Front-end Analysis - Blueprint for Success (Jul 11)

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Front-end analysis (FEA) is the “blueprint” for creating instruction. A FEA, conducted early in the process, will save time and money. A FEA defines project requirements, describes the ideal performance or instruction to meet the project requirements, and identifies acceptable alternatives.

Well-defined requirements at the beginning of a project usually produce an excellent product. Subject-matter experts (SMEs), instructional systems designers (ISDs), workers, and instructors are some of the potential participants in a FEA. FEA is a process that determines whether a problem may be amenable to solution by training, or whether you need a different solution.

In this presentation of Front-end Analysis, I will show you:

- The FEA process and its rationale, outcomes, and benefits
- An explanation of the many elements that may be part of an FEA
- Methods for gathering information
- How to conduct an FEA
- Producing the FEA Report

[Note from the Editor: This is a bit different from tutorials we have run in the past. You might consider this article and the next as checklists, or as a summary of items to consider in the design process, after you have determined that instruction is the appropriate course of action, rather than or in addition to task redesign, a job aid, reference materials, or other interventions. Although we have many more ways to support learning, top-down design is still effective for many requirements, and in fact front-end analysis may help the designer determine the optimum blend of learning pathways. If you are new to eLearning design, look on what you find here as more tools in your kit, not as an obstacle course.]

The FEA process, rationale, outcomes, and benefits

Use the following processes to identify the current learning or performance status of your students or trainees:

- Define the learning or job as it exists now
- Define the best possible learning or job outcome after training or other solutions
- Rank the new goals in order of importance
- Identify discrepancies between “what is” and “what should be”
- Determine positive areas of learning or job performance
- Set priorities for actions
List all possible solutions along with the impact of not providing any solution
Define the impact of each solution with regard to time, money, and customer satisfaction
Make recommendations, based upon learning or performance goals, desired results, financial resources, and other relevant factors

Rationale

The FEA process provides the who, what, when, why, and how of instruction:

• **Who** – Identify your real client (decision-maker rather than an intermediary.)
• **What** – Determine the reason for this instructional or training request.
  o Mandated training
  o Orientation training for new hires
  o Instruction or training based upon the need to fix performance deficiencies
  o Other
• **When** – Examine training requirements and identify alternative approaches to training job tasks.
• **Why** – Provide the client with enough information to meet training needs within budget, time, and personnel constraints. The FEA offers options with different training potentials and cost estimates.
• **How** – Determine methodologies to gather your data – questionnaires, interviews, and job observation.

Outcomes

The outcome or results of FEAs include:

• Improves ability to produce “on-target” courses effectively
• Facilitates the design and development of instruction to satisfy the needs, goals, and objectives of the target audience
• Enables students to enroll in appropriate content rather than the total instructional package

Benefits

Benefits of an FEA include:

• Improving cost estimates
• Collaborating to identify and quantify project requirements
• Developing, evaluating, and cost estimating “alternatives to instruction”
• Identifying and mitigating risks at an early stage of the project when revisions are easier and less costly.

What is Front-End Analysis?

FEA involves a series of separate analyses. There are a number of such analyses; I have described a dozen of them below.

*[Editor’s Note: It is not always necessary or advisable to pursue all 12 in depth for a given project, but a designer should consider whether each one is needed or not. It is as much a mistake to default to doing all of them as it is to default to doing none of them. Experience is your best guide, together with time and budget available. (There is no point in spending more on analysis than the solution to a problem is worth.)*]
Problem analysis

By identifying where specific problems exist in your instruction or workplace, you can narrow your training to specific parts of the instruction or training. Reducing training time should reduce your training cost. FEA focuses on specific tasks rather than training for your entire program.

First identify the business or instructional need. Identify the performance requirements. What external forces, for example, the political environment, may influence the problem?

Next, define the problem. The client, including the necessary stakeholders, should define the business or instructional problem. Prepare all questionnaires and complete all prior readings before meeting with your clients. Client time is extremely valuable.

Lastly, determine the solution to the problem. If training solutions will solve this problem, which ones best fit the client's needs? If training cannot solve this problem, possible solutions may include electronic bulletin boards or newsletters.

