

Dimensions of Usability: Defining the Conversation, Driving the Process

Whitney Quesenbery
Whitney Interactive Design

ABSTRACT

Have you ever wondered if your colleagues or clients really understand usability? Too often, standards or guidelines substitute for really engaging our business, technical and design colleagues in a discussion of what usability means. By looking at usability from five dimensions, we can create a consensus around usability goals and use that definition to provide the basis for planning user centered design activities.

SETTING THE STAGE

It's a conference room. Five or ten people from a project team. You are starting a new project. Perhaps it's with a new client or a new team. They have decided they want some of that "usability" they've been hearing about, and you are the person who's going to help them get it. The project leader starts.

"We want to make our product more usable" You reply, "OK, let's talk about your goals in a little more detail, so we can plan how to achieve them." Then he throws down the challenge card. "You're the expert. You tell me."

Or perhaps they say, "You know. We want it to be easy for people to use. Intuitive. What should we be doing?" All eyes turn to you. What you say next will set the stage for all of your work on this project.

Sound familiar? In this situation, I have two goals.

- ❑ The first, and most immediate, goal is to get the other people on the project talking about usability in a way that both informs me as the usability professional on the team *and* helps them understand what I will be doing.
- ❑ Second, I need to use this information – sometimes quickly – to define the process and select the right activities to meet the usability goals for the project.

The dimensions of usability are my entry point, how I get the conversation started.

TALKING ABOUT USABILITY

I'm going to use the word "usability" as the quality or characteristic of a usable product, although it is also used as short-hand for a user-centered design process, or some of the specific research and evaluation techniques in such a process. We can define this characteristic in a general way, as the ISO 9241 standard does. It says that usability is:

"The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use"

But what does effectiveness, or efficiency, mean for those specified users in their specified context of use? Like all standards, this definition is not specific enough to guide design

decisions. Instead, it is a template, a starting point that we must fill in for each project. We end up not with the anonymous "specified goals" but with goals that we have defined and elaborated.

This definition has done little to help us sell usability or even to help understand what it means. More importantly, it has done little to engage the imaginations and commitment of the other stakeholders in our projects. There are three important criticisms of the 9241 definition:

- ❑ It is too focused on well-defined tasks and goals, either ignoring the less tangible elements of user experience or forcing simplistic definitions of tasks (such as reducing an e-commerce site to the simple task "buy things").
- ❑ The emphasis on efficient and effective as the most important attributes of an interaction make it difficult to talk about how usability applies to products or context where these are less important. Work that looks at pleasure, engagement, or other difficult to measure emotional aspects is often defined as "beyond usability."
- ❑ "Satisfaction" is not a robust enough term to cover the needs in many situations. It feels like "just enough" not "really great." This may have been acceptable in a context of enterprise or other work-related applications. In the consumer world of shopping and information-seeking and online services, it is not a broad enough view of human interaction to describe the usability goals of either the users, or the business.

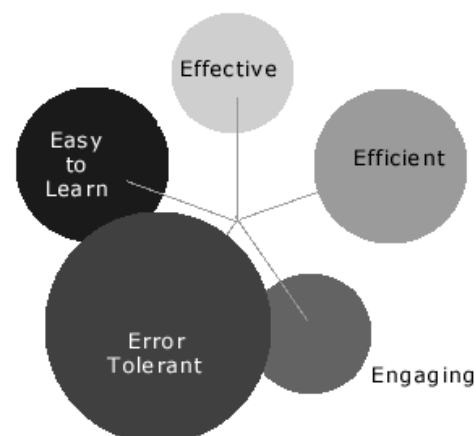
Simply put, we have failed to communicate the larger vision of usability to the software, web and product design community. Talking about usability is the process of breaking it down into less abstract terms so that it can be discussed, in detail, from different perspectives, or dimensions.

DEFINING THE DIMENSIONS

When I reviewed discussions of the qualities of usability, I found a number of good suggestions in addition to efficient, effective and satisfying: user friendly, memorable, pleasure, accessible, learnable, findability, quality, useful, error-averse. In Usability Engineering, Jakob Nielsen suggested five qualities of a usable product: learnability, efficiency, memorability, errors (low rate, easy to recover), satisfaction.

At first, using words that all started with "E" was a word game, but I was also looking for a way to make the dimensions of usability easy to remember and the 5Es were born. I decided on:

- ❑ Effective
- ❑ Efficient
- ❑ Engaging
- ❑ Error Tolerant
- ❑ Easy to Learn



Effective

The completeness and accuracy with which users achieve their goals.

