

Assessing Paper Usage at the Dalplex

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ABSTRACT:

The greening the campus initiative encourages both staff and students to reduce the ecological footprint of their institution. The athletics facility at Dalhousie University, the Dalplex, was selected for this project for numerous reasons. Paper usage at this facility appeared to be very high. Additionally, all students have access to this building and it is a multi-faceted facility that incorporates fitness, education, school spirit, and financial areas into its operations. This study was conducted to assess the virgin paper usage within the Department of Athletics and Recreation.

A variety of data collection methods were utilized over the course of the study. Both quantitative and qualitative methodologies were utilized to increase the reliability and validity of the data. Surveys were distributed among Dalplex staff, specific individuals were interviewed, and quantitative measures of paper usage were assessed. The triangulation of different methodologies assures the reliability of the study.

The results of this study indicated that full-time staff print with greater frequency and in greater volume than the part time staff. It was also strongly felt by both full and part-time staff members that required tasks could be completed using less paper. Furthermore, many staff members possessed the technological skills to print and photocopy double-sided and on previously printed paper but did not incorporate this practice in the workplace.

Recommendations for implementation at the Dalplex were divided into three tiers of initiatives. Level one initiatives can be implemented immediately, level two initiatives requires the investment of some funds and man hours, and level three initiatives require an alteration of current business practices.

INTRODUCTION:

Paper is considered a necessary part of doing business and ingrained into academic practices. However, with present technology paper usage is not necessary as internet article submission and electronic banking should supply the necessary means of facilitating the requirements of a hard copy. The Greening the Campus initiative aims to change university practices to something more sustainable. As a university we should look to “improve our existing policies and practices in order to set an example of environmental responsibility as an institution” (Unknown, 2001). The way in which the university handles environmental standpoints reflects on how student, once into their career choice, will handle decisions. One of the goals of the Greening the Campus initiative is to purchase low impact environmental products and put a cap on waste leaving the facility (Unknown, 2001). This goal directly applies to the consumption of paper at Dalhousie University.

Dalhousie advocates that all of its varied academic and building operation have positive impact upon the environment (Dalhousie University Senate, 1990). It has a series of environmental policies on sustainable practice that are to be used at the institution. It promotes that all persons and those affiliated with the university work towards being more environmentally conscious (Dalhousie University Senate, 1999). It encourages practices of sustainable operation by ensuring all procedures are environmentally sound using current technology (Dalhousie University Senate, 2006). Dalhousie is currently using “60 to 65 million sheets of paper per year” which indicates that the institutions paper practices are not in line with the environmental policies (Adams et al, 2004).

Our project focused on paper usage at the Dalplex because it is a multifaceted facility having academic, recreational, and business sectors. The Dalplex was selected as the location

for our Greening the Campus initiative because it is a central location known to the majority of students regardless of their faculty (Appendix A, Figure 1). The Dalplex serves as the main location for varsity games, campus recreation and also caters to community members and offers a wide variety of programs including march break and summer camps. All students have access to the building therefore, it can serve as a key role in the lives of many students. It can be argued that school spirit and a sense of community, which is often derived from supporting varsity teams, is generated and intrinsically linked with this building. The building holds the kinesiology department and hosts finals for the campus. To this end we believe the Dalplex is a model representative of the social, economic and educational components of Dalhousie. As a result of this important role in student life and the university community, the Dalplex should strive to honour the environmental commitments made by university administrators.

Through hearsay, prior to our investigation, it was determined that the Dalplex had exceeded its paper quota before December 2006 for this fiscal year, which ended March 30, 2007. Therefore, we felt it was important to conduct an analysis of virgin paper use at the Dalplex.

BACKGROUND

Paper was first discovered in 105AD by a Chinese scholar and government official called Ts'ai Lun. It is made from "suspension of hemp waste in water, then it is washed, soaked, and beaten to a pulp with a wooden mallet" (Williams, 2006). A mould is then dipped into the fibre slurry from "the vat and held for drying". Paper making process is further improved with development of "smooth material for mould covering, starch as a sizing material, the use of yellow dye to repel insects and for added color". The spread of paper making process began in

Korea, Japan, Central Asia and Persia, and finally spread to England in 1494. In Korea the production of paper began in 6th century AD. The pulp had been prepared from fibres of hemp, rattan, mulberry, bamboo, rice straw, and seaweed. Papermaking began in Japan when a Korean monk named Doncho brought it over to the “Imperial Palace in 610 A.D. The Japanese used paper for official records and documentation. The Chinese papermakers taught Tibetans to make their own paper as a replacement to their original writing source. The shape of these Tibetans books reflects the “original palm-leaf books” (Williams, 2006).

It takes approximately 17 trees to make about 1000kg of paper, uses up to 28,000 litres of water, and 3 and half barrels of oil. The resulting resources – in paper form – will occupy 90 cubic feet in landfills (Unknown, 2006). Every year the United States consumes 12,000 square miles of forest to make paper (Treecycle, 2006). The industry emits the fourth highest level of carbon dioxide into the atmosphere. This current system of using raw materials only for producing paper is not sustainable and is detrimental to the environment. One way to combat this further demise to the environment is to use recycled paper or advocate environmentally responsible practices such as printing double-sided documents.

Recycled paper is paper that has been used by the consumer and returned to the mill for recycling (William, 2006). This type of paper is less damaging to the environment than 100% virgin paper as it causes 74% less air pollution, 35% less water pollution, uses 58% less water, and 64% less energy than virgin paper (Recycling Council of Ontario, 1999).

STATEMENT OF PURPOSE:

The purpose of our project is to explore the usage of 100% virgin paper at the Dalplex and assess the extent of its use. It is also to explore which sectors are consuming the most

amount of paper and how they are using it. The answer to this question leads us to a series of recommendations for paper reduction that are practical to the facility.

RESEARCHABLE QUESTION:

How is virgin paper being used and disposed of at the Dalplex by staff?

OBJECTIVES:

1. To assess the amount of virgin paper (8.5"x11") used.
2. To assess how paper is disposed and utilized the Dalplex.
3. To determine the level of computer literacy and environmental awareness among Dalplex staff.
4. To assess how paper is used at the Dalplex (i.e. photocopying, printing and faxing)
5. To determine what paper is used for at the Dalplex (e-mails, promotions, other documents)

IMPORTANCE, RATIONAL, AND SCOPE:

Examining paper usage at the Dalplex is an important component of sustainability at the University. This project is being designed and implemented with the Campus Sustainability Assessment Framework (CSAF) provided by SustainDal in mind. The CSAF is a template style framework of indicators created by Lindsay Cole (2003). The CSAF uses approximately 170 indicators to estimate the level of sustainability within the campus microcosm. The indicators are used to assess the level of economic, social, and environmental considerations at a university, such as level of ethnic food choice availability and how much water is being utilized (Cole, 2003). We hope that the information we collect and recommendations we make can be utilized by SustainDal and implemented elsewhere on campus. Recommendations listed within this document are primarily tailored to the Dalplex and the facility's paper consumption but should not be discounted for use across Dalhousie.

DEFINITION OF TERMS:

The following definitions require clarification for the purpose of our research.

Nominal definitions define *what* the concept means, or what you are after, while operational definitions are indicators of *how* you will capture what you are after (Palys, 2003).

Nominal:

Recycled paper – any paper that has 10% or more post-consumer paper content.

Previously printed on paper – paper that is used only on one side.

