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# Using Task Analysis to Inform Instructional Design

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The emphasis of this chapter is to explore the value that task analysis brings to the design process. Task analysis is an important skill; if instructional design is a process where instructional designers create “detailed specifications” (e.g., Richey et al., 2011) for learning systems, it is important that the information we provide our learners is accurate, relevant, and delivered in a timely manner. Task analysis allows us the opportunity to do just that.

The instructional design process encompasses five phases that involves the analysis, design, development, implementation, and evaluation (otherwise known as ADDIE) of instructional interventions. The role of analysis encompasses the phase whereby the instructional designer gathers information to gain a clearer understanding of the situation warranting instruction, the needs of the learning audience, and other contextual factors that will influence the design and implementation of instruction as well as transfer of knowledge (Stefaniak, 2021). This information is typically gleaned from conducting needs assessments, learner analyses, contextual analyses, and task analyses.

## What is Task Analysis?

Task analysis is the process of breaking down tasks and activities into a series of steps to understand how they are performed. Conducting a task analysis places emphasis on understanding the tasks and documenting them in a step-by-step fashion (Annett, 2003). The goal of a task analysis is to understand how a task should be performed. While the techniques and guidelines for conducting task analyses can be applicable to a variety of industries, I will discuss task analysis as it relates to instructional design.

Task analysis is not supposed to be about how the instructional designer will design instruction; rather it’s meant to focus on understanding what that task will look like when engaged in by an expert. Taking an in-depth look at the steps required to complete the task can help instructional designers identify the complexities of the task, brainstorm strategies to compartmentalize tasks, and begin to establish a plan for how these tasks may be further broken down and explained to a learning audience. The results of a task analysis are often used to inform instructional design decisions such as what to cover in training materials, develop performance checklists to guide on-the-job performance and assessments, construct job analyses and job descriptions that accurately reflect work that is assigned to specific roles within an organization, and helping to aid in the development of automated decision trees (Hackos & Redish, 1998; Jonassen et al., 1999).

## Task Analysis in Instructional Design

Task analyses are not something that can be rushed. Task analyses are similar to any other form of analysis performed in instructional design; it is important that sufficient data is collected to provide an accurate portrayal of the task and the situation where it is desired to be performed. When we conduct a rigorous task analysis, it becomes quite apparent how much work is needed to really dissect a task in its entirety. A good task analysis provides a detailed breakdown of a

task or topic that will aid the instructional designer with providing sufficient information to their learning audience as well as contribute to overall performance within the organization (Brown & Green, 2016; Morrison et al., 2013).

Jonassen et al. (1999, p. 3) noted several common assumptions about task analysis as it relates to instructional design:

1. "Task analysis is essential to good instructional design.
2. "Task analysis is the least understood component of the instructional design process.
3. "Task analyses are uncertain.
4. "Different contexts demand different task analysis methods; one size does not fit all."

Jonassen et al.'s (1999) assumptions about task analysis still ring true. Consider this saying in regards to the instructional design process: "Measure twice. Cut once." The results of a task analysis can be used to inform many initiatives within an organization and can support the development of both instructional and non-instructional interventions to support learning and performance. The more detail we can gather during task analysis, the better our instruction tends to be.

Task analysis also faces similar challenges when compared to needs assessment. Jonassen et al. (1999) note that it is the least understood component of the instructional design process. In fact, while Dousay & Branch (2022) note that task analysis is an integral part of the design process, some evidence suggests that many instructional designers do not consider it an important part of the instructional design process at all. In their survey of instructional design models, for example, only three models specifically call out task analysis (e.g., Branson, 1975; Morrison et al., 2013; Seels & Glasgow, 1998). Further, there is a high degree of variability within and among the instructional design models in our field when it comes to task analysis as well as many of the other relevant processes of design.