Job description

A job description explains how a person performs the job. You write job descriptions in general terms.

First, check to see if a job description exists for the task that you are analyzing. If the job description is current, use it as an early step to draft your task analysis. If the job description is outdated, modify it by editing the main tasks. If a job description does not exist, describe the main tasks that make up the job performance to satisfy the instructional need.

A job description may include special circumstances such as hazards or safety warnings. At a minimum, the completed job description should contain the:

- Position title,
- Generic position description,
- Specific knowledge, skills, and attitudes required for a successful project completion, and
- A list and explanation of performance measures used for the job tasks

Task analysis (measurable behavior)

Task analysis provides the analyst with all the tasks necessary to solve a problem. Use a task analysis to determine the status and the business process of your problem. Use the define/identify/identify/identify (DI^3) process to:

- Define the performance need this task analysis will satisfy
- Identify all job related duties. Generally, describe the tasks necessary to complete the job
- Identify, sequence, and describe the individual tasks
- Identify all sub-tasks (knowledge, skills, and attitudes) that support the identified tasks. What are the specific responsibilities? For example, performance objectives or learning objectives for completing the job description.

More detailed job descriptions usually provide a better starting point for the task analysis.

Needs analysis

The next step is to conduct a needs analysis to determine your business or instructional needs. These needs should provide the information necessary to create the FEA report.

- Where are we? (current status)
- Where do we want to go? (future status)
What is the best way to get there? (present analysis of alternatives)

**Environmental (situational) analysis**

What are the organizational, physical, socio-cultural, and/or economic factors that may affect your FEA? Are there any detracting factors or enhancing factors that may affect job performance or instructional need? Examples of influencing factors are noise (outside road drilling), temperature (80°+ indoor temperature when the outdoor temperature is 90°+), or ventilation (inadequate ventilation for classroom activities). If people are working under poor environmental factors such as poor lighting or inadequate ventilation, it is harder for them to perform their jobs well for an extended period.

**Audience analysis**

Audience analysis determines the learner’s or job performer’s characteristics, intellectual skills, and subject knowledge level before the instruction or training is developed. Audience analysis may determine who will take the course and how they will use the information in the job performance area or instructional setting. What are the background and learning characteristics of the trainees as they relate to the job performance or instructional need? Use audience analysis to analyze the population of your students or trainees.

Areas for audience analysis include:

- Skill, knowledge, and attitudes
- Experiences
- Subject-matter entry errors into the job performance or instructional setting
- Demographics – ages, socioeconomic status, and ethnicities
- Goals – what do the trainees or students expect to get out of the class?
- Uses – how will the trainees or students use the information from the training or instruction?
- What are the best methods of instruction for these trainees or students?
- Motivation – What motivates them – money, jobs, personal growth, or something else?

Examples of types of audience analysis information are:

- Level of audience expertise
- Educational level of audience
- Experience level of audience

Ensure your information is current or recently updated.

**Objectives analysis**

What domains and levels of the objectives do you need to satisfy the job performance or instructional need? What is the goal of this job performance or instructional need? Objectives must clearly communicate what you expect the trainees to learn. The objectives include:

- Course objectives: clearly state what you expect the trainee to do or learn at the end of the course
- Terminal objectives: clearly state what you expect the trainee to do or learn at the end of the unit
- Lesson objectives: clearly state the knowledge and skills the trainee will demonstrate at the end of a lesson
Content analysis

Content analysis is the detailed approach to task analysis directed toward the analysis of instructional content rather than job performance. Use content information to decide which information is most critical. Break the information down into individual concepts and consult taxonomies.

Job performance or instructional experts may provide excellent sources of reference information. Subject matter experts (SMEs) are usually the main resource for this material. Technical documentation may provide excellent references. The main question that SMEs answer is, “Do these tasks, and the order in which they are listed, reflect total successful job performance or instructional needs?”

Four steps to consider for conducting content analysis are:

- Identify key characteristics of the content
- Address validity considerations
- Develop potential test items
- Validate potential test items

Data analysis

Use data analysis to collect information and compare current data with previous data. Many sources exist to research information to complete a data analysis, such as periodicals, technical manuals, course materials, and information clearinghouses.