Virgin paper (100%) – Paper created from virgin wood fiber that has never before been used to make pulp, paper or board (Confederation of European Paper Industry, 2007)

Part-time staff – individuals employed at the Dalplex, under the Department of Athletics and Recreation, who work less than 40 hours per week

Full-time staff – individuals employed at the Dalplex, under the Department of Athletics and Recreation, who work 40 hours per week.

Dalplex – The primary athletics facility of Dalhousie University. It is located on the Studley Campus at 6260 South Street.

Operational:

Excessive paper use –If paper in the recycling bin is one-sided previously printed on paper then the paper is considered to have been wasted before the resource was completely utilized.

SYSTEMS ANALYSIS:

The larger system that provided the setting for our study was the Dalhousie University Campus. Our system however, was bound by the athletics building, the Dalplex (Appendix A, Figure 1). We included the entire university campus within the scope for our system because; through utilizing the snowball methodology we may have been referred to University staff

outside of the building. Ultimately, the Department of Athletics and Recreation falls in line with university administrative policies and practices.

Our system was defined in 3 ways: spatially, temporally, and conceptually. The spatial definition of the system includes the physical structure of the Dalplex as well as all of its employees. Defining the system temporally was more difficult. During the fall and winter semesters there are significantly more students attending University and therefore, many more members of the Dalplex. On the other hand, there are many programs for members that are run throughout the year including swim lessons, after-school care, March break camps, and summer day camps. The use of virgin, white paper by the Dalplex staff may vary throughout the year as a result of the programs that are occurring and the level of membership. Conceptually, the system must be defined by all the operational functions of the Dalplex.

A conceptual model or framework is the generalization of a model from a real system. The conceptual model of the operational paper scheme at the Dalplex is a simplified representation of a real system. A simplified framework was used to limit data making it easier to interpret the results due to time constraints. The design of the conceptual model can affect validity, data analysis, and results. The model was used to define what would be studied, how it would be studied, and to describe the inputs, outputs and assumptions of the operational paper system. The model was constructed to assure validity, utility and feasibility of the study (Robinson, 2006).

The conceptual model designed for the Dalplex paper system (Appendix B, Figure 2) began with 100% virgin white paper (8.5" x 11") ordered every three months from the Dalhousie print shop. Paper is ordered for the entire athletics department *excluding* kinesiology and physiology. A total of 60,000 sheets of paper – twelve cases containing 5000 sheets – are

ordered during this three month time period for the facility's consumption. This paper is distributed to the coaches, athletic director's office, and marketing department. The marketing department does outsource some of their printing requirements; however they still utilize the paper from the same paper pool mentioned above for internal usage. Internal paper usage includes signage, email, sales reporting, meeting minutes, promotional flyers, training modules, membership forms, schedules, course lists, memos, faxes, mailings and personal usage. We categorized three types of uses for paper at the Dalplex, core business functions, intermediate and personal usage. Core business functions included promotions, receipts, output schedules, signage and memos. Intermediate usage included faxes, emails and mailings. Personal usage included course assignments and emails.

Once the paper was used for its intended purpose it was assumed that it was placed appropriately in recycling collection barrels or shredders. There are two shredders located in the directories and senior manager's offices. There are recycling bins in the public hallway leading to the kinesiology area. There are three large green barrels located in the elevator airlock area. There are also bins located in each individual office or shared area (Appendix C, Figure 3). The bins are collected Monday mornings if required staff will return on Tuesday to pick up any excess and taken to the Dalhousie paper management facility. In 2005, a total of 463.49 tonnes of paper products were collected (Murphy, 2006). All paper products were then transferred to Scotia Recycling located in Burnside Industrial Park.

The perception of an issue can be described on a systematic, proximate or fundamental level. Systematic viewed as a technical problem, proximate as a management problem and fundamental as one ingrained into society (Wright, 2006). If we perceive our system on a symptomatic level then there is not enough paper. Consequently, our solution would be to

increase the amount paper available. However, if the system were to be defined on the proximate level then the solution relies in changed made within the management and operational practices of the Dalplex. In this case, our solution would recommend altering procedures at Dalplex so that less paper is used. The fundamental solution would require a decrease in our reliance on paper. This fundamental issue is not just found in our system, but is found in society. The solution for this level of definition would require knowledge of how business is conducted. The proximate level is manageable for the time limit we have to complete our project; therefore the majority of our recommendations are based on paper reduction.

This system contains various multi-stakeholders, where each participates in a certain way within the system. The part-time and full-time staff would be considered passive actors as they do not have the ability to alter the operations of the paper system at the Dalplex. The assumption was made that personal virgin paper usage was minimal and considered passive. However, if a full-time staff member has the ability to change the paper use within the workplace then they would be considered “should be actors”. They do have an interest in seeing the costs reduced from the usage of paper and there may be an environmental mentality among the staff to see a reduction in paper usage. The custodians at the Dalplex do not contribute to the virgin paper usage at the Dalplex, but they are responsible for recycling within the building. Therefore, the custodians can also be considered passive actors. The core actors in this system would be the senior staff members. This category of staff plays a direct role in the decision making on virgin paper usage at the Dalplex. The university administration is an institutional actor – until we learn otherwise, we are assuming Dalplex purchases paper through the administration.

RESEARCH METHODS

Prior to the commencement of our study, an ethics form was submitted through Dr. Tarah Wright and forwarded to the Dalhousie Ethics Committee. Attached to the ethics form were copies of the survey, interview questions, and cover letters used. These materials can be found in appendixes D, E, F, and G.

Surveys:

The main method of data collection was surveys. The surveys main focus, as a descriptive methodology, was to examine the paper usage at the Dalplex. Subject matter of the questionnaire included patterns of paper consumption and examined participant's attitudes towards reducing paper use. Another section of was based on personal attitudes towards the use of 100% post consumer paper. Surveys were distributed among Dalplex staff in all areas: Coaching, Customer Service, Facilities Management, Building Services, Aquatics, Marketing, and the remaining full time staff. Self-administered questionnaires were distributed among the staff. This method utilized non-probabilistic purposive sampling as it targeted a certain group of individuals. The surveys were used to obtain qualitative as well as quantitative information. The subject matter of the questionnaire included patterns of paper consumption and participant's attitudes towards reducing paper consumption. The surveys also provided Dalplex staff with a chance to self-evaluate their paper usage. Another section of the survey was based on personal attitudes towards the use of 100% post consumer paper. The results of the survey relating to quantitative data were paired with the results of the weighed paper to provide validity to our findings. Through the distribution of surveys we achieved a disproportionate stratified sample (Palys, 2003). The information collected was compared across staffing categories.

Justification of Surveys:

Surveys were an appropriate instrument to use to obtain data for our research in order to reach our objectives. Surveys are an easy way to offer respondent anonymity and for respondent to feel that anonymity is provided. It is also a good way to amass a lot of data quickly (Palys, 2003). We chose to include structured questions because they allow the respondent a small range of responses (i.e. checking off a point on rating scale) and involve some presupposition on the researcher's part about which aspects of a given issue are important to address (Palys, 2003).

Interviews:

This project required collecting data on the initial amount of paper ordered by the Dalplex and its use within the facility. Interviews were conducted with key members of the Dalplex staff. An individual from each of the following areas was interviewed: Facilities management, marketing, and finance. An individual from each area was selected for an interview to get their opinions on paper and its use within the building. Non-probabilistic and snowball sampling was utilized to ensure that the correct individuals were interviewed and then later surveyed. This was done so that qualitative data from the perspective of policy makers could be obtained. Both exploratory and descriptive methods were utilized in the interviewing process.

