CHAPTER 7: DECIDING ON A DESIGN CONCEPT

Chapter outline

- Using test results
- Using design requirements and specifications
- Creating decision matrices
- Talking to the client
- Interviewing experts and testing more mockups

Generating and testing alternatives will yield a great deal of information that you can use to decide on a single direction for your final design. Of course, that does not mean that you now know the details of every feature of the design you will propose. You will need to continue generating alternative components for those features, mocking them up, and testing them, but all that will be done within the context of the design concept you finally settle on. How do you decide on the key elements of the design concept that will be the focus of your further work on the project? This chapter discusses several methods for making those decisions.

7.1 USING TEST RESULTS

If you have organized the results of your design concept clearly, aspects of your design direction will leap out at you. For instance, a team designing the interface for an electronic kiosk to give shoppers information on restaurants and entertainment (Johnson, Chen, Kidd, Lesperance, & Marvin, 2002) observed users operating three mockups: a touch screen, trackball, and keypad. The average scores (on a scale of 1 to 5, with 5 being the best) were:

- Touch screen: 4.36
- Trackball: 2.12
- ATM: 2.15

Because their research had already shown that the three methods were comparable in price and durability, the team decided on the obvious favorite—the touch screen. Sometimes, test results do not clearly favor one alternative feature. When the kiosk team presented users with three alternative methods for

searching by location, price, and type (of entertainment or food), they got these results:

- Location: 4.09
- Price: 4.03
- Type 3.55

Users rated searching by location and price nearly the same, with searching by type not far enough behind to be eliminated. In this case, the team decided to incorporate all three search methods into their design concept, because doing so stayed within the client's budget and offered users several search methods. If you have tested your alternatives in a lab or other controlled setting, you can use the results in the same way to make decisions.

7.2 USING DESIGN REQUIREMENTS AND SPECIFICATIONS

Your project definition—described in Chapter 3—is another important tool in helping you choose the main features of your design.

A team designing a structure that would help their client organize the papers on her desk relied on the project definition to help them decide on their design concept. When no clear favorite emerged after testing their three alternative mockups, the team turned to their project definition, which revealed that the client wanted an individually tailored product because she had tried the products available in commercial catalogues and found them all unsatisfactory in various ways. The team realized that their alternatives were similar to catalogue products, so they combined the best elements of all three alternatives in an original way and presented a design that delighted their client.

7.3 CREATING DECISION MATRICES

A decision matrix can help you sort through multiple alternatives and requirements to determine which features of your alternative designs to use.

A simple and effective decision matrix lists the relevant design requirements along one axis and the alternative features along another. Each alternative is then "scored" (using plus and minus signs or some other method) with respect to each requirement.

A team redesigning a stage in a church generated two alternatives—a ramp and an electric lift—to accommodate users with walkers and wheelchairs. Many church members favored a ramp because they worried that a lift would strain the church budget. Other members thought the ramp would take up too much room and that a lift would be easier to use.

With these conflicting views in mind, the team drew up the decision matrix illustrated below. The two alternatives are in the top row, and the requirements are in the first column. The team used three requirements to rate the ramp versus the lift: cost, ease of use, and efficient use of space. They gave the alternative two pluses when it satisfied the requirement extremely well, and two minuses when it did so extremely poorly. Otherwise, they used a single plus or minus to rate the alternatives.

Example 7.1: Decision matrix for choosing between two alternatives

	Lift	Ramp
Cost	--	++
Ease of use	+	-
Use of space	++	--
Total	+	-

KEY

++ = satisfies requirement extremely well

+ = satisfies requirement adequately

- = does not satisfy requirement adequately

-- = satisfies requirement extremely poorly

Although most church members favored the ramp, the decision matrix helped the team decide that the lift was a better option because it satisfied more requirements.

The decision matrix also could help the team evaluate alternatives against requirements that are not equally important. For example, the team may have decided, based on interviews with church members, that cost was the most important requirement. In that case, they could have created a weighted decision matrix like the one below to help them evaluate the alternatives.

Example 7.2: Weighted decision matrix for choosing between two alternatives

	Lift		Ramp	
	Raw	Weighted	Raw	Weighted
Cost (x2)	--	----	++	++++
Ease of use (x1)	++	++	-	-
Use of space (x1)	++	++	--	--
Total	++	0	-	+

KEY

++ = satisfies requirement extremely well

+ = satisfies requirement adequately

0 = neutral

- = does not satisfy requirement adequately

-- = satisfies requirement extremely poorly

Using this matrix, the team might conclude that if cost is the driving requirement, a ramp is the better choice, even though it is less effective in meeting the other requirements. Then they could double-check their assumptions about priorities with the client.

Sometimes, a matrix might not lead you to a single answer, but will help you eliminate alternatives. User testing on the electronic kiosk showed that some users wanted extensive information, such as restaurant menus, which would mean more time and money to build and maintain the database and possibly cause long lines at the kiosk as users pondered their choices. To figure out a solution, the design team created the matrix below to measure three alternatives against three requirements. The alternatives, in the top row, are: full menus; a list of featured dishes and their prices; and the type of restaurant and its location. The first column lists the key requirements: providing useful information, keeping costs low, and ensuring efficient use of the kiosk.

Example 7.3: Decision matrix for choosing among three alternatives

	Full menu	Featured items	No menu info
Provide useful info	++	+	--
Keep costs low	--	-	++
Use kiosk efficiently	--	++	++
Total	--	++	++

KEY
++ = satisfies requirement extremely well
+ = satisfies requirement adequately
- = does not satisfy requirement adequately
-- = satisfies requirement extremely poorly

While the matrix enabled the team to decide against full menus, the other two alternatives fared equally well. The next sections offer additional methods for making decisions when matrices don't yield definitive answers.

7.4 TALKING TO THE CLIENT

When you have tough decisions to make about your design, especially those involving costs, it's important to seek input from your client, who can tell you what she is willing to spend and what is most important to her.

After eliminating complete menus, the kiosk team had to decide, based on inconclusive user testing, whether to list a restaurant's featured dishes or just the type of food and the address. The deciding factor was cost. A meeting with the client confirmed that he was willing to spend the money required to enter information on featured dishes into the database.

7.5 INTERVIEWING EXPERTS AND TESTING MORE MOCKUPS

The last two methods for making decisions about your design concept involve interviewing experts and testing more mockups on users or in controlled settings.

Interviewing experts: When you don't know enough to measure how well certain features meet all relevant requirements, seek out experts. Even after interviewing church members and the client, the team designing the access to the

church stage still couldn't decide if the electric lift was the best choice. They assumed that a lift would be easy to operate and would use space efficiently. They also assumed a ramp would be harder to navigate than a lift and would take up more space. But they needed more than just assumptions, so they sought the advice of experts on handicap accessibility in rehabilitation institutes, college faculties, and companies that make equipment for people with disabilities.

Testing more mockups: Lastly, you can go back to users or the lab with new mockups that embody the alternatives you are stuck between. The kiosk team might want to know whether users would be satisfied with a brief list of featured items for each restaurant or how much time people would spend at the kiosk reviewing full menus. To answer these questions, they could quickly mock up pages that included the alternatives: lists of featured menu items, complete menus, and no extra information. Then they could show these to users and give them a task—"Using these pages, decide where to go to dinner tonight"—and time their interactions with the mockups. Perhaps only at that point could the team feel confident that they knew enough to decide how much information to include in the kiosk database.

7.6 REFERENCES

Johnson, A., Chen, R., Kidd, L., Lesperance, I., Marvin, J. (2002). *Progress report #3*. Engineering Design and Communication, Northwestern University.