# How can designers positively help individuals make decisions?

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 Decision making is an important skill that can be developed through well-designed learning experiences. Expert decision makers rely on an extensive content knowledge base and use different strategies from novice decision makers. People make systematic errors in their decision-making process. Normative decision-making approaches are helpful for novices, while naturalistic approaches are regularly used by experts. Effective decision-making training involves access to strong mental models, deliberate practice, quality feedback, and appropriately challenging tasks. In this chapter, the authors review key ideas related to effective human decision making.

Design in Context: Turning Failure into Success, a Small Business Owner's Critical Pivot

Alfonso Hernandez is the owner of a successful café located in a touristic city in southern Mexico. The café’s menu consisted of locally grown coffee, sandwiches, and French pastries. After operating the café for eight years with steady growth, Alfonso decided to open a second location. However, after six months the new location was struggling and not generating a profit. Alfonso hired a marketing consultant who ran an expensive marketing campaign and made several improvements to the café, but without a significant increase in sales. At this critical point, Alfonso began to question whether he should continue working on the new café or change to a different concept altogether.

Alfonso considered his business objectives, which included making a profit, delivering good customer service, and avoiding layoffs. He also considered his personal objectives: continuing to learn and sharing Mexican culture with others. With these goals in mind, Alfonso evaluated four options: continuing to run the current café, converting the café into a traditional Mexican restaurant, closing the location, and relocating the café.

Each option presented challenges and benefits. Continuing to run the café could work eventually, but it had not generated income for the last six months. Converting to a restaurant would require additional financial investment to redecorate the space, but it would satisfy his goals of sharing Mexican culture with others, allow him to learn new things, and retain most of his staff. Closing the café would avoid further losses, but it would mean losing all of the investments he made so far and require layoffs. Moving to a new location would mean a large financial investment to set up a new space, but it would offer a second chance to the café and avoid layoffs.

Alfonso was excited about the idea of converting to a restaurant, but hesitant because there was a lot of competition in the neighborhood from other local Mexican restaurants. He was also unsure about whether his current staff would be suitable for the fast pace of a restaurant. Despite these risks, he decided to convert the restaurant. This option would allow him to share his family recipes with others and retain most of his staff by reorganizing employees between the two businesses. He partnered with his grandmother to develop a menu of moles and other traditional Mexican dishes.

As a result of Alfonso’s decisions, the new restaurant became a commercial success. During weekends and holidays, the restaurant started becoming full and had to turn away customers. It also attracted other lucrative opportunities, such as catering for weddings and film shoots.

### Discussion Questions

1. How did the business owner approach decision-making?
2. What are some possible biases that could impact decision-making?

### Key Design Principles

Key principles for designing effective multimedia include

1. Novice decision makers benefit from using explicit, structured decision-making processes to help them see what they do not know and avoid bias.
2. Case studies and simulations should be used in instruction to make training relevant to learners.
3. Training decision making skills requires access to top mental models, deliberate practice, quality feedback, and appropriate difficulty levels.

## Introduction

Decision making is a critical skill that is not often formally taught or developed in the classroom. Making sound decisions is an important skill because errors can have severe consequences (Milkman et al., 2009). In fact, research has found that decision making is a key distinguishing feature between novices and experts (Day et al., 2009; Elvira et al., 2017; Germain, 2012). In this chapter we discuss the nature of decision making and offer six suggestions for how designers can help individuals improve the skill of making decisions.

## The Science of Decision Making

Klein (2015, p. 165) defined decisions as “choices among several options.” Jonassen (2012) further distinguished four fundamental types of decisions: choices, acceptances/rejections, evaluations, and constructions. Decisions may involve a single decision or multiple linked decisions. The process of making a decision, therefore, is a higher-order cognitive skill in professional and everyday life that ranges from simple to complex.

Hoffman and Yates (2005) outlined the contextual issues that are part of the decision-making process: determining the set of goals and needs; managing the costs of deciding; scanning the options, considering consequences; assessing trade-offs; and anticipating any roadblocks to implementation. As alluded above, research has shown that novices and experts display different characteristics when approaching decisions (Eriksson et al., 2006; Herbig and Glöckner, 2009; Kobus et al., 2000). Table 1 below depicts the key differences between novices and experts when making decisions.