- An interview was conducted with the purchaser of paper for the Dalplex to determine the volume of paper entering the Dalplex system.
- An exploratory interview was conducted with facilities management to determine how paper is disposed of in the building.
- An interview with the marketing lead, a department assumed to utilize the majority of paper.

Justification of Interviews:

The interviews were conducted because they ensure high response rates (80- 90%) and also tend to increase the quality and clarity of the response as it allows both researchers and participants to elaborate on the questions and answers (Palys, 2003).

Quantitative data collection:

Paper in the recycling bins was weighed to determine the amount of paper disposed of at the Dalplex. The average weight of the containers was subtracted from the total weight which provided the weight of the paper. This weight will be compared to industry standards such as the weight of individual sheets of paper and the amount of pulp and trees required to produce that paper. The comparison allows for a rough approximation of the number of sheets of paper in the recycling bins. The weigh scale used was a common bathroom scale and therefore was not extremely sensitive. 230 sheets of paper weighs at one kilogram on the scale we used so a standard error of +/- 230 sheets of paper can be applied to our weight results. A visual inspection was also conducted to conclude how the paper was being utilized. An eyeballing method was applied, meaning a researcher would sift through the recycled paper and estimate how the paper was being used for example, two-sided printing verses one-sided printing. Eyeballing is typically used in biology population studies to estimate numbers in an animal population. A foreign object, such as a broom handle, was used to sift through the paper. The same researcher consistently evaluated the paper in the recycling bins to minimize bias and sampling error.

Analyzing the Data

After the data and survey information was collected, basic statistical analysis methods were used to present the data and determine if any patterns in paper usage and attitudes existed. The software program utilized in data analysis was QDA Miner. This program was used to

compile the results of the survey and was used to produce the appended graphs. The qualitative data was used to deduce how much paper was not being used to its fullest extent. Combined with the number of full and part time staff and the results of our survey we estimated how much paper staff members think they use and compared it to the set quota and the results of the paper weighing to give validity to our study.

Limitations and Delimitations

This project had to be completed within a single university term, approximately 3 months; therefore, we were not able to realistically evaluate all types of paper used within the Dalplex. In response, we narrowed our focus to 8.5” x 11” paper sheets. Another limitation was the accuracy of paper usage, besides what has already been mentioned, the Dalplex is not a closed system and we could not account for students bringing in paper from different areas and recycling them at the Dalplex. We assumed that there was an equal amount of paper coming in as there was leaving the paper system at the Dalplex. The surveys were distributed to full and part time staff at the Dalplex, where we assumed that everyone would fill them out honestly in order to get an accurate measure of paper usage. The surveys were anonymous, which has the greatest advantage for the participants, but from the perspective of researchers it is the weakest part of the survey because one cannot verify who is responding to the survey or the seriousness with which it is being completed (Palys, 2003). Not all the employees were surveyed at Dalplex, but only particular areas that were believed to have access and use the printers, photocopiers and faxes; therefore we assumed that these employees were generating the most paper usage in the facility. In addition, to surveys we eyeballed and weighed the paper (8.5” x 11”) in the recycle bins to estimate the amount of paper used in the Dalplex.

Reliability and Validity

Validity is important because it allows a researcher to ensure you are measuring what you think you are measuring and reliability certifies the consistency of the testing methods (Palys, 2003)

We used an inter-rater reliability process, where more than one group member analyzed the same interview information and rated the same paper utilization estimation for consistency. (Palys, 2003) Interviews were recorded to ensure the exact wording was transferred to an electronic format giving the entire group the ability to analyze the information. The quantitative data required eyeballing, which means that a personal assessment was required to estimate the percentage of one-side paper in the recycling bins, three different people assessed this for. The estimated percentages were 4% in difference (95%, 99%).

We triangulated the volume of paper being utilized; the results of our survey were consolidated and compared to the paper quota set by the university along with the results of recycled paper weigh amounts to give validity in our assessment. This was to ensure we were receiving accurate numbers.

RESULTS

During our study, 61 surveys were distributed to full and part-time staff at the Dalplex. A total of 36 completed surveys were received. The results of the survey demonstrated that 52% of staff always recycled paper and 39% sometimes recycled paper. While only 6% rarely recycled paper and 3% never recycled paper (Appendix H, Figure 4).

From the 36 completed surveys, 15 were filled out by full-time staff and 21 were completed by part-time staff members. Figure 2 compared full and part time staff to the average

amount of times they printed per week. The results show that 73% print 10 or more times per week and 20% print 1 to 3 times per week. Part-time staff printed more frequently in each printing category than full-time staff. 29% of part-time staff indicated that they printed 1 to 3 times per week and 19% indicated they printed 4 to 6 times per week, exceeded 10 or more times per week, or never printed in an average week. When the size of print jobs were compared between full and part-time staff it was found that 40% of full-time staff printed an average size of 1 to 2 pages per week and 33% printed 10 or more pages per week (Appendix H, Figure 6). The other 27% of full-time staff printed 3 to 5 pages per week. In an average week, the majority of part-time staff (43%) printed 1 to 2 pages per week, while 29% printed 3 to 5 pages and 19% did not print any pages. A lesser proportion (5%) printed both 6 to 10 pages and 10 or more pages per week.

Knowledge of the size of the average print job and the number of times each staff member prints per week, allowed us to explore the rationale behind use of printers or photocopiers at the Dalplex. The results indicated a majority of the population (13%) use paper for cash-related printing and 12% use the printer and photocopier for both reports and signage. Member information accounted for 11% of paper usage and 9% for both mailings and faxes. Surprisingly, only 5% indicated that paper was for personal use and 3% for school related printing or photocopying. Other reasoning for paper usage included drafts for designs and financial records (0.6%) (Appendix H, Table 1).

When asked if staff members believed that what they were required to print could be completed using less paper 28% both strongly and somewhat agreed, while 26% agreed (Appendix H, Figure 4). A lesser proportion (9%) indicated that they either disagreed and somewhat disagreed that they could not use less paper to carry out their jobs. It should be noted

that 28% of the staff did not know how to print or photocopy double-sided (Appendix H, Figure 8). On the other hand, 14% did not know how to print or photocopy using previously printed paper (Appendix H, Figure 9). Table 2 (Appendix H) shows a list of viable alternatives to printing, the most common being email (25%), online submissions (19%), and web resources (18%). Another suggested PDF (0.8%) as a viable alternative.

Two weeks of recycled paper were recorded. An average of 9.75 kilograms was calculated which indicates 2,242 per week and 116,610 per year. In comparing the surveys with the quota of paper set by the facility and recycled paper, we observed a large discrepancy; 61,000 for the survey, 240,000 in the quota (which has been exceeded) and 116,610 for the recycled paper.

DISCUSSION:

The goal of this study was to assess how much virgin paper was being utilized in the Dalplex by staff members. We wanted to explore if there was excessive usage of 100% virgin paper at the Dalplex; and if so, to determine its extent. We also wanted to assess what the paper was used for, i.e. photocopying, printing and faxing and why it was being used, i.e. e-mails, promotions, or other documents.

Overview of significant Findings:

Results of the interview data demonstrate that a quota of 12 cases of paper, each consisting of 5,000 sheets of 100% virgin white paper, is ordered every three months for printers, photocopiers and fax machines. When the amount was exceeded, then more paper was ordered. Possible explanations for this include faxes from sport related promotion companies and a lack of individual staff accountability (Schori, 2007). There is a proportion of 80 percent internal

printing versus 20 percent external printing. Of the internal printing approximately 75 sheets per day is used by each of the 7 full-time marketing staff members (Hynes, 2007).

