The Effects of Public-Posted Feedback on the Use of a Photocopy Machine by Faculty in an Academic Department

Shijing Hu
Western Michigan University

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THE EFFECTS OF PUBLIC-POSTED FEEDBACK ON THE USE OF A PHOTOCOPY MACHINE BY FACULTY IN AN ACADEMIC DEPARTMENT

by

Shijing Hu

A Thesis
Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Master of Arts Department of Psychology

Western Michigan University Kalamazoo, Michigan August 1992
This study assessed the effects of a public-posting intervention on photocopy machine use by faculty members in an academic department. Public posting included posting of a chart that displayed number of copies made each week by individual faculty members along with the average cumulative rate of copying for previous weeks for each person. The intervention was applied in an A-B-A reversal design where data were collected prior to the intervention under usual conditions (A), during public posting (B), and after the public posting intervention was removed and usual conditions were restored (A). The results indicated that: (1) number of copies made decreased during the intervention, (2) the greatest reduction was among those who showed the highest usage rates prior to the study, and (3) some whose usage rates were low prior to the intervention increased copy usage rates during the program. A cost analysis showed that this strategy reduced photocopy costs during the intervention. It was suggested that differential strategies for low and high users be developed and considered in future research.
ACKNOWLEDGMENTS

I would express a special acknowledgement and sincere appreciation to my main thesis advisor and committee member, Dr. William Redmon, for his kindly and patient advice, guidance, assistance, and in the task of proofreading and correction; to my committee chairperson, Dr. Jack Michael, for his encouragement and support throughout my course of study; and to Dr. Alan Poling, for his participation and support. Appreciation is expressed also to Mrs. Patty Deloach for her assistance in the weekly data collection.

My deepest thanks and appreciation go to my husband, Zhigang Wang, for his love, support, sacrifice, and for help with the study.

Shijing Hu
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The effects of public-posted feedback on the use of a photocopy machine by faculty in an academic department

Hu, Shijing, M.A.
Western Michigan University, 1992
TABLE OF CONTENTS

ACKNOWLEDGMENTS ................................................................. ii
LIST OF TABLES ................................................................. iv
LIST OF FIGURES ................................................................. v
CHAPTER
  I. INTRODUCTION ................................................................. 1
  II. METHOD ................................................................. 5
      Subjects and Settings ................................................. 5
      Independent Variable .............................................. 5
      Dependent Variable ................................................. 5
      Experimental Procedure ........................................... 6
  III. RESULTS ................................................................. 8
  IV. DISCUSSION ............................................................... 18
APPENDIX
  A. Informed Consent for Participating in the Investigation ....... 21
  B. The Approval Letter from Human Subjects Institutional Review Board .. 23
BIBLIOGRAPHY ............................................................... 25
LIST OF TABLES

1. Total Number of and Mean Number of Copies Produced Per Week by Each Subject for All Experimental Conditions ..................................................... 9
LIST OF FIGURES

1. Sample Public-Posting Graph ................................................................. 6

2. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 1 ................................................................. 10

3. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 2 ................................................................. 10

4. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 3 ................................................................. 11

5. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 4 ................................................................. 11

6. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 5 ................................................................. 12

7. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 6 ................................................................. 13

8. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 7 ................................................................. 13

9. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 8 ................................................................. 14

10. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 9 ................................................................. 14

11. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 10 ................................................................. 15
List of Figures--Continued

12. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 11 ................................................................. 15

13. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 12 ................................................................. 16

14. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 13 ................................................................. 16

15. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 14 ................................................................. 17

16. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 15 ................................................................. 17
CHAPTER I

INTRODUCTION

Public posting is a form of intervention that gives the subject feedback through a display of performance data of groups or individuals so that every person in the work setting can access the information visually (Fairbank & Prue, 1982). Public posting interventions have been shown by applied behavior analysis research to be effective for clarifying job performance in business and organizational settings. Furthermore public posting has been shown to be superior to several other types of feedback including written memos and personal letters (Fairbank & Prue, 1982).

