

Aspek usability dalam desain produk

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Menurut ISO, usability berarti efektifitas, efisiensi, dan kepuasan yang ditetapkan pengguna sehingga tercapai tujuan tertentu dalam lingkungan tertentu. Dalam hal ini efektifitas berarti seberapa jauh tujuan, atau tugas, tercapai. Sedangkan efisiensi memiliki arti jumlah usaha yang dibutuhkan untuk menyelesaikan tujuan. Dan kepuasan merupakan tingkat kenyamanan yang pengguna rasakan saat menggunakan produk dan seberapa diterima sebuah produk bagi pengguna untuk mencapai tujuan mereka.

Sebuah produk yang dapat digunakan bagi sebagian orang, belum tentu dapat digunakan bagi sebagian yang lainnya. Untuk itu haruslah dipikirkan karakteristik apa saja yang ada pada pengguna yang mempengaruhi tingkat kemudahan produk. Berikut adalah karakteristik tersebut.

1. Pengalaman
2. Domain Knowledge
3. Latar belakang budaya
4. Disability
5. Usia dan jenis kelamin

TUJUAN USABILITY

Minimasi Gangguan

Apabila sebuah produk memiliki tingkat usability yang rendah, maka pengguna akan merasa sangat terganggu saat menggunakan produk tersebut. Banyak sekali produk-produk keseharian yang memiliki usability yang rendah sehingga menyebabkan frustrasi bagi penggunanya. Norman (1988 dari Jordan, 2001) melaporkan bahwa banyak orang yang telah menyatakan bahwa mereka mendapat kesulitan dengan produk sehari-hari seperti mesin cuci, mesin jahit, kamera, dan VCR, dan kompor. Dengan demikian, maka usability bertujuan untuk meminimalkan gangguan yang ditimbulkan pada sebuah produk bagi penggunanya

Mempengaruhi Product sales

Dalam waktu belakangan ini, isu produk ergonomi merupakan hal penting dalam penentuan produk yang akan dibeli oleh masyarakat. Perusahaan menjadikan isu ini sebagai keuntungan terhadap kompetitor. Dengan demikian, maka usability akan berdampak bagi tingkat penjualan dari sebuah produk.



Kompor gas, Salah satu produk yang seringkali tidak menggunakan prinsip usability

Produktivitas

Produk yang tidak usable di tempat kerja akan membuang waktu dan ongkos. Usability pada produk yang digunakan dalam tempat kerja juga berdampak pada tingkat kepuasan diantar pekerja. Dengan demikian maka, usability akan mempengaruhi tingkat produktivitas dari pekerja.

Safety

Dalam beberapa kasus usability dari produk dapat mempengaruhi keselamatan dari pengguna. Kondisi ini dapat terjadi apabila terjadi kesalahan operasi yang dilakukan pengguna. Hal ini dapat saja menyebabkan hal yang lebih besar, terutama pada penggunaan alat-alat yang memiliki tingkat resiko yang tinggi. Untuk itu usability dari produk perlu diperhatikan agar pengguna

PRINSIP USABILITY DALAM PRODUK

Konsistensi

Perancangan produk yang konsisten dalam produk memiliki pengertian bahwa pekerjaan yang serupa seharusnya dapat dikerjakan dengan cara yang serupa pula. Dengan demikian, pengguna akan lebih mudah dalam belajar untuk menggunakan produk, berdasarkan pengalamannya terdahulu dalam berinteraksi dengan produk.

Kesesuaian

Desain untuk kesesuaian (Compatibility) merupakan merancang produk produk agar metode pengoperasian produk sesuai dengan ekspektasi pengguna berdasarkan pada pengetahuan mereka terhadap tipe lainnya dan wawasan mereka. tingkat kesesuaian dalam sebuah produk sangat dipengaruhi oleh stereotip masyarakat yang kemudian akan mempengaruhi persepsi mereka pada sebuah objek.

