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# Design and Implementation of a Pilot Orientation Program for New NASA Engineering Employees

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# DESIGN AND IMPLEMENTATION OF A PILOT ORIENTATION PROGRAM FOR NEW NASA ENGINEERING EMPLOYEES

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## SUMMARY

This paper describes the design and field testing of an orientation program for new employees of NASA Lewis Research Center's Engineering Directorate. A group of new employees designed the program using a series of TQM analysis techniques.

The program objectives were: provide consistent treatment for new employees; assist management and clerical staff with their responsibility for orientation; introduce the employee to as many facets of the organization as possible; allow the employee to feel like a member of the organization as early as possible; maximize the use of existing services; use up-to-date information.

The major aspects of the program included: training of management and clerical staff; lab tours and briefings describing the organization; shepherding, using senior employees as shepherds; a handbook of information about the Center and the Directorate; a package of information about northeast Ohio; social activities involving the new employees and shepherds.

The program was tested on a pilot group of six new employees over a four-month period and was considered to be highly successful by both the employees and management. Aspects of the program have subsequently been adopted for Center-wide use.

## INTRODUCTION

In 1991, management of NASA Lewis Research Center's Engineering Directorate (ED) commissioned the design of an orientation program for its new employees. Orientation within the Directorate had until that time been at the discretion of line management. This lack of a defined process led to concerns that new employees were given treatment that was at best inconsistent and at times inadequate.

Orientation programs within NASA, such as that proposed by Brindley (ref. 1) have often been composed primarily of lectures. Johnson, Johnson, and Smith (ref. 2) give reasons for lectures to be at times difficult for students to internalize, and a new employee can be treated in many respects as a student. The program described here gives them an active role in orientation.

The Engineering Directorate (ED) is a "matrix" operation providing engineering support for research programs and project offices at the Center. Those receiving ED support are referred to as "customers." Not only are new employees within the organization called upon to grow in their engineering skills, but they are also asked to manage jobs on behalf of ED and to interact directly with customers. These roles sometimes put new employees in positions where they need to understand organizational policies that had not been explained to them.

At the time this program was created, NASA Lewis was providing new employee orientation, consisting primarily of a briefing and, when available, an information handbook. The information given to

the new employees was not consistently updated, as there was no defined process for updating information. Solutions to this concern might also have been simplified by dependence on existing Center services.

A team of new employees was created within the Directorate to design an ED-specific program, with the following goals:

- provide consistent treatment for new employees;
- limit the use of lecturing;
- minimize requirements placed on management and secretarial staff;
- provide sufficient and current information about the organization;
- maximize use of available services.

The design team operated by several Total Quality Management (TQM) techniques, known as the Seven Management and Planning Tools and defined in GOAL/QPC's Memory Jogger Plus (ref. 3).

The completed program design was presented to and accepted by ED management, which then formed a second team to implement the program. This team was able to field test the program with a pilot group of six new employees over a four-month period.

The major aspects of the implemented program included the following: a presentation describing the organization and its relationship to the rest of the Center and to NASA; shepherding, to establish non-technical relationships between new and experienced employees; an updated handbook, tailored to the needs of new employees; briefings and tours of areas of general interest within the Directorate; a complete information package about the greater Cleveland area; and a regular social "mixer" for the new employees, their shepherds, and the implementation team.

The test was considered highly successful by the new employees and Directorate management. As a result of this success, several aspects of the program have subsequently been adopted for Center-wide use.

## PROGRAM DESIGN

The design team created an imaginary "typical customer:"

Name: Edie  
Gender: Female  
Age: 22  
Education: BSME, University of Miami (FL), 3.3 GPA  
Status: New graduate, unfamiliar with Cleveland  
Other data: Owns a cat, concerned about personal fitness and the environment

Having assumed Edie's existence, the design team was able to interactively reach a consensus on Edie's needs as a customer of the orientation program. The following techniques were used (ref. 4):

- brainstorming;
- affinity diagrams;
- interrelationship digraphs;
- tree diagrams.

