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The Effects of Feedback Delivery Mechanisms on Employee Engagement Participation

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by

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Abstract

The effects of different feedback mechanisms on safety engagement were examined in an industrial manufacturing setting with twenty employees. During a 30-day period, participants who received feedback showed a significant increase in safety engagement participation when compared to a five-month baseline period of no feedback. There was no significant difference in safety engagement participation between employees who received verbal feedback versus those who received written feedback. Furthermore, survey responses indicated that feedback improved employee attitudes toward the plant's safety program. Together, these findings suggest that feedback systems can be used to effectively improve industrial safety programs.

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Introduction

With worker's compensation claims nearing $56 billion annually (U.S. Department of Labor, 20012), occupational safety programs play a crucial role in many organization. This experimental study explores the effects of feedback mechanisms on employee engagement participation at an industrial manufacturing setting.

Employee engagement programs vary from one organization to another. However, the fundamental goal of these programs is usually the same: to increase work quality and performance by turning employees from followers into active participants (Raines, 2011). Numerous government safety certifications acknowledge the importance of employee engagement by incorporating standards that specifically focus on worker involvement and participation. OHSAS 18001 *Communication, Participation and Consultation* standard requires that organizations demonstrate employee involvement in the development and review of safety policies and goals (British Standards Institution, 2007). The OSHA Voluntary Protection Program takes an even more active stance by mandating that employees be involved in at least three different meaningful aspects of the safety management program (Occupational Safety & Health Administration, 2008). Similarly, the ANSI Z10-2005 ranks employee engagement as one of the core features of a safety management system (Manuele, 2006).

These standards have guidelines that tell organizations what features their engagement programs should have but not necessarily how they should be implemented. This allows companies to develop programs that are shaped to meet their specific safety needs and goals. These safety standards show an industry-wide recognition on the perceived importance of employee engagement.

Companies that invest time and resources in strategic employee engagement programs have seen significant improvements in accident levels and overall safety climate. The results of a meta-analysis conducted by Harter, Schmidt, and Killham (2006) that included over 125 organizations, suggested that companies with strong employee engagement reported 62% fewer accidents than companies with less developed engagement programs. Results from another meta-analysis concluded that a positive employee environment composed of open communication and employee involvement was a main predictor of safety performance (Erickson, 2000).

The evidence supporting engagement programs is overwhelming. In 2002, the Molson Coors beverage company attributed saving $1.7 million in safety costs to the development of a stronger employee engagement program. The report suggested that "engaged employees were five times less likely than non-engaged employees to have a safety incident and seven times less likely to have a lost-time safety incident" (Vance, 2006). Furthermore, safety accidents caused by engaged employees were usually of lower severity and cost than those of non-engaged employees due to increased awareness of major hazards and adherence to safety regulations.

In a different study, a company that implemented a comprehensive employee involvement program that emphasized teamwork and cooperation between management and employees noticed a 100% reduction in safety procedure violations; from 50 violations to 0 violations in a one year period (Ariss, 2003).

Engagement

Although the concept of employee engagement has numerous definitions, for the purpose of this study, engagement is defined as the extent to which a person is emotionally involved and committed to his job and to the well-being of his colleagues and the organization. Raines (2001) argues that successful engagement programs must possess five fundamental factors: employee involvement, consideration of employee ideas, communication, positive feedback, and respect.

One of the reasons engagement is important in reducing accident rates and improving site safety is because employees are the individuals most familiar with their work stations and the hazards associated with them. Workers who spend hours every day performing routine tasks and operating machinery are in the best position to identify hazards and unsafe conditions. A good safety program will train employees in hazard recognition. A better safety program will train employees to report and correct such hazards.

To achieve positive results, a safety management program must create opportunities for employees to contribute to the safety process. Employees must *feel* involved. Their ideas and suggestions must be valued and taken into consideration. Engagement is about empowering employees and giving them control over their work and their environment. This encourages an important level of communication between management and the employees.

However, if employees don't feel that their ideas are taken seriously, the communication between the two groups will decline and the safety reporting process will not lead to any improvements. "Workers may view Environmental Health and Safety (EHS) professionals as safety cops who simply implement and enforce management initiatives and do not truly help employees" (Raines, 2011).

Employees who actively participate and contribute input toward safety projects are also more likely to support new workstation changes and adapt to them in a faster manner. Ergonomic or safety engineering modifications that are supported by employees, experience shorter break-in periods and are more likely to show improvements (Brandenburg & Mirka, 2005).

Engagement must be supported by active management communication. Management must encourage and reward safety suggestions, concerns and ideas from employees. One of the biggest challenges faced by engagement programs is obtaining high levels of employee participation. Companies have resorted to creative ways to encourage participation. Many of these methods involve financial incentives. A manufacturing company in Virginia held a safety poster design competition among its employees. Instead of buying the regular posters, they used the money to reward the employees who came up with the best poster designs and displayed them around the plant. This activity reinforced the safety culture at the site and incentivized employees to be more safety-minded. Another manufacturing company with a poor completion rate of environmental audits and safety analysis cards began a program to donate small quantities of money to the local Boy's Club for each completed safety card. After a six-month period the company had donated over $40,000 and increased participation from 20% to 90% (Williams, 2008).