Effective is the first E. If a user cannot actually do the thing he or she set out to do, it probably doesn't matter whether the experience was short or long, easy or hard. In the end, they have failed to complete their tasks or meet their goals. If we want to be able to measure effectiveness, we have to know how people define success or usefulness, whether this is relatively straight forward or more subtle.

Efficient

The speed (with accuracy) with which this work can be done.

Efficiency may be something that is carefully defined, for example in a call center where operators are measured on the number of calls they can handle in a day. It may be a subjective judgement of when a task is taking "too long" or "too many clicks."

Engaging

How pleasant, satisfying or interesting an interface is to use

"Engaging" replaces "satisfaction," looking for a word that suggests the ways that the interface can draw someone into a site or a task. It also looks at the quality of the interaction, or how well the user can connect with the way the product is presented and organized.

Error Tolerant

How well the product prevents errors, and helps the user recover from any that do occur

It would be lovely to say "error free" or "prevents errors" but mistakes and accidents and misunderstandings will happen. The cat nudges the mouse as you click. You misread a link and need to find your way back, or enter a number with a typo. The real test is how helpful the interface is when an error does occur.

Easy to Learn

How well the product supports both initial orientation and deeper learning

A product may be used just once, once in a while, or on a daily basis. It may support a task that is easy or complex; and the user may be an expert or a novice in this task. But every time it is used the interface must be remembered or relearned, and new areas of the product may be explored over time.

IDENTIFYING THE 5Es

Identifying and understanding what usability means – how each of the dimensions of usability are defined – is a good first step for talking about usability. It is important not to do this in a general way, but to explore the specific context of each product and each user persona.

One way of doing this is to create first-person statements that express a usability requirement for each dimension. These requirements may be explicit, or implicit in a typical statement. The best way to do this is to draw on direct quotes from user research. But it is

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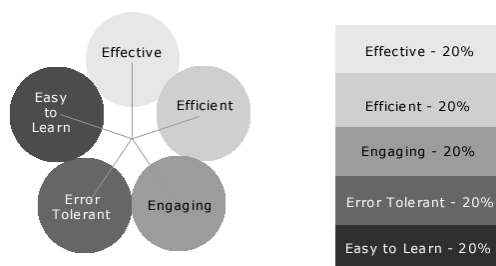
also possible to construct statements that reflect current knowledge or assumptions about users.

These statements should be in the first person, reminding the team that they reflect the users' point of view, not the business requirements. Good statements also expose an underlying attitude towards the task or product, and have a good sense of the user's voice in style and terminology. Here are some examples:

- ❑ "I hope this thing won't let me make a mistake" (error tolerant)
- ❑ "This better be faster than printing out the form and mailing it in...I don't want to spend all day on this." (efficient)
- ❑ "How do I know whether it registered me for the right class?" (effective)
- ❑ "We get training, but I only use this program once a week, so it's easy to forget how to do things." (ease of learning)
- ❑ "...And then I got to this big blank screen and I didn't know what to do next. It just stopped me dead, so I went to another site" (engaging)
- ❑ "I found *something*, but is this the *only* answer? I don't know...there might be more to read." (effective)
- ❑ "It wasn't a bad site, but the words were so small I could barely read them." (engaging)

The dimensions are, of course, interconnected. An interface that is difficult to learn or remember will take longer to use. One that allows mistakes to slip by unnoticed will hardly be effective. Understanding these relationships can be a matter of hearing the nuance in what the users say. Consider the difference or emphasis (and placement of responsibility) between, "I don't want to make a mistake" and "I hope it will do this correctly." Both express concern about the outcome of the interaction, but one suggests that the product needs to emphasize error tolerance (and preventing errors) to reassure the user during the process, while the other suggests a need for confirmation of actions that the product has taken.

A QUESTION OF BALANCE



It would be convenient if each of the dimensions of usability were equally important in every product. They are not, just as the usability requirements for a product depend in part on the context of use – consider the differences between a repetitive operational task and a game. This provides one of the first opportunities to work with the 5Es to better understand the usability requirements for a product.