Figure 1 is a tree diagram of Edie's potential needs, or customer requirements. Each of the 32 needs identified was assigned a weighting factor of one through five, determined via consensus agreement, with

five indicating greatest needs. These needs consisted mostly of information, and fell mostly into the administrative, morale, and technical areas. The design team concluded that Edie would need much of the technical information immediately, while many administrative and morale needs would continue for some time.

Once the customer needs were agreed upon, the same interactive techniques were employed by the design team to identify methods for meeting these needs, or design requirements. Figure 2 is the tree diagram that illustrates design requirements. While Edie's needs were defined to the fourth level of detail in figure 1, the design team worked through three levels shown in figure 2, and identified 12 methods, most of which directly addressed Edie's need for information.

Figure 3 shows a simplified Quality Function Development (QFD) matrix, derived from King and others (refs. 4 to 6) developed by the design team based on the information from figures 1 and 2. This matrix was used to assign weights to each of the 12 design requirements, based on the relative importance of each customer requirement. Each of the 12 methods from figure 2 was assigned a column in the matrix, and each need from figure 1 was assigned a row. The weighting factor for each need was assigned to a column at the right-hand side of the matrix.

Two simplifying assumptions were made in the development of the QFD matrix:

- no interaction between design requirements (so the "house of quality" (ref. 6) roof matrix could be ignored);
- no significant risk or cost in any design requirement.

The team examined each intersection of a row and column to decide whether there was a correlation. If they thought it likely that the method of column j would help to meet the need in row i, then a symbol was placed in space ij of the matrix. Three different symbols were used, indicating how strong the team considered the correlation to be.

After examining each space, the team assigned a numerical value to each space in which there was a symbol. The numerical value used was the weighting factor in the right-hand column times one of the following:

- 0 no correlation;
- 1 weak correlation;
- 3 nominal correlation;
- 9 strong correlation.

This scoring method allowed the team to prioritize the level of correlation for each need.

The scores were then totalled by column, with a histogram of the totals prepared at the bottom of the matrix. The column totals were used to prioritize orientation methods, so that only the most effective methods would be selected for implementation.

## PROGRAM IMPLEMENTATION

A second employee team was selected by ED management for program implementation. This team represented all Divisions (four) and all functions (engineering, design, management, clerical) within the

Directorate. The team reviewed the program, and implemented it in the following form, similar to that proposed by Holoviak and Williams (ref. 7):

1. training of supervisors;
2. orientation briefings and tours;
3. pre-mailing of information;
4. employee Handbook;
5. shepherding.

This five-part program implementation was the result of examining the design in the light of the program's original goals.

1. Training of supervisors consists of requiring them to discuss the following key subjects with each new employee:

- description of the work of the employee's group;
- description of work policies (time-keeping, meetings, lunch, etc.);
- performance feedback;
- integration with team members;
- processing of vouchers;
- supervisory accessibility;
- flexibility of work assignments.

This structure is similar to that proposed by DeSena (ref. 8).

Although the program design identified flexible work assignments for Edie as desirable for the first several months of her career, work in some groups within this Directorate does not lend itself well to flexible work assignments, so the team elected to reduce this aspect from a design requirement to a recommendation.

Although the original design emphasized Edie's need for a quick integration with her working team, this could be interpreted as more a function of the team itself than of the supervisor, so that aspect of training was eliminated.

The remaining aspects above were condensed into a checklist (as shown in fig. 4) with an attached reference package to assist the supervisor.

Instead of a detailed training session, supervisors are required to view two videos, each of which is about 30 min long and is available at the NASA Lewis Learning Center. These videos, entitled "Welcome Aboard!" (ref. 9) and "I'm Glad You Noticed," (ref. 10) were viewed by management and clerical staff throughout the organization, although viewing was only specifically required for the management chain of new employees. Individual managers must view the videos again whenever bringing on new employees, if they have not seen the videos within the previous 2 years.

2. Orientation briefings and tours include a review of the following:

- available training (particularly in CAD/CAE tools);
- employee services and benefits;
- ED's role and how it fits into the Center;

- organizational administrative details;
- commonly-used facilities.

The implementation team condensed the information about services and benefits provided by other organizations at the Center. Summaries of major Center facilities and available training were distributed to the new employees, making single summary charts for each subject sufficient for the briefing. The resulting briefing is 20 min long, with extra time allotted for questions and answers.