Pertimbangan sumberdaya pengguna

Dalam hal ini perancang haruslah mendesain sebuah produk yang pengoperasiannya mamperhitungkan permintaan yang ditempatkan pada sumberdaya pengguna selama interaksi berlangsung.



Feedback

Merancang sebuah produk agar tindakan yang dilakukan pengguna diakui dan mengindikasikan hasil dari tindakan tersebut.

Pencegahan kesalahan

Merancang sebuah produk sehingga kesalahan yang dilakukan user dapat diminimalan dan aar apabila terjadi erroro pengguna dapat kembali dengan cepat dan mudah.

User Control

Merancang sebuah produk sehingga mengetahui sejauh mana user mengawasi tindakan yang dilakukan oleh produk.

Kejelasan Visual

Mendesain produk dimana informasi yang ditampilkan dapat dibaca dengan cepat dan mudah tanpa adanya keraguan.

Prioritas fungsional dan informasi

Merancang produk sehingga fungsi dan informasi yang paling penting dari produk dapat dengan mudah dimasuki oleh user.

Transfer teknologi yang sesuai

Membuat kesesuaian kegunaan dari teknologi yang berkembang dalam konteks lain untuk meningkatkan usability dari produk.

Ketegasan

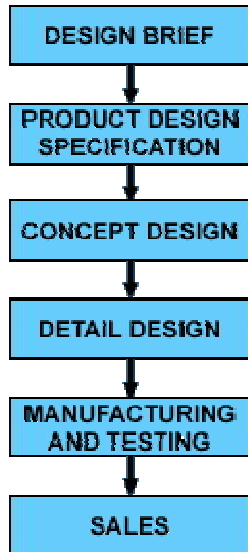
Merancang produk sehingga isyarat yang diberikan sebagai fungsi dan metode operasi. Prinsip ketegasan ini juga berkaitan kepada tingkat ambiguitas dari suatu feature yang ada pada produk. dengan demikian, ketegasan dari isyarat yang diberikan oleh produk akan mempengaruhi tingkat usability dari produk.

Gambaran Tentang Proses Desain Produk (1)

Design

Design is the process by which the needs of the customer or the marketplace are transformed into a product satisfying these needs. It is usually carried out a designer or engineer but requires help from other people in the company.

Design essentially is an exercise in problem solving. Typically, the design of a new product consists of the following stages:



The development of a new product may also require the development of a prototype to prove that new technologies work before committing resources to full-scale manufacture.

The traditional view of the design to manufacture process is that it is a sequential process, the outcome of one stage is passed on to the next stage. This tends to lead to iteration in the design. I.e. having to go back to an earlier stage to correct mistakes. This can make products more expensive and delivered to the marketplace late. A better approach is for the designer to consider the stages following design to try and eliminate any potential problems. This means that the designer requires help from the other experts in the company for example the manufacturing expert to help ensure that any designs the designer comes up with can be made.

So what factors might a designer have to consider in order to eliminate iteration?

- * **Manufacture** - Can the product be made with our facilities?
- * **Sales** - Are we producing a product that the customer wants?
- * **Purchasing** - Are the parts specified in stock, or do we have to order them?
- * **Cost** - Is the design going to cost too much to make?
- * **Transport** - Is the product the right size for the method of transporting?
- * **Disposal** - How will the product be disposed at the end of its life?

Design Brief

The design brief is typically a statement of intent. I.e. "We will design and make a Formula One racing car". Although it states the problem, it isn't enough information with which to start designing.

Product Design Specification (PDS)

This is possibly the most important stage of the design process and yet one of the least understood stage. It is important that before you produce a 'solution' there is a true understanding of the actual

problem. The PDS is a document listing the problem in detail. It is important to work with the customer and analyse the marketplace to produce a list of requirements necessary to produce a successful product. The designer should constantly refer back to this document to ensure designs are appropriate.

To produce the PDS it is likely that you will have to research the problem and analyse competing products and all important points and discoveries should be included in your PDS.