The results of the survey data show that a majority of the population always recycled their paper (52.8%) and only a small proportion never recycled (2.8%) (Appendix H, Figure 4). Part-time staff most frequently printed one to two pages per week and no full-time staff printed zero pages or six to ten pages but rather printed ten or more pages (Appendix H, Figure 6). Using these numbers in our sample, and the marketing per day usage of 75 sheets, we applied them to the actual number of employees and estimated that staff members were aware of using approximately 61000 sheets of paper a year. A large proportion of the population strongly agreed (28.6%); agreed (25.7%) or somewhat agreed (28.6%) that their required printing usage could be completed using less paper (Appendix H, Figure 5). This means that they are aware that they can print double-sided but the equipments in the facility may not allow them to do so. Another interesting result we found was that 72% of the staff members knew how to print double-sided while only 28% did not know how to. Possible explanations for this could be that the computers do not have the option for double printing. Also, during busy times of the day, some staff may find it easier to just press the print button as opposed to going through the series of steps for double-sided printing. Furthermore, in the interview conducted with Krista Hynes, when asked why people print hard copies of documents such as emails, the response was, “[b]ecause that's the way they have always done it.” Changing the habits of people is “inherently difficult” (Unknown, 2001).

Our surveys were printed on 100% recycled paper, the participants were asked if they could distinguish between the quality of recycled and virgin paper. Many of the responses were similar where most indicated there was a "definite difference, but no reason not to use it." To

follow up the survey asked whether they would be inclined to use recycled paper if it was available. Some of the responses included, "[t]here is not enough difference in quality to justify not using the recycled paper. Another participant responded, "[d]o not give people a choice, just make it available and most won't even notice a difference!" However, the most frequent response for using recycled paper was that it is "better for the environment."

Discrepancies:

The data from the surveys indicated that the staff members believe they use 61,000 sheets of paper a year, the recycle bins indicated 116,610 with 52% of the staff recycling all of the time and the quota consistently being exceeded at 240,000 sheets per year there is a discrepancy. The numbers do not add up. The validity of our assessment has been compromised. However this information could be used for other deductive reasoning. Table 1 (Appendix H) states that cash related printing has the highest frequency and yet the part time staff that work with cash, state that they print very little in week. Using that information we can assume that they do not realize how much they print within a week and the issue lies in the commonality of print jobs.

Sources of Error:

In order to allow for proper discussion and analysis of our results – it is important to discuss the problems and sources of error we encountered. The first problem we encountered involved the distribution of the surveys. Due to hectic, and frequently opposite schedules, we were unable to get the surveys printed and distributed at the Dalplex by our predetermined date; we were two days behind schedule. Additionally, the staff member who received the bulk of the surveys and was asked to assist in distribution did not receive clear instructions regarding who the target group was. As a result, the surveys did not get distributed throughout the building until

two days later. Furthermore, many staff members balked when requested to complete a paper usage survey *on paper*. As a result, some individuals did not take the survey seriously and possibly some of the extended responses reflected that.

The second problem we encountered was with our survey itself. Question numbers 18, 19, 20, asked staff members how often they printed/photocopied/faxed using previously used paper (Appendix E). However, we neglected to provide a box for those staff members who did not use these items of technology. As a result, a skewed number of staff indicated they never fax and never photocopy using previously used paper simply because they do not use those machines. Moreover, as a result of some staff not taking the survey seriously or not realizing that the surveys were for an outside study, some of our results could have been affected. Question number 5 (Appendix E) asked staff members for what purposes do they print while at work. Very few staff indicated that they printed for personal or school related reasons. Lastly, some of our results may have become skewed due to the zealotry of some staff members. Believing that paper is being over-used at the Dalplex, some staff may have exaggerated their actual paper use in order to see change in the facility. However, due to the extensive, and rapid, accumulation of paper for recycling in a given week our results could actually be fairly representative.

A third issue of utmost importance is bias. One researcher is a part-time Dalplex employee and a second individual is on a varsity team and involved in a relationship with a supervisor. In attempts to minimize bias, these two individuals did not conduct the interviews and were not directly involved in distributing the surveys. As the surveys were voluntary and anonymous the researchers did not feel that, as a group, the data would be interpreted incorrectly. All members of the research team, regardless of their affiliation with the Dalplex, would like to see a reduction in paper usage on the Dalhousie campus – which is where our bias lies.

RECOMMENDATIONS:

While conducting our assessment it was realized that a 20% reduction of paper consumption is a very attainable goal. A 50% reduction of paper consumption can realistically be attained with 95% of paper in the recycling bin being only utilized to 50% of its capacity.

Our recommendations include areas of emphasis brought to our attention through the surveys and well known printing practices. All of these recommendations center on the utilization of less paper and purchasing low impact environmental products. The recommendations are organized in a hierarchal fashion into three levels. Level one requires very little man-hours, if any, and no investment of funds. Level two requires some funds and man-hours dedicated to accomplishing implementation of these practices. Implementing the first level should produce enough of a reduction in use to support the extra funds and man-hours. Level three represents a very conscious environment where the environment is the first priority in how business is conducted and can give a great marketing strategy to the surrounding community giving residences the ability to vote with their dollars and choose the facility that is environmentally responsible.

Level One Initiatives

- Encourage good printing practices.
- Collect one-side paper for re-use in the facility.
- Format internet information in a word processor before printing.
- Format margin size to use less paper.
- Read your documents on the computer instead of printing them.
- Proof before your print.
- Use previously used one sided paper in your fax machine and when sending faxes.

- Do not print emails.
- Print end of shift accounting slip on one-sided paper.
- Default printer/copiers to two sided printing

Encouraging good printing practices is listed first because if management encourages this behavior part time staff will be more aware of what they are printing and how much. In other words if management cares about what and how much is being printed it becomes a ripple effect on those who work with them.

Level Two Initiatives

- Use 100% Recycled Paper.
- Make each area be held accountable for their paper usage.
- Enter in the staff training manual how to print two-sided and how to reduce margin size to reduce amount of paper within a particular print job.
- Reformat how reports are presented to management.

100% recycled paper does cost more however a 50% reduction in consumption saves enough money in the budget to afford the switch. As an intermittent choice the switch to 30% recycled (through the Dalhousie print shop) is a very minimal increase and can be afforded immediately.

In light of how much raw material, water, energy and land is use for making paper, it is advisable that management of Dalplex promote a more sustainable paper policy. They must address their use of paper as their current rate of 60,000 sheets of virgin paper for the every three months is not feasible. The current use of paper by staff members and others are not in line with Dalhousie University environmental policy of ensuring that their day to day operations are environmentally sound (Dalhousie University Senate, 1999). The seven staff members use 75 sheets of paper per day, which in a twelve month period are 22,500 sheets of paper. If Dalplex

management enforces the rule of printing on double-sided paper, they would save 11,250 sheets of paper and trees. Besides the promotion of printing double sided, they must make that there are other options to using only 100% virgin paper such as 100% recycle paper. If staff members become aware of how much water, energy, and resources go into the production of paper, they might be encouraged to print double sided. This is easily done by having poster of how paper is made and how much landfills it takes to contain these wasted paper once it is thrown out.

Level Three Initiatives

- Reprogram customer service desk software to use the least amount of paper possible by only printing when requested by a client.
- Every employee has easy access to a double-sided printer and utilizes the option.
- Paper for internal use approaches zero and the facilities intranet is used for all internal communication.
- Only outsource printing contracts to company's that are paper responsible.