Another challenge is that there is a lot of uncertainty associated with the actual steps used during a task analysis. While there are typical processes that can be followed when conducting a task analysis, a lot of the process is driven by the individuals involved, the unique needs of the system, and what the instructional designer (and anyone else assisting) has access to that can inform the breakdown and compartmentalization of tasks. When we talk about instructional strategies, we know that different learning outcomes warrant different instructional design strategies (Richey et al., 2011). The same can be said about task analysis. Different types of tasks warrant different forms of task analyses. Different types of tasks may require different forms of data collection to inform analysis. This makes it challenging when trying to convey best practices, particularly in instructional design courses.

# Where to Start? What to Focus On?

Determining what tasks to include in a task analysis can sometimes be challenging. Thus, it is important to prioritize when conducting a task analysis. Focusing on repetitive tasks enables the identification of potential areas for improvement and provides opportunities to improve efficiency, accuracy, and overall performance. An instructional designer is not expected to include every single task that an individual may complete. Instead, think about the tasks broadly the same way you would if you were crafting a job description. You would not include every single task in a job description; rather, you would prioritize the most important and recurring tasks.

Some questions you may consider when determining which tasks you should focus on during a task analysis may include, but are not limited to, the following:

- How often is the task completed?
- How important is the task in relation to the job?
- How important is the task in relation to plans for training?
- Do individuals encounter challenges while completing the tasks?
- Are there specific protocols that need to be followed while completing a task due to safety?
- Are there safety, ethical, and/or legal implications associated with completing the task incorrectly?

When determining what tasks to focus on, Jonassen et al. (1999) suggest 5 criteria to use to help guide task selection. These criteria and questions to consider are included in Table 1. Making an exhaustive list of tasks related to a particular job or related to the topic you plan on designing instruction for and then weighting them with these criteria can help to prioritize what should be explored in a task analysis. Typically, tasks that are ranked higher in priority will most likely be the tasks you would want to focus on when designing instruction.

**Table 1**

*Criteria for Task Selection (Adapted from Jonassen et al., 1999)*

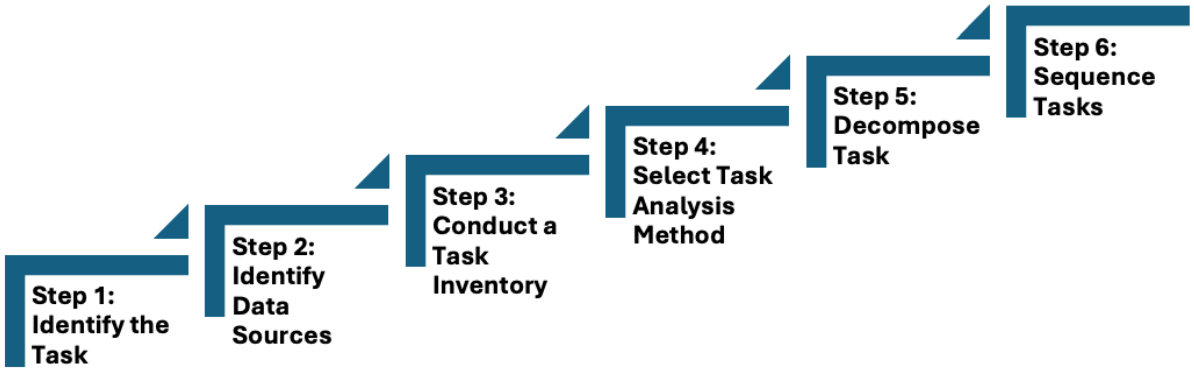
| Criterion | Questions to Consider |
|---|---|
| Criticality | • How important is the task to the overall job?<br>• How does performing the task contribute to overall job and/or organizational goals?<br>• What the implications (legal, ethical, and/or safety) if the task is not completed correctly? |
| Universality | • How often is the task completed?<br>• How widely is the task completed across different contexts within the organization? |
| Standardization | • Is the task completed the same way across different contexts?<br>• Are there instances when a task may be performed differently? How often does that occur?<br>• What types of situations or contextual factors warrant the task being completed differently? |
| Feasibility | • Is there support for individuals responsible for completing the task?<br>• Are adequate resources provided to support training individuals how to perform the task correctly? |
| Difficulty | • How difficult is it to perform the task?<br>• How difficult is it to learn to perform the task?<br>• Do people encounter challenges completing the task correctly? |