Concept Design

Using the PDS as the basis, the designer attempts to produce an outline of a solution. A conceptual design is usually an outline of key components and their arrangement with the details of the design left for a later stage. For example, a concept design for a car might consist of a sketch showing a car with four wheels and the engine mounted at the front of the car. The exact details of the components such as the diameter of the wheels or the size of the engine are determined at the detail design stage. However, the degree of detail generated at the conceptual design stage will vary depending on the product being designed.

It is important when designing a product that you not only consider the product design specification but you also consider the activities downstream of the design stage. Downstream activities typically are manufacture, sales, transportation etc. By considering these stages early, you can eliminate problems that may occur at these stages.

This stage of the design involves drawing up a number of different viable concept designs which satisfy the requirements of the product outlined in the PDS and then evaluating them to decide on the most suitable to develop further. Hence, concept design can be seen as a two-stage process of concept generation and concept evaluation

http://drawsketch.about.com/...//www.ider.herts.ac.uk/school/courseware/graphics/engineering_drawing/

Gambaran Tentang Proses Desain Produk (2) lanjutan

Concept generation

Typically, designers capture their ideas by sketching them on paper. Annotation helps identify key points so that their ideas can be communicated with other members of the company.

There are a number of techniques available to the designer to aid the development of new concepts. One of the most popular is brainstorming.

This technique involves generating ideas, typically in small groups, by saying any idea that comes into your head no matter how silly it may seem. This usually sparks ideas from other team members. By the end of a brainstorming session there will be a list of ideas, most useless, but some may have the potential to be developed into a concept. Brainstorming works better if the members of the team have different areas of expertise.

Concept evaluation

Once a suitable number of concepts have been generated, it is necessary to choose the design most suitable for to fulfil the requirements set out in the PDS. The product design specification should be used as the basis of any decision being made. Ideally a multifunction design team should perform this task so that each concept can be evaluated from a number of angles or perspectives. The chosen concept will be developed in detail.

One useful technique for evaluating concepts to decide on which one is the best is to use a technique called 'matrix evaluation'

With matrix evaluation a table is produced listing important the features required from a product - usually this list is drawn up from the important features described in the product design specification. The products are listed across the table. The first concept is the benchmark concept. The quality of the other concepts are compared against the benchmark concept for the required features, to help identify if the concept is better, worse than, or is the same as the benchmark concept. The design with the most 'better than' is likely to be the best concept to develop further.

Most people who use the matrix technique will assign points, rather than simple, better, worse, same, so that it is easier to identify which concepts are the best. It is also likely that some features of the design will be more important than others so a weighting is used.

Detail design

In this stage of the design process, the chosen concept design is designed in detailed with all the dimensions and specifications necessary to make the design specified on a detailed drawing of the design.

It may be necessary to produce prototypes to test ideas at this stage. The designer should also work closely with manufacture to ensure that the product can be made.

http://drawsketch.about.com/...//www.ider.herts.ac.uk/school/courseware/graphics/engineering_drawing/

Apa itu Manufaktur dan Sejarahnya

Manufaktur adalah suatu cabang industri yang mengaplikasikan peralatan dan suatu medium proses untuk transformasi bahan mentah menjadi barang jadi untuk dijual. Upaya ini melibatkan semua proses antara yang dibutuhkan untuk produksi dan integrasi komponen-komponen suatu produk. Beberapa industri, seperti produsen semikonduktor dan baja, juga menggunakan istilah fabrikasi atau pabrikasi. Sektor manufaktur sangat erat terkait dengan rekayasa atau teknik. - Wikipedia bahasa Indonesia