This level brings the Dalplex to a solution that satisfies the fundamental issue of paper usage in a professional environment. It does require an investment of both funds and man-hours but can have a spin-off effect of becoming the primary choice for a recreational facility for those members of society that seek sustainable options.

CONCLUSION

Paper is considered a necessary part of a commercial institution because the use of paper is not sustainable and in its very nature it is a necessary evil. The reduction of paper consumption is the only way to become more sustainable. This means that the leaders of institutions should change the face of what is considered professional business practices. Double sided printing and

reusing of paper that has already been printed on should become normal practice. Paper used internally in an office setting should be considered the last option with technology offering much more sustainable options such as back-up drive and network storage. To change the university practices we need to change the habits and professional practices of paper consumption.

There are three main focuses we have highlighted for future paper consumption assessments. To reassess the paper consumption after different levels of recommendations have been implemented. This could tell us how effective each level is to help promote these practices elsewhere. Another focus is to use this same assessment with different locations on campus. Although some areas will need to be altered to be practical for different areas on campus, it can be successful in bring to light new recommendations. The last highlighted focus is to assess where the discrepancy is between what people believe they are consuming in paper produces and what actually is being consumed. Perhaps with more research we can find the best way to break the need for paper consumption,

A 20% decrease in paper consumption was considered because it is a reasonable goal however with a review of our assessment a 50% decrease at the Dalplex is attainable. The printing practices need to be responsible and the paper utilized on both sides, with these recommendations, success in reduction can be foreseen at the Dalplex.

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APPENDIX A

Map of campus

DALHOUSIE UNIVERSITY CAMPUS MAP

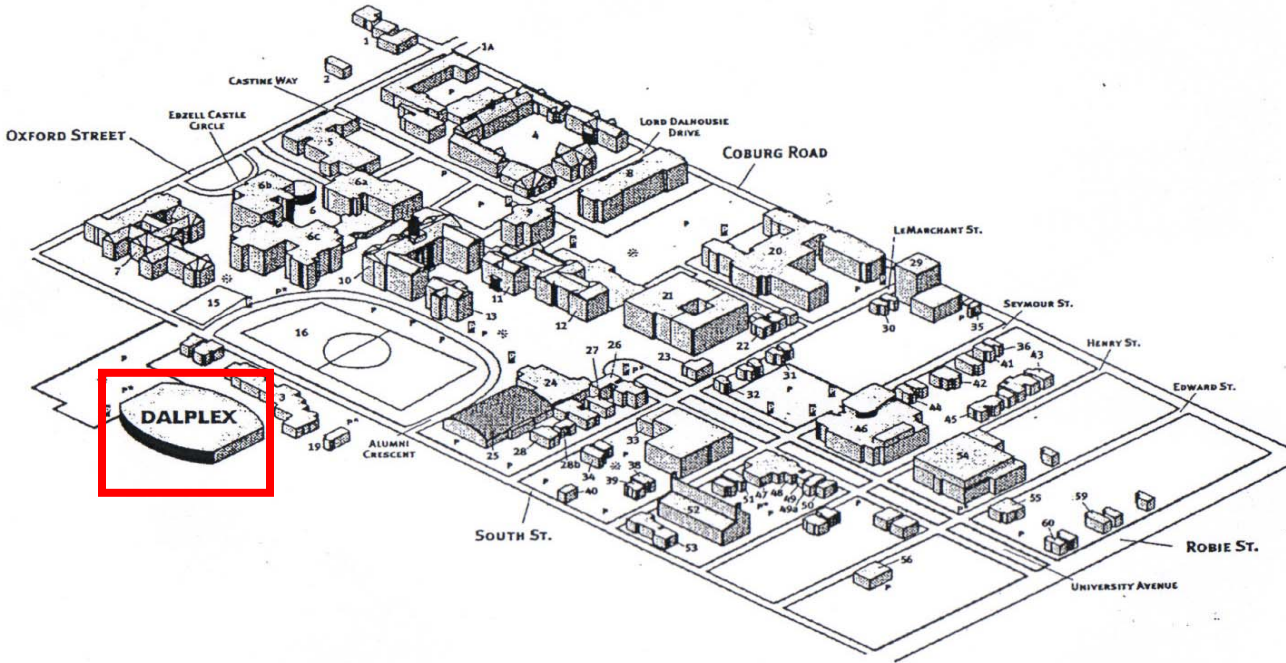


Figure 1: Dalhousie University campus map. Dalplex is highlighted with a red rectangle.

APPENDIX B
Conceptual model

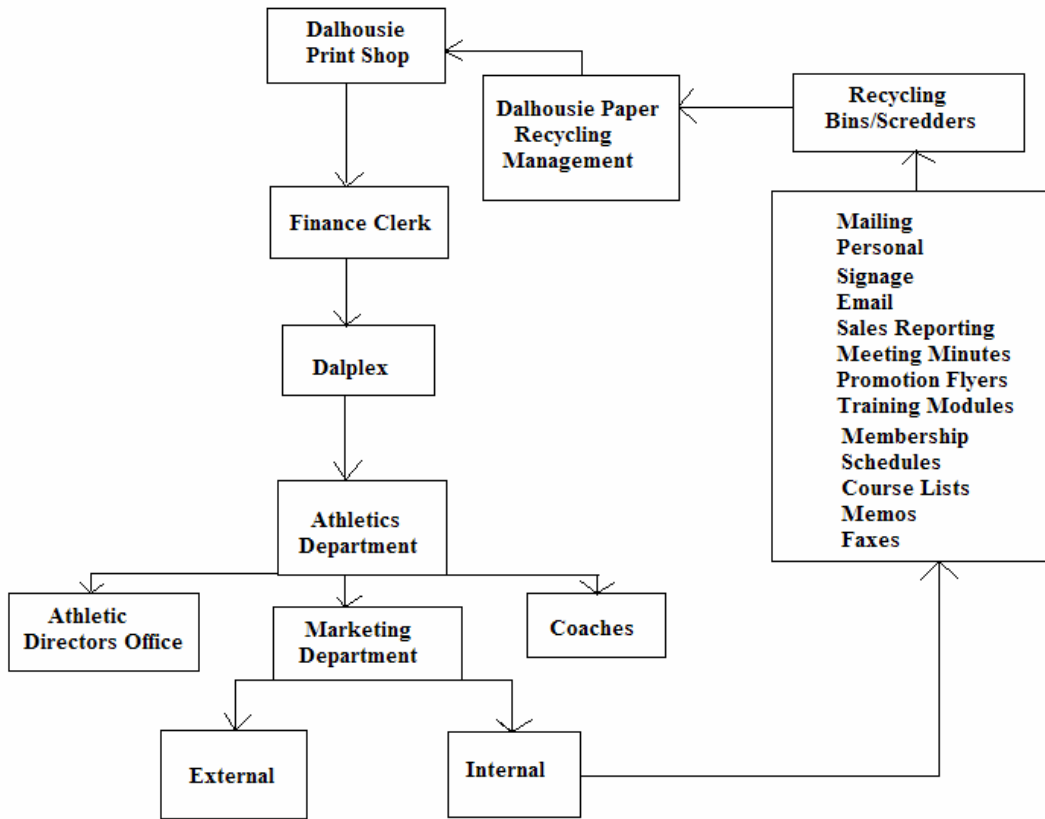


Figure 2: Conceptual model or flow diagram of the paper system at the Dalplex. Paper is ordered from the Dalhousie print shop every three months. Recycled paper put into bins and shredders are picked up every three weeks.