During the weeks following the presentation, each new employee was invited to tours of lab facilities under the control of the Engineering Directorate and to briefings of general interest within ED, such as its time-keeping system and CAD tools.

3. Pre-mailing of information was originally considered for the following:

- arrangements for travel and moving;
- information about Northeast Ohio;
- information about pet provisions;
- information about the Center's fitness facility.

The team obtained nearly all of this information in packages supplied by the Cleveland Growth Association for \$5 per employee (ref. 11). These packages were to be mailed to new employees prior to their arrival at the Center, with a cover letter from their shepherd.

4. The Employee Handbook was the implementation team's revision of the Lewis Employee Information Handbook (ref. 12), which had been given to most Center employees over the last several years. The Lewis Handbook was out of print at the start of the ED program, and further publication was uncertain. The revised Handbook contained only current, general Center information not readily available elsewhere, with an extra section on specifics related to the Engineering Directorate. A highlight of the extra section was a list of senior Engineering Directorate experts and their specialties, referred to simply as the "Wizards List," consistent with recommendations made by Ginsburg (ref. 13).

5. Shepherding involves a senior employee being available to the new employee to answer nontechnical questions. The team was careful to separate this function from that of a mentor, which the members felt was a technical (or at least more directly job-related) role. Aspects of a shepherd which the team felt were crucial included the following:

- willingness to volunteer an average of 4 hr per month for a 6-month period;
- ability to find a few local landmarks and fill out a few common forms;
- interest in helping new employees become comfortable;
- ability to direct new employees to detailed help;
- civil servant classification.

Some volunteers were uncomfortable with working with new employees of the opposite gender, or with more than one new employee at a time, or with teams working with the same new employee, or with new management employees. The implementation team dealt with each issue. The program was initially designated for civil servants only.

## PROGRAM ADMINISTRATION

The team recognized the need for a Program Administrator to serve as a contact for the entire organization, and who would be responsible for the following:

- coordinating shepherds;
- briefing Division office staff;
- presenting orientation briefings to new employees;
- ensuring updates in program materials as needed;
- arranging facility tours, socials, etc.

The Administrator's position is voluntary and in addition to that individual's regular duties. The Administrator must be a civil servant employee. There is a 1-year term, keeping the program fresh. Directorate management agreed to allocate time for the Administrator, approximately 80 to 100 hr per year.

The program operates as follows: (1) the Directorate or Division secretaries notify the Administrator of the hiring of a new employee; (2) the Administrator assigns a shepherd and contacts the new employee's Division office; (3) the shepherd sends the Growth Association package to the employee with a personal note attached; (4) the supervisory chain of the new employee ensures that its management and clerical personnel have kept their training up to date. Given this procedure, Edie's orientation would actually begin before she arrived at NASA Lewis.

## TESTING OF PILOT PROGRAM

The final program package was field tested on a group of six new employees. Each of them had already started at NASA Lewis when the implementation period began, with the "most senior" of them having been employed at NASA Lewis for 3 months.

The Administrator made a call for shepherd volunteers throughout the Directorate. A logo, designed by an ED employee and showing an ancient "shepherd" figure, was helpful in catching the attention of potential volunteers. The seven volunteers viewed the two videos seen by management and clerical staff and were given a briefing in preparation for their role.

The shepherds each wrote a welcome note to their assigned new employee and hand-carried it, along with a copy of the Handbook and the Growth Association package, to the employee's work area for their first meeting. To assist the shepherds in their new role, a support group was formed, giving them a chance to share among themselves techniques and methods that were successful in their relationships with the new employees.

The new employees enrolled in the pilot program were given the overall orientation briefing and briefings on the following subjects:

- ED's automated time-keeping system, EDJOB;
- the use of CAD/CAM in engineering design;
- the Surface Tension Driven Convection Experiment (STDCE) program - a space experiment project with significant ED involvement.

In addition, they were given the opportunity to tour various lab facilities under the organization's control:



- Structural Dynamics Lab;
- Electromagnetic Compatibility (EMC) Lab;
- Static Structural Test Lab.