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Kata manufaktur berasal dari bahasa Latin manus factus yang berarti dibuat dengan tangan. Kata manufacture muncul pertama kali tahun 1576, dan kata manufacturing muncul tahun 1683. Manufaktur, dalam arti yang paling luas, adalah proses merubah bahan baku menjadi produk. Proses ini meliputi (1) perancangan produk, (2) pemilihan material, dan (3) tahap-tahap proses dimana produk tersebut dibuat. Pada konteks yang lebih modern, manufaktur melibatkan pembuatan produk dari bahan baku melalui bermacam-macam proses, mesin dan operasi, mengikuti perencanaan yang terorganisasi dengan baik untuk setiap aktifitas yang diperlukan. Mengikuti definisi ini, manufaktur pada umumnya adalah suatu aktifitas yang kompleks yang melibatkan berbagai variasi sumberdaya dan aktifitas sebagai berikut:

- Perancangan Produk
- Manufacturing
- Perancangan proses
- Material / Bahan Baku
- Mesin dan perkakas
- Production control
- Support services
- Customer service
- Pemasaran
- Pembelian
- Penjualan
- Pengiriman

Hal-hal di atas telah melahirkan disiplin ilmu tentang teknik manufaktur. Sesuai dengan definisi manufaktur, keilmuan teknik manufaktur mempelajari perancangan produk manufaktur dan perancangan proses pembuatannya serta pengelolaan sistem produksinya (sistem manufaktur). Meskipun teknik manufaktur pada berbagai perguruan tinggi memiliki ke-khas-an sendiri-sendiri namun selalu ada bagian yang sama pada jurusan-jurusan tersebut. Keilmuan teknik manufaktur selalu berbasis kepada aktifitas pembuatan produk manufaktur yang melibatkan berbagai aktifitas dan sumberdaya seperti yang telah diuraikan di atas.

Jika dicermati, bidang ilmu teknik manufaktur sesungguhnya merupakan sinergi (gabungan yang saling menguatkan) dari jurusan teknik mesin dan teknik industri. Dari teknik mesin diadopsi ilmu-ilmu yang terkait dengan perancangan produk dan perancangan proses pembuatan, sedangkan dari teknik industri diadopsi ilmu-ilmu yang terkait dengan pengelolaan sistem di industri manufaktur (industri yang menghasilkan produk manufaktur). Dengan demikian akan ada beberapa matakuliah yang bisa dijumpai terdapat pada ketiga jurusan tersebut (overlapping).

Karena sinergi tersebut, di beberapa perguruan tinggi yang belum memiliki teknik manufaktur sebagai jurusan tersendiri, keilmuan teknik manufaktur biasanya menjadi bagian dari jurusan teknik mesin atau teknik industri. Dengan demikian banyak bidang ilmu di kedua jurusan tersebut yang juga dipelajari di jurusan teknik manufaktur.

Seperti yang telah dituliskan sebelumnya, teknik manufaktur berhubungan dengan produk-produk

manufaktur. Yang dimaksud produk manufaktur di sini adalah produk-produk yang pembuatannya melalui berbagai proses manufaktur. Sebagai ilustrasi, mari kita perhatikan dan kita periksa beberapa obyek di sekitar kita: arloji, kursi, stapler, pensil, kalkulator, telpon, panci dan pemegang lampu. Kita segera akan menyadari bahwa semua obyek tersebut mempunyai bentuk yang berbeda. Benda-benda tersebut tidak akan bisa kita jumpai ada di alam ini sebagaimana seolah-olah tersedia begitu saja di ruangan kita. Benda-benda tersebut telah ditransformasikan (diciptakan/dibuat) dari berbagai material dan dirakit hingga menjadi benda-benda yang kita pergunakan sehari-hari.