Public posting interventions have been used to improve the performance of elementary school children (Kastelen, Nickel, & McLaughlin, 1984), to affect work-related behaviors (e.g., driving speed of automobile) (Van Houten, Nau, & Merrian, 1981), to improve staff activity in a state institution for retarded (Panyan, Boozer, & Morris, 1970), and to increase staff presence and on-time arrival at team meetings at an institution for the handicapped and severely retarded (Hutchison, Jarman, & Bailey 1980). In industrial settings, most public-posting feedback interventions have been combined with other variables. Thus, improvements in performance may not be the result of the public posting alone (Emmert, 1978). In Emmert's study, both group and individual public feedback were presented; and a dramatic increase in performance was seen during the individual feedback, while less of an increase in performance was seen in the group public feedback condition. In this study, more than one intervention was used including goal setting, verbal praise and feedback provided by foremen in the form of individual interviews.
In a study conducted by McNees, Gilliam, Schnelle, and Risley (1979), the only behavior intervention was public posting and other unrelated variables were controlled. The target behavior was employee theft in a snack bar, and posted data described specific products stolen and the time period during which items were stolen. The result was an immediate significant decrease in theft.

In research by Jones, Morris and Barnard (1986), a combination of instructions regarding appropriate performance and posting of graphed group performance feedback were studied. This study was done in a mental health treatment setting where staff cooperation could directly influence patient's rights, and where practices had come under close scrutiny from the courts. Detailed instructions were provided to each person for each job done and group performance was posted publicly. The study showed immediate and significant increases in correct completion of the forms which demanded a good deal of effort by staff members, and the effects were maintained for six months. One public posting study showed a reversal of effects during the last phases of the posting procedure (Stoerzinger, Johnston, Pisor & Monroe, 1978). The setting was a division which salvaged donated household goods; and the subjects were the employees in the housewares division who were responsible for receiving, cleaning, repairing, pricing and packing all household items. During the first part of the intervention, performance improved significantly. However, as the program continued, a reversal of effects was observed. This decrease in performance continued until it reached a level similar to that of baseline. The reasons for these effects are unclear. Observations indicated that employees were highly motivated; thus, the posting intervention should have produced a significant outcome.

A majority of the major studies have reported an effective outcome. However, the only professional-level subjects studied so far are the staffs of institutional settings.
(Favell, 1973; Hutchison et al., 1980). In Hutchison's et al. study, an ABAB design was used to measure the effects of public posting on attendance and tardiness at weekly meetings in a situation where the meeting was a critical component in service. Subjects were direct-care staff in institutional settings. The results indicated that public posting improved attendance especially during the second posting period. Unfortunately, because the public posting was done by a supervisor, the effects of the posting could not be separated from supervisor's presence. Behavior may have changed as a result of the threat or power of the supervisor. In the tardiness area, the intervention failed to decrease tardiness because the baseline level was low and each member's daily schedule was hectic. The author indicated that tardiness was not an effective dependent variable to measure because of the these reasons.

In another study, Panyan et al. (1970) presented feedback in a different way. One group of staff who received feedback immediately after a skills-training class performed best. The results indicated that the longer the baseline lasted before feedback was introduced, the more time was required for staff to reach the expected behavior. The authors suggested that the feedback procedure should be started right after the formal training to maintain higher performance levels. In a second study in this area, Favell (1973) was the first to conduct research on improving the performance of professional-level staff. She provided private feedback to subjects at the end of each meeting. The results showed only slight improvement in performance. The author reported that the weak effects were probably a result of displaying the feedback only to the subjects and indicated that public posting could be a potentially more effective technique.

No study has been done to apply public posting to the performance of professional-level subjects in a university setting or to improve performance directly
related to important job elements in this type of setting. The purpose of the present study was to examine the effects of public posting on the weekly usage of photocopies in an academic department of a university. The copies were paid for by the department and the budget was limited. Therefore, the usage rate had implications for effective planning and management.
CHAPTER II

METHOD

Subjects and Settings

All full time faculty of the Department of Psychology served as subjects in this experiment. All participants were asked to sign informed consent forms before the study (Appendix A). Every faculty member in the Psychology Department could use his/her own code number for photocopies paid for by the department. The setting for the study was the room where the copy machine was located in the Department office. The machine recorded automatically the number of the copies made by each person according to code number.

Independent Variable

The independent variable in this experiment was feedback given to faculty through public posting. A graph which showed the number of copies made by each person each week and the average number of copies made for all previous weeks of the study was posted on the wall by the photocopier each Monday morning at the beginning of the work day.

Dependent Variable

The dependent variable in the experiment was the total number of copies made by each faculty member each week.
Experimental Procedure

An ABAB design was employed to assess the effects of public posting on weekly copying rates.

**Baseline I (A)**

The copy rate data were collected privately every Friday after the office was closed. No special conditions were present and no instructions were given to faculty.

