (Mrema et al, 2007). They were also interested in which sectors within the Dalplex are using the most paper and for which reasons they are using it. Their research problem was: 'How is virgin paper being used and disposed of at the Dalplex by staff?' (Mrema et al, 2007). Their objectives focused on the amount of virgin paper being used, how it was disposed and the

environmental awareness of staff (Mrema et al, 2007). The research project that was conducted at the Killam Library in 2004 focused on the promotion of sustainable paper use (Adams et al, 2004). This project focused on the educational aspect of reducing, reusing, redirecting and rethinking paper use in the Killam Library (Adams et al, 2004).

In addition to these projects, an on campus organization called Papercut has been very active at Dalhousie over the last few years. This campaign works with universities around the country to reduce paper use in four main ways; encouragement of double-sided printing, eliminating unnecessary printing jobs, encourage faculty to accept online assignments and to encourage the distribution of class documents online (PaperCut, 2006). This campaign also encourages the use of 100% post-consumer recycled paper (PaperCut, 2006). These projects and campaign have dealt mainly with the awareness aspect of paper use on campus and not behavioural change. The goal for our project is to provide information about the printing habit of student, staff and faculty in the Killam Library. We would like this information to be used to implement double-sided printing in the Killam library.

### **1.3 Project Description**

Currently, Dalhousie has the ability to print double-sided on all of the printers in the Killam library, but this preference mode is not being used to its full potential. One way to reduce the amount of paper that is consumed at Dalhousie is to make people aware of the double-sided printers on campus and how to use them. By focusing on paper reduction in the Killam library, this will serve as a symbol of reducing Dalhousie's ecological footprint for the entire campus. If all of the printers in the Killam library print

double-sided by default, this will reduce the amount of paper that is purchased, which in turn saves trees, greenhouse gas emissions and toxic chemicals being released into the environment. This will hopefully change students printing practices not only on campus but in their everyday lives.

The use of paper in educational institutions is an issue that has the ability to provoke positive change for the long term. If the printers in the Killam automatically print double-sided, this may change students printing behaviour when they print in other places. Ultimately, this will hopefully spark paper reduction overall for students. It may bring attention to paper use on campus to professors. This may also translate into the surrounding campus and community. If printing double-sided in the Killam library is the norm, then there may be change to make all of the other printers on campus to automatically print double-sided as well. This could spread into the community through awareness of the paper reduction and financial savings that are a result of printing double-sided.

The rationale for this project is that more of Dalhousie's student body would print double-sided if it was a default setting on all of the printers. One of the reasons why Dalhousie students are not printing double-sided could be that they do not know that it is an option and how to do it. It is also important to get the opinions of professors about double-sided printing to make sure that it is an acceptable way for students to hand in assignments. In the Environmental Science department this is a widely accepted way to hand in assignments, but this may not be the case in other disciplines.

The scope of this project will be to focus mainly on the paper use of the Killam library. This will focus even further into the paper use from the three printers on the main

floor that are fed from the two computer labs. The reason our group is focusing on the Killam library is because it seems like an attainable goal. It is also the most widely used of the computer areas, and therefore stands to serve as a symbol of the greater campus. If our group is able to make the default mode of all the printers to print double-sided, then it may spawn this movement throughout campus. It may also increase awareness of paper use in both the student body and the faculty. This could also make professors more aware of the issue and either promotes double-sided printing for all assignments or even move to paperless courses. This could serve as a small win for a larger battle towards sustainability on campus.

#### **1.4 Research Problem**

What is the feasibility of having all the computers in the Killam library, by default not by preference, print double-sided?

#### **1.5 Objectives**

1. Determine the attitude of students about double-sided printing in the Learning Commons.
2. Determine the behaviour of faculty members to promote double-sided printing in their classrooms.
3. Determine the technological and administrative feasibility of changing the printers in the Learning Commons to automatic double-sided printing.

## 2.0 Methodology

To satisfy the objectives of our research, both qualitative and quantitative research techniques were used. This provides a greater range of insights and perspectives and increases the validity of the research which according to Palys and Atchison (2008) is “a term that refers, in the most general sense, to whether research measures what the researcher thinks is being measured” (p. 430).

For this research the population of interest is Dalhousie University’s students, faculty, and staff. We aimed to assess their attitudes and practices about double-sided printing in the Killam Library and investigate about the possibilities of changing the current printing system to make double sided printing the default option. The data gathered, in turn, will help us, and future research in this area, to reach our main goal of increasing awareness about paper consumption in Dalhousie University and creating a culture of sustainability in our target population. Identifying the objectives of the research led us to choose three methods to gather our data, which are self-administered questionnaires, an observational study, and face-to-face interviews.

### **2.1 Limitations and Delimitations**

One major limitation for this project was time. The time allotted for this project was three months (January 7<sup>th</sup> until April 9<sup>th</sup>, 2008) to complete the project. This relatively short period of time hindered the group’s ability to gather large samples and contact people for interviews. Also, since the group consists of four members time was a limitation in the sense that it was difficult for all the members of the group to meet at flexible times. Another limitation that was externally imposed on our research is that the



projects are only done on Dalhousie University; this is understandable since the purpose of this research is to contribute to greening the campus movement. Furthermore we will discuss the delimitations that we imposed on our research in terms of boundaries. There are geographical, conceptual and temporal boundaries that delimited our research.

### *Geographical boundaries*

Given that Dalhousie University is large in size and has three campuses Studley, Carleton, and Sexton, we set the Killam Library in the Studley campus as our geographical boundaries. It is centrally located and the hub of student activity due to the various services it provides. It is also one of the main printing stations in Dalhousie University.

### *Conceptual Boundaries*

Although our main objective is raising awareness about paper consumption in Dalhousie University, our research focuses on double-sided printing as a mean to reduce paper consumption. In addition to that, another conceptual boundary was whether or not this research will inform decision makers and produce the desired actions.