# A Typical Process for Conducting a Task Analysis

As previously mentioned, there is a lot of uncertainty that accompanies establishing standard practices for conducting task analyses because a one-size-fits-all approach does not work. It is important to know that while most instructional designers and performance improvement experts will agree on the broader guidelines, these steps may be repeated as new information becomes available. Figure 1 provides an overview of the common steps for completing a task analysis (Beven et al., 2012; Jonassen et al., 1999)

**Figure 1**

*Task Analysis Process*




## Step 1: Identify the Task

The first thing to occur during a task analysis is to identify the task(s) to be examined. During this step, you would begin to identify what the task analysis is focusing on. From an instructional design perspective, there are times where training has already been identified as necessary, and particular topics and related tasks have already been identified as being a priority. The goal of the task analysis would be to break down tasks to develop a more thorough understanding for what to include in instruction. Other times, an organization may conduct a task analysis as part of a larger needs assessment project. The results could inform the development of new jobs, the refinement of existing job descriptions, or more accurate records (i.e., organizational reports and performance metrics) that may inform training and assessment activities.

## Step 2: Identify Data Sources

It is important to ensure that you have adequate data sources that can inform your understanding of the task that is being analyzed. The more data sources that you can gain access to, the deeper understanding you should gain. Data sources are often dependent on a number of variables such as access and time. Table 2 provides an overview of the types of data sources you may want to consider using.

**Table 2**

*Possible Data Sources for a Task Analysis*

| **Data Source** | **Examples** |
|---|---|
| Direct Observations | • Observe subject-matter-experts perform the tasks correctly.<br>• Observe individuals performing the tasks to note best practices as well as any challenges they may encounter. |
| Interviews | • Interview individuals who may be responsible for completing the task.<br>• Try to interview individuals with varying levels of expertise as this will help you to identify areas to focus on in training. |
| Document Analysis | • Review manuals, handbooks, job aids, and protocols that may provide insight into how the task is supposed to be performed. |
| Focus Groups | • Conduct a focus group with 6-8 individuals at a time.<br>• Create questions that provide insight into how tasks are completed? |
| Surveys | • Surveys allow you to gather feedback from multiple individuals who complete the task (or may be expected to complete the task). |

## Step 3: Conduct a Task Inventory

Steps 2 and 3 are often completed in tandem. As more information becomes available about the potential tasks being included in the analysis, the assessor would create a list of the tasks to be explored. Focusing the criteria outlined in Table 1, the assessor would rate the tasks based on criticality, universality, standardization, feasibility, and difficulty. Data gathered from your various sources will help you rate the tasks. It is also important that you ask individuals (e.g., subject matter experts, employees, supervisors) questions that can help you address their criteria.

## Step 4: Select Task Analysis Method

There are a variety of task analysis methods, and, similar to many instructional design processes, different tasks warrant different task analysis methods. Four common task analysis methods include procedural task analysis, cognitive task analysis, hierarchical task analysis, and time-and-motion studies. Procedural and cognitive task analyses are the most common in instructional design.

Procedural task analyses focus on the step-by-step procedures and sequences involved in executing a particular task. It breaks down tasks into detailed procedures, specifying the order of actions, decision points, and potential variations (Morrison et al., 2013). This type of analysis is valuable in instructional contexts, where it helps create instructional materials and training programs that guide individuals through the correct execution of tasks. Procedural analysis ensures that individuals understand not only what needs to be done but also the specific sequence and nuances associated with each step of a task. The following is an example from an instructional design project that demonstrate how a procedural task analysis may be conducted to break down a task.

**Table 3**

*Example: The Basic Journey of Polymer Clay*

| **Task: Conditioning polymer clay by hand** |
|---|

1. With an X-ACTO knife, cut off a chunk of clay that can fit into the palm of your hand.
    1. If you do not have an X-ACTO knife, you can tear off a chunk of clay with your hand.
2. Put the chunk of clay on the palm of your hand.
    1. Any hand works.
    2. 
3. With both of your hands, begin rolling the chunk of clay back and forth in the palm of your hands.
    1.  
4. As you are rolling the block back and forth, your clay should become smooth and snake-like.
    1. 
5. Once your clay is smooth and snake-like, with both hands, smush the clay together.
    1. By smushing, you are pressing your hands together to flatten the clay.
    2. 
6. After the clay is smushed, roll the clay back and forth in a circular motion in the palms of your hands until it becomes a ball.