Beberapa obyek terdiri dari satu komponen, seperti paku, baut, kawat, gantungan baju. Namun demikian, kebanyakan obyek – mesin pesawat terbang (ditemukan tahun 1939), ballpoint (1938), panggangan roti (1926), mesin cuci (1910), AC (1928), lemari es (1931), mesin fotocopy (1949), dan semua jenis mesin, serta ribuan produk lainnya - dibangun dari perakitan sejumlah komponen yang terbuat dari berbagai jenis material. Semua komponen tersebut dibuat melalui berbagai proses yang disebut manufaktur (manufacturing). Disamping produk-produk akhir tersebut, manufaktur juga melibatkan aktifitas dimana produk yang dibuat dipergunakan untuk membuat produk lain. Produk tersebut adalah mesin-mesin yang dipakai untuk membuat berbagai macam produk. Misalnya mesin press untuk membuat plat lembaran menjadi bodi mobil, mesin-mesin untuk membuat komponen, atau mesin jahit untuk memproduksi pakaian. Aspek yang sama pentingnya adalah perbaikan dan perawatan (service and maintenance) mesin-mesin tersebut selama umur hidupnya.

link: http://tm.ubaya.ac.id/index.php?option=com_content&view=article&id=19&Itemid=27

[Design in Manufacturing Engineering \(4\)](#)

TERMINOLOGY

The word "design" is often considered ambiguous depending on the application.

Design and art

Design is often viewed as a more rigorous form of art, or art with a clearly defined purpose. The distinction is usually made when someone other than the artist is defining the purpose. In [graphic arts](#) the distinction is often made between [fine art](#) and [commercial art](#).

In the realm of the arts, design is more relevant to the "applied" arts, such as architecture and industrial design. In fact today the term design is widely associated to modern industrial product design as initiated by [Raymond Loewy](#) and teachings at the [Bauhaus](#) and [Ulm School of Design](#) (HfG Ulm) in Germany during the 20th Century.

Design implies a conscious effort to create something that is both functional and aesthetically pleasing. For example, a graphic artist may design an advertisement [poster](#). This person's job is to communicate the advertisement message (functional aspect) and to make it look good (aesthetically pleasing). The distinction between pure and applied arts is not completely clear, but one may consider [Jackson Pollock's](#) (often criticized as "splatter") paintings as an example of

pure art. One may assume his art does not convey a message based on the obvious differences between an advertisement poster and the mere possibility of an abstract message of a Jackson Pollock painting. One may speculate that Pollock, when painting, worked more intuitively than would a graphic artist, when consciously designing a poster. However, Mark Getlein suggests the principles of design are "almost instinctive", "built-in", "natural", and part of "our sense of 'rightness'." Pollock, as a trained artist, may have utilized design whether conscious or not.



Fig. 4. The new terminal at [Barajas airport](#) in [Madrid, Spain](#)

Design and Engineering

[Engineering](#) is often viewed as a more rigorous form of design. Contrary views suggest that design is a component of engineering aside from production and other operations which utilize engineering. A neutral view may suggest that both design and engineering simply overlap, depending on the discipline of design. The [American Heritage Dictionary](#) defines design as: "*To conceive or fashion in the mind; invent,*" and "*To formulate a plan*", and defines engineering as: "*The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, machines, processes, and systems.*". Both are forms of problem-solving with a defined distinction being the application of "scientific and mathematical principles". How much science is applied in a design is a question of what is considered "[science](#)". Along with the question of what is considered science, there is [social science](#) versus [natural science](#). Scientists at [Xerox PARC](#) made the distinction of design versus engineering at "moving minds" versus "moving atoms".

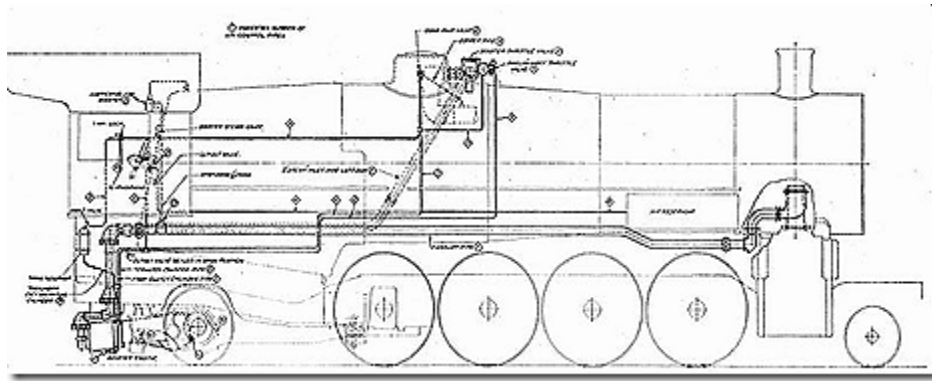


Fig. 5. A drawing for a booster engine for [steam locomotives](#). Engineering is applied to design, with emphasis on function and the utilization of mathematics and science.