### *Temporal Boundaries*

The temporal boundaries include the idea of whether the results obtained from this research will be immediately realized. Also, since this project spans over only one semester, the implementation of double-sided printing in the Killam library and other computer labs may not be realized within the semester.

## 2.2 Self-Administered Questionnaires

Two self-administered questionnaires were conducted for this project. The first one was directed to Killam Library users, and the second self-administered questionnaire was directed to faculty members. The first questionnaire (Appendix C) was conducted to rate the attitudes of Killam Library users about double-sided printing, and to gather data about their printing habits such as whether they print more at home or at the Killam Library and whether or not they knew how to print double-sided.

The sampling technique used for this questionnaire is simple-random probabilistic sampling is the most effect way to identify a random sample according to Palys and Atchiston (2008). The sampling frame for this questionnaire is the entire Killam Library users and that includes students, faculty, and staff. We chose to distribute the questionnaires in the Killam Library's atrium, which is the large open space located within the Library. The selection was based on the fact that the atrium provides us with a cross-section of the Library users and ensures that the sampling was done randomly. Information letters (Appendix B) that include a brief summary about the study were available and were provided to the participants (Palys & Atchiston, 2008).

Each member of the group distributed approximately 50 questionnaires on different days during various times. Table 2.2a shows the dates and times at which the questionnaires were conducted.

*2.2a: Table 1. Shows the dates and times of Killam Library users' questionnaire.*

<b>Date</b>	<b>Time</b>
<b>March 6<sup>th</sup>, 2008</b>	<b>11.30 am to 1.30 pm</b>
<b>March 11<sup>th</sup>, 2008</b>	<b>11.00 am to 1.00 pm</b>
<b>March 12<sup>th</sup>, 2008</b>	<b>10.30 am to 1.30 pm</b>
<b>March 13<sup>th</sup>, 2008</b>	<b>10.30 am to 1.30 pm</b>

Because of time constraints and the difficulty of sampling the entire sample frame, systematic sampling error is a possibility. Systematic sampling error “occurs when aspects of your sampling procedure act in consistent, systematic way to make some sampling elements more likely to be chosen for participation than others” (Palys & Atchison, 2008, p.113). However, the general purpose of this questionnaire is to rate the attitudes of the Killam Library users towards double-sided printing, and during the times that the questionnaire was conducted each person in the atrium had an equal chance of being selected. In total 201 questionnaires were conducted.

The second questionnaire (Appendix D) was directed solely to the faculty of Dalhousie University. The main purpose of the faculty survey was to assess the attitudes and practices of the faculty regarding double-sided printing in the Killam. The sampling frame for this questionnaire includes all the 1,100 faculty members of Dalhousie University. For the faculty questionnaire we used a non-probabilistic haphazard sampling which means we conduct the questionnaires with the subjects based on the ease of access. Thirty questionnaires were obtained at a variety of different times in varying locations of the Dalhousie Campus. Table 2.2b shows the dates, times, and location in which the questionnaires were distributed.

*2.2b: Table 2. shows locations, times, and dates of the “faculty questionnaire”*

<b>Location</b>	<b>Time</b>	<b>Date</b>
<b>Marion McCain Arts and Science Building</b>	<b>1.00 pm to 1.30 pm</b>	<b>March 19<sup>th</sup>, 2008</b>
<b>Chemistry Building &amp; Chase Building</b>	<b>11.30-12.30</b>	<b>March 19<sup>th</sup>, 2008</b>
<b>Kenneth Rowe Building</b>	<b>12.30-1.00</b>	<b>March 19<sup>th</sup>, 2008</b>

The sampling technique clearly does not produce a representative sample; nevertheless the purpose of the questionnaire is to explore some of the practices of the

faculty regarding double-sided printing, for example question 1 in the questionnaire asks if professors encourage double-sided printing in their classes, our hypothesis was that most professors are not aware of double-sided printing and therefore do not encourage it, so the finding from this questionnaire can help us further explore and explain this hypothesis. The responses for both of the questionnaire were then transferred to an Excel spreadsheet for analysis. This will be shown in the results and discussion sections.

### **2.3 An Observational Study**

To increase the reliability of our findings and include more quantitative methods in our project the group conducted an observational study. The study took place in the Killam Library’s Learning Commons on the first floor of the Library. The purpose of the observational study was to record and observe Killam Library users’ printing habits. The study consists of a member of the research group sitting in close proximity to the printers located in the learning commons and observing the printing patterns of the subjects. Using a checklist which has two options, either double-sided or single sided the observer notes what option the participants used to print.

Each group member conducted this observational study for an hour on four different days. Table 2.3a shows the dates and times at which the observational study was conducted by the four group members.

*2.3a: Table 3. shows the times and dates of the observational study.*

<b>Date</b>	<b>Time</b>
<b>March 14<sup>th</sup>, 2008</b>	<b>12.30 pm to 1.30 pm</b>
<b>March 18<sup>th</sup>, 2008</b>	<b>12.30 pm to 1.30 pm</b>
<b>March 24<sup>th</sup>, 2008</b>	<b>1.30 pm to 2.30 pm</b>
<b>March 26<sup>th</sup>, 2008</b>	<b>2.00 pm to 3.00 pm</b>

One of the most common problems with observational studies is the issue of reactivity, which means “the degree to which (if at all) the researcher’s presence causes research participants to react by changing from their “usual” or “normal” behaviour patterns because they know they’re being observed” (Palys & Atchiston, 2008, p. 427). In the case of the observational study conducted by the group the degree of reactivity is kept to a minimum due to the fact that the observers (i.e. the group) have not identified themselves and therefore, the participants printing habits will not be any different than if the group were not present at all.