1. 

7. Press a finger into the ball of clay.

1. 

8. Ask yourself, “Does the clay feel warm and soft?”
    1. By soft, there should be little to no resistance when you press into the clay.
9. If yes, your clay is fully conditioned. If not, repeat steps 3-8 again until your clay is warm and soft.
10. If you have multiple pieces of clay that need to be conditioned, repeat steps 3-8 until all of your clays are conditioned.

Source: Nguyen, A. (2023). Task analysis. From clay to creation: The basic journey of polymer clay [Unpublished paper]. Workforce Education and Instructional Technology. University of Georgia.

Cognitive task analysis delves into the mental processes, knowledge, and problem-solving strategies that individuals employ while performing a task (Militello & Hutton, 1998). It goes beyond the observable actions and aims to uncover the underlying cognitive skills involved. Commonly applied in psychology, education, and human-computer interaction, CTA helps identify expertise, design effective training programs, and improve the usability of systems by understanding how users think and approach tasks (Clark et al., 2008; Wei & Salvendy, 2004). The following are examples from instructional design projects that demonstrate how a cognitive task analysis may be conducted to break down a task.

**Table 4**

*Helping the Caregiver. How to Meal Plan for a Senior*

| **Task: Identify common meal planning challenges** | |
|---|---|
| 1. | Identify common meal planning challenges |
| 1.1 | Financial resources |

| | |
|---|---|
| 1.1.1 | Determine how much you will contribute financially, if applicable. |
| 1.1.3 | Discuss whether the senior will make a financial contribution. NOTE: Prepare to be flexible as the amount from either or both parties can change. |
| 1.1.3.1 | Verify type and amount of resource (e.g. cash, debit card, EBT card) |
| 1.1.3.2 | Verify when resource (s) is available. |
| 1.1.3.3 | Standardize a time to access resource(s), if reoccurring, that coincides with shopping. |
| 1.1.3.3 | Standardize a time to access resource(s), if reoccurring, that coincides with shopping. NOTE: If senior provides a debit of EBT card, ensure that you ahve the card's PIN. |
| 1.2 | Time |
| 1.2.1 | Use calendar(s) to confirm no conflicts with appointments, work deadlines, and/or extra-curricular events to create a shopping list for meals. |
| 1.2.2 | Use calendar(s) to confirm no conflicts with appointments, work deadlines and/or extra-curricular events to establish when you will shop for ingredients. |
| 1.2.3 | Use calendar(s) confirm no conflict with appointments, work deadlines and/or extra-curricular events to determine when you will prepare meals. |
| 1.3 | Food access |
| 1.3.1 | Identify nearby traditional food retailers |
| 1.3.1.1 | Verify hours of operation. |
| 1.3.2 | Determine availability of specialty food stores (e.g. ethnic food stores). |
| 1.3.3 | Determine if you will need to seek supplemental food sources depending on the financial resources available. |
| 1.3.3.1 | Acquire a list of food banks or pantries, if needed. NOTE: Consult your local chamber of commerce or United Way agency for such a list. |
| 1.3.4 | Identify a nearby farmer's market for seasonal produce. |
| 1.3.4.1 | Verify hours and days of operation. |

Source: Green, S. (2023). Task analysis: How to meal plan for a senior [Unpublished paper]. Workforce Education and Instructional Technology. University of Georgia.