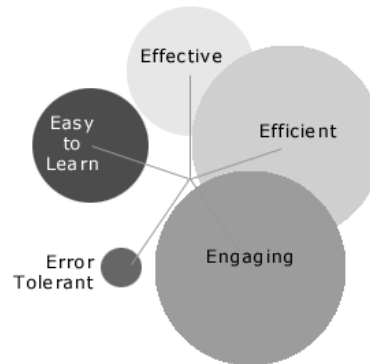
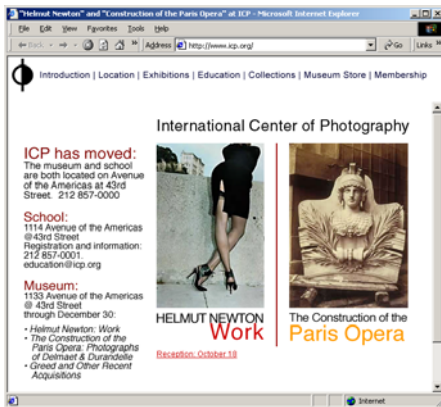
The balance or relationship between the 5Es can set the direction for the interface design, and help determine the techniques for both user research and usability evaluation used during the project. It will suggest design approaches, and identify places where trade-offs can be made when necessary.

The two examples that follow are of a museum web site and a registration update form, both web sites for the general public.

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A museum web site

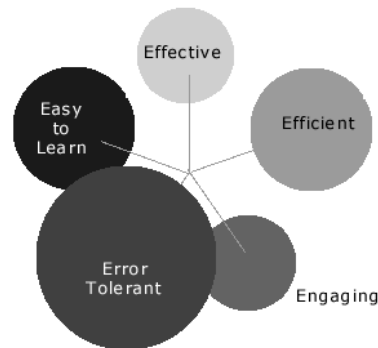
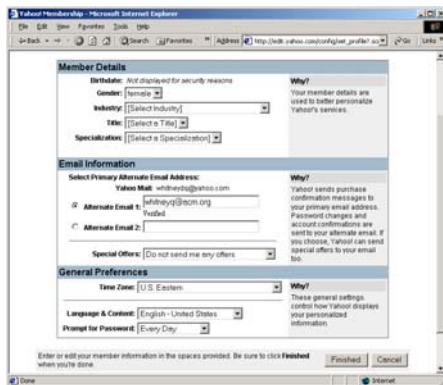
The three most important dimensions of a museum web site might be:



Engaging	"I want to see what kind of museum it is right away, and get a sense of the exhibits"
Efficient	"All I want is the location and their opening hours. How many pages do I have to look on to find this out?"
Effective	"The last time I used the web to plan a museum visit, the hours were wrong and I couldn't get in to see the exhibit at all."

A registration update form

In contrast, on this registration update form, they are:



Error tolerant	"What happens if I get something wrong? Will I be able to fix it?"
Easy to learn	"Don't tell me I have to read a manual just to update this thing. Can't they make it easier to understand?"
Efficient	"This can't take me longer to do online than by calling tech support."

USING THE 5Es THROUGHOUT THE PROCESS

In selecting the dimensions, I was also looking for qualities that, if understood for a specific project, would suggest how to design the interface, and how to tailor the user-centered design process for that project. As we look at all stages of a project, the 5Es are useful in each of them.

Although it starts as a way to talk about usability, the work to define the “meaning” of usability for the project really pays off as a guide the entire user-centered design process.

The 5Es can also function as an advocacy tool, The need to create concrete user statements for each dimension can help expose areas where the team does not know enough about the users of their product...and in doing so, provided a strong justification for filling that knowledge gap. A participant in a conference session once commented that it was difficult to put words in the mouths of people you have never met. He didn't realize until he tried to do it how little he knew.

Initial vision or discovery conversation

There are several different techniques for conducting the initial discussion with a group, depending on the roles of the participants, their experience with usability, and the depth of user knowledge for the project. The overview of the process is a simple one:

1. Discuss the meaning of each of the 5Es to be sure that everyone understands them and how they might be understood in the context of your project.
2. Identify (or create) typical user statements that express their attitudes towards each of the dimensions. You can do this for the primary persona, or for several personas or user groups.
3. Discuss the relative importance of each of the dimensions to the success (and overall usability) of the product, noting the reasons for how the priorities are set.

The style or formality of this session should be appropriate to the group. Scott McDaniel and some other colleagues have used games for the priority setting. In this approach, the group is given \$100 in play money and asked to spend it on the 5Es. They have to spend some money on each dimension, but some will be more valuable (and cost more) than others. Turning this into a game may seem like a frivolous way to handle such an important discussion, but in some teams it has been an excellent “ice-breaker.” The important thing is to get the group talking about users and thinking about what we mean by “usability” for their project.

Planning user analysis

What kind of user analysis will help uncover deeper requirements in each of the dimensions? For example, do you need to understand how long a task takes now (efficient), or how users build knowledge over time (easy to learn)? Each of these suggests a different focus or technique for user research.