It is a continuing function of the Administrator is to seek out other potential topics of interest to new employees, as well as tours of facilities in which substantial work was done by ED.

Shortly after starting the implementation period, a mixer was held for the new employees, their shepherds, and the implementation team. The mixer provided an opportunity for the new employees, shepherds, and team members to get acquainted. A luncheon was held several months later, allowing participants to renew acquaintances and discuss the program.

Six months after beginning the field test, the implementation team met to assess the program's performance and to look at ways to improve the program and keep it up to date. A survey was used to gauge the response of management, shepherds, and new employees to the program. Management felt the program was beneficial and did not add burdens to any manager's workload. One manager stated that the program "make(s) the new employee(s) feel (that they are) a part of the group and that we have their interests at heart." Shepherds also felt the program did not involve too much of their time.

The survey results confirmed the idea that a successful orientation does a great deal to eliminate fear often found in new employees, making the new employees more productive than they might otherwise be (ref. 14), at an earlier stage of their careers; and making them more likely to stay in the job for the long term (ref. 15).

New employees agreed unanimously that shepherding relationships were helpful and that the briefings and tours were informative. One commented, "(the program) has helped me a lot and I hope it continues to help other employees over the years. Maybe someday I can be a Shepherd instead of a Sheep."

#### AREAS FOR FURTHER STUDY

The orientation program described here was open only to civil servants. One area open to study is the extension of the program to on-site contractor personnel, or at least the integration of this program with those of contractor organizations. The Directorate's program must also be coordinated with the Center's program.

Shepherds were uncomfortable with shepherding management personnel, so the program was initially not open to management. One manager hired from outside the Center, however, wanted to be fully enrolled in the program, so changes were made in the program during the field test. An area open for study is nonmanagers shepherding management employees (some organizations already have such relationships going the other way).

Leibowitz, Schlossberg, and Shore (ref. 16) suggest that recently oriented employees (such as those in our field test) be paired with new employees, acting as "sponsors." In this program, recent hires (if they wanted to) would go directly from their own orientation to shepherd status. Such a modification to this program merits consideration.

Finally, no new clerical employees joined the organization during field testing, so no changes were made to the program to allow for the needs of clerical personnel. This area is open.

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	Timing	Primary	Secondary	Weight
Eddie's needs	Pre-arrival	Contentment	1. Travel arrangements	4
			2. What will NASA pay enroute?	5
			3. How does NASA pay expenses?	3
			4. How do I start residence hunting?	3
			5. Pet provisions	2
			6. Northeast Ohio info	3
			7. Fitness facility info	2
		Administrative	8. Benefits info	3
			9. Availability of cash/checks on arrival	1
			10. Cash advance info	1
			11. Avail. of pers. time after arrival	3
	First two weeks	Technical	12. Computer facility info	5
			13. Available experts/mentors	3
			14. Info on ed. related facilities	3
			15. What does branch do?	5
			16. Top level matrix overview	3
			17. Jargon	3
			18. Available training	4
			Administrative	19. Branch work policies
		20. Administrative details		3
		Morale	21. Emergency and safety procedures	2
	22. Feel like a team member		4	
	23. Flexibility for assimilation		3	
	First six weeks	Environmental	24. Updated Northeast Ohio info	2
			25. The "Big Picture"	3
			26. Major facility orientation	3
		Administrative	27. Availability employee services	4
			28. SSC relationship	3
			29. Edjob system specifics	3
		Morale	30. How to buy things	2
			31. Performance feedback	5
				32. Feel like a team member

Figure 1.—New employee needs with associated weights.