**Table 5**

*Leading Change in an Organization*

| **Task: Ensure that individuals make the change initiative their own and create innovative ways to use and improve it.** |
|---|

1. Foster a culture of ownership within the change initiative.

1. Create a culture within the organization that encourages and values individual ownership of the change initiative.
    1. This involves leadership support and recognition of innovative contributions.
        1. Spot bonuses
        2. Additional time off
        3. Verbal recognition
    2. Highlight previous innovations
    3. Demonstrate how innovative suggestions and processes have been incorporated into the company
2. Clearly define the boundaries and constraints within which individuals can make changes to the initiative.
    1. Constraints and boundaries can be:
        1. Financial
        2. Time bound
        3. Technical
        4. Scope related
    2. This ensures alignment with organizational goals and objectives.
3. Empower individuals by granting them the autonomy to make decisions related to the change initiative.
    1. Allow them to experiment with innovative ideas.
        1. Give them a test environment to try their ideas
        2. Develop an innovation grant program
        3. Allow X-number of hours for innovative play
4. Continuously communicate the importance of individual contributions to the success of the initiative.
    1. Engage in open discussions about the value of innovation.
    2. Celebrate previous innovation successes to change initiatives.
    3. Have previous innovators discuss their innovations at town halls.
5. Collaborate with Learning and Development to provide training and resources on innovation tools, methodologies, and best practices to equip individuals with the skills needed to generate and implement innovative ideas.
    1. This could include workshops, guest speakers, infographics, podcasts, and other training development.
    2. Develop a budget for employees to purchase books or courses on their own to develop their innovation
6. Create channels for individuals to brainstorm and share innovative approaches to the change initiative.
    1. Channels may include:
        1. Submission portal on the intranet
        2. Workshops
        3. Community communications boards
        4. Interdepartmental competitions
7. Establish a system to recognize and reward innovation.
    1. This may include a list of:
        1. Incentives
        2. Awards
        3. Different levels of recognition.
8. Create feedback channels so individuals can get feedback on their innovations.
    1. Feedback channels can include:
        1. Scheduled surveys
        2. Dedicated instant messaging channel
        3. Anonymous question boxes
        4. Presentation panels with Q&As
        5. Demo spotlight
    2. Encourage them to iterate and refine their ideas.
9. Document and share best practices on a common platform.

1. Documentation is dependent on above discussed communication styles
2. Common platform could be:
    1. Intranet
    2. Cloud file share system
    3. Instant messaging channel

10. Ensure ongoing innovation by cultivating a learning culture.
    1. Foster a culture of continuous learning and improvement, where individuals are encouraged to learn from failures and successes and apply these lessons to future innovation efforts.
        1. Invest in employee learning through learning technologies, certifications, courses
        2. Make learning a stated company value
        3. Recognize employees for learning achievements
            1. Spot bonuses
            2. Promotions
            3. Learning spotlights
            4. Gamification within the Learning Management System
        4. Make training easily accessible
        5. Set aside time for employees to learn

Source: Curry, K. (2023). Task analysis: Becoming a champion of change. [Unpublished paper]. Workforce Education and Instructional Technology. University of Georgia.