APPENDIX C

Map of recycling bins

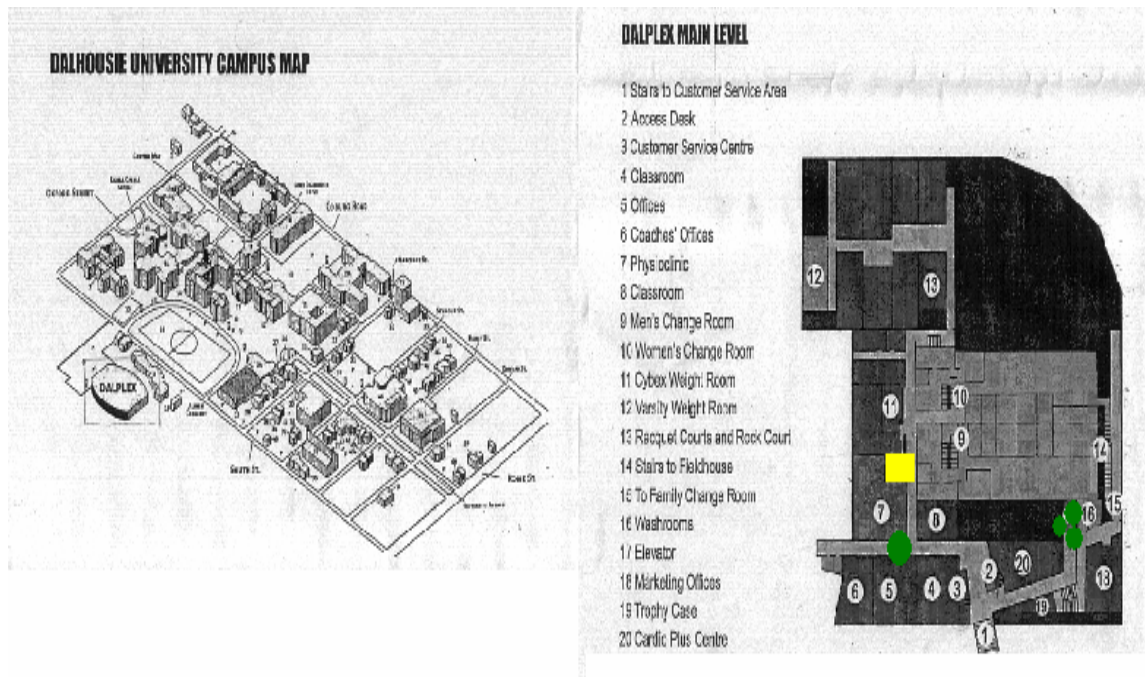


Figure 3: Map of Dalplex indicating locations of paper bins and shredders. There are two shredders (■) located in the athletic director's (not shown) and senior manager's offices. There are paper recycling bins (●) in the public hallways leading to the kinesiology area. There are three large paper barrels located in the elevator lock area on the second level. It should be noted that there are individual paper bins in each office and in shared areas.

APPENDIX D

Information Letter for Surveys

Hello Dalplex Employee,

This survey is to assess the paper usage at the Dalplex and is distributed by a student group doing a course related research project. The focus of our project is to examine the paper usage of 100% virgin paper at your facility.

This survey will take approximately five minutes. This project has been through and ethics review, management approval and the survey is voluntary, anonymous and confidential.

Completing this survey to the best of your abilities will give us valuable information for our research. Please fold your survey in half, staple the open end and return your completed survey to the box labelled “completed surveys” located behind the customer service desk.

If you have any comments, questions, concerns or to obtain information on our study please let us know! Our e-mail address is paperusagegroup@yahoo.ca

APPENDIX E

Questionnaire for Dalplex Employees

1. What is your age?

- 20 or younger
- 21-25
- 26-30
- 31-35
- 36-40
- 41- +

2. Are you a full or part time staff member?

3. What area are you employed in at the Dalplex? Check all that apply

- Aquatics Coach Customer Service Building Services
- Senior Staff Facilities Other If other please list: _____

4. How long have you worked at the Dalplex (check one)?

- Under 6 months
- Between 6 months and a year
- Over one year but less than 2 years,
- At least two years, but less than 3 years,
- At least 3 years, but less than 5 years,
- At least 5 years, but less than 10 years,
- At least 10 years or more

5. Do you use a printer or photocopier at work (check all that apply)?

- Printer Photocopier Fax None

6. For what reasons do you use a printer or photocopier at work (check all that apply)?

- Cash-related printing Course Lists Mailings
- Member Information Memos Reports
- Schedules Emails Signs
- School Related Faxes Personal
- Other (please list): _____

7. Do you recycle your paper?

- Always Sometimes Rarely Never

8. Do you have access to a recycling bin (circle one)?

- Yes No Don't Know

9. Do you think that the printers at the Dalplex should have the ability to print double sided (check one)?

Strongly agree Agree Somewhat Agree
 Somewhat Disagree Disagree Strongly disagree

10. Do you think that the photocopiers at the Dalplex should have the ability to print double sided (check one)?

Strongly agree Agree Somewhat Agree
 Somewhat Disagree Disagree Strongly disagree

11. In an average week how many times do you print or photocopy?

Never 1-3 times 4-6 times 6-9 times 10 + times

12. In an average week what is the average size of your print job?

0 pages (I never print) 1-2 pages 3-5 pages 6-10 pages 10 pages +

13. How often do you print double-sided documents (check one)?

Always Sometimes Rarely Never

14. How often do you photocopy double-sided documents (check one)?

Always Sometimes Rarely Never

15. This survey is printed on 100% recycled paper. Do you see any difference in quality between this paper and paper presently use at the Dalplex (check one)?

Large difference Somewhat of a difference Small difference
 No difference

16. If you perceive a difference in paper quality, please explain:

17. Would you be inclined to use recycled paper if it was available to you (circle one)?

Yes No Don't Know

Please explain:

18. Do you use the blank side of previously printed-paper for your own printing purposes (check one)?

Always Sometimes Rarely Never

19. Do you use the blank side of previously printed-paper for your own photocopying purposes (check one)?

Always Sometimes Rarely Never

20. Do you use the blank side of previously printed-paper for faxing (check one)?

Always Sometimes Rarely Never

21. Do you know how to print double sided (circle one)?

YES NO

22. Only respond to this question if you answered **NO** to question 21:

If you were to receive instructions on how to print double sided on a printer would you do so more frequently?

Yes Maybe No I don't know

23. Do you know how to photocopy double sided (circle one)?

Yes No

24. Only respond to this question if you answered **NO** to question 23:

If you were to receive instructions on how to photocopy double sided would you do so more frequently (check one)?

Yes Maybe No I don't know

25. Do you know how to print using the blank side of previously printed paper (circle one)?

Yes No

26. Only respond to this question you if you answered **NO** to question 25:

If you were to receive instructions on how to print using the blank side of previously printed paper would you do so more frequently (check one)?

Yes Maybe No I don't know

27. Do you know how to photocopy using the blank side of previously printed paper (circle one)?

Yes No

28. Only respond to this question if you answered **NO** to question 27:

If you were to receive instructions on how to photocopy using the blank side of previously used paper would you do so more frequently (check one)?

