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Unstructured versus Structured On-the-Job Training

Midwest Automotive Plant

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On-the-job training (OJT) has grown in importance in recent years. The following case shows the comparison of a structured OJT program with an unstructured process. Intuitively, we usually conclude that structured OJT has greater efficiency and a greater influence on the quality of the work than unstructured OJT. This case reaches those two conclusions with supporting data using a forecasted financial benefits model. Although this case does not illustrate a typical return-on-investment analysis, it shows that there is a payoff for investing in structured OJT. At the request of the organization, some specific data have been withheld.

Background

Learning on the job has been the subject of increased interest among managers and human resource development (HRD) professionals in the past decade or so. Interest in this topic is part of the broader recognition that employees learn most of what they know and can do in the workplace while actually doing their jobs, rather than in off-site training classrooms. Unfortunately most of this learning is the result of training that is unplanned (i.e., unstructured), which more often than not leads to undesirable outcomes for the individuals and organizations involved. It is under these circumstances that structured on-the-job training (OJT) has emerged as a distinct training approach, a development that has provided the impetus for the financial forecasting case study presented in this chapter.

All names, dates, places, and organizations have been disguised at the request of the case author or organization.

Structured OJT and Financial Forecasting

Increasingly, managers have sought to formalize the training that naturally occurs among employees in their work areas. The issue of most concern has been that this training has lacked the necessary planning, or structure, to produce reliable training outcomes. As a result, structured OJT has emerged as a distinct form of training in many organizations. Structured OJT is defined as the system approach of developing job expertise by having novices learn directly from experts in the workplace (Jacobs, 1992; Jacobs and Jones, 1994). When OJT is approached in this way, learning on the job ceases to be an opportunistic activity, undertaken by individuals who learn merely by watching other people or by doing tasks alone without any formal guidance. Instead, learning on the job becomes intentional and purposeful.

As do all planned training efforts, structured OJT frequently incurs substantial costs for its design and implementation. When allocating scarce resources, even managers who recognize the desirability of using structured training approaches may rightly question whether the cost of structured OJT is warranted. After all, most employees learn their jobs using informal means anyway, and this unstructured training approach does not involve any costs. Thus, the issue for many managers is basically financial. Compared with unstructured OJT, is structured OJT really a "good deal" from a financial perspective?

The case study presented here addresses this basic question by using a model for comparing the forecasted financial benefits of HRD program options (Swanson and Gradous, 1988). As shown in Figure 1, the model proposes that, to compare the financial benefits of unstructured and structured OJT, cost must be subtracted from performance value to obtain the financial benefit. Performance value is the financial worth of the work being produced using a particular HRD program option. Cost is an accounting of the expenses required to produce and deliver that HRD option, such as labor, materials, consultants, and equipment. Benefit is the extent of the financial contribution to the work produced, given the costs to achieve the performance.

In the model, unstructured and structured OJT are presented as distinct training approaches and should have different performance values and costs associated with their use. The financial forecasting model should show whether the differences in performance value and cost result in meaningful differences in financial benefits. Thus, the model can show a link between the two training approaches and the performance outcomes that result from their use.

Figure 1. Financial forecasting model (adapted from Swanson and Gradous, 1988).

Unstructured on-the-job training	Structured on-the-job training
Performance value - Cost <hr style="width: 50%; margin: 0 auto;"/> Benefits	Performance value - Cost <hr style="width: 50%; margin: 0 auto;"/> Benefits

Case Setting

The following case presents the results of using the financial forecasting model to address two issues important to organizations: training efficiency and product quality. Both parts of the case were conducted in the same facility, a large truck assembly plant in the Midwest, and were undertaken to help senior management and staff determine the effects of using the current training approach (unstructured OJT) and the anticipated effects of the new training approach (structured OJT) that was about to be implemented plantwide. Where possible, completed worksheets are provided to show the calculations used to derive the results. Some of the calculations have been removed at the request of the organization.

Training Efficiency

The purpose of this first part of the case is to compare the training efficiency of unstructured and structured OJT. Portions of this part of the case have been reported earlier in the literature (Jacobs, Jones, and Neil, 1992).

Training efficiency is defined as the rate at which novice employees learn new tasks to the extent that those employees can do those tasks without assistance after the training. Those employees might not be considered experts at the tasks, but they at least would possess sufficient mastery to handle most situations by themselves. Managers desire higher training efficiency because this capability allows employees to make more valuable contributions sooner. In a sense, training efficiency can be equated to the production concept of cycle time.

Level of Analysis and Variables

The level of analysis of the case is the task level. In this organization, many distinct tasks are performed by production employees within the many assembly work areas. Given that the organization has an active total

quality management program, tasks within each work area can vary from maintaining production charts, to doing the actual assembly work, to performing basic equipment maintenance and housekeeping tasks. Approximately 40 tasks were initially identified as tasks that could be considered unique to their respective work areas and that employees would likely require training in as they entered those work areas.