After all the data from the observational study was collected it was transferred to an Excel spreadsheet for further analysis

#### **2.4 Face-to-Face Interviews**

Another non-probabilistic sampling technique that we used in our project is face-to-face interviews. The sampling technique used is called purposive sampling which means the participant is used based on predetermined criteria from the researcher (Palys & Atchiston, 2008). We conducted two face-to-face interviews. On March 7<sup>th</sup>, 2008 at 2:00 pm the group conducted an interview with William Maes, the Head Librarian in the Killam Library (Appendix F), and on March 20<sup>th</sup>, 2008 at 10.30 am the group conducted another interview with Marc Comeau the webmaster from the systems department in Killam Library (Appendix G).

The main questions asked in these interviews were related to the feasibility of making double-sided printing the default option for printing in the Killam Library however some questions were intended to gather information such as the dollar amount

spent on ink and paper per year. Both interviewees were contacted via email and agreed to participate in the interview. The main purpose of the project was explained before each interview and the responses were noted.

### 3.0 Results

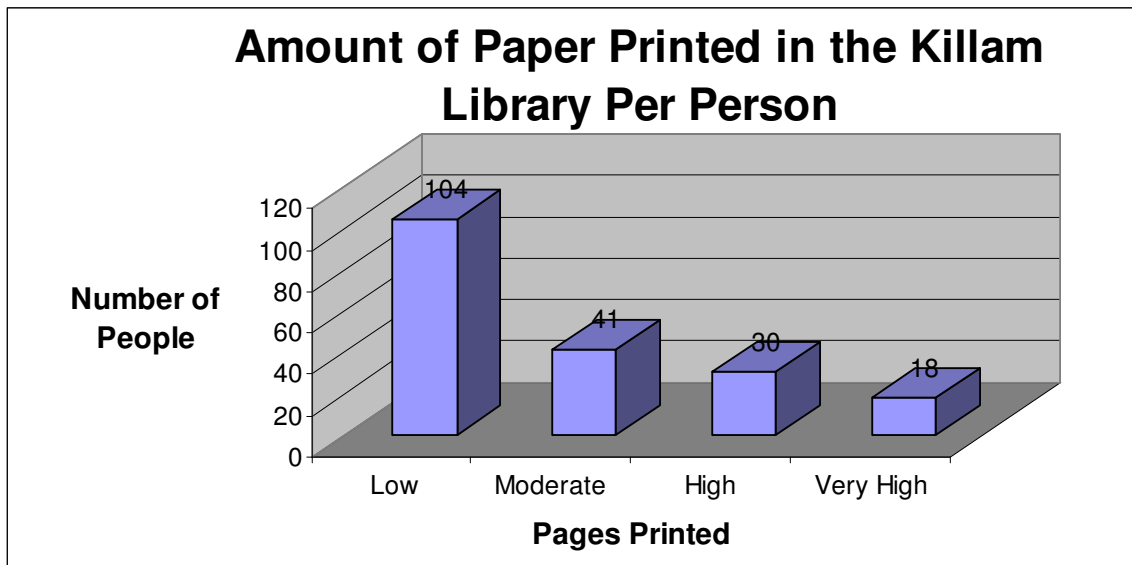


Figure 1 – Average amount of printing per semester.

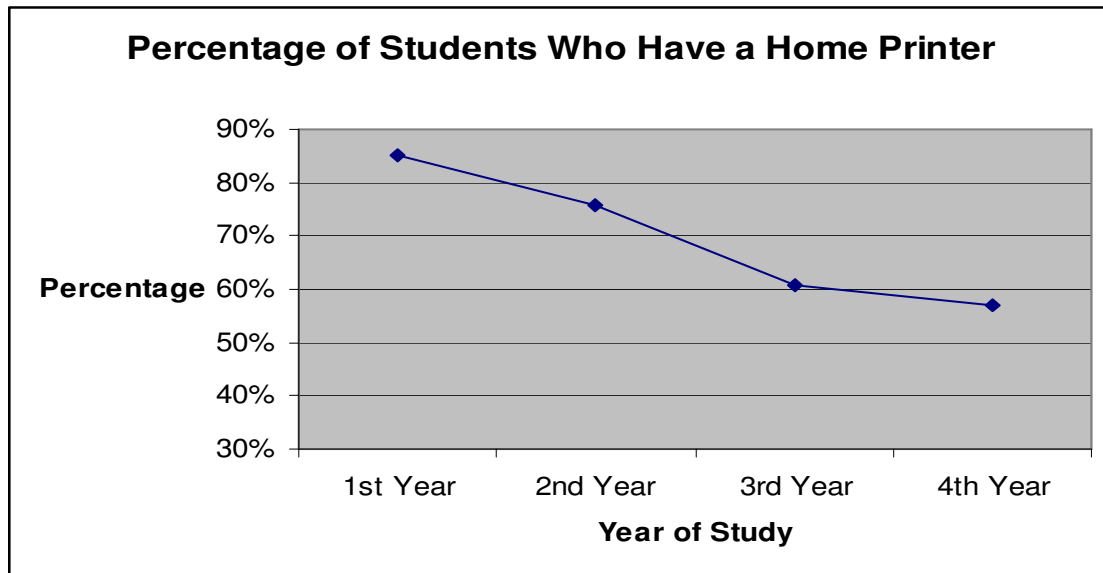


Figure 2 - Percentage of students who have a home printer.