**Table 6**

*Developing a Workshop to Motivate Learners*

| **Task: Differentiate between motivational constructs.** |
|---|

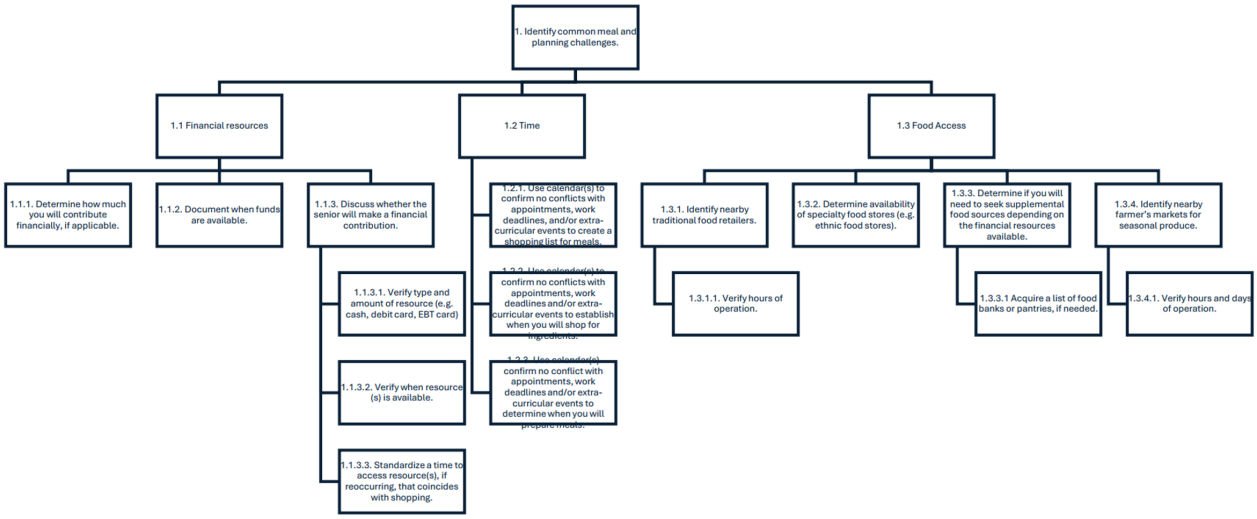
1. List mainstream motivation construct used in education.
    1. Self-determination Theory
    2. Social Cognitive Theory (Self-efficacy)
    3. Expectancy-Value Theory
    4. Interest Theory
2. Define those motivation constructs and identify their characteristics.
    1. Self-determination Theory
        1. Introduced by Richard Ryan and Edward Deci.
        2. SDT is a formal theory that defines intrinsic and varied extrinsic sources of motivation and describes the respective roles of intrinsic and extrinsic motivation in cognitive and social development and individual differences.
        3. Two types of motivation:
            1. Intrinsic motivation
            2. Extrinsic motivation
        4. Three needs of learners:
            1. Competence
            2. Relatedness
            3. Autonomy
    2. Social Cognitive Theory (Self-efficacy)
        1. Introduced by Albert Bandura
        2. Social means “people are influenced by others,” and cognitive means “behavior is not enough to explain motivation.”
        3. Sources of self-efficacy:
            1. Mastery experiences (performance outcomes)
            2. Vicarious experiences
            3. Verbal persuasion
            4. Physiological arousal
    3. Expectancy-value Theory
        1. Introduced by Jacquelynne S. Eccles.
        2. Expectancy is an individual’s prediction for success, and value is the extent to which the individual likes or wants something.
        3. Types of values:
            1. Interest-enjoyment Value
            2. Attainment Value
            3. Utility Value
    4. Relative Cost (Negative Value)
       Interest Theory
        1. Introduced by Paul R. Pintrich.
        2. Interest is an emotional state of liking and willful engagement tied to an activity.
        3. The phases for interest development
            1. Triggered Situational Interest
            2. Maintained Situational Interest
            3. Emerging Individual Interest
3. Well-Developed Individual Interest
4. Compare main motivational constructs from their characteristics and focus to find their differences.
5. Recognize how the differences in constructs could facilitate online learning in different ways.
6. Analyze how each construct can be applied in online settings.
7. List potential motivational strategies with each construct.
8. Consider integrating strategies in one of the online classes to motivate students.

Source: Yang, L. (2023). Task analysis: Motivating learners in online learning environments [Unpublished paper]. Workforce Education and Instructional Technology. University of Georgia.

Hierarchical Task Analysis (HTA) is a systematic method for breaking down complex tasks into a structured hierarchy of sub-tasks and steps. This analysis provides a visual representation of the relationships and dependencies between different components of a task, allowing for a comprehensive understanding of the overall workflow (Annett, 2003; Salmon et al., 2010). HTA is particularly useful in fields such as systems engineering and human factors, where the goal is to gain insights into task structure and identify critical decision points. By organizing tasks hierarchically, HTA aids in designing efficient processes and user interfaces, ultimately enhancing system usability. Figure 2 provides an example of what a HTA may look as it relates to the example provided earlier for taking care of a senior and assisting with meal planning.