Although financial incentives can have a positive effect, not all companies have the financial resources to maintain these kinds of programs in order to achieve sustained, long term results. Positive feedback however, has been linked to increased employee performance and could be utilized as an effective, low-cost method to drive employee engagement (Sulzer-Azaroff & deSantamaria, 1980)

Feedback

Feedback is defined as information about one's task performance or behavior as perceived and evaluated by others or oneself (Ashford and Cummings, 1983).

Although numerous studies cite communication as a critical component of employee engagement (Williams, 2008; Raines, 2011; Cook, 1968), literature on the effects of feedback delivery on employee engagement is limited. Feedback research has been historically connected to goal setting theory, in which positive behaviors are attained by developing goals and improved through the use of feedback (Locke, Shaw, Saari, & Lantham, 1981). In separate study, feedback has also been shown to "improve performance, facilitate training, and enhance work motivation" (Komaki, Heinzmann, & Lawson, 1980.)

Visual Mechanisms. Saari and Nasanen (1989) conducted a study in which visual feedback on observed housekeeping behavior was given by using a large graph on a wall. A statistically significant decrease in unsafe behaviors was observed while feedback was provided and the effects were sustained for a two-year follow-up period. Laitinen & Ruohomaki (1996) conducted a similar study at two separate constructions sites. Using behavioral checklists, safety delegates made observations for every day of work. Every week a large graph would be updated with the safety index for those days. The first site with about 100 workers observed an improvement in the safety index from 60% to 89%. The second site with 40 workers also experienced an improvement in the safety index from 67% to 91%. The effects were attributed to the frequent feedback that the employees received, allowing them to recognize bad work habits and begin working in a safer manner at a conscious level. Visual feedback also encouraged communication of safety rules between employees. Additionally, workers were more likely to spot unsafe behaviors and look out for one another.

McAffe & Winn (1989) performed essentially the same experiment in the manufacturing industry with equally positive results. The safety index improved even faster in this setting with the effects of feedback becoming apparent in less than a one-month period.

Verbal Mechanisms. A study by Sulzer-Azaroff & deSantamaria (1980) used verbal feedback to praise employees who used their safety glasses at a facility with a high incidence of eye injuries. The experimental group that received the verbal feedback showed a statistically significant decrease in eye injuries over the control group.

Cooper’s (2009) meta-analysis included four different studies on the effects of verbal feedback on incident rates at manufacturing sites. The results supported those of Sulzer-Azaroff & deSantamaria by revealing statistically significant levels of injury reductions on all of the four studies. The evidence also revealed that daily or intermittent verbal contact with employees was more effective at modifying behavior and reducing injuries than routine weekly contact.

Verbal feedback can be a highly effective leadership and managerial tool. A meta-analysis by Stajkovic & Luthans (2003) reported that supervisory feedback and employee recognition were among the most powerful incentives influencing job performance. Daily informal exchanges between supervisors and employees regarding safe and unsafe behaviors were found to be highly effective at reducing accident rates and engaging employees. This can be especially useful during times of extreme time pressure when safety meetings and other interventions may interfere with production schedules.

Written Mechanisms. Written feedback, individually delivered to employees, has been shown to also have a positive effect on safety performance. Williams & Geller (2000) conducted a behavior-based safety study at a large soda bottling plant in which feedback was given through sealed envelopes to each employee. One group received scores for specific behaviors which the observers were trained to evaluate. The second group received the same information but their feedback cards also contained information comparing their performance to that of the group. The study found that the main effect for written feedback was significantly better for both conditions over the baseline levels. Over a six week period, the group that received the social comparison feedback performed substantially better than the group that didn't receive any. This evidence suggests that the concept of social learning theory (Bandura, 1977) can play an important role in feedback delivery as employees will want to model the performance of the group.

The literature on the effects of only written feedback is more limited than that of written and visual mechanisms. However, the results from the carefully constructed William & Geller (2000) study followed closely the results of both the verbal and visual feedback studies in terms of safety performance gains. There is also no evidence to suggest that written feedback should produce largely different results from other feedback mechanisms explored in this paper.

Multiple Mechanisms. A literature review by Cooper (2009), analyzed 19 different studies on the effects of feedback mechanisms on incident reduction and behavior modification. The results indicated that the best safety performance was obtained when a combination of feedback mechanisms were used. For instance, when verbal, written, and posted visual feedback were combined with weekly safety briefings, the highest levels of incident reduction and behavior modification were achieved. "Processes that use three to four feedback mechanisms had more than twice the impact on injuries and behavior than those with one to two mechanisms, in both static and dynamic settings." Cooper (2009) suggests that combining feedback mechanisms increases the opportunities to discuss safety issues and allows employees to feel more involved in the safety improvement process. Furthermore, not all individuals may respond equally to different types of feedback. By increasing the number of mechanisms, there is a greater likelihood that employees will better process the information being given.