**Table 1**

Differences Between Novices and Experts In Decision Making

|  |  |
| --- | --- |
| Novices | Experts |
| ●      Rely on simple strategies●      Process information explicitly●      Identify few cues●      Spend more time thinking about a plan of action●      Spend more time comprehending the problem●      Perceive a narrower range of options | ●      Rely on complex strategies●      Rely on automatic processing, avoiding cognitive overload●      Identify and rate cues better, relying on a deep knowledge base●      Spend more time assessing the situation and available information●      Spend more time searching for information, or gather more information in the same amount of time●      Aware of many existing options |

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### Content Area Expertise

One of the most important factors that affects decision-making is content area (i.e. subject matter) expertise. Experts are able to draw upon a deep well of interconnected knowledge in order to make informed decisions. Specifically, experts can conceptualize problems better, see a wider range of alternative options, evaluate consequences effectively, and assess risk accurately (Herbig and Glöckner, 2009; Martinez et al., 2024). Experts can make decisions faster than novices because they have developed a deeper knowledge base and expertise of the content area.

### Rational Decision Making

Rational choice theory assumes that humans are fundamentally rational, self-interested, and aim to make the most optimal decisions based on weighing costs and benefits (Scott, 2000). The rational decision-making model is based on the assumptions of the rational choice theory. According to Chermack (2003), the rational decision-making model comprises six steps: Pop-out box:

“(1) identifying the problem;

(2) generating alternatives;

(3)

(4) choosing an alternative;

(5) implementing the decision;

(6) evaluating decision effectiveness” (p. 414).

Normative decision-making approaches are deliberative and analytical methods based on rational choice theory (Jonassen, 2012).  Due to the explicit nature of normative approaches, they are useful for problems where justification is needed. approaches are useful for novices because a structured approach helps to avoid biases and oversights. However, since normative approaches are time consuming, they are not suited for time-pressured situations. Examples of rational approaches include cost-benefit  and risk assessment models.

### Naturalistic Decision Making

Whereas rational decision involves a slow and deliberative approach to decision making, naturalistic decision making is a more intuitive approach. Studies have shown that experts, especially in time-constrained high-stakes situations, often use a naturalistic approach in decision making (Barreto and Ribeiro, 2012; Olsen, 2002; Phipps and Parker, 2014). Naturalistic decision-making is driven by unconscious drives, emotions, and previous experiences, and uses construction of stories about possible outcomes (Jonassen, 2012). Additionally, naturalistic decision makers do not necessarily choose optimal choices, rather they choose an option that satisfies minimal requirements (Olsen, 2002). In a study of fireground commanders after critical incidents, 80% of commanders made decisions through recognizing cues and taking immediate action. In fact, some commanders said they never made decisions at all. In short, they did not follow an analytical decision process, rather they drew upon their experiences and acted instinctively (Eriksson et al., 2006).

Naturalistic decision-making approaches are intuitive and rely on the decision maker’s identity and contextual factors. These approaches are often used in situations with ill-structured, complex problems with incomplete and shifting information, unclear and competing goals, high stress, and often multiple participants (Olsen, 2002).

### **Heuristics, Biases, and Emotions**

Heuristics are mental shortcuts that allow an individual to make quick decisions by ignoring some information. In some instances, heuristics result in faulty decision-making; in other cases, they are used as part of an accuracy-effort trade-off to either avoid spending too much time on a trivial decision or compensate for cognitive limitations (Gigerenzer & Gaissmaier, 2011).

are tendencies that lead people to choose a certain option over others (Hammond et al., 1999). For example, when negotiating the price of an item, the seller may set a high price in order to “anchor” the value of the item in the buyer’s mind (Hammond et al., 1999). It would be in the buyer’s interest to estimate the value of the item prior to listening to the seller’s offer and avoid bargaining down from the seller’s offer.

**Table 2**

Common Biases in Decision Making

|  |  |
| --- | --- |
| Anchoring | Leaning on initial impressions, ideas, estimates or data. |
| Status quo | Avoiding taking action that upsets status quo |
| Confirmation | Seeking evidence to confirm opinion |
| Recallability | Inferring chances of an event based on experience, memory and dramatic events |
| Clustering illusion | Seeing patterns that don’t exist; attributing luck to randomness. |
| Framing effect | Framing the problem in a certain way, such as gains vs. losses or using different reference points |
| Overconfidence.            | Being overly confident in your initial estimates, leading to either exposure to more risk or missing opportunities |
| Prudence trap | Being overly cautious, leading to overestimating risk and incurring excessive costs |

Emotions affect how we appraise events, risk and attribute responsibility (Lerner et al., 2015). The influence of emotions can be mitigated by awareness, and practicing strategies, such as diminishing emotional intensity, minimizing the role of emotions in decision-making, and countering emotional biases by leaning towards an opposing bias.