Instructional analysis

Whereas a task analysis focuses on job performance, an instructional analysis focuses on the step-by-step instructions that take learners all the way to achievement of the objectives.

The completion of an instructional analysis provides the analyst with all the tasks necessary to conduct the instruction. Use instructional analysis to determine the status and instructional need of your problem. Use a define / identify / identify / identify process to:

- Define the instructional need that this instructional analysis will satisfy
- Identify all steps – describe the information necessary to complete the instruction
- Identify, sequence, and describe the individual instructional components
- Identify all sub-tasks (knowledge, skills, and attitudes) that support the identified tasks. What are the specific responsibilities? For example, performance objectives or learning objectives for completing the job description.

Media and technology analyses

Use a media analysis to select the most effective and cost effective media to fit the instructional or training situation. Media analysis, for the purpose of instructional or training content, is a five-step process. These five steps are:

1. Identify instructional concepts, course, and lesson strategies
2. Identify sensory stimulus requirements for each learning objective (LO)
3. Identify the sensory stimulus for all available media
4. Match the sensory stimulus requirements with the sensory stimulus feature to identify a candidate list of media
5. Select the best media format available based on resource constraints, classroom logistics, electronic capabilities of media distribution, and other relevant factors
Use a technology analysis to select the most effective and most cost effective technology to fit communication needs.

This technology analysis should analyze technology available for reference and/or performance support, testing and assessment, material distribution, and delivery of the instruction.

**Critical-incident analysis**

Use critical-incident analysis to obtain data on the critical part of job performance or instruction. Use the following five steps to conduct Critical Incident Analysis:

- Select an incident
- Review / verify the material
- Put material into a timeline
- Review the material with the experts
- Ask “What if” questions at specific, critical parts of the incident

After your task list is complete, it is important that you determine:

- What tasks are critical (must train) to the job performance or instructional need
- What tasks are beneficial for the learner to know
- What tasks will not need training

Criteria for task selection, beneficial tasks, and deselection of tasks may include:

- Frequency – How often is the task performed?
- Difficulty – How hard is it to perform this task?
- Criticality – How important is it to perform this task?
- Time – Are there time limitations for this task?
- Impact – What is the impact if they do not perform this task properly?

So far, I outlined the Front-end Analysis (FEA) process and its many elements, with attention to the information that you will need to collect. Now I describe how to conduct an FEA and how to report the results.

**Gathering information**

Gather information to obtain knowledge from subject matter experts (SMEs), appropriate job-performance personnel, target audience, and other relevant resources. Use this information to create a task list for job performance requirements or instructional goals.
In order to produce a Front-end Analysis (FEA), use any or all of these four methods to gather information: self-completed questionnaires, direct interviews, focus groups, and direct observation. Other techniques are available.

**Self-completed (survey) questionnaires**

Self-completed questionnaires gather information from a large population sample. Construct each question to require specific information, because specific questions leave less to the respondent's ability to add subjective interpretation. Design each question with the help of a Subject Matter Expert (SME), because an SME's participation should ensure that the questions are focused and accurate. Test the questionnaire with a sample group of employees or trainees.

Do you want anonymous questionnaires? If so, ensure that responses will remain anonymous. Of course, anonymous responses means there is no way to contact respondents for follow-up questions or to clarify answers. One way to solve this problem is to code the questionnaires so that only designated data personnel can match code numbers to names. Additional surveys, in combination with observation and other techniques, may help the task analyst confirm what was learned.

**Direct interviews**

Direct interviews are often used to gather information for specific job-related needs. Additionally, direct interviews may provide consensus data about how employees perform a task. Group interviews provide direct questioning of several people at the same time. You may also elect to interview individuals one at a time (see individual interview notes below).

Direct interviews:

- Provide a direct line to the appropriate people who have the specific information about the problem that you are trying to solve
- Provide a structure to the necessary planning and scheduling elements such as having specific rules with a guided focus
- Provide the ability to collect follow-up information
- Encourage the participants to analyze and discuss problematic or important parts of the job or instruction
- Determine how collaborative roles contribute to the job performance or the success of the instruction.

Prepare thoroughly for the interviews by studying available handbooks, user guides and other appropriate materials.