Feedback Summary. Cooper's (2009) meta-analysis on feedback mechanisms is arguably on of the most complete and up-to-date reviews on this topic. Evidence from this and other studies suggests that feedback mechanisms when used by themselves will have a significant positive effect on employee safety engagement and awareness. Cooper's comparison of four verbal feedback studies and 12 visual feedback studies did not find a significant difference between the two mechanisms in terms of intervention effect size. The evidence collected does support that (a) verbal, written, and visual feedback mechanisms have positive effects on safety program interventions; (b) feedback mechanisms are most effective when combined with each other; (c) more feedback mechanisms are connected to greater injury reduction and larger behavioral improvement.

Furthermore, Williams (2008) suggests that employee feedback should be provided right away and focus on specific behaviors. Employee suggestions or concerns should receive follow-up communication regarding the status of their suggestions. Most importantly, the employees should feel that their ideas and/or concerns are valued by the company. At the very least, employees should be regularly thanked for contributing to the safety process (Raines, 2011).

Study Overview

The main purpose of this study is to determine the effects of verbal, written, and visual feedback on employee engagement participation.

A small chemical manufacturing plant with less than 25 employees was selected as the setting for the study. Currently, the employee engagement program at the site requires employees to fill out a hazard analysis card (HAC) every week and an unsafe condition report (UCR) every two weeks. The HACs request that employees check off all possible hazards associated with their current task from a list (See Appendix A). UCRs ask the employees to identify any hazardous conditions within the plant and notify why the condition is unsafe and provide input on how it can be corrected, (See Appendix B). The employee engagement program also incorporates a point-based incentive system. Employees are awarded points for meeting the required amount of HACs and UCRs every month and for going beyond the expected requirements. The points can be redeemed for a monetary reward at the end of the quarter.

Currently, the amount of feedback provided to the employees is minimal. A short employee meeting is held at the end of the quarter notifying employees on their performance. Performance is measured on the number of forms turned in. Employees who meet requirements (4 HACs and 2 UCRs per month) are given a certificate of achievement. On rare occasions, employees are contacted for clarification on their submission or in the case of a serious hazardous condition. Otherwise, employees receive very little, if any, feedback on their submissions.

Employees are only allowed to turn in filled forms. UCRs do not always have to identify major conditions; simple housekeeping issues such as clutter and misplaced tools are also acceptable for submission. This provides employees ample opportunities to identify a valid issue and turn in a report. Although meeting requirements is part of the employees' job expectation, it is not strictly enforced. There are no penalties for not completing forms.

Based on the five-month baseline period, on average a total 69 HAC and 50 UCR forms were turned in per month by employees. On average, an employee turned in 3.5 HACs and 2.5 UCRs per month. The current average percentage of employees meeting requirements was 58%. These data were based on a total of 200 individual reports over that five-month period.

Hypothesis

The researcher has three hypotheses regarding the effects of feedback on the employee engagement program:

a) Formal feedback will increase levels of participation in the employee engagement program over the baseline levels.

b) The participations scores from the verbal feedback group will not differ significantly from those of the written feedback group.

c) Employee perceptions of the safety program, as measured on a survey, will improve over the baseline survey.

Methods

Participants

A total of 20 industrial manufacturing workers from the same facility participated in the study. This sample size is limited by the number of employees currently working at the site. Participants were between the ages of 28 and 54, (mean = 42 years). At the time of the study, all employees had completed the required site safety training. The average length of service at the facility was 10 years, suggesting familiarity with plant procedures and safety policies.

Employees were divided into two groups of 10 participants each. One group received only verbal feedback on their individual safety submissions and the other group received only written feedback on to their individual safety submissions. Both groups received visual feedback as displayed by a progress chart. Individual performance data collected for five moths prior to the study was used to divide employees evenly between the two groups matched by frequency of responses. This was done by averaging the participation scores of each employee during the baseline period and matching the two groups on the mean total scores.

Apparatus and Materials

A company-issued personal computer with Microsoft Excel was used to record the number of HACs and UCRs submitted by each employee.

All forms were made available to employees by placing them in four different stations around the plant. Locked suggestion boxes were used to collect the submissions from the employees. The boxes were located in the same stations as the forms.

A short script was developed to be followed as closely as possible when the safety specialist (SE) provided one-on-one verbal feedback to the employees. The script contained the following key points: 1) a statement acknowledging that the submission was received, 2) a statement specifying the actions that the Safety Department would take to correct or mitigate the safety concern or a statement explaining why safety concern did not present a hazard and no action was required, 3) a statement providing a realistic timeline for the completion of all corrective actions, and 4) a thank you statement for contributing to the safety process. A different script was used in case the SE required clarification about a specific condition. Templates of the scripts can be found in Appendix C.

A feedback report slip was developed to deliver written feedback to the employees. The slip contained the same key components of the verbal feedback scripts. Templates of the slips used can be found in Appendix D.

Visual feedback was delivered through a graph displayed on large television screen at the plant break room. The graph was updated daily with overall submission scores for HACs and USCRs until the 30 day mark.