## Designing to Develop Decision-making

According to the learning science and expertise literature, an optimal developmental program includes the following elements: access to top mental models; access to quality feedback; an opportunity for deliberate practice; and an appropriate level of difficulty as a part of that practice (Ericsson, 2017; Martinez et al., 2024). But the question remains, “Where the rubber meets the road, how might designers apply these elements?” At this tactical stage, we refer back to the six steps of Chermack’s (2003) rational decision-making model to suggest a series of options a designer might deploy.

### Identifying the Problem

IDs play an important role in helping learners improve the skill of identifying problems. IDs can facilitate this process by providing clear learning objectives, creating realistic scenarios and cases, and then modeling the process of identifying problems.

**Provide Clear Learning Objectives**. IDs can emphasize that identifying the problem is a key learning outcome. This ensures that learners understand the importance of this step in the overall learning process. Consider framing learning objectives in a manner that prompts learners to focus on problem identification (e.g. "Analyze the situation to identify potential issues").

**Create Realistic Scenarios and Cases**. Designing scenarios that closely mimic real-world situations allows learners to see how the problems they need to identify relate to their lives or future careers. Realistic contexts help learners connect the content with practical applications. Additionally, using case studies or simulations can immerse learners in situations where they must identify underlying problems.

**Model the Problem-Identification Process**. Research shows that depicting examples of how to identify problems in different contexts can serve as a blueprint for learners as they approach their own tasks, thus helping develop the mental models associated with effective decision-making (Elvira et al., 2017). Think-alouds help learners understand the steps involved in identifying a problem.

### Generating Alternatives

Effective decision making and innovation are a result of thoughtful consideration of a range of alternative solutions (Howell & Boies, 2004; Flynn et al., 2003). By creating environments that encourage creativity, critical thinking, and exploration, IDs help learners develop their idea generation skillset.

**Encourage Divergent Thinking**. IDs can incorporate activities that promote brainstorming, where learners are encouraged to generate as many ideas as possible without immediately evaluating them (Dell'Era et al., 2020). Requiring learners to use visual concept tools (e.g., mind maps, spider diagrams) helps expand their initial ideas and further explore various branches of possible solutions (Wylant, 2008).

**Open-Ended Problems**. Open-ended problems prompt learners to think creatively and consider different approaches (Elvira et al., 2017; Pfeffer, 2015). Therefore, consider presenting learners with problems that do not have a single correct answer; encouraging them to explore multiple solutions. Case studies can allow for various possible solutions, and encourage learners to explore and justify different alternatives (Boshuizen et al., 2020; McCauley & McCall, 2014).

**Promote Collaborative Learning**. Collaboration can produce a richer pool of ideas. IDs should design group discussions and peer feedback sessions where learners can build one another's ideas. Digital tools (e.g., Mural, Miro, Lucidspark) can facilitate remote collaboration, where learners can share and build on each other's ideas in real-time without the restrictions associated with time/place.

### Evaluating Alternatives

IDs should guide learners through a disciplined process where they carefully assess the feasibility, effectiveness, and potential impact of different ideas. To accomplish this, IDs can provide the relevant tools, frameworks, and opportunities for critical analysis.

**Introduce Decision-Making Frameworks**. IDs should introduce frameworks or models (e.g., decision matrices, SWOT, force-field analysis) that learners can use to systematically approach problem identification. encourage learners to create lists of the advantages and disadvantages of each alternative, which helps in comparing different ideas side by side.

**Promote Evidence-Based Analysis**. IDs should consider encouraging learners to support their analysis with data, research, or case studies (i.e. real-life experience, whether personal or vicarious). This reinforces the importance of evidence-based decision-making and reduces reliance on intuition alone. Additionally, incorporating activities where learners must research to verify the feasibility of their alternatives has also been proven to be an effective instructional technique (Schrier et al., 2024).

### Choosing An Alternative

Having evaluated the possible options, the next goal is to guide learners in selecting the most effective solution. Similar to the evaluation of alternatives, IDs can help learners choose the best alternative idea when making a decision by introducing structured decision-making tools (mentioned above) and providing opportunities for reflection.