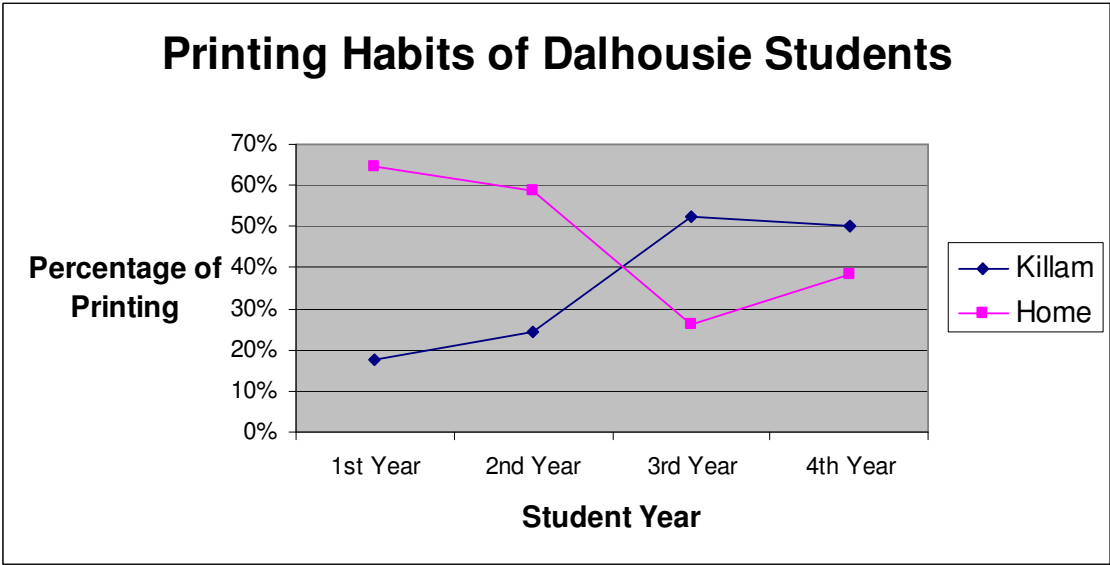


Figure 3 - Preferred printing location by year of study.

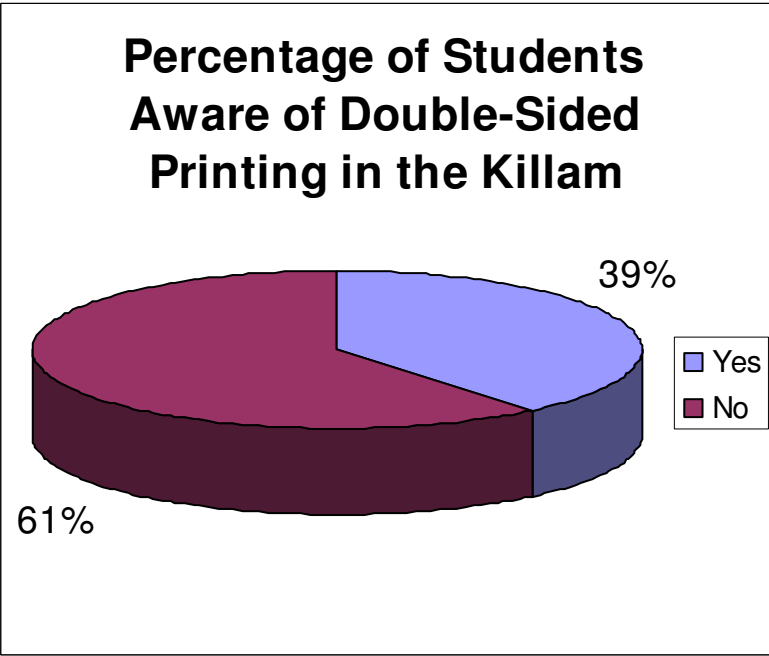


Figure 4 - Pie chart of total respondents aware of capabilities in Killam library.

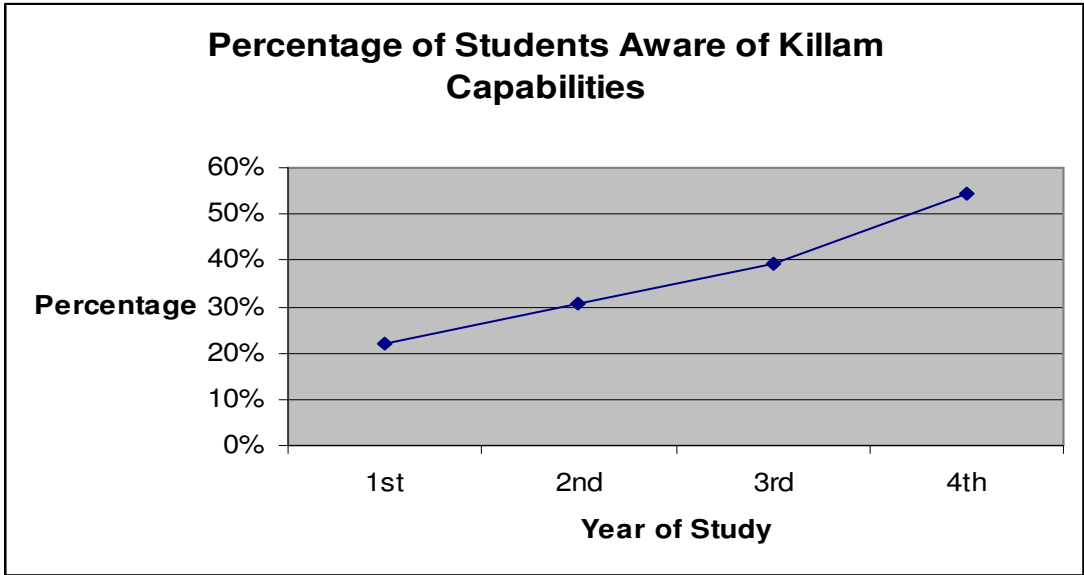


Figure 5 - Percentage of students aware of Killam capabilities by year of study.