A short survey was created to gather subjective employee responses on issues regarding levels of work satisfaction, management involvement and opinions on the effectiveness of the plant safety program. The survey was fielded before the beginning of the study and once again a day after the end of the study. A copy of the survey can be seen in Appendix E.

Design

The study explored two separate independent variables: feedback mechanism and month of response. Verbal and written feedback mechanisms were tested using a between-subjects experiment for a period of one month. Feedback response over time was tested using a within-subjects approach that compared participation scores for both verbal and written groups across the baseline and experimental months.

The dependent variables being measured were the employee participation scores (composite number of HACs and UCRs submitted) and employee opinions on the safety program based on surveys given before and after the test period.

Procedure

The performance baseline was determined from employee data collected when no formal feedback was delivered. All conditions present during the baseline period were kept constant during the test period.

An employee survey was given before any feedback conditions were studied in order to obtain a subjective opinion on different aspects of the current safety program.

Feedback delivery was provided for a total of 30 days. The length of the testing period was supported by similar behavioral safety studies in which a noticeable increase in safety performance were observed in experimental groups after delivering feedback for a period of about one month (Al-Hemoud & Al-Asfoor, 2006; McAffe & Winn, 1989). For this duration, every time an employee submitted an UCR, the SE evaluated it and determined the actions needed to resolve the issue. It was the responsibility of the SE to come up with the best strategy to correct the hazardous condition. This often required communicating with maintenance personnel, the plant engineer and/or supervisors in order to devise an appropriate solution. With a strategy in place, the SE would estimate a timeline for the completion of all corrective actions. Having gathered all the information, the SE incorporated it into the feedback script.

Employees were approached by the SE within a period of no more than two days once the UCR was initially submitted. Feedback was delivered closely following the script in a one-on-one session at the beginning of the employee's shift.

Verbal feedback for HACs was slightly different. Because HACs are meant to keep employees aware of their surroundings and do not generate any input from the employees, the feedback was limited to thanking the employees for their submission and notifying them of how many HACs they had already submitted that month.

The written feedback condition followed the same initial steps as the verbal feedback condition. For this group, a feedback report was written stating all of the same key feedback points. Instead of approaching the employees, the SE placed the feedback report in the existing employee drop-boxes located in the plant break room. The drop boxes served two purposes: 1) they reduced second-hand exposure of the written condition to the verbal group and 2) they eliminated the need to inconvenience the employees with papers while they were in their work areas. Drop boxes could be easily accessed by the workers any time of the day. These were checked at least twice per day by the employees when picking up and dropping off their identification badges in the morning and afternoon. Employees took the feedback slips seriously and the researcher can assume with a high degree of certainty that all slips were viewed by employees the same day they were delivered.

The response time to the submissions for the written feedback was, once again, no more than two days. In the event that clarification for certain condition was needed due to an employee having difficulties explaining it in writing, the verbal clarification script was used to fully capture and understand the employee's concern. Once the condition was clarified, feedback was given using the written slip.

To provide feedback for the HACs, a separate feedback slip was given which thanked the employee for their submission and kept track of his/her progress.

The employee survey was fielded at the end of the month to capture an updated view on the plant safety climate.

Results

The analysis focused on three primary aspects which address all the statements in the original hypothesis: 1) the comparison of verbal and written feedback participation scores between the experimental period and the five-month baseline period, 2) the comparison between the written feedback group to the verbal feedback group during the experimental period, and 3) the comparison in survey responses collected before and after the experiment.

To obtain a mean monthly score for every participant, the HACs and UCRs were combined, creating a single composite score. All the analyses were performed using the average composite participant scores. Monthly group scores can be seen in Table 1.

Table 1

Average Group Scores by Month

				95% Confidence Interval	
Group	Month	Mean	Std. Error	Lower Bound	Upper Bound
Written	1	6.600	1.462	3.292	9.908
	2	5.700	1.212	2.959	8.441
	3	5.700	.883	3.704	7.696
	4	6.500	1.500	3.107	9.893
	5	5.400	1.600	1.781	9.019
	6	8.400	1.424	5.180	11.620
Verbal	1	5.400	1.688	1.582	9.218
	2	6.400	1.087	3.940	8.860
	3	6.200	1.236	3.403	8.997
	4	5.300	.700	3.716	6.884
	5	4.900	1.524	1.454	8.346
	6	8.200	1.153	5.592	10.808

Feedback Response

As seen in Table 2, separate repeated measures ANOVAs were used for each feedback mechanism across the baseline and experimental months. A Greenhouse-Geisser correction was applied to account for the violation of Mauchly's sphericity test. Written feedback showed a significant main effect for participation scores by month $F(3.70, 33.32) = 3.24$, $p = .026$, $\eta^2 = .27$, Observed Power = .75. Verbal feedback also showed a significant main effect for participation scores by month F(3.13, 28.19) = 3.10, $p = .041$, $\eta^2 = .26$, Observed Power = .67.