Research shows that reflection is a necessary ingredient in developing the mental models necessary for effective decision making (Schilling et al., 2023). Therefore, IDs should prompt learners to ask reflective questions such as, "Which alternative best aligns with my goals?" or "What are the risks and potential unintended consequences of this decision?" Such questions help strengthen the learner’s thought process. Additionally, consider presenting scenarios where learners must consider the long-term and short-term consequences of their decision. This helps them weigh the pros and cons of each alternative before choosing.

### Implementing The Decision

**Provide Feedback and Iterative Decision-Making Opportunities**. Providing learners strong, timely feedback on their decision-making process helps them develop their own approach (Kluger & DeNisi, 1996; Lacerenza, et al., 2017). IDs can encourage learners to reconsider and adjust their decisions based on feedback in any task that requires them to revise-and-try-again. In this manner, an iterative process that incorporates feedback helps learners understand the flexibility and adaptation necessary for sound decision-making.

**Incorporate Real-World Constraints**. Introducing constraints helps learners make more practical and realistic decisions. IDs can consider introducing budget limits, time restrictions, or resource availability within the decision-making process of a task or scenario. In doing so, designers should ask learners to consider the perspectives of different stakeholders who might be impacted by their decision. Doing so helps learners choose an alternative that balances various interests and priorities.

### Evaluating

**Post-Mortem and After-Action Review**. Once a decision has been made, learners should then reflect on the decision, assess its outcomes, and identify what ultimately did and did not work. This additional layer of reflection further enhances the learning benefit (Lopes et al., 2013; Schrier et al., 2024). Post-mortems and after-action reviews (AAR) are two types of formal evaluations that evoke such reflection.

**Consider Unintended Consequences**. IDs can ask learners to reflect and identify whether there were any unintended or unexpected consequences of their decisions. Learners should specifically analyze how such outcomes impacted the overall effectiveness of their decision. IDs can present scenarios where learners must reflect on the potential long-term impact of decisions.

### Design Challenge

Imagine you were designing a course for small business owners who have to make similar decisions frequently. Create an outline of the course. Consider the following questions:

* How will you involve experts in your course?
* What topics should be covered?
* What kinds of activities will you include?

**After you have outlined a course, let’s talk about what you learned.**

Group Discussion Questions

●      How did you incorporate concepts from the chapter into your design? Were any portions difficult to address?

●      How can technology (AR/VR, digital simulations) be used to help the development of learning experiences?

Personal Reflection Questions

●      How can you apply the science of decision making to your daily life?

●      What surprised you about decision making?

**Possible Solutions**

Create a course that includes case studies, simulations, and role-plays. Every week, a small business expert could be invited to present a difficult decision they made in their career. Each learner could also be paired with a mentor who provides them with regular feedback on their progress.

## Conclusion

            Decision making is an important skill that can be developed through well-designed learning experiences. Expert decision makers rely on an extensive content knowledge base and use different strategies from novice decision makers. People make systematic errors in their decision-making process. Normative decision-making approaches are helpful for novices, while naturalistic approaches are regularly used by experts. Effective decision-making training involves access to strong mental models, deliberate practice, quality feedback, and appropriately challenging tasks.

### Read More

1. “Designing for Decision Making” article by David H. Jonassen.
2. “Developing Expertise in Decision Making” article by Gary Klein.
3. “How can decision making be improved?” article by Katherine L. Milkman, Dolly Chugh and Max H. Bazerman.

“Smart choices: A practical guide to making better decisions” book by John S. Hammond, Ralph L. Keeney, and Howard Raiffa.

### Knowledge Check

* Which of these tools are used for normative decision making? (select all that apply)
	1. Cost-benefit analysis
	2. Simulations
	3. Storytelling
	4. Risk assessment
* How does the Prudence Trap affect decision-making?
	1. We are too tolerant of risk and choose disadvantageous options.
	2. We are too cautious and overestimate risk.
	3. We refuse to take action.
	4. We rely too much on previous experiences.
* What strategies can designers use to foster creative idea generation and alternative solutions in learners during decision-making processes?
	1. Providing structured, closed-ended problems
	2. Encouraging divergent thinking and brainstorming without immediate evaluation
	3. Focusing on individual problem-solving
	4. Requiring the use of systematic problem-identification tools

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