Yes Maybe No I don't know

29. Paper is being unnecessarily printed at the Dalplex (check one).

Strongly agree Agree Somewhat Agree
 Somewhat Disagree Disagree Strongly disagree

30. I believe that what I am required to print for my job could be done using less paper (check one).

Strongly agree Agree Somewhat Agree
 Somewhat Disagree Disagree Strongly disagree

31. How often do you format documents to minimize paper use (check one)?

Always Sometimes Rarely Never

32. Do you proofread prior to printing (check one)?

Always Sometimes Rarely Never

33. Do you feel any of the following are viable alternatives to printing and photocopying (check all that apply)?

Email Verbal communication Web resources
 Saving on a disk/CD Hand written on less paper Online submission
 Other (please explain)

APPENDIX F

Information Letter for Interviews

My name is Kirsten MacLean and I am emailing you on behalf of my group.

This group is part of a student group that is assessing the use of 100% virgin paper at the Dalplex. We are presently trying to get permission from Mr. Scott to perform this ethics approved assessment. After we obtain permission we would like to interview key people within the Dalplex system. We want to talk with you and set up a twenty minute interview time with you next week. We selected you to interview because we feel that you are the best person in regards to information on how paper is primarily utilized at the Daplex. Please reply via email at paperperusagegroup@yahoo.ca or call me at at your earliest convenience to set an appropriate interview time for you.

Thank-you for your time,

Kirsten MacLean

Paper Usage Group Representative

APPENDIX G

Interview Questions

Interview with Beatrice Schori, Finance Clerk

1. How frequently do you order paper?
2. How much paper does your facility order in that time span?
3. Do you have a paper quota?
 - a) Do you ever go over your quota?
 - b) If so, why do you think the Dalplex did go over its quota?
4. What areas of Dalplex use the paper you order?
5. Where do you order your paper?
6. Is the paper you order 100% virgin bleached paper?
7. Does this facility have different recycled paper alternatives (Such as 10% recycled versus 100% recycled)?
 - a) After viewing the 100% recycled paper would you consider ordering it?

Interview with Kathie Wheadon-Hore, Senior Manager of Building Operations

1. Do you know when the recycling is collected within the Dalplex?
2. Is the recycling collect all within one time period (i.e. every Tuesday morning by 10:00 a.m.)?
3. Do you know where the recycling bins are located?
If so, where are they located?

Interview with Krista Hynes, Senior Manager of Marketing and Member Services

1. Are all of your marketing strategies outsourced to other companies for printing?
2. What is your estimate for the proportion of internal printing verses external printing for your department?

3. What is your estimate of the percentage of paper is used for marketing at the Dalplex?
4. How much internal paper does marketing use and in what time span?
5. What does the marketing department use paper at the Dalplex for?
6. What category of paper usage uses the most paper by marketing and communication sector, such as advertising for events or exchange of office memos?
7. Is the paper that your department uses confidential or is it able to be reused?
If it's not confidential would you be adversed to re-circulate it within this facility to be re-used?
8. Is the paper that your department uses able to be recycled by external recipients?
 - a) Do you know if that paper uses expectable inks in order to be recycled?
9. Do you encourage this behavior within your department?
10. Are there other methods of communicating your department's agenda besides paper media that your department uses?
11. Do you think that these alternative medias of communication are valuable to your department's goals?
12. Do you feel that paper, in general, is used excessively at the Dalplex?
13. These interview questions are printed on 100% post consumer paper. Can you tell the difference between the quality of this paper and the paper that your facility uses?
14. Would you consider using 100% post consumer paper for marketing use?

APPENDIX H

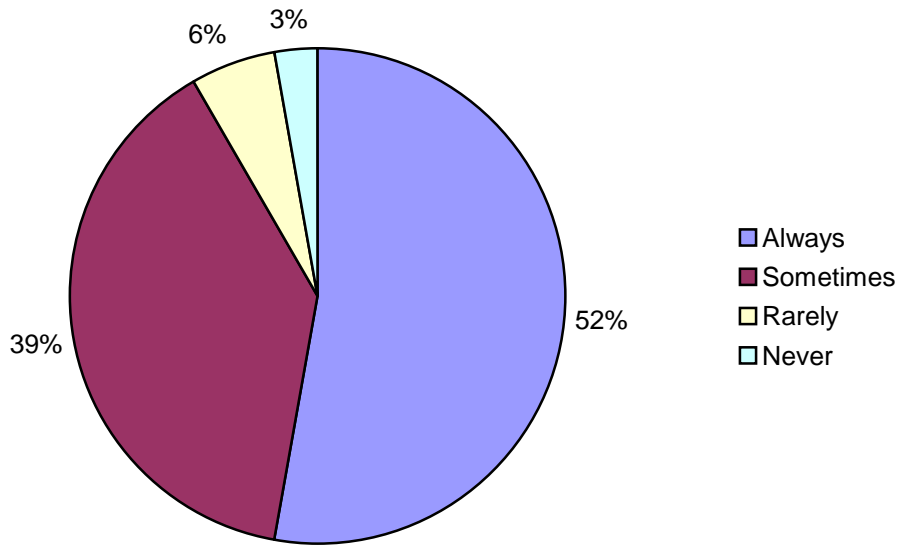


Figure 4: Pie Chart indicating the percentage of Dalplex employees who recycle paper.

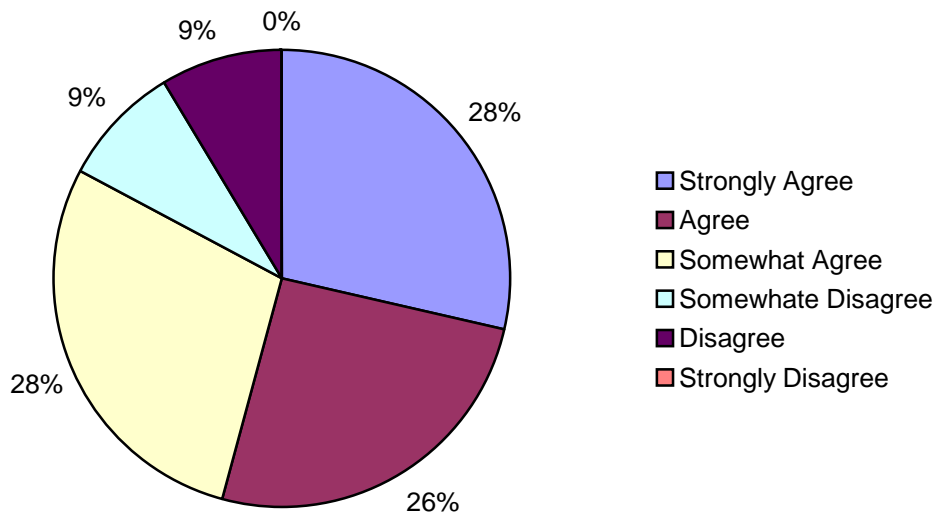


Figure 5: Pie chart showing the responses of Dalplex staff that believe what they were required to print could be completed using less paper.