Table 2

Test of Within-Subjects Effects

Group	Source		df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power[a]
Written	Month	Sphericity Assumed	5	12.057	3.245	.014	.265	.849
		Greenhouse-Geisser	3.702	16.282	3.245	.026	.265	.752
		Huynh-Feldt	5.000	12.057	3.245	.014	.265	.849
		Lower-bound	1.000	60.283	3.245	.105	.265	.364
Verbal	Month	Sphericity Assumed	5	14.147	3.101	.017	.256	.830
		Greenhouse-Geisser	3.133	22.579	3.101	.041	.256	.672
		Huynh-Feldt	4.998	14.151	3.101	.017	.256	.830
		Lower-bound	1.000	70.733	3.101	.112	.256	.350

Post-hoc tests using Fisher's LSD correction (as seen in Table 3) showed significant differences between the experimental month and all five baseline months for the written feedback condition. The verbal feedback condition also showed significant differences between the experimental month and all five baseline months. No significant differences were observed between the individual baseline months and are therefore not reported. Average monthly scores with standard error bars can be seen in Figure 1 and Figure 2.

Table 3

Pairwise Comparisons by Month (Fisher's LSD)

Group	(I) Month	(J) Month	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
Written	6	1	1.800	.696	.029	.225	3.375
		2	2.700	.597	.001	1.349	4.051
		3	2.700	.907	.016	.647	4.753
		4	1.900	.809	.043	.070	3.730
		5	3.000	.894	.008	.977	5.023
Verbal	6	1	2.800	.892	.012	.782	4.818
		2	1.800	.512	.007	.642	2.958
		3	2.000	.843	.042	.092	3.908
		4	2.900	.849	.008	.979	4.821
		5	3.300	1.202	.023	.580	6.020