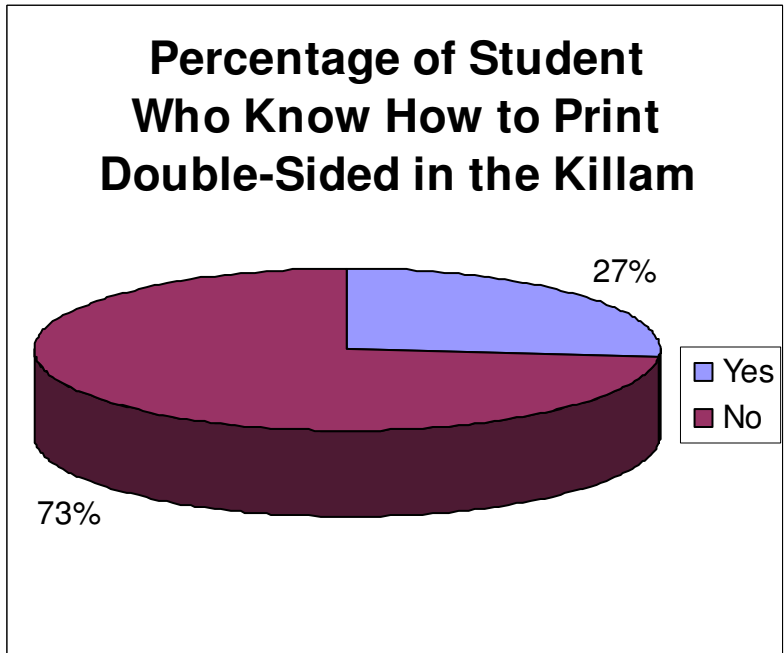


Figure 6 - Pie chart of percentage of all respondents who know how to print double-sided in the Killam.



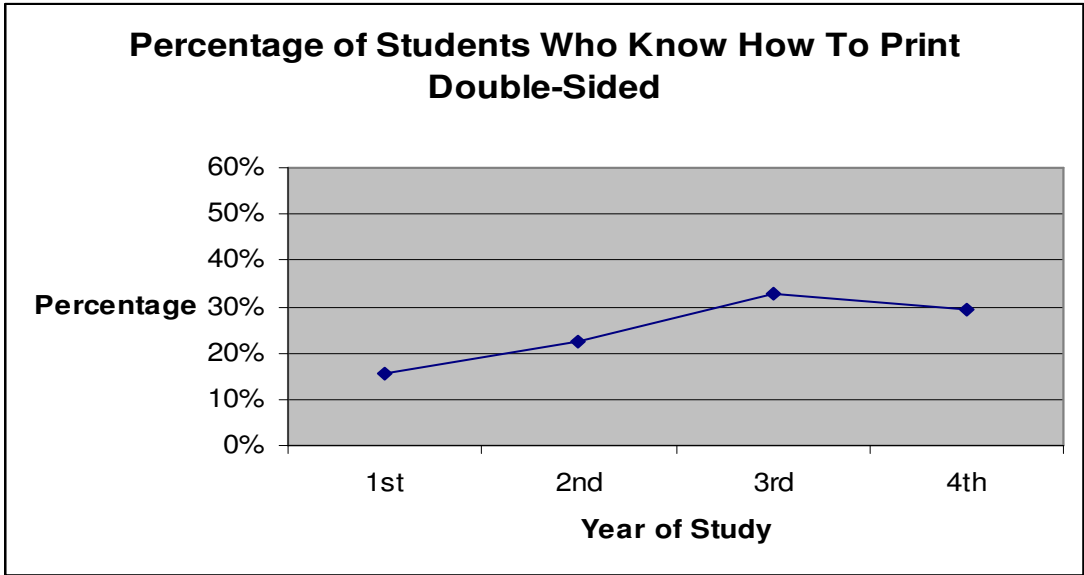


Figure 7 - Percentage of students who know how to print double-sided in the Killam by year of study.

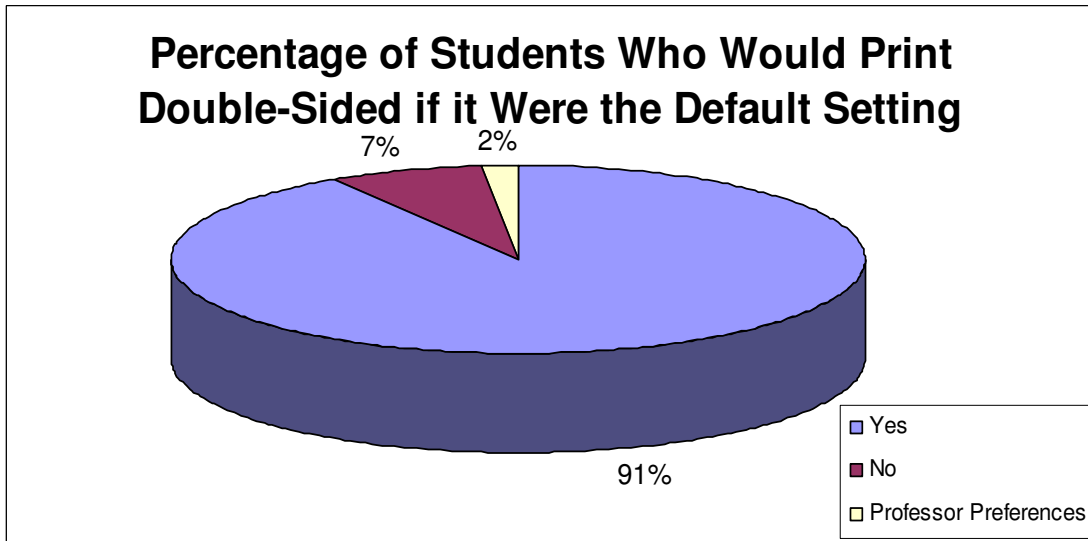


Figure 8 - Student support for double-sided printing as default in the Killam library.