**Public Posting I (B)**

During the first week of the intervention, a graph that displayed the number of copies made was placed on the wall in front of the copy machine in a place easy to view by the users. On the graph, the cumulative average number of copies per week and the number of copies for the immediate past week made by each faculty member were presented (see Figure 1).

![Sample Public-Posting Graph](image)

**Figure 1. Sample Public-Posting Graph.**
Baseline II (A)

The public posting was removed and data were collected as in Baseline I.
CHAPTER III

RESULTS

The effects of public posting were evaluated by means of comparison of copies made prior to, during and following the public posting intervention. The total number and mean number of copies produced by each subject per week for all experimental conditions are shown in Table 1, which indicates the number of copies that each faculty member made, the mean of each experimental phase and the mean for each week for each subject. The data in Table 1 indicate that the mean for all subjects decreased in the public posting phase and reversed during the Baseline II phase. Generally, about 80% of the subjects reduced the number of copies made during the intervention. However, some subjects did not decrease their use of the copy machine; and some of them, especially low users in the pre-intervention phase, increased the number made each week relative to baseline.

For further analyses, the total group was divided into three usage groups using baseline data (i.e., high=220 per week or above; medium=185-220 per week; and low= below 65 per week). The means of the high-user group indicated a large decrease during the public posting phase and a slight reversal during Baseline II phase as indicated in the Figures 4, 5 and 6, or a large decrease in the public posting phase and maintenance of the lower level of usage in Baseline II as shown in Figures 2 and 3.
<table>
<thead>
<tr>
<th>Subjects</th>
<th>Pre-Intervention</th>
<th>Public Posting</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
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<td>Std. Dev.</td>
<td>Mean</td>
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<td>473.3</td>
<td>278</td>
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<td>2</td>
<td>427</td>
<td>338.6</td>
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<tr>
<td>3</td>
<td>330</td>
<td>200.7</td>
<td>98</td>
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<tr>
<td>4</td>
<td>302</td>
<td>156.4</td>
<td>152</td>
</tr>
<tr>
<td>5</td>
<td>256</td>
<td>204.0</td>
<td>135</td>
</tr>
<tr>
<td>6</td>
<td>220</td>
<td>240.6</td>
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<td>7</td>
<td>220</td>
<td>102.9</td>
<td>186</td>
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<td>8</td>
<td>221</td>
<td>103.5</td>
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<td>11</td>
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<td>32</td>
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<td>103</td>
</tr>
<tr>
<td>All Subjects</td>
<td>212</td>
<td>96.6</td>
<td>155</td>
</tr>
</tbody>
</table>
Figure 2.  Average Number of Copies Made Per Week for Pre-Intervention (4 weeks),
Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject
Number 1.

Figure 3.  Average Number of Copies Made Per Week for Intervention (4 weeks),
Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject
Number 2.
Figure 4. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 3.

Figure 5. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 4.
For the medium users the reaction to public posting varied. Some of them (Subjects 7 and 8) showed decreased usage during both Public Posting and Baseline II as indicated in Figures 8 and 9, Subjects 6 and 10 showed decreased usage in the public posting phase, but increased above the levels of Baseline I during Baseline II (see Figures 7 and 11). Subject 9 showed a large increase in the Public Posting phase, and a large decrease in the Baseline II phase as well (see Figure 10). Subject 11 showed a great increase in the Public Posting phase and a slight decrease in the Baseline II phase (see Figure 12).
Figure 7. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 6.

Figure 8. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 7.

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Figure 9. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 8.

Figure 10. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 9.
Figure 11. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 10.

Figure 12. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 11.

Low users, Subjects 12, 13, and 15 increased usage in both Public Posting and Baseline II phases as indicated in Figures 13, 14, and 16. Subject 14 (Figure 15)
Figure 13.  Average Number of Copies Made Per Week for Pre-Intervention (4 weeks),
Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject
Number 12.

Figure 14.  Average Number of Copies Made Per Week for Pre-Intervention (4 weeks),
Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject
Number 13.
Figure 15. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 14.

Figure 16. Average Number of Copies Made Per Week for Pre-Intervention (4 weeks), Public Posting (4 weeks), and Post-Intervention (2 weeks) for Subject Number 15.

showed a decrease in the Public Posting phase, but a large increase in the Baseline II phase. Overall, however, the weekly copying rates of low users were still lower than the medium and high users.
CHAPTER IV

DISCUSSION

The results of this study demonstrated that the Public Posting intervention led to a reduction in weekly number of copies made by faculty members in a university, especially among the high users whose number of copies had a great influence on the Department supply budget. About 80% of the faculty members reacted immediately to the public posting intervention (Table 1).

