

Aspects of wicked problems



Introduction

When facing a design problem, designers need to consider a wide range of factors to ensure that it is as successful as possible. When a design problem is ill-defined a wicked problem arises, which complicated the process more. Sustainability is a very important consideration when designing. It's also important that designers understand the role they are playing, and exactly what their task is. I've looked at these things and related them to my own design experiences when possible.

Wicked Problems

Definition

Wicked designs can be summarised as problems that are difficult to solve, where there is no real obvious solution that will fully resolve the initial problem. This can be due to unclear, unspecific or changing requirements that can make it hard for the designer to know exactly the situation they are designing for. Furthermore, as one aspect within the product is solved, other problems may be unveiled leading to more problems. A typical example of a wicked problem outside the area of design is politics – whatever is done there are still problems and not everyone is happy, additionally as politicians solve issues more emerge. The term wicked design has been defined by ten characteristics compiled by Rittel and Webber (1973) shown below.

Number Characteristic

1. There is no definitive formulation of a wicked problem
2. Wicked problems have no stopping rule
3. Solutions to wicked problems are not true or false, but better or worse

4. There is no immediate and no ultimate test of a solution to a wicked problem
5. Every solution to a wicked problem is a “one shot operation” because there is no opportunity to learn by trial and error every attempt counts significantly
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well described set of permissible operations that may be incorporated into the plan
7. Every wicked problem is essentially unique
8. Every wicked problem can be considered to be a symptom of another problem
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problems resolution
10. The planner has no right to be wrong (planners are liable for the consequences of the actions they generate)

Explaining the Characteristics

There is no definite formulation of a wicked problem

Model3When faced with a wicked problem, it is often difficult to state exactly what this problem is, and what you are aiming to do. This can therefore lead to confusion as to whether or not the issue has been resolved, it is a continuous problem. In my design experiences, I have picked up on things that I didn't initially think about whilst doing research and consulting users. For example whilst doing my product study on Speedo fast skin swimsuits, when I gave a questionnaire to a user it highlighted issues that I didn't initially consider such as the user's experience whilst using it, such as feeling

claustrophobic. This led me to look further into the research Speedo had done regarding comfort. The whole design process ends up being a learning experience because you have to thoroughly look into all aspects necessary in order to try and solve the wicked problem. Figure 1 below shows that the design process is continuous – it is a never ending circle.

Wicked problems have no stopping point

A wicked problem can arise when you are designing and there is no clear or obvious place to stop at – they don't have an exhaustive end point. You can go on and on developing and altering the design but the end point will never be clear because of the nature of the problem being solved. In my previous design experiences, the stopping point has always been when I have met all the identified required needs stated in the specification, when the time limit prevents me from going any further, and when I have received positive feedback about the design, illustrating that potential users are happy with it. It is also important to ensure that the design has been explored thoroughly from all perspectives. Time and deadlines are often the most contributing factor to determine the point you stop at. This may lead to the design not being fully explored. In a lot of my design experiences, especially at GCSE, I had to move on to the next part of the design process before fully exploring everything as the opportunities were endless, it was a wicked problem – design something to be sold by the National Trust in their shops

Solutions to wicked problems can't be described as true or false but good or bad

Solutions to design problems can't be described as true or false or right or wrong because it varies depending on whom is using the product. Designs

are normally described using personal opinion by evaluating them from different perspectives and considering various factors, for example, function, size, ease of use etc. A design cannot just be classed as right or wrong, it's not that simple, parts of it may be correct whereas others might not work. A design may be perfect for one specific group of people but not at all for others. Constructive criticism is a good thing to use when looking at solutions, considering good points, bad points and ways to improve. For example, for AS level I made a lamp intended for use by children, the aesthetics I came up with would suit children but wouldn't appeal to many others. Designers may be given the same brief to work from, yet the end results will not all be the same. This doesn't mean that one person is right and the rest are wrong, the problem has just been solved in other ways depending on how the designer has interpreted it.

Every wicked problem can be considered a symptom of another problem

A lot of designs can continuously be improved and developed due to reasons such as new technology and materials being developed. Wicked designs can't ever be fully solved; they depend on trends, opinions, financial situations etc. So you may temporarily satisfy the design criteria but not in the long run. An example of this is mobile phones; they are constantly changing and getting better to meet people's needs and to compete with competitive brands. Figure 2 below suited the need at the time it was designed – you could phone off it. Now, figure 3 meets the needs of people, it is multi functional and does everything from browsing the internet to video calling. Every wicked problem can be considered a symptom of another problem. Products that seem out of date now would have been designed to

suit the target market at the time they were designed; it is not because of a fault of the designer. Sustainability now has much more importance than previously so the way products are made has changed. Designers know that it is a current issue so strive to create products that are sustainable.