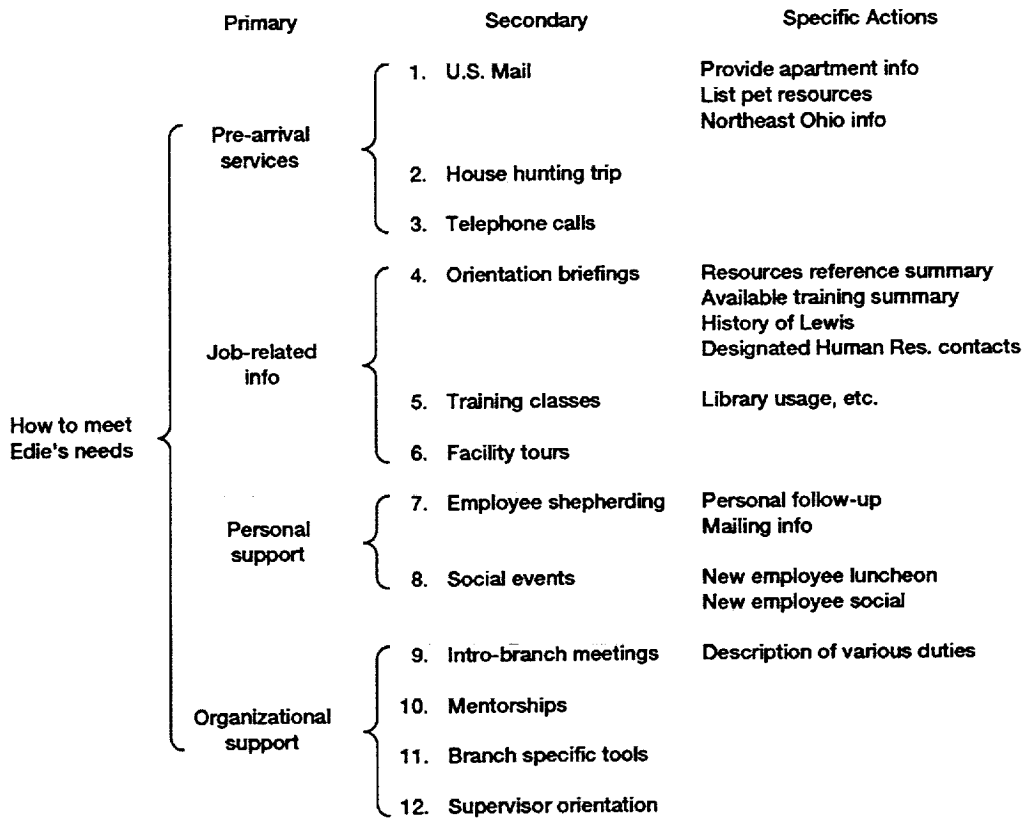
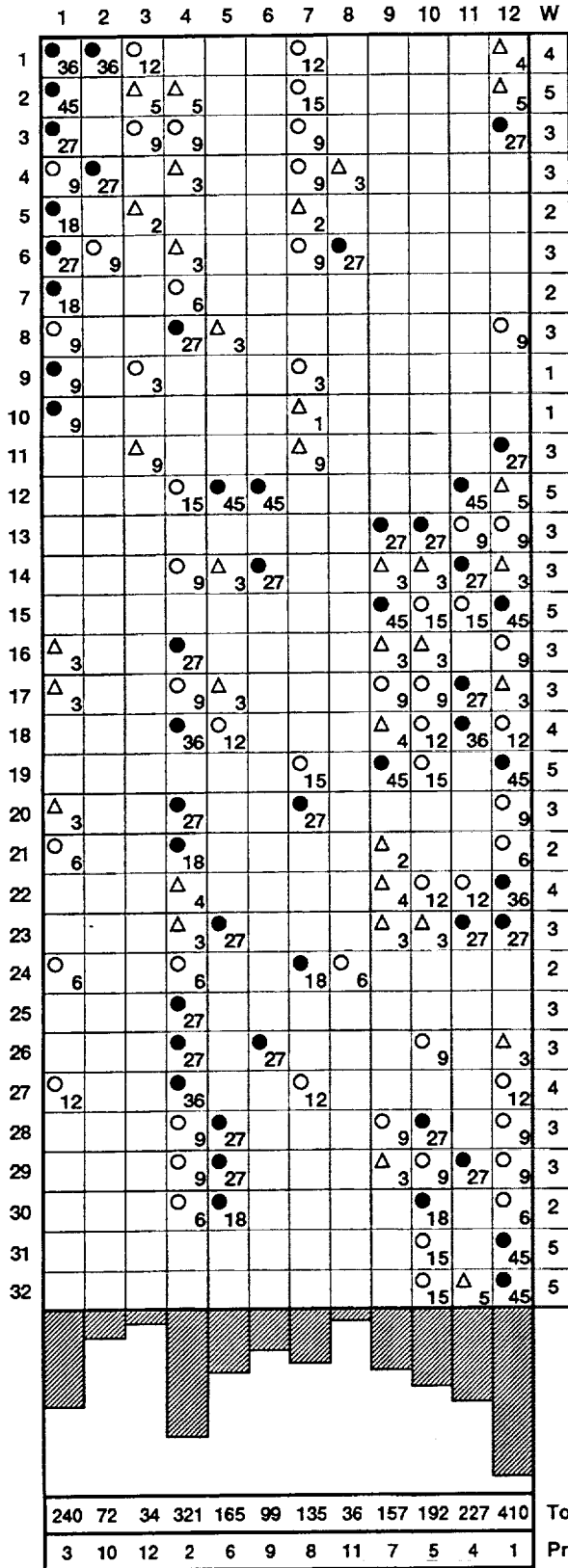