The overall results agree with the conclusions of Hutchison, Jarman and Bailey (1980) and the findings of Van Houten (1980) who showed that public posting improved staff performance. Also, the results of the present study indicated that a public-posting intervention with professional university staff had much the same effects on performance as those found with nonprofessional staff and professionals in non-university settings.

In the present study, the intervention did not affect all users equally. Most who used the copy machine at high rates prior to the public posting decreased their use during the intervention. Those who made copies at low rates prior to study increased their rates during the intervention, apparently the result of information about their level of use compared to their peers. Some middle users increased their number of copies presumably because they became aware that their usage rates were lower than those of the high users as shown on the posted graph, while other middle-level users decreased their use. This result is similar as that of Hutchison's et al. study (1980). In their study, the intervention failed to decrease staff tardiness at weekly staff meetings for persons with low baseline levels of tardiness.
It is possible that the effects observed were achieved due to the social pressure resulting from the very clear comparisons among staff performances made possible by the public posting. Evidence for social influence included a dramatic decrease in the number of copies made during the first public posting week and refusal by some faculty members to participate in the experiment.

The cost for materials and time for the entire intervention was approximately $40 ($10 per week for 4 weeks). Total copies made was reduced by 855 when the four-week baseline was compared to the four-week intervention. At a cost of 5 cents per copy, the total savings amounted to $43.00. During the post-intervention period, the number of copies made decreased by 480 compared to baseline. Thus, the reduction observed during intervention was maintained during the post-intervention period resulting in a savings of $24 (480 X 5 cents). During the period of the study, total savings amounted to $67; this is $27 more than the cost of the intervention.

For future studies, different types of interventions should be developed for each group of users because the public posting had different effects for the different group of users. The intervention did not appear to be appropriate for the low user group in that their pre-intervention rates were already low. Future studies should provide some kind of reward to keep their use at low levels once the posting begins. In this sense, they could be used as models for other users.

Additionally, it might be a good idea to add a good line to the graph to show the accepted number of copies weekly. It would be better to show the difference between the goal of all subjects and the average number of copies made so that some standard other than the usage levels of these could be set for individuals. Finally, clear rules about items that are acceptable for copying might be helpful. As an intervention in the
future study, a sign could be posted by the machine to remind faculty of the rules regarding use of the machine and appropriate materials for copying.
Appendix A

Informed Consent for Participating in the Investigation
INFORMED CONSENT FOR PARTICIPATION IN THE INVESTIGATION

You are invited to participate in a research study entitled "The effects of Publicly-Posted Feedback in the Use of a Photocopy Machine by Faculty in an Academic Department." This research is being done by Shijing Hu as part of the requirements for a Master of Arts thesis at Western Michigan University. The purpose of the research is to test the effectiveness of a performance feedback system on use of department copy resources and to add information to research on public posting with professional-level staff in a public agency.

As part of this study, data on photocopy use will be posted publicly using faculty names. Therefore if you agree to participate, your copy use rated will be posted with your name on a chart located in the copy room. By signing this document, you will be giving researchers permission to post your data and name. Your signature will also give permission to use the data resulting from this study in research publications and presentations. Although your name cannot be withheld during the study, your identity will be protected in all publications and presentations of the results of this work. In these cases, only code names or numbers will be used to identify individual date.

The risks to you from this research are minimal and your participation is voluntary. You may choose not to participate or to withdraw at any time without penalty. If you have questions now or at any time, you may contact Shijing Hu or William K. Redmon, faculty advisor at 387-4485.

Your signature below indicates that you have read and understood the above information and that you agree to participate in this study.

Signature ___________________________ Date ____________
(Faculty)

Signature ___________________________ Date ____________
(Investigator)
Appendix B

The Approval Letter from Human Subjects Institutional Review Board
Date: February 7, 1990
To: Shijing Hu
From: Mary Anne Bunda, Chair

This letter will serve as confirmation that your research project, "The Effects of Publicly-Posted Feedback on the Use of a Photocopy Machine by Faculty in an Academic Department", has been approved as expedited by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any change in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

xc: W. Redmon, Psychology

HSIRB Project Number 90-01-20

Approval Termination February 7, 1991
BIBLIOGRAPHY