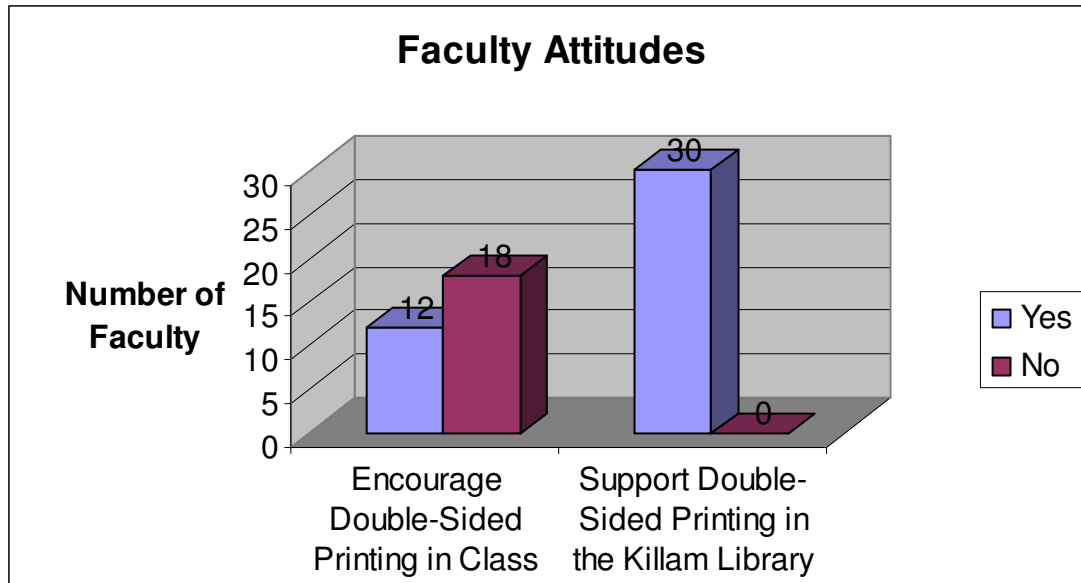


Figure 9 - Current level of faculty encouragement for double-sided printing and support for default setting in Killam.

## 4.0 Discussion

### 4.1 General Results

In total, 201 questionnaires were completed over our study period. We chose to separate them into groups based on year of study or role at the university, for example 1<sup>st</sup> year student or member of faculty. We also sought to know the area of study of each of the respondents, but in the end felt that if we were to separate them again we would be left with subpopulations too small to indicate anything significant. In total, we surveyed 34 first year students, 41 second year students, 46 third year students and 44 fourth year students. Nine respondents indicated that they were in their fifth year or other, while 13 respondents were graduate students and 12 were faculty members.

In total, 34% of respondents said that they were most likely to print in the Killam library. It should be noted that the questionnaires were conducted in the Killam library

atrium, and so could have biased the results. However, we were hoping to survey that subpopulation at Dalhousie in order to determine the printing habits of Killam library users. Conversely, 43% of respondents said that they were most likely to print at home. This could show that Killam library printing is not the biggest source of printing for the students of Dalhousie. This statistic is interesting when it is compared with the percentage of respondents who said they own a printer at home, which were more than two thirds of the respondents.

When asked how many sheets of paper the respondents use per semester in the Killam library, the majority of respondents indicated that their paper use in the Killam is what we would call very low. Around 54% of respondents said that they print 0-30 sheets per semester, on average. Only 9% of respondents said that they print more than 100 sheets per semester (see Figure 1). This indicates that the Killam printers are most often being used for smaller jobs, and less likely to be used for larger printing operations.

#### **4.2 Trends in Printer Ownership**

Figure 2 shows a change in the trend of printer ownership. It is clear that a larger percentage of first year students have a printer at home. Roughly 85% of respondents in the first year said that they own a printer. The trend is a decreasing one, indicating that a smaller percentage of upper year students have a home printer, down to 57% in fourth year. This may be a changing trend in that more and more students are purchasing a printer prior to attending university, or it could imply that upper year students are finding a home printer costly to operate and maintain. A similar study would have to be done in 2 or 4 years to see how this trend would compare to determine the reason.

Figure 2, however, might help to explain Figure 3, which shows that a larger percentage of first and second year students are printing at home, while a larger percentage of third and fourth year students are printing in the Killam library. The Figure shows an opposing trend. There could be a combination of reasons for this, but again we did not ask these qualitative questions in our questionnaire. Because more of our respondents in their first and second years owned printers, they might be more likely to print at home. Also, first and second year students are also more likely to live in residence, which would be either on campus or very close to campus, allowing easy access from campus to a home printer. Students in their third and fourth years might be less inclined to go home from campus in order to print an assignment. As with the change in printer ownership, another study would have to be done in 2 or 4 years to determine whether this trend is continuous or one that is changing because of other factors.

### **4.3 Printing Habits**

Of the respondents who indicated that they owned a printer, around 46% claimed that the printer had the ability to print double-sided. However, when asked whether or not they exercised that ability, potentially using other techniques, only 40% of respondents claimed that they printed double-sided at home.

In the Killam library, around 4 hours were spent monitoring the printing area, and whether or not projects were being printed double-sided. In total, 86 print projects were counted, and of those a mere 7 were printed double-sided, which is around 8%. This indicates that students are either unaware of the abilities of the Killam library printers, or

they are unwilling to print double-sided while at school. Another possibility, which was mentioned on 3 surveys, was that some professors do not want assignments printed double-sided. Because of its location, the Killam library printers are used most often for printing assignments. In contrast to those relatively low numbers, 91% of respondents said that they would be more inclined to print double-sided if it were the default option (Figure 8). This implies that the Dalhousie population is interested in doing more to reduce their paper use, but are as yet unsure how to do so.

#### **4.4 Awareness of Printer Capabilities**

Respondents were asked if they knew that it was possible to print projects double-sided in the Killam learning commons. This became an interesting question, and generated the most feedback. Only 39% of all respondents said that they were aware that the printers in the Killam were capable of printing projects double-sided (Figure 4). Similarly, only 27% of all respondents knew how to print double-sided in the Killam library (Figure 6).