Three tasks were ultimately selected on the basis of the level of two variables: work-area turnover and task difficulty. A mix of these variables was considered desirable for the case study. Turnover was the total number of production employees who had entered the work area in which the task was performed, during the previous year. Task difficulty was the estimated time to master the task using unstructured and structured OJT. Time estimates were determined through a series of observations and interviews. All data were approved by senior plant officials before the case study proceeded.

Table 1 presents the turnover rates and task difficulties for the three tasks selected in the case study. Subsequent analyses have confirmed the forecasted time estimates for using structured OJT.

Results

Table 2 presents the Performance Value Worksheet for Task 1. (The Performance Value Worksheets of the other tasks cannot be shown.) The performance goal represents the average number of times per day that the task was repeated during the period of analysis. The dollar value per repetition represents the wages and fringe benefits required to accomplish one repetition of the task. The estimated time to master the task was determined for unstructured and structured OJT. As stated, turnover is the total number of employees who had entered the work area during the period of analysis. With these figures, the total performance gain was calculated for each option.

Table 1. Turnover rate and task difficulty for the three tasks studied.

Task	Turnover rate	Task difficulty (days to reach mastery)	
		Unstructured on-the-job training	Structured on-the-job training
1	25	5	1
2	5	10	2
3	7	5	1

Table 2. Performance value worksheet for Task 1.

Component	Unstructured on-the-job training	Structured on-the-job training
a. Performance goal	34 reps/day	34 reps/day
b. Beginning performance level	0	0
c. Value per repetition	\$8.40	\$8.40
d. Time to reach mastery	5 days	1 day
e. Longest time to reach mastery	5 days	5 days
f. Turnover rate	25 employees/year	25 employees/year
g. Average learning rate during longest time to reach mastery (a ÷ 2)	17 reps/days	17 reps/days
h. Number of repetitions during the time to reach mastery (g × d)	85	17
i. Number of repetitions during the longest time to reach mastery (g[d - e] + [g × e])	85	153
j. Performance value during longest time to reach mastery (i × c)	\$714.00	\$1,285.20
k. Performance value per employee (j - [b × c × e])	\$714.00	\$1,285.20
l. Total performance value (k × f)	\$17,850.000	\$32,130.00

Table 3 presents the cost breakdown for unstructured and structured OJT for Task 1. For example, structured OJT incurred costs to analyze the task, develop the training guide, prepare the experts as structured OJT trainers, hire an external consultant to deliver the trainer training, and conduct the performance follow-up. The total cost associated with the use of one structured OJT module was calculated as \$976. In contrast, unstructured OJT had no costs associated with it. This may seem odd at first, but one must consider that most unstructured OJT occurs in the workplace, without any intentional commitment of organizational resources. In a sense, the costs associated with unstructured OJT are actually represented in the performance value side of the equation.

Table 4 presents the financial benefits forecasted for each of the three tasks. The results showed that structured OJT was five times more efficient than unstructured OJT. That is, trainees were predicted to learn the tasks five times faster using structured OJT. In addition, the financial benefits of structured OJT were forecasted to be approximately twice the

Table 3. Cost analysis for Task 1.

Cost category	Unstructured on-the-job training (\$)	Structured on-the-job training (\$)
Task analysis	0	270
Training guide development	0	216
Train-the-trainer costs	0	303
Consultant costs	0	118
Material costs	0	15
Performance follow-up	0	54
Total	0	976

benefits for unstructured OJT. Finally, the results showed that turnover rate affected the financial benefits more than task difficulty did.

It can be concluded that structured OJT provides greater training efficiency than unstructured OJT, and that the greater efficiency brings about higher forecasted financial benefits. However, the financial advantages are not at the same proportion as the training efficiency advantages.

Product Quality

The purpose of the second part of the case is to compare unstructured and structured OJT in terms of product quality. Product quality is defined as the outcomes achieved from doing a task. Product quality is a function of several personal and environmental variables, such as having the proper tools, resources, standards, and feedback. Product quality can also be a function of the level of knowledge and skills that employees possess (Gilbert, 1978). Thus, in a relative sense, if employees have more expertise—often achieved through more effective training programs—then they can be expected to produce better results.

Task and Product Defect

Task 2 was selected for analysis in this section of the case. The nature of this task cannot be identified in specific terms, but it can be stated that the task requires the installation of a specific part on all trucks. When the part is not installed properly, a noticeable problem will occur, and this problem can be detected only after the assembly process has been fully completed. If a problem is detected, the part must be removed and then reinstalled to meet the inspection criteria.

Table 4. Summary of forecasted financial benefits for the three tasks studied (in dollars).

