Aesthetic-Usability Effect

Aesthetic designs are perceived as easier to use than less-aesthetic designs.[1]

The aesthetic-usability effect describes a phenomenon in which people perceive more-aesthetic designs as easier to use than less-aesthetic designs—whether they are or not. The effect has been observed in several experiments, and has significant implications regarding the acceptance, use, and performance of a design.[2]

Aesthetic designs look easier to use and have a higher probability of being used, whether or not they actually are easier to use. More usable but less-aesthetic designs may suffer a lack of acceptance that renders issues of usability moot. These perceptions bias subsequent interactions and are resistant to change. For example, in a study of how people use computers, researchers found that early impressions influenced long-term attitudes about their quality and use. A similar phenomenon is well documented with regard to human attractiveness—first impressions of people influence attitude formation and measurably affect how people are perceived and treated.[3]

Aesthetics play an important role in the way a design is used. Aesthetic designs are more effective at fostering positive attitudes than unaesthetic designs, and make people more tolerant of design problems. For example, it is common for people to name and develop feelings toward designs that have fostered positive attitudes (e.g., naming a car), and rare for people to do the same with designs that have fostered negative attitudes. Such personal and positive relationships with a design evoke feelings of affection, loyalty, and patience—all significant factors in the long-term usability and overall success of a design. These positive relationships have implications for how effectively people interact with designs. Positive relationships with a design result in an interaction that helps catalyze creative thinking and problem solving. Negative relationships result in an interaction that narrows thinking and stifles creativity. This is especially important in stressful environments, since stress increases fatigue and reduces cognitive performance.[4]

Always aspire to create aesthetic designs. Aesthetic designs are perceived as easier to use, are more readily accepted and used over time, and promote creative thinking and problem solving. Aesthetic designs also foster positive relationships with people, making them more tolerant of problems with a design.

See also Attractiveness Bias, Form Follows Function, Golden Ratio, Law of Prägnanz, Ockham's Razor, and Rule of Thirds.

[1] Note that the authors use the term *aesthetic-usability effect* for convenient reference. It does not appear in the seminal work or subsequent research.

[2] The seminal work on the aesthetic-usability effect is "Apparent Usability vs. Inherent Usability: Experimental Analysis on the Determinants of the Apparent Usability" by Masaaki Kurosu and Kaori Kashimura, *CHI '95 Conference Companion*, 1995, p. 292–293.

[3] "Forming Impressions of Personality" by Solomon E. Asch, *Journal of Abnormal and Social Psychology*, 1946, vol. 41, 258–290.

[4] "Emotion & Design: Attractive Things Work Better" by Donald Norman, www.jnd.org, 2002.

Nokia was one of the first companies to realize that adoption of cellular phones required more than basic communication features. Cellular phones need to be recharged frequently, carried around, and often suffer from signal loss or interference; they are not trouble-free devices. Aesthetic elements like color covers and customizable rings are more than ornaments; the aesthetic elements create a positive relationship with users that, in turn, make such troubles more tolerable and the devices more successful.

While VCR's around the world continue flashing *12:00* because users cannot figure out the poorly designed time and recording controls, TiVo is setting a new bar for recording convenience and usability. TiVo's intelligent and automated recording features, simple navigation through attractive on-screen menus, and pleasant and distinct auditory feedback are changing the way people record and watch their favorite programs.

Affordance

A property in which the physical characteristics of an object or environment influence its function.

Objects and environments are better suited for some functions than others. Round wheels are better suited than square wheels for rolling; therefore, round wheels are said to better afford rolling. Stairs are better suited than fences for climbing; therefore, stairs are said to better afford climbing. This is not to say that square wheels cannot be rolled or fences climbed, rather that their physical characteristics influence the way they function and are likely to be used.[1]

When the affordance of an object or environment corresponds with its intended function, the design will perform more efficiently and will be easier to use. Conversely, when the affordance of an object or environment conflicts with its intended function, the design will perform less efficiently and be more difficult to use. For example, a door with a handle affords pulling. Sometimes, doors with handles are designed to open only by pushing—the affordance of the handle conflicts with the door's function. Replace the handle with a flat plate, and it now affords pushing—the affordance of the flat plate corresponds to the way in which the door can be used. The design is improved.

Images of common physical objects and environments can enhance the usability of a design. For example, a drawing of a three-dimensional button on a computer screen leverages our knowledge of the physical characteristics of buttons and, therefore, appears to afford pressing. The popular "desktop" metaphor used by computer operating systems is based on this idea—images of common items like trash cans and folders leverage our knowledge of how those items function in the real world and, thus, suggest their function in the software environment.[2]

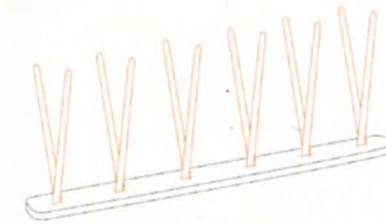
Whenever possible, you should design objects and environments to afford their intended function, and negatively afford improper use. For example, stackable chairs should only stack one way. Mimic familiar objects and environments in abstract contexts (e.g., software interfaces) to imply the way in which new systems can be used. When affordances are successfully employed in a design, it will seem inconceivable that the design could function or be used otherwise.