After the user research and analysis is complete, you have an opportunity to look at whether the understanding of users from user research differs from or expands on the original definitions? Doing the initial work with stakeholders not only helps the usability professional understand their point of view, but also provides a way to expose incorrect assumptions.

Creating usability goals and requirements

Each of the user statements for the 5Es can be the basis for a usability goal. What must the product do to meet the requirements that are implicit in these statements? A user statement like "How do I know whether it registered me for the right class?" might lead to a requirement that the user be able to see and confirm all choices before taking a final action. Or a program with many infrequently used tasks might have a usability goal that it is possible for a (typical, trained) user to complete them without special additional training or the use of an external manual.

Whether the statement leads to a functional requirement or a usability goal, tying each of them to one of the dimensions of usability connects it to that initial conversation and the shared vision that emerged from it

This can also help show any differences in needs – or emphasis. For example, a manager may care that the work is done efficiently, and see this as a "time on task" problem, while the worker may see it as a problem of error tolerance, and how well the application supports them as they work.

Forming design concept

How can the design approach focus on the most important dimensions of usability? What design elements will help tailor the interface to the needs that users express? For example, do some users need short-cuts or ways to handle more than one "item" at time, or do infrequent users need built-in assistance to "remind" them how to use the interface?

Each of the 5Es suggests some approaches:

Dimension	User Needs	Possible Design Needs
Effective	Accuracy	<input type="checkbox"/> Provide feedback on all actions <input type="checkbox"/> Eliminate opportunities for error
Efficient	Operational speed	<input type="checkbox"/> Design navigation for ideal workflows as well as for alternates <input type="checkbox"/> Provide shortcuts <input type="checkbox"/> Use interactions styles and design widgets that support speed <input type="checkbox"/> Minimize extraneous elements on the screen
Engaging	To be drawn in	<input type="checkbox"/> Incorporate the "brand promise" into the design <input type="checkbox"/> Use clear language and appropriate terminology <input type="checkbox"/> Set an appropriate, helpful tone
Error Tolerant	Validation and confirmation	<input type="checkbox"/> Transform "errors" into alternate paths <input type="checkbox"/> Use controls that aid in accurate selection <input type="checkbox"/> Be sure actions are easily reversible
Easy to Learn	Just in time information	<input type="checkbox"/> Make interface helpful with minimalist prompts and instructions <input type="checkbox"/> Create "guided" interfaces for difficult or infrequent tasks

Planning usability testing

What kind of usability evaluation is needed to ensure that the design has met usability goals? What kinds of prototypes are needed to be able to get useful results? For example, an application that needs to support very efficient operation probably needs to be tested with a high fidelity prototype or an early version of the program, with some initial training, and a realistic set of work matching typical working conditions. A product that needs to engage people can probably be tested with an early conceptual prototype.

Dimension	Possible Evaluation Techniques
Effective	<ul style="list-style-type: none"> <input type="checkbox"/> Create scenarios with difficult or ambiguous tasks. <input type="checkbox"/> Evaluate tasks for how accurately they are completed and how often they produce undetected errors.
Efficient	<ul style="list-style-type: none"> <input type="checkbox"/> Construct the test with enough repetitions of typical tasks to create a realistic work rhythm. <input type="checkbox"/> Use working software or a high fidelity prototype. <input type="checkbox"/> Collect timing data, but also interview participants for their subjective impression of the program
Engaging	<ul style="list-style-type: none"> <input type="checkbox"/> Use satisfaction interview questions or surveys as part of the evaluation <input type="checkbox"/> Do comparative preference testing of presentation design. <input type="checkbox"/> Construct the test so that participants are able to abandon a product if they want.
Error Tolerant	<ul style="list-style-type: none"> <input type="checkbox"/> Construct scenarios to create situations in which errors or other problems are likely. <input type="checkbox"/> Observe how easily or accurately users are able to recover from problems when they occur.
Easy to Learn	<ul style="list-style-type: none"> <input type="checkbox"/> Control how much instruction is given to test participants, or recruit participants with different levels of experience or knowledge. <input type="checkbox"/> Mix frequently used task with scenarios for functions used less often or tasks with unusual variations.

CONCLUSION

For each project or person, using the dimensions of usability to tie together process and design decisions throughout the project life-cycle can be a powerful way to bring all of the elements of user-centered design together, and focus them on an understanding of what usability “means” in that context. The 5Es can be the basis for a new technique in the usability toolkit to help sell usability and its power to guide a project towards a more successful design.

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