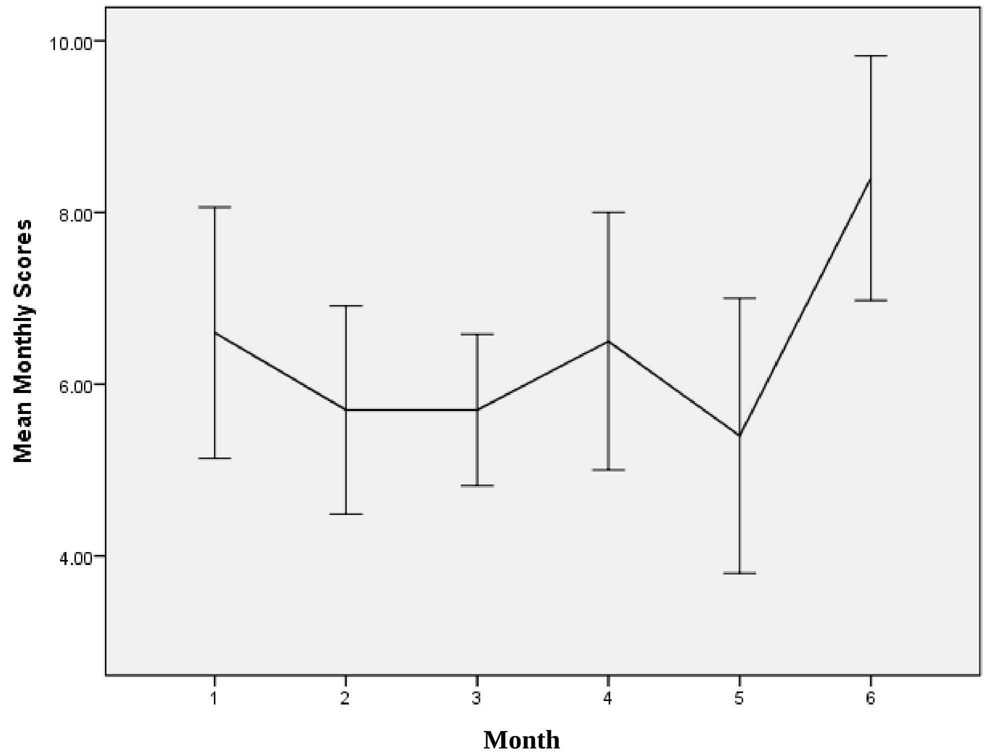

Figure 1. Written Feedback Average Monthly Scores and Standard Error Bars

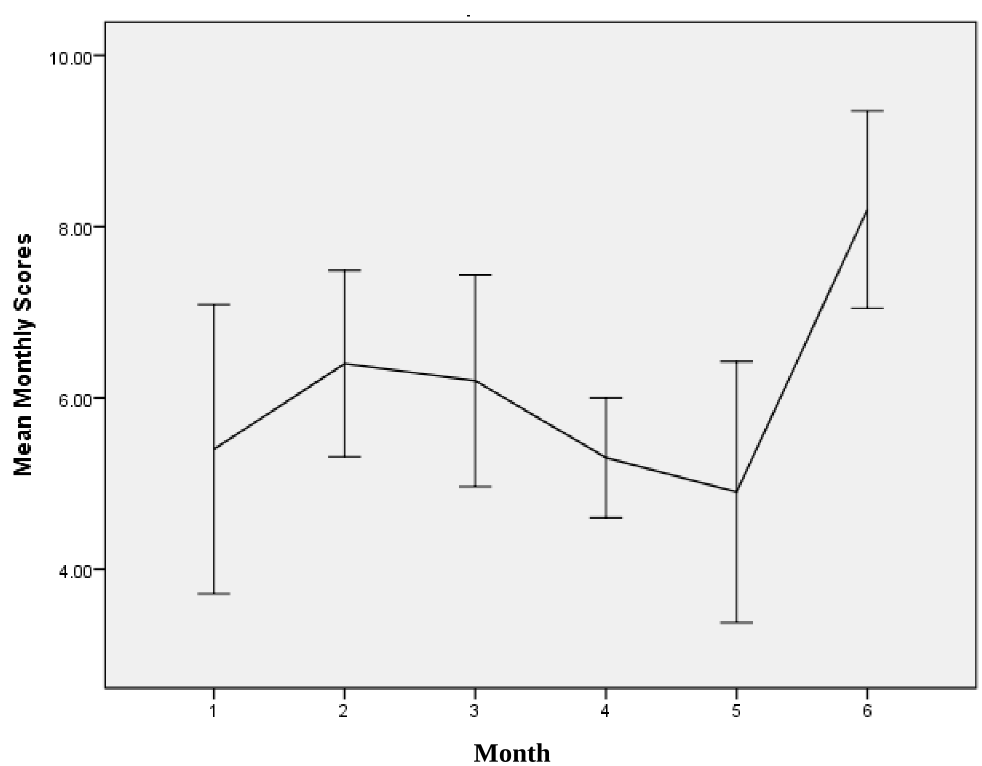

Figure 2. Verbal Feedback Average Monthly Scores and Standard Error Bars

Feedback mechanisms

Because the written and verbal group assignment could only be performed during the experimental month, the effect of the feedback mechanisms was tested using a separate analysis. The data from the baseline periods was collected prior to the study when no group assignments had been made. Therefore, it was not possible to combine both feedback mechanism and month into a single analysis.

In order to investigate the change the feedback program had on response rate, the effect of written and verbal feedback was analyzed by comparing the change scores from the experimental month and the last baseline month for both groups. Since no difference in the baseline reporting was seen as identified in the overall ANOVA, the last baseline month was compared against the experimental month to equalize the amount of time compared between the two conditions. A repeated measures ANOVA revealed no significant difference between the baseline months as observed below.

Table 4

Test of Within Subjects Effects for Baseline Period

Group	Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Written	Month	Sphericity Assumed	11.480	4	2.870	.715	.587
		Greenhouse-Geisser	11.480	3.040	3.776	.715	.553
Verbal	Month	Sphericity Assumed	16.120	4	4.030	.827	.517
		Greenhouse-Geisser	16.120	2.646	6.092	.827	.479

An independent samples t-test (seen in Table 5) showed no significant difference between the participation change scores for the written feedback group (M = 3.00, SD = 2.82) and the verbal feedback group (M = 3.30, SD = 3.80) during the experimental month.

Table 5

Independent Samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Delta	Equal variances assumed	.364	.554	-.200	18	.844	-.30000
	Equal variances not assumed			-.200	16.626	.844	-.30000

Survey Responses

Participants received a short ten-question survey before and after the experimental month. The survey used a five-point scale where 1 = *Strongly Disagree / Very Dissatisfied* and 2 = *Strongly Agree / Very Satisfied.* The frequencies from the survey responses can be seen in Table 6. Analysis of the surveys using a Wilcoxon Signed Ranks Test showed significant differences between the pre-study and post-study responses as seen in Table 7.

Table 6

Survey Response Frequencies

	Five-Point Scale									
	1		**2**		**3**		**4**		**5**	
Survey Question	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
Safety Bucks has increased the safety of the plant	0%	0%	5%	0%	30%	15%	35%	40%	30%	45%
The EHS department takes into consideration my opinions and suggestions	10%	0%	15%	0%	20%	5%	30%	55%	25%	40%
The EHS department provides me with sufficient feedback about my performance	0%	0%	0%	0%	20%	20%	65%	35%	15%	45%
I actively participate in the Safety Bucks Program	0%	0%	10%	5%	10%	20%	50%	45%	30%	35%
The EHS department responds quickly to safety concerns	0%	0%	5%	0%	10%	15%	70%	70%	15%	15%
The EHS department is effective at correcting safety issues	0%	0%	30%	0%	5%	10%	40%	30%	20%	60%
Safety forms are always available when I need them	5%	0%	25%	0%	10%	20%	40%	40%	20%	35%
How satisfied are you with the Safety Bucks Program?	5%	0%	0%	0%	25%	10%	35%	35%	40%	55%
How satisfied are you with safety at the plant?	0%	0%	0%	0%	0%	0%	40%	45%	60%	55%
How satisfied are you with your job?	0%	0%	0%	0%	0%	0%	50%	55%	50%	45%