See also Constraint, Mapping, Mimicry, and Wayfinding.

[1] The seminal work on affordances is "The Theory of Affordances" by James Gibson, in *Perceiving, Acting, and Knowing* by R. E. Shaw & J. Bransford (Eds), Lawrence Erlbaum Associates, 1977; and *The Ecological Approach to Visual Perception* by James Gibson, Houghton Mifflin, 1979. A popular treatment of affordances can be found in *The Design of Everyday Things* by Donald Norman, Doubleday, 1990.

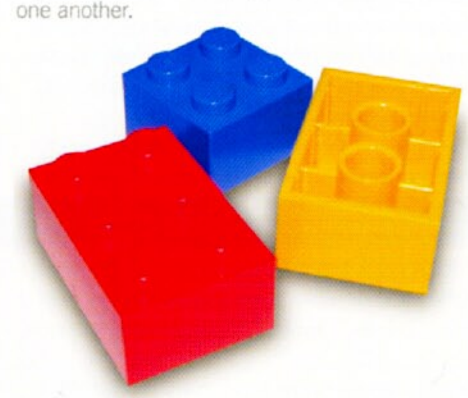
[2] Note that the term *affordance* refers to the properties of a physical object or environment only. When images of physical objects or environments are used (e.g., image of a button), the images, themselves, do not afford anything. The knowledge of button affordances exists in the mind of the perceiver based on experience with physical buttons—it is not a property of the image. Therefore, the affordance is said to be *perceived*. See, for example, "Affordances and Design" by Donald Norman, www.jnd.org.

OXO is well known for the handle designs of their products; shape, color, and texture combine to create irresistible gripping affordances.

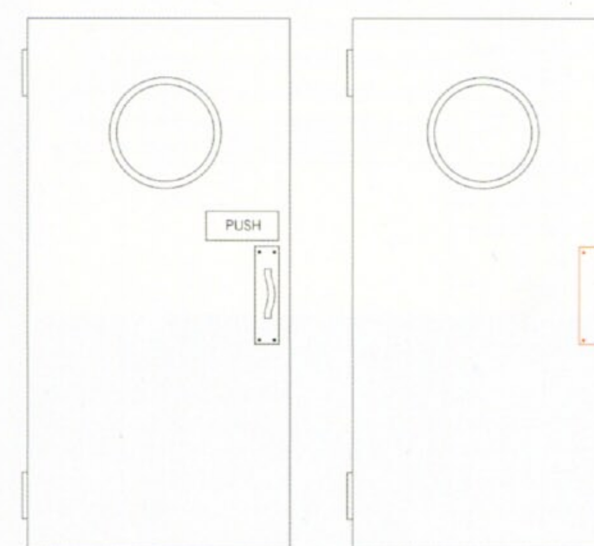


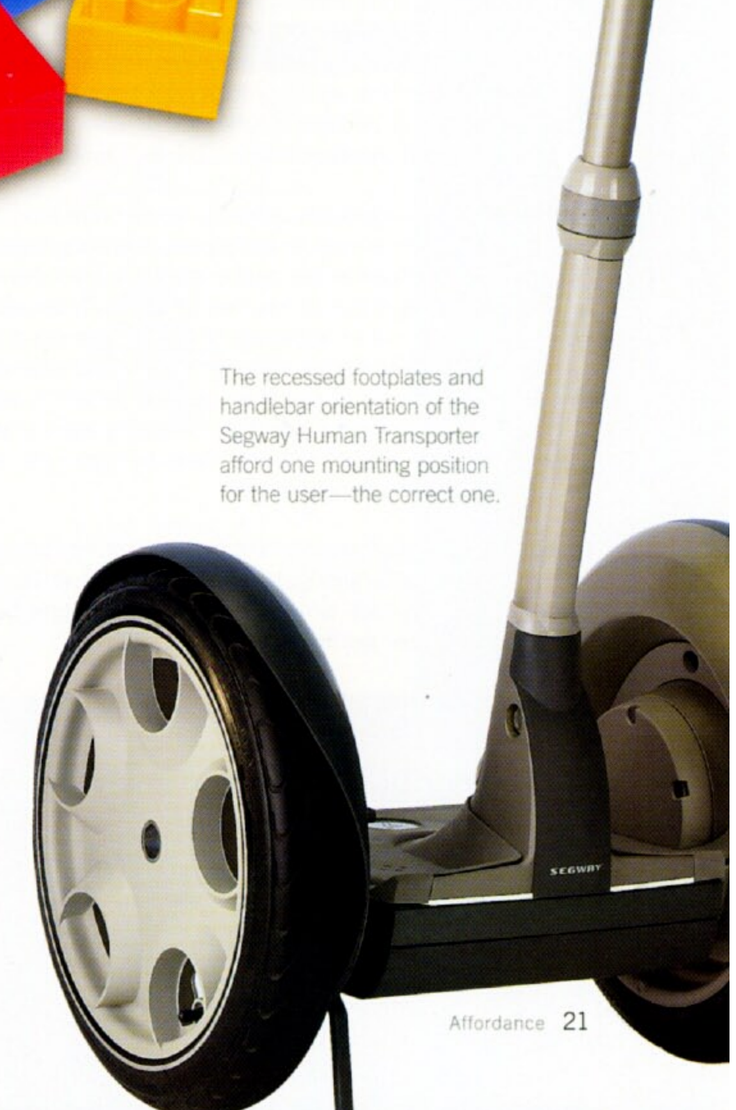
Outdoor lighting structures often afford landing and perching for birds. Where birds perch, birds poop. This anti-perch fixture is designed to attach to such structures and reduce the perching affordance.