Financial component	Unstructured on-the-job training	Structured on-the-job training
Task 1		
Performance value	17,850.00	32,130.00
Cost	- 0.00	- 976.00
Benefit	17,850.00	31,154.00
Task 2		
Performance value	3,327.00	6,702.25
Cost	- 0.00	- 976.00
Benefit	3,327.00	5,726.25
Task 3		
Performance value	9,877.00	18,766.30
Cost	- 0.00	- 976.00
Benefit	9,877.00	17,790.30

Because of rework costs, reducing the number of defects is a high priority for management. The average cost of reworking this defect before it leaves the plant was determined to be \$250. This figure included time for inspection, troubleshooting, and reinstallation of the part. If the defect should go undetected before customer delivery, and the truck is delivered to a dealer, then the rework cost would likely be higher. In this situation, the dealer would perform the rework and then charge back the costs to the organization at a much higher labor rate. These cost considerations are minimal compared with the frustration and additional costs that customers incur as a result of rework after delivery.

A performance analysis was conducted to identify the most probable cause of the product defect. This analysis was critical because, in order to do a true comparison between unstructured and structured OJT, a lack of knowledge and skills had to be identified as the most likely reason the defect occurs. The performance analysis confirmed that no other cause, such as lack of tools, standards, or feedback, could cause this product-defect problem.

Results

At the request of the organization, the completed Performance Value Worksheet for this task cannot be shown; however, table 5 presents sufficient information for understanding the performance value. The task was done an average of 34 times per day for approximately 200 workdays per year, for a total of 6,800 repetitions of the task per year. The average defect rate using unstructured OJT was reported to be an average of three defects per week, or 120 per year. The use of structured OJT resulted in no more than an average of one defect per week.

The performance value for using unstructured OJT was calculated to be \$30,000 in rework costs; there was no cost for the unstructured OJT. The performance value for using structured OJT was calculated to be \$10,000 in rework costs; the cost of the structured OJT was calculated as the same amount shown in the first case study, \$976. As shown in Table 6, the financial burden for using unstructured OJT was \$30,000. The financial burden for using structured OJT was \$10,976 (\$10,000 for the rework plus \$976 for the structured OJT). Thus, the results show that by reducing the defect rate from an average of three defects per week to one defect per week, structured OJT substantially reduced the financial burden to the organization. In fact, analyses conducted after the case study show that the defect rate has been reduced to an average of slightly below one per week. The average cost of doing the rework has also been reduced.

It can be concluded that by using structured OJT to train employees to do this task, the organization can reduce defects, thereby

Table 5. Summary of performance value for Task 2.

<u>Measure</u>	<u>Amount</u>
Present defect rate using unstructured on-the-job training	3 defects per week (120 defects per year)
Desired defect rate using structured on-the-job training	1 defect per week (40 defects per year)
Average cost of rework	\$250
Performance value of unstructured on-the-job training	\$30,000
Performance value of structured on-the-job training	\$10,000

Table 6. Financial burden in product quality for Task 2 (in dollars).

Financial component	Unstructured on-the-job training	Structured on-the-job training
Performance value	30,000	10,000
Cost	0	976
Burden	30,000	10,976

increasing product quality. The financial benefits can be calculated in terms of the amount of money the organization does not have to pay out to fix the defects.

Implications

The results suggest that the financial desirability of using structured OJT rather than unstructured OJT for the tasks presented is unequivocal. Although unstructured OJT incurred no apparent costs to the organization, this training approach resulted in less training efficiency and lower product quality, compared with structured OJT. Structured OJT required a sizable investment up front, but carried with it the promise of future financial benefits that were substantially higher than the costs.

The ability to generalize these results to other tasks and organizations is necessarily limited. Obviously, more case studies covering a wider range of tasks and organizational settings are required. Yet the relationships shown here may exist in most other situations, as well. If unstructured and structured forms of HRD interventions are compared, then the performance value of the structured training approach will likely be greater than the value of the unstructured training approach. The question remains whether the costs to achieve the structured training option are sufficiently low to make the investment a good deal. Obviously, performance value and cost will differ across situations, requiring that the relationships be tested for each new situation.

Questions for Discussion

1. Under what conditions might the financial analysis show that unstructured OJT is preferable to structured OJT?
2. At what point in the planning stage can generalizations begin to be made about the costs and performance values of certain HRD program options?

3. Which individuals are responsible for using forecasted financial benefits to make selection decisions in organizations?
4. How do the forecasted financial benefits of structured OJT compare with off-the-job training options, such as classroom-based training?
5. Are there ways of reducing the costs of structured OJT in order to increase the benefits of this training approach, without reducing its effectiveness? Explain.
6. Are there nonfinancial issues involved in the selection of structured versus unstructured OJT? Explain.

The Author

Ronald L. Jacobs is associate professor of human resource development at the Ohio State University. In the past 10 years, Jacobs has helped implement structured on-the-job training in a variety of organizations, including manufacturers, service providers, and government agencies. This case study is part of a larger ongoing research effort to study the financial implications of workplace learning. Jacobs is a frequent contributor to the human resource development literature and presently serves as associate editor for *Human Resource Development Quarterly*. Jacobs can be contacted at the following address: The Ohio State University, Graduate Program in Human Resource Development, 325 Ramseyer Hall, Columbus, OH 43210.

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