Design and Production

The relationship between design and [production](#) is one of planning and executing. In theory, the plan should anticipate and compensate for potential problems in the execution process. Design involves problem-solving and [creativity](#). In contrast, production involves a routine or pre-planned process. A design may also be a mere plan that does not include a production or engineering process, although a working knowledge of such processes is usually expected of designers. In some cases, it may be unnecessary and/or impractical to expect a designer with a broad [multidisciplinary](#) knowledge required for such designs to also have a detailed knowledge of how to produce the product.

Design and production are intertwined in many [creative professional](#) careers, meaning problem-solving is part of execution and the reverse. As the cost of rearrangement increases, the need for separating design from production increases as well. For example, a high-budget project, such as a [skyscraper](#), requires separating (design) [architecture](#) from (production) [construction](#). A Low-budget project, such as a [locally printed](#) office party invitation [flyer](#), can be rearranged and printed dozens of times at the low cost of a few sheets of paper, a few drops of ink, and less than one hour's pay of a [desktop publisher](#).

This is not to say that production never involves problem-solving or creativity, nor that design always involves creativity. Designs are rarely perfect and are sometimes repetitive. The imperfection of a design may task a production position (e.g. [production artist](#), [construction worker](#)) with utilizing creativity or problem-solving skills to compensate for what was overlooked in the design process. Likewise, a design may be a simple repetition (copy) of a known preexisting solution, requiring minimal, if any, creativity or problem-solving skills from the designer.



Fig. 6. [Jonathan Ive](#) has received several awards for his design of [Apple Inc.](#) products like this laptop. In some

design fields, [personal computers](#) are also used for both design and production

Process Design

"Process design" (in contrast to "design process") refers to the planning of routine steps of a process aside from the expected result. Processes (in general) are treated as a product of design, not the method of design. The term originated with the industrial [designing of chemical processes](#). With the increasing complexities of the [information age](#), consultants and executives have found the term useful to describe the [design of business processes](#) as well as [manufacturing processes](#).

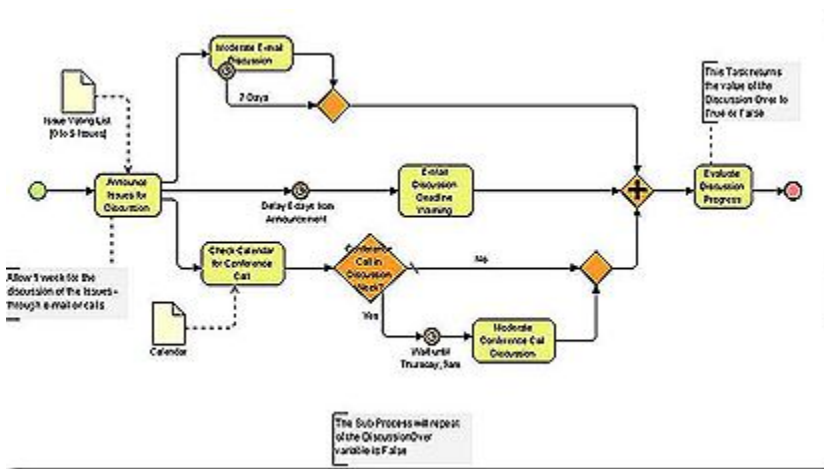


Fig. 7. An example of a business workflow process using [Business Process Modeling Notation](#).

<http://en.wikipedia.org/wiki/Designs>