With opposing male and female surfaces and featureless sides, Legos naturally afford plugging into one another.



Door affordances frequently conflict, as shown in the door on the left. The "push" affordance of the door is knowable only because of the sign, which conflicts with the powerful "pull" affordance of the handle. By replacing the handle with a flat plate, the conflict is eliminated and the sign is superfluous.





The recessed footplates and handlebar orientation of the Segway Human Transporter afford one mounting position for the user—the correct one.

Mental Model

People understand and interact with systems and environments based on mental representations developed from experience.

Mental models are representations of systems and environments derived from experience. People understand systems and environments, and interact with them, by comparing the outcomes of their mental models with real-world systems and environments. When the imagined and real outcomes correspond, a mental model is accurate and complete. When they do not correspond, the mental model is inaccurate or incomplete. With regards to design, there are two basic types of mental models: mental models of how systems work (*system models*) and mental models of how people interact with systems (*interaction models*).[1]

Designers generally have very complete and accurate system models, but often have weak interaction models—i.e., they know much about how a system works, but little about how people will interact with the system. Conversely, users of a design tend to have sparse and inaccurate system models, but through use and experience commonly attain interaction models that are more complete and accurate than those of designers. Optimal design results only when designers have an accurate and complete system model, obtain an accurate and complete interaction model, and then design a system interface that reflects an efficient merging of both models.[2]

Designers can obtain accurate and complete interaction models through personal use of the system, laboratory testing (e.g., focus groups and usability testing), and direct observation of people interacting with the system, or similar systems. Use of the system by the designer will reveal obvious design problems, but will fail to reveal the problems of interaction that emerge when the system is used by people who are unfamiliar with it. Laboratory testing is useful for evaluating designs in a controlled environment, but must be conducted with care, as the artificial context, and resulting expectation effect, can compromise the validity of the results. Direct observation of users in the target environment is the preferred method for acquiring accurate information about how people interact with systems, but is costly and impractical for designs that are not yet publicly available.

Design with people's interaction models in mind. If there is a standard mental model for how something works, try to design leveraging that model. When this is not possible, (e.g., when the system is new and novel), create an interaction experience that draws from common mental models as much as possible, such as the desktop metaphor for computers. However, do not contrive design just to leverage a familiar model—it is better to have people learn a new model that is clear and consistent, than to use a familiar model that does not fit. Actually use the systems that you design, and employ laboratory testing and field observation in order to develop accurate and complete interaction models. Above all, watch people use the design and take note of how they use it.

See also Affordance, Expectation Effects, Mapping, and Mimicry.

[1] The seminal works on mental models are *The Nature of Explanation* by Kenneth Craik, Cambridge University Press, 1943; and *Mental Models: Towards a Cognitive Science of Language, Inference, and Consciousness* by Philip N. Johnson-Laird, Cambridge University Press, 1983. For a design perspective, see "Surrogates and Mappings: Two Kinds of Conceptual Models for Interactive Devices" by Richard M. Young, and "Some Observations on Mental Models" by Donald Norman, both in *Mental Models* by D. Gentner and A. Stevens (Eds.), Lawrence Erlbaum Associates, 1983.

[2] Note that an *efficient* merging does not simply mean revealing the system model. It may mean concealing the system model from users, revealing the system model to users, or a combination therein.

Despite the measurable safety benefits of antilock brakes in controlled tests with trained drivers, research by the Highway Loss Data Institute indicates that antilock brakes have not reduced the frequency or cost of accidents in real-world driving situations.

The likely cause is that people are not using antilock brakes properly—or rather; antilock brakes are not designed properly. The interaction model for antilock brakes differs radically from the interaction model for conventional brakes.

This suggests that designers gave little consideration to the interaction models of the target audience in the design process.