*Prepare for the interview.* Learn about the tasks analyzed. Background reading allows you to use relevant task language. Additionally, it helps you define what you need from the interviewees.

*Select the interviewees.* Will you need content experts, performance experts, training experts or instructional experts?

*Schedule the interview.* Contact the interviewee to schedule the interview. First send a letter introducing the interviewer and stating the purpose of the interview. Next, call the interviewee to set up an interview time. Finally, show up *on time* and fully prepared to conduct the interview.

*Listen to the interviewees.* Allow the interviewees to talk. Detailed preparation for this interview might include follow-up questions, such as, “Why would a person use process ‘X’?” or “What does term ‘Y’ mean?” Demonstrate interest in the subject by smiling, nodding, or saying, “Excellent point.” Only interrupt an interviewee if he or she goes off-topic.
Take notes. Ask the interviewees for permission to take notes. If you cannot take electronic notes, try to copy the interviewees’ responses verbatim.

Individual interviews

While individual interviews obtain direct, detailed information from the interviewee, they are expensive in terms of time and money. Organizing direct interviews will maximize return on investment (ROI) at a minimum of time and cost. To best utilize time and money:

- Use questions and statements to start the session and keep it moving effectively
- Keep the questions highly structured. Whenever possible, open-ended questions work better than “yes/no” questions
- Pace the interview effectively by using periodic summaries and/or pointing out time restrictions

Focus groups

Focus groups help develop a job description and a list of prerequisite skills that accurately reflect the position and the jobholder. The end results of these focus group meetings are the knowledge, skills, and attitudes (KSA) of the job holder.

Focus groups may consist of current jobholders and supervisors. Usually, seven to ten people is an effective number of participants for a focus group.

Direct observation

Use direct observation when none of the other three information-gathering techniques is available. Select a Subject Matter Expert (SME) or job expert to observe this job performance. Write down every step performed by the SME or job expert.

Before conducting this observation, do the following:

- Designate team members to conduct the observations
- Develop observation checklists
- Provide “train the trainer” (how to conduct the observation) information to the designated team members who will conduct these observations
- Designate successful job performers for the observations
- Request permission from appropriate authorities to conduct the observations
- Provide dates and times for the observations
- Mark the checklist
- Share observations with the job performer

Gathering information correctly should give an estimation of the requirements for successful performance for the given job (process).

Conducting a Front-end Analysis

After completing the steps in the information gathering process, you are now ready to conduct an FEA. Job performers, SMEs, ISDs, and other appropriate personnel may conduct each step of the FEA. While there are many different types of FEA templates, I recommend a process that:

- Determines the nature of the opportunity or request
- Identifies the types of information (data) required
- Identifies the sources of information for your FEA research
• Creates the data collection tools
• Identifies your audience(s)
• Collects the data
• Analyzes the data
• Produces a FEA report

Determine the nature of the opportunity or request

To document and process initial customer requests, gather introductory information, such as the name of the client, the name of the requesting authority, the date of the request or the start date of the FEA research, and the end date of the FEA,. Use this information to collect general information from your client. Assign one or more of your team members and a project Identification code to the project. There are three reasons for gathering this preliminary information. The first reason is to determine what type of training or instruction may be needed. (Two examples of types of instruction are policy training and regulation training.) The second reason is to determine what system(s) will need training or instruction. The third reason is to determine the performance gap (the difference between the current job or instructional performance and the ideal or acceptable job or instructional performance.)

Identify the types of information (data) required

Your data should provide appropriate resource information for the following questions:

• What is the “as of now” performance? How do people perform now?
• What is the ideal performance at the end of performance support, training, or instruction? What end result is desired following performance improvement or instruction?
• What is the best solution to achieve the desired performance at the end of training? Do we need “perfect” performance or will a lesser standard (75%) satisfy the performance or instructional requirements for this instruction?

Identify your sources of information for your FEA

Identify sources of information, the materials needed, and where to find this information. Your sources of information may include books, journals, Websites, and job descriptions.