Table 7

Mean Survey Scores

Survey Question	Pre-Mean	Post-Mean	*Z*-Score	*p* -Value
Safety Bucks has increased the safety of the plant*	3.90	4.30	-2.309[b]	.021
The EHS department takes into consideration my opinions and suggestions*	3.45	4.35	-2.886[b]	.004
The EHS department provides me with sufficient feedback about my performance*	3.40	4.50	-3.244[b]	.001
I actively participate in the Safety Bucks Program*	3.45	4.05	-2.762[b]	.006
The EHS department responds quickly to safety concerns	3.95	4.25	-1.732[b]	.083
The EHS department is effective at correcting safety issues	4.00	4.15	-.758[b]	.448
Safety forms are always available when I need them	3.95	4.00	-.277[b]	.782
How satisfied are you with the Safety Bucks Program?	4.15	4.45	-1.604[b]	.109
How satisfied are you with safety at the plant?	4.60	4.60	-.378[c]	.705
How satisfied are you with your job?	4.50	4.45	-1.000[c]	.317

Note. Indicates a statistically significant difference.*

Discussion

The results support the main hypothesis, suggesting that feedback is an effective method to improve employee engagement in safety programs. The outcomes also validate the literature linking feedback to increase safety performance. As expected, there was no significant difference between the verbal and the written experimental groups. This confirms Cooper's (2009) assessment that the individual performance of feedback mechanisms is relatively equal when compared to one another. Furthermore, survey responses showed that employees' attitudes toward the plant's safety program improved in multiple key areas.

General Observations

The response from the experimental groups to the feedback was positive. The majority of the employees seemed eager to communicate their concerns, no matter how small they were.

They actively engaged with the safety program, raising concerns and suggestions, not only on safety issues, but also on day-to-day operations.

Participation from the verbal and written feedback groups was relatively equal. This suggests that the mechanism used to deliver the feedback did not play a strong role in this process. As long as the message is informative, relevant, and delivered within a reasonable time to participant, it should make no difference if it is done verbally or in writing.

Survey responses showed significant positive increases in employee opinion for many key areas. When asked if the safety program was improving the safety of the plant, agreement increased from 65% to 85%. Fewer employees felt neutral about the program and no employees disagreed with the statement.

After completing the study, 95% of employees agreed that management was talking their opinions into consideration versus 55% before the study. Finally, when asked if they actively participated in the program, 75% of employees agreed post-test versus 60% pre-test. Equally important, disagreement to the statement dropped from 30% pre-test to only 5% post-test. These findings indicate a greater sense of involvement from both employees and management; key attributes of a successful safety program (Raines 2011).

When asked if the EHS department responded quickly to safety concerns those who ‘strongly agreed’ increased from 15% to 45%. Similarly, when asked about their level of satisfaction with the safety program, those who were very satisfied increased from 40% to 55%. These changes reveal a positive directional change in employee attitudes.

Limitations

The baseline period was created before the experimenter began the study and therefore, it was not possible to randomly select and track groups from early on. The written and verbal groups could only assigned during the experimental month and the interaction between baseline/experimental month and the type of feedback could not be measured.

Another limitation is the possible introduction of response bias in the survey responses. As with other survey instruments, there is a possibility respondents may answer questions in the way they think the questioner wants them to answer rather than according to their true beliefs.

It should also be noted that running and maintaining a feedback system like the one in this study is a time consuming activity and may not be a feasible option for organizations with a large number of employees.

Applications

A simplified feedback system with more practical delivery mechanisms could be applied to a variety of manufacturing operations to improve engagement in safety programs. Although it requires an investment in personnel time, it is otherwise cost-efficient and very effective. While some programs focus on rewards and financial incentives to increase engagement (Williams, 2008), a feedback system drives engagement through increased management involvement and communication.

Summary

The study supported the three original hypotheses:

a) Formal feedback significantly increased levels of participation in the employee engagement program over the baseline levels.

b) The participations scores from the verbal feedback group did not differ significantly from those of the written feedback group.

c) Employee perceptions of the safety program showed significant improvements over different categories between the pre-study survey and post-study survey.

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Appendix A

Hazard Analysis Card Form

Safety Analysis Card

Create a Safe Day

Prior to starting a job assignment, stop and take time to assess the hazards of the job. Identify areas where hazards occur or potentially occur. Your input helps mitigate those risks!

Remember Safe Start Principles: Rushing, frustration, fatigue, and complacency lead to critical errors – eyes not on task, mind not on task, line of fire, loss of balance, traction, or grip.

Name:____

Date:________________ Job Task:______________________

Building:______________ Area:_________________________

I have received proper training to complete this job

(Yes or No) _________

Hazard Sources: (check all that apply)

- ☐ Drums, Boxes, Containers
- ☐ Power/Hand Tools
- ☐ Electrical
- ☐ Pressurized Systems
- ☐ Noise
- ☐ Forklifts
- ☐ Chemicals
- ☐ Heavy Equipment
- ☐ Environmental (Heat/Cold)
- ☐ CTD (Cumulative Trauma Disorder)
- ☐ Confined Spaces
- ☐ Cranes/Hoists
- ☐ Pinch Points
- ☐ Ladders/Scaffolds/Lifts
- ☐ Falls
- ☐ Lighting
- ☐ Stairs/Walkways
- ☐ Working surfaces
- ☐ Inhalation
- ☐ Lockout/Tag-out