**Figure 2**

*Hierarchical Task Analysis Outline for Meal Planning for a Senior*




Time-and-Motion Studies involve the systematic observation and recording of the time required to complete each step of a task and the associated physical motions. Widely employed in industrial and manufacturing settings, this analysis aims to optimize efficiency, identify bottlenecks, and streamline workflow processes. By quantifying the time spent on each task element and analyzing motion patterns, organizations can make informed decisions to enhance productivity, reduce errors, and improve overall operational effectiveness (Arndt et al., 2017; Reed et al., 2018).

## Step 5: Decompose Task

Once you have selected a task to focus on, you can initiate task decomposition by identifying the overall goal of the task. Once the goal is established, break it down into major subtasks using one of the task analysis approaches listed in Step 4, focusing on the sequential order of actions (Annett, 2003). For example, if the task is "baking a cake," major subtasks might include gathering ingredients, preparing the batter, and baking. Subsequently, delve deeper into each subtask, identifying the specific actions required. In the "preparing the batter" subtask, for instance, actions could include measuring ingredients, mixing, and ensuring a smooth consistency. Continue this process until the task is broken down into its most granular elements, often referred to as individual actions or steps. This comprehensive breakdown allows for a thorough understanding of the task's intricacies, facilitating effective training, troubleshooting, and optimization (Morrison et al., 2013).

It's important to consider the cognitive and physical demands associated with each step. Identify decision points, where choices must be made, and critical points where errors could lead to task failure. For instance, in the *How to Meal Plan for a Senior* example mentioned earlier, there is a note provided in step 1.1 to alert the individual performing the task that they may have to deviate depending on whether a senior provides a debit or EBT card. It is also important to note any contextual factors or external factors that may impact task performance. The goal is to create a detailed map of the task, providing an overview of not only the sequential flow of actions but also the cognitive processes and environmental considerations.

## Step 6: Sequence Tasks

This last phase of the task analysis involves the sequencing of tasks. At this time, the task assessor would review the information and determine a logical order for the task(s) and subtasks. This systematic sequencing not only aids in understanding the task's workflow but also serves as a foundation for designing efficient training programs, allowing individuals to grasp the step-by-step progression and develop mastery in a structured manner.

### Points of Discussion

1. How can task analysis serve as a foundation for designing effective instructional materials and training programs?
2. How does task analysis contribute to creating learner-centered instructional experiences? What role does learner variability play in the task analysis process, and how can it be addressed in instructional design?
3. Task analysis is often an iterative process. How can instructional designers adapt their analysis based on feedback from learners or changes in the learning environment? Discuss the importance of flexibility and continuous refinement in the task analysis phase of instructional design.

### Activity 1: Task Analysis Observation Exercise

There are several methods instructional designers may employ to gather data for a task analysis. Direct observations provide instructional designers with an opportunity to see tasks carried out in completion in situated contexts. With a partner, choose a public setting (e.g., a coffee shop, a grocery store, local library, computer lab) where you can observe an individual performing a specific task.

You and your partner should take detailed notes on the task being observed, breaking it down into individual steps. Make note of any instances where the individual may have been interrupted or had to make adjustments to do the environment. Compare your notes with your partner's. What were the key steps you identified in the task? Where there specific steps that should be emphasized? Did the individual encounter any challenges completing the task?

## Activity 2: Task Instructions Challenge

When individuals have a lot of familiarity with a particular subject matter, completing certain tasks becomes intuitive. Tasks that we do every day or on a regular basis become second nature. This can sometimes pose challenges when the time comes and we're asked to breakdown a task and explain it to someone else.

In the spirit of design, you will work in a small group to practice your shoe tying skills. Working in a group of 3 people, you will assign the following roles: instructional designer, learner, and observer.

The instructional designer will take a few minutes and write down the steps needed to tie a shoe with shoestrings. Once they have completed the steps, the instructional designer will read out the tasks. The learner will follow their instructions in an attempt to tie a shoe. It is important that the learner only performs the tasks as given in the instructional designer's instructions. While the learner is working to complete the task, the observer will take notes to see if any confusion arises while instructions are being delivered. The observer will be responsible for noting if steps appear to be missing or if additional cues may be needed to support the learner's understanding and ability to complete the task. Afterwards, the team will debrief on what they experienced and observed.

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