Create the data collection tools

Use the following methods for gathering material:

• Surveys and questionnaires to specifically question task performers, supervisors and other appropriate personnel. Some question and answer formats include surveys, checklists and Likert Rating Scales
• Focus groups - use specific questions for seven to ten designated people. You may have one focus group for the FEA data collection or several focus groups to represent different target audiences
• Lessons learned: ask these questions: “What event went wrong?” “Why did the event go wrong?” and “What is the solution to fix the event?”
• Direct observation: use direct observations to gather data when formal data is not available

Use SMEs to help create your data collection instruments, so that your survey instruments ask the right questions. Two important questions to ask when collecting the data are, “How many people are needed to satisfy your sample size?” and “How many different audiences are needed to satisfy your sample size?”
Collect the data

In collecting data, the analyst wants to capture the right types of information from enough appropriate people. A good method is as follows:

- Randomly select employees based on the total number of names on the population list. Divide by twice the number of employees desired for the sample.
- A solution for a 10% sample of an employee population would be calculated this way:
  - 5000 employees \( \times .1 = 500 \) employees
  - 500 \( \times 2 = 1000 \) employees as a random sample size
- Call or e-mail employees on the list until you have received a commitment from 500 employees.

Analyze the data

You are looking for "triggers" that serve as learning or training requirements. These requirements are potential inputs to the instructional analysis process. When you determine that there is such a requirement, these process steps apply:

- Identify the required level of proficiency for the skill set
- Identify the critical tasks, knowledge, skills, tools and resources (based upon importance, consequence of error, and frequency data)
- Group tasks using the job task analysis data
- Prioritize main tasks, subtasks and procedures
- Identify the training characteristics (e.g. how long it takes to learn, coordination of teaming requirements, chain of command, likely performance errors and remediation strategies)
- Identify the training conditions (e.g. location, environment, time pressure, stress level, changing equipment and tools)
- Identify the training gaps
- Identify the desired outcomes (cognitive, psychomotor, verbal and social) for each core task, core subtask or procedure
- Identify a learning objective statement verb
- Identify criterion for acceptable performance, such as quality, quantity and speed
- Generate the learning objective statement (the OUTPUT from the task analysis)

Completing an FEA Report

The purpose of a Front-end Analysis Report (FEAR) is to solidify a plan, collect and analyze information, and integrate with the design and development steps of the ADDIE process. Three areas of concern for the FEAR are to:

- Identify the major needs, concerns or problem(s)
- Identify the relevant existing information and its formats
- Determine the data to collect and sources, methods and potential uses of the data

Use a formal report format for detailed reports. The length of your report depends on the audience receiving the report and their needs. Use slides if the FEAR will present only key points.

A FEAR may consist of a number of sections. I recommend using the structure in Sidebar 1 to organize the information.
Sidebar 1  Front-end Analysis Report (FEAR)
Recommended Format

<table>
<thead>
<tr>
<th>Section</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preliminary Information: requestor, requesting authority, date of request, start and end dates of the analysis, reasons for conducting the analysis, brief description of the analysis</td>
</tr>
<tr>
<td>2</td>
<td>Current job performance or instructional situation</td>
</tr>
<tr>
<td>3</td>
<td>Desired job performance or instructional situation</td>
</tr>
<tr>
<td>4</td>
<td>Comparison: current situation vs. desired situation</td>
</tr>
<tr>
<td>5</td>
<td>Current materials needed for this project</td>
</tr>
<tr>
<td>6</td>
<td>Additional resources for the project</td>
</tr>
<tr>
<td>7</td>
<td>Explanation and recommendation of instructional presentation methods (e.g., classroom instruction, on-the-job training (OJT), media-based instruction)</td>
</tr>
<tr>
<td>8</td>
<td>Output statements (with explanation for this front-end analysis)</td>
</tr>
</tbody>
</table>

Summary

A successful Front-end Analysis ensures a thorough investigation of a performance or instruction problem and identifies possible alternative ways to correct it, before the design team begins to create instructional content. This saves time, money, and resources, and gives better assurance that the action taken will correct the problem.

A number of elements that may be part of a Front-end Analysis, and a systematic procedure such as the one I have outlined in the two parts of this article is essential in order to cover them all. It is important not to rule out any of the alternative solutions (not only instruction, but also performance support, improved references, changes to practice or process, better selection of persons to assign to critical tasks, and changes to supervisory or managerial practices) before completing the investigation and analysis.