Potential Injuries: (check all that apply)

- ☐ Abrasion
- ☐ Amputation
- ☐ Concussion
- ☐ Electric shock
- ☐ Hernia
- ☐ Respiratory
- ☐ Cut/Laceration
- ☐ Burn (Thermal)
- ☐ Contusion
- ☐ Heat/Cold Stress
- ☐ Eye
- ☐ Heat/Skin Rash
- ☐ Crushing
- ☐ Burn(Chemical)
- ☐ Fracture/Dislocation
- ☐ Back
- ☐ Poisoning
- ☐ Sprain/Strain

PPE Required: (check all that apply)

- ☐ Bump Hat
- ☐ Goggles
- ☐ SCBA
- ☐ Leather gloves
- ☐ Rubber boots
- ☐ Hearing protection
- ☐ Face shield
- ☐ Dust mask
- ☐ Chemical gloves
- ☐ Cut proof gloves
- ☐ Welding shield
- ☐ Chemical suit
- ☐ Full face respirator
- ☐ Safety Harness
- ☐ Safety Glasses

Suggestions to Reduce Risk (use back if needed)

Appendix B

Unsafe Condition Report Form

Unsafe Condition Report Form

ENVIRONMENTAL HEALTH & SAFETY

Name: ____________________ Date: _________________

Request Type: ☐ Maintenance ☐ Safety

Area in which condition exists:

____

Please provide a detailed description of the problem:

____
____
____
____
____

Contributing factors (please check all that apply)

	Lack of Guards		No Guard Rails
	Inadequate Guard		Reckless use of Forklift
	Defective Equipment		Explosive Materials
	Hazardous Arrangement		Damaged Equipment
	Disputes among employees		Cluttered Floors
	Unsafe Ventilation		Blocked Isles
	Hazardous Methods/Procedures		Blocked Fire Exits
	Insufficient Lighting		Poor Housekeeping
	Tripping hazard		Equipment Failure
	Concentration of fumes/dust/gases		Overloaded Pallet/Platforms
	Abnormal temperature and humidity		Ignoring of Rules and Procedures
	Horseplay		Other:
	Lack of Personal Protective Equipment		

How do you think this problem can be corrected?

____
____
____
____

Appendix C

Feedback Scripts

Script A: (corrective action)

Hi (employee name). Could I talk to you for a minute?

I wanted to thank you for turning in an unsafe condition report. I'm just letting you know that I have looked through it with (engineer/maintenance/supervisor/manager) and this is what we think we can do to resolve the issue: (provide technical explanation)

It should take approximately (time frame) to correct the situation. This may vary depending on (provide factors).

We hope that this takes care of the problem and we are open to any suggestions you may have.

Once again, we appreciate your input and hope that you continue to do so. So far you currently have (provide program scores).

Scrip B: (clarification)

Hi (employee name). Could I talk to you for a minute?

I wanted to thank you for turning in an unsafe condition report. I was hoping that you could provide with a more detailed explanation of the problem so that I can better address it.

Explanation is given

I will have to talk to (engineer/maintenance/supervisor/manager) to see what can be done about it. I will make sure to get back to you with more information.

Once again, I appreciate your input and hope that you continue to do so. So far you currently have (provide Safety Bucks scores).

Script C: (No action taken)

Hi (Employee Name). Could I talk to you for a minute?

I wanted to thank you for turning in an unsafe condition report. I have talked to (engineer/maintenance/supervisor/manager) and we have come to the conclusion that this does not present a problem (OR cannot be resolved) because (technical explanation).

If you disagree with this decision we are open to suggestion on how to handle the problem

Once again, I appreciate your input and hope that you continue to do so. So far you currently have (provide Safety Bucks scores).

Appendix D

Feedback Slips

Slip A: (Unsafe Condition Report Action Form)

To:				Date:
In response to the following unsafe condition report: *"The chain that held the nitrogen tank was too short making it hard to close and open"*				
Actions Generated:	1) Work Order submitted to maintenance	2) Chain will be replaced with longer one.	Time Frame:	< 1 week
Comments:	None.			
Current stats:	Hazard Analysis cards : 2		Unsafe condition Reports: 4	
Thank you for contributing to the safety reporting process.				

Slip B: (Status Report)

To:			Date:
In response to submitting 2 hazard analysis cards.			
Comments:	Thank you!		
Current stats:	Hazard Analysis cards : 2	Unsafe condition Reports: 4	
Thank you for contributing to the safety reporting process.			

Appendix E

Employee Survey

Select your department:	Lab – Mixing – Packaging – Maintenance – Office

Scale	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Safety Bucks has improved the safety of the plant.					
Management takes into consideration my opinions and suggestions.					
Management responds quickly to safety concerns.					
Management is effective at correcting safety issues.					
Safety forms are always available when I need them.					
Management provides me with sufficient feedback about my performance regarding Safety Bucks participation					
I actively participate in the Safety Bucks Program.					
Scale	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
How satisfied are you with the Safety Bucks Program?					
How satisfied are you with safety at the plant?					
How satisfied are you with your job?					
Additional comments:					