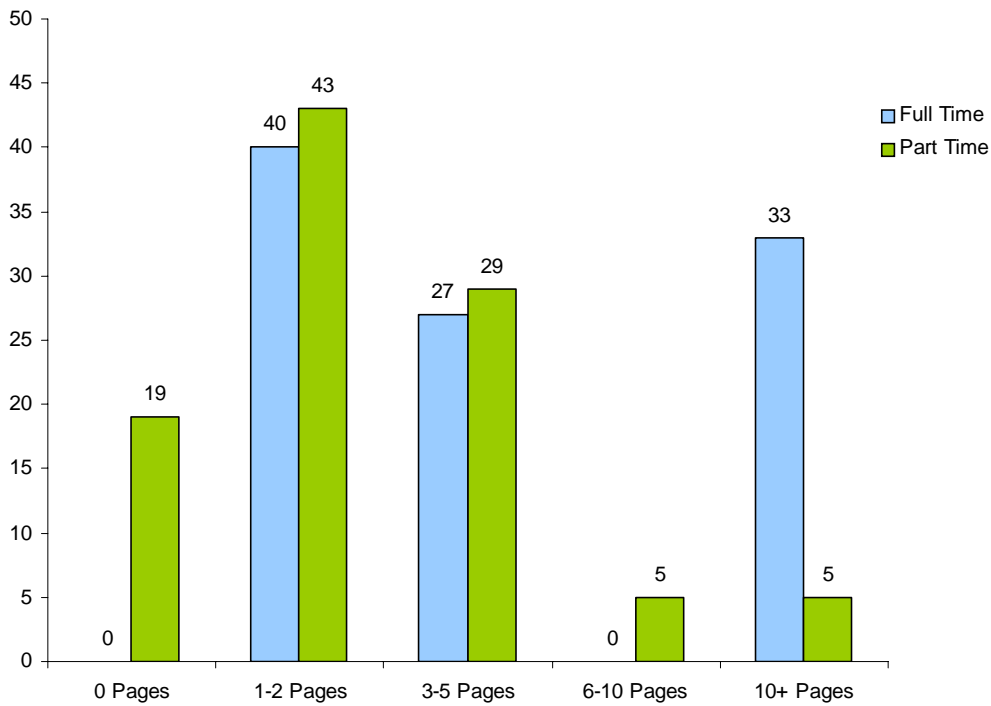


Figure 6: A comparison between full and part-time staff with respect to the average size of their print job.

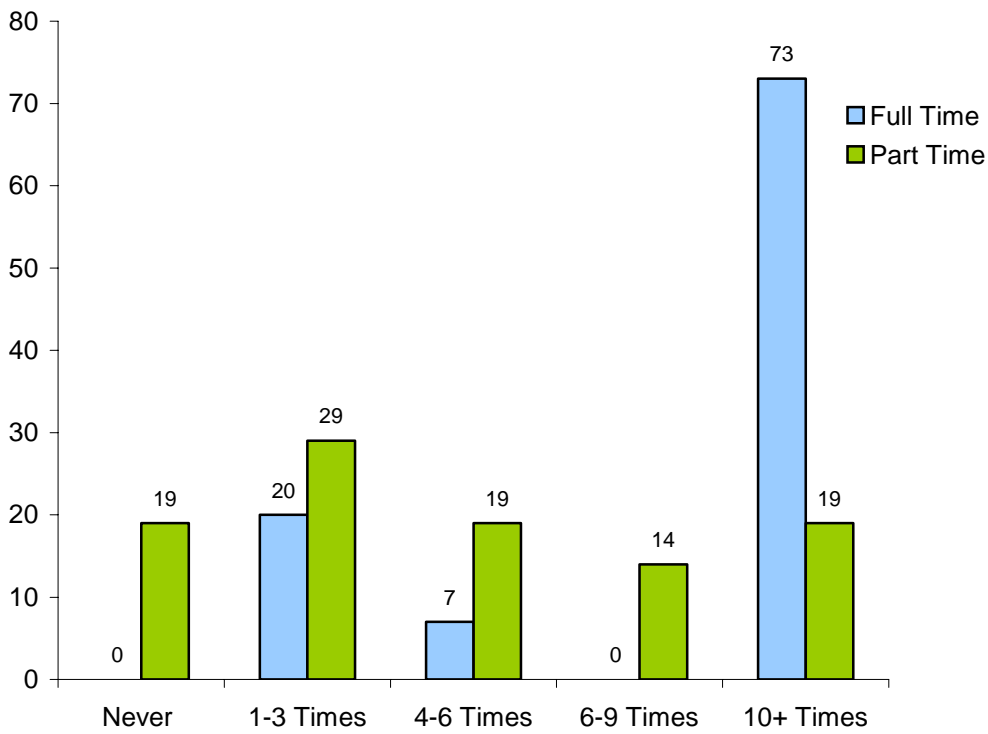


Figure 7: A comparison of the full and part-time staff and the average size of print jobs per week.

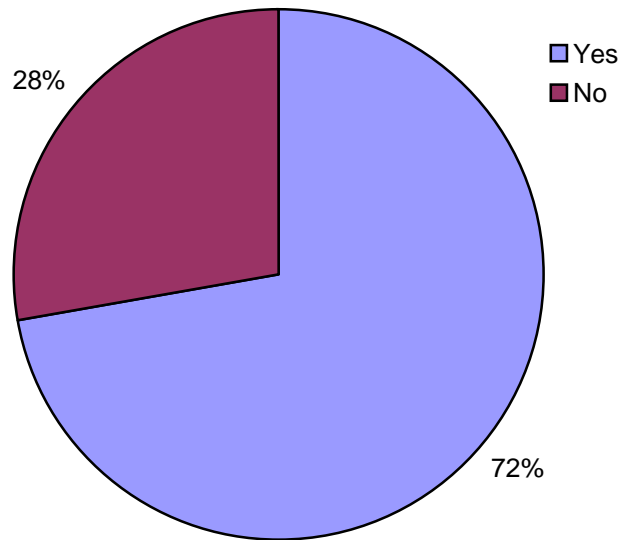


Figure 8: The percentage of Dalplex staff that either know how or not know how to print or photocopy double-sided.

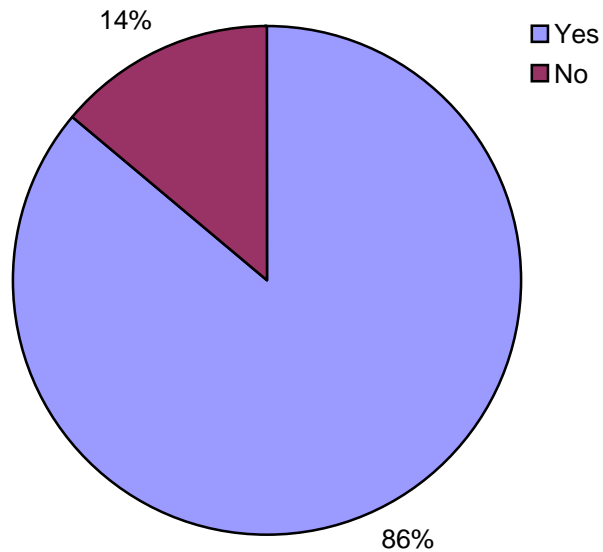


Figure 9: The pie chart shows the percentage of Dalplex staff that either know how or do not know how to print or photocopy using the blank side of previously printed paper.

Table 1: The options staff selected as reasons for using the printer or photocopier at work.

Reasons for Using the Printer or Photocopier	Frequency	Percent Distribution
Cash-Related printing	21	13.1
Reports	19	11.9
Signs	19	11.9
Member Information	17	10.6
Faxes	14	8.8
Mailings	14	8.8
Course Lists	12	7.5
Schedules	11	6.9
Emails	11	6.9
Personal	8	5
Memos	7	4.3
School Related	5	3.1
Design Proofs/Drafts	1	0.6
Financial Records	1	0.6

Table 2: Alternatives to printing or photocopying that Dalplex staff deem viable.

Alternatives	Frequency	Percent Distribution
Email	33	25.4
Online Submission	25	19.2
Web Resources	23	17.6
Saving on a disk/CD	19	14.6
Verbal Communication	17	13.1
Hand written on less paper	11	8.5
Books	1	0.8
PDF	1	0.8