Figure 2.—Methods of meeting new employee needs grouped by type.



Orientation methods prioritized

Primary

- 12. Orientation training of supervisors
- 4. Orientation briefings for new employees
- 1. U.S. Mail
- 11. Training in Branch-specific tools
- 10. Mentorships
- 5. Formal training classes
- 9. Introductory Branch meetings
- 7. Employee shepherding

Secondary

- 6. Facility tours
- 2. House hunting trips
- 8. Social events
- 3. Telephone calls

- Strong correlation (weight x 9)
- Nominal correlation (x 3)
- △ Weak correlation (x 1)

Figure 3.—Quality function deployment matrix used to rank methods for meeting needs.

A. Computer Facilities Information

- 1. Description of organization specific software
  - 2. Training in organization specific software
  - 3.\* Analex computer support description
  - 4.\* LIMS training (Analex)
  - 5.\* EDJOB information (Sverdrup)
  - 6.\* CADAM information (Sverdrup)
  - 7.\* APOLLO information (Sverdrup)
  - 8.\* Applications support (Sverdrup)
  - 9. CSD consultation (individuals)
  - 10.\* Platform and OS training (CSD)
  - 11.\* Applications training (CSD)
  - 12.\* Training announced courses (computer)
- } R. Zalewski 3-8014
- } CSD Help Desk  
3-9800 and 9700

B. Available Training

- 1.\* MS/PhD engineering (CSU)
  - 2. 2+2 Program (CSU)
  - 3.\* MCIS (CSU)
  - 4. MBA
  - 5. Other degree programs
  - 6. CPS program
  - 7. STEP program
  - 8. CEP
  - 9. GO
  - 10.\* Training announced courses
  - 11. Learning center training
    - a. Stress management
    - b. Time management
    - c. Management (Human Relations)
    - d. (PC software literacy (LC))
  - 12. Technical videos
  - 13. Special topics for branch/division/project
  - 14. Seminars
  - 15. Conferences
  - 16. Video of latest "State-of-the-Center" address
- } V. Webb-Thurman 3-3768
- } Learning Center  
3-2996

C. Information on ED Related Facilities

- 1. Fab Shop briefing/tour (J. Bergstrom 3-3009)
- 2. Machine Shop briefing/tour (J. Bergstrom 3-3009)
- 3. Avionics Development Lab briefing/tour (J. Kolacz 3-3881)
- 4. Structural Dynamics Lab briefing/tour (S. Elgin 3-3895)
- 5. Static Test Lab briefing/tour (J. Roche 3-2575)
- 6. Project test rigs specific to organization

D. Branch Jargon - List of Jargon Specific to each Organization

E. Flexibility for Assimilation

- 1. Description to new employee of all types of work being done in organization
- 2. Discussion of job satisfaction with new employees at each six month progress review period
- 3. Presentation of options for new assignments within the organization at each six month progress review period
- 4. Emphasis on "open door" policy with new employees to discuss job satisfaction issues

F. What does the Organization Do?

- 1. Define organization charter
- 2. Describe branch projects, including PE, customer, contractors and other ED organizations involved
- 3. Role of secretary in organization

= Required      \* = Attachments

Figure 4.—Topics for introducing new employees to the organization.

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