These two questions again showed that there is correlation between year of study and printing habits. Less first year students knew that double-sided printing was possible than fourth year students. Only 22% of the first year respondents knew it was possible, and 16% knew how, whereas 55% of fourth year students knew it was possible, and 30% knew how. When compared with the totals, we can see that first year students' awareness of printing capabilities was below average, while fourth years knowledge was well above (Figures 5 and 7). Grad students and faculty members were also well above average.

#### **4.5 Faculty Survey**

Our faculty survey consisted of only 3 questions, and a sample of 30 individuals. Only 12 of the 30 respondents said that they already encouraged students to print assignments double-sided (Figure 9). All of the respondents said they would consider encouraging their students to print double-sided in the future.

#### **4.6 Interviews**

William Maes, the head librarian at the Killam, indicated that he is in support of the initiative to have double-sided printing the default option in the library. He said that members of the library staff were currently trying to reduce their paper use by printing things double-sided. He said that the new printers in the Killam are physically capable of printing high volumes of paper double-sided. He recognizes that there is no incentive to print double-sided, but also revealed that the Killam library is not making money on the printers. He did indicate that he would be willing to change the pricing of a document printed double-sided, to create more of an incentive. However, he acknowledged that there are technical issues involved, and suggested we speak to Marc Comeau.

Marc Comeau is the Dalhousie webmaster. He was also supportive of this initiative. He mentioned that one of the main issues with this problem is the fact that printing double-sided costs the same as printing 2 single pages. He had been discussing changing this so that a double-sided page costs the same as 1 and a half pages (18 cents instead of 24). He also suggested that we complete a survey rating students' attitudes towards this initiative, as there had been some vocal protest to this idea previously. He suggests that a majority support would be sufficient to enact change.

## **4.7 Level of Support**

Having surveyed a large number of students and a fair representation of faculty, it is safe to say that these groups support this initiative. The percentage of support measured by the student survey is 91%, while in the faculty survey 100% of respondents were behind the idea for double-sided printing as a default in the Killam library. This shows that were this initiative to be implemented, there would likely be praise for the administration on their efforts to reduce the ecological footprint of Dalhousie University. In addition, both library administration and the technical staff support this initiative, meaning that besides the technological limitations, there are no barriers to this being implemented.

## **5.0 Conclusion**

### **5.1 Recommendations for Action**

Based on the findings of this report, certain recommendations can be made. Because of the high level of support for this initiative, we recommend that it be implemented as soon as possible. There is no better time than now to begin reducing our paper use at Dalhousie. Secondly, create an incentive for double-sided printing. Some people may still prefer to print single-sided, but it ought to cost more to reflect the environmental costs of virgin paper use. Printing double-sided at the Killam library should cost no more than 18 cents per double-sided page.

Also, we recommend that the administration at Dalhousie investigate certain rules and regulations. For example, professors at Dalhousie University should be obligated to accept any assignments or reports printed on double-sided paper. We will not go as far as

suggesting that all reports should be printed double-sided, because in certain situations it is not possible. However, those students who choose to print assignments double-sided should not be penalized or asked not to do so. We feel that these changes to the regulations will help students understand that double-sided printing is acceptable and even encouraged by the Dalhousie administration.

## **5.2 Recommendations for Further Research**

Past Dalhousie ‘Greening the Campus’ projects have covered a broad area of topics, including paper use habits and trends. Our project has focused on gathering information from students and faculty to determine their attitudes about default double-sided printing in the Killam library. Through interviews and questionnaires, we have discovered that the technological resources are in place, and student and faculty members are showing enthusiasm for making the change to default double-sided printing in the Killam Learning Commons. This was an exciting discovery for our group, to know that this project was not purely for research purposes, but our data will be used for taking action towards reducing paper consumption.

To further investigate how Dalhousie can reduce their paper ‘footprint’, it would be beneficial to research the feasibility of having default double-sided printing in all common printing areas on campus, or even all three campuses. They are operated by separate faculties and supported by different software programs, but unifying them to a single paper-conserving system would undoubtedly slash the consumption of paper in all faculties.



In the faculty questionnaires that we distributed, some professors mentioned the growing trend of online assignment and quiz submission. This drastically reduces the amount of paper used per class, and is already a successful alternative to using excessive amounts of paper for course-related assignments. An interesting and influential research project could investigate the environmental benefits and implications of shifting course assessments to a predominantly online format. Many professors have already adopted this system in part or fully in their courses. “Paperless” courses at Dalhousie University will drastically reduce paper consumption and will increase student and faculty environmental awareness.

In our research, we found that year of study correlated with certain printing habits; students earlier in their degree owned printers and printed more often from home than students in the later years of their education. It would be interesting to do follow-up research in 2 to 4 years to determine if first year students printing predominantly from home are a continuing trend or an anomaly. This research could determine if the early-year students in 2008 will continue to be printing from home in their 4<sup>th</sup> year, or if they will be more likely to use on campus printing resources as they get further into their degree.

### **5.3 Closing Remarks**

Dalhousie University has been spending more attention to environmental conservation and awareness projects now than it ever has. Climate change and booming human populations are forcing us to reevaluate the way we utilize our current resources,

and is compelling us to find new ways to warm our homes, fuel our transportation, and feed our bodies.

Greening the Campus projects at Dalhousie University have been predominantly researched based feasibility analyses. This project, on the other hand, has shown serious potential for action; student, faculty and staff groups surveyed have shown overwhelming support for a default double-sided program. With cooperation of campus management this initiative can be made a reality. Default double sided printing at Dalhousie University's largest computer lab will significantly reduce on-campus paper consumption and will demonstrate that this institution is actively working towards greening its campus, for students of today and tomorrow.

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## **Appendices**

### **Appendix A**

#### Introduction for Survey

“Hi, my name is \_\_\_\_\_ and I’m doing research on students’ habits and attitudes with regards to paper use in the Killam library. I was wondering if you would like to take part by completing this short survey. It is only \_\_ questions (13 for students, 3 for faculty), and should only take \_\_ minutes (5 for students, 2 for faculty). If you’d like to take part, all we ask is that you answer as honestly and as accurately as possible. Thank you very much for your participation.”

## Appendix B

### Information letter

We are undergraduate students at Dalhousie University in Environmental Sciences. We are currently conducting a study for a research project for ENVS 3502, Environmental Problem Solving II. This questionnaire is to gather information on students' habits and attitudes about double-sided printing in the Killam Library. The report will deal with assessing our findings and making recommendations to the staff and Dalhousie administration

Please answer the questions as honestly and as accurately as possible. This will help us to compile accurate data. The questionnaire is completely anonymous and we will not collect or use any personal information. If there are any questions which seem to invasive, feel free to skip to the next questions.

If you have any questions regarding the research or the final project, you can contact us at [robgriffith@dal.ca](mailto:robgriffith@dal.ca) or [Ab915129@dal.ca](mailto:Ab915129@dal.ca). The final report will be online at the end of the semester on the environmental programmes website.

Thank you for your participation.

## Appendix C

1. What year of your studies are you currently in?

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2. Are you an:

Undergraduate  Graduate  PhD  Faculty  Other

3. What is your major?

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4. Where do you choose to print most of your work?

Killam Library  Other computer labs at Dal  Home  Other

5. Do you have a printer at home?

Yes  No (If **NO**, continue to question 8.)

6. Does it print double-sided?

Yes  No

7. Regardless of answer in Q6, do you print double-sided at home?

Yes  No

8. On average, how many sheets of paper do you print in the Killam each semester?

0-30  31-60  61-100  Over 100

9. Were you aware that it is possible to print double-sided in the Killam?

Yes  No

10. Do you know how to print double-sided in the Killam?

Yes  No

11. Do you know of other places to print double-sided?

Yes  No (If **NO**, continue to question 13.)

12. If yes, is that where you choose to print?

Yes  No

13. If double-sided printing was the default setting for printers at the Killam library, would you print double-sided?

Yes  No

**Appendix D**

1. Do you encourage your students to print their assignments double-sided?

Yes  No

2. If no, would you consider asking your students to print assignments double-sided?

Yes  No

3. Would you support a movement to implement double-sided printing as a default for all printers in the Killam library?

Yes  No

## **Appendix E**

### **Follow-up/thank you letter**

Dear Mr.Comeau,

We would like to express to you our greatest thanks for participating in our project, “The Feasibility of Default Double-Sided Printing in the Killam Learning Commons” and providing us with valuable information. Your insights were very helpful, and you made a tremendous effort in obtaining accurate information that will be used in our project.

We truly appreciate the time and effort you put in to give us this interview.

Sincerely,

Abdullah Alharoun  
Sheena Clark  
Rob Griffith  
Julia Pelton

P.S.

Attached to this message a copy of the interview we carried out on March 20th, 2008.

### **Follow-up/thank you letter**

Dear Mr.Maes,

We would like to express to you our greatest thanks for participating in our project, “The Feasibility of Default Double-Sided Printing in the Killam Learning Commons” and providing us with valuable information. Your insights were very helpful, and you made a tremendous effort in obtaining accurate information that will be used in our project.

We truly appreciate the time and effort you put in to give us this interview.

Sincerely,

Abdullah Alharoun  
Sheena Clark  
Rob Griffith  
Julia Pelton



**Appendix F**  
**Interview with Bill Maes**  
**Friday, March 7, 2008 1:30-2:00**

**What initiatives have you taken in the Killam library to reduce paper use?**

- reduced the number of printers for the staff
- encourage double-sided printing for work
- photocopiers have been switched to print double-sided
- new printers that have the capacity for high volume double-sided printing

**Why does the Killam have no financial incentive when students print double-sided?**

- recognizes the disincentive
- the Killam is not making a profit

**Would you support the default setting on the computers in the Killam to print double-sided?**

- not a lack of interest, more of a technological challenge
- the library printing network is different from other labs on Dalhousie Campus
- Dalcard was supposed to catch onto all of the other computer labs, but never did
- Computer services do not use the Dalcard but print credits, it is a different system

**Who would you suggest to contact about the technical side of switching the computers to double-sided printing?**

- John Robertson- Computing Services
- Marc Comeau- Webmaster at Dalhousie

**Appendix G**  
**Interview with Marc Comeau**  
**Thursday March 20<sup>th</sup>, 2008 10.30 am -10.50 am**

**What are the main issues that are being talked about regarding double-sided?**

One of the main issues that we talk about is that it costs the same to print double sided and 2 pages. We're now working on changing that so that the second paper will cost 50% less if you print double sided. So if you print double sided it will cost you 18 dollars instead of 24. I should also mention that many students did not like the idea of default double-sided printing, or more accurately some vocal students did not welcome the idea so I suggest a university wide survey rating students' attitudes regarding double-sided printing.

**Can it be done technically?**

No big deal technically, could be done in relatively short order, (one term to the next) most of the time it takes is spent on testing and making sure everything works properly. This only has been feasible and technically possible after Christmas. UCIS made changes to accommodate this.

**What percentage of students could bring about change?**

Don't know, library is experienced with these issues. Maybe more than 50% it won't be overwhelmingly huge.

**What can be done to drive change?**

This issue has been on the backburner, but recently there have been some actions taken and the wheels are in motion. As for the main Drivers for change I have to ask my colleagues about the proper channels that this issue has to go through.

**How much is spent on paper & ink per year?**

We spend roughly the same amount on paper and toner every year. This year we spent approximately \$10,000 for each which is down from last year's spending of \$14,000 on paper and toner although the prices are still in the same range.