Industrial designers and engineers

Often it is hard to distinguish between the role of the engineer and that of the industrial designer because the way they work is so similar; however there are some influencing differences. The engineer is more concerned about the technological aspects of the design and the accuracy of it. There is often a right or wrong answer as it frequently involves mathematics and science. On the other hand, the industrial designer focuses more upon the aesthetics, production, social and environmental impact, sustainability and price. There is no definite answer to the initial brief; it is a matter of opinion. Their aim is to make the product appeal to users so that they will buy it.

“ The role of the industrial designer is to create and execute design solutions towards problems of form, usability, user ergonomics, marketing, brand development and sales” http://en.wikipedia.org/wiki/Industrial_design Aug 2008

“ Engineering is the discipline, art and profession of acquiring and applying technical, scientific and mathematical knowledge to design and implement materials, structures, machines, devices..” <http://en.wikipedia.org/wiki/Engineering> Nov 2009.

My experience

For my AS project I designed a lamp inspired by the design movement pop art for young children. It was be a night light.

For my A Level project, I designed something to encourage healthy eating for children and families to improve their lifestyle. I choose to do the product shown below, you place each person's photo in the frame on the box, and whenever you eat an item of fruit or vegetable (one of your five a day) you put a counter in the slot above your photo. For both of these, some aspects of the design process were considered to be traditional industrial design, and some considered to be the responsibility of the engineer.

Role of industrial designer in my experience

Industrial design was involved in my A level project because aesthetics was a very important factor to ensure that children would want to use the product. This involved considering colour, shapes, finish and form. Cultural and social concerns played an important part in the designing. I did some research and found that interactive learning was one of the better ways to educate and influence children. I also found out that gentle competitiveness would encourage people to interact with the product. In this case it was done by competing to see who could eat the most fruit/vegetables in one day, recorded by putting counters in the slot above your photo. It was important for me to consider cost and manufacture to ensure that the product would be accessible to people of as many backgrounds as possible. Safety was also an important factor in this design as it's intended to be used by children, the parts couldn't be too small and there couldn't be any sharp parts. The

industrial designer also needed to consider the materials to be used, and the surface finish needed.

Role of engineer in my experience

The role of the engineer was to make sure that the design provided the required function, and that performance was up to the right level. I had to make sure that the gap between the two sheets for the counters to slot into was exactly the right size – so that the counters didn't get stuck, but didn't move around too much. I also had to make sure that the dimensions were correct so that the top black piece fitted into the base securely enough, yet it could be removed to tip upside down to remove the counters. A lot of precision was needed to ensure that the pieces all fitted together correctly. For my lamp it was the role of the engineer to ensure that the electrical parts of the design functioned correctly and that they were held inside the casing safely.

Sustainability

Sustainability has become a very important influence when designing due to society's increasing concern about it. Designers need to think about the product they are designing from “cradle to grave”, meaning they need to consider where the materials are obtained from – whether they are readily available, renewable or non renewable and where they have to be shipped from. The manufacturing process then needs to be considered to ensure that it causes the most minimal effect on the environment and that the conditions workers are in are acceptable. Packaging needs to be thought about to make sure that it is not in excess, and so that the shape is as efficient as possible for transportation. Figure 7 compares the cradle to gate method (just

considering the products lifecycle until it is sold) and the cradle to grave idea, where you consider the products impact after its useful life has ended. Sustainability can be split into three categories – economic, social and environmental. The sustainability handbook defines them all, the economic one means “ considering economic implications of our actions including ensuring that there is an economic benefit both to the region from which the product came and to the region in which it is marketed.” The social one means “ ensuring that our own and other peoples quality of life and human rights are not compromised to fulfill our expectations or demands.” And the environmental one can be defined as “ ensuring that our actions and lifestyles don’t cause the planets resources to be used at unsustainable rates.” When designing a product, as a designer you should consider each of these three categories and the potential impact your product will have on them.

Defenitions of Sustainability

“ Meeting the needs of the present without compromising the ability of future generations to meet their own needs”

Sustainability is all about preserving the world’s natural resources for future generations. A fully sustainable industry would be one that has zero impact or a positive impact on the environment.

My experience of sustainability

My experience of sustainability involved several factors. My material choice was an important factor. I had to find out how easily available various materials were, what is done with them after their useful life has ended and how they are processed. With my A level project, once the user has finished <https://assignbuster.com/aspects-of-wicked-problems/>

with the product, the different materials can easily be split into MDF and acrylic ready to be recycled. This concept reflects the idea that Papanek had (1994) of ‘designing for disassembly’; designing products so that they are easy to take apart and sort for recycling. He referred to the concept as “assemble for disassembly.” He proposed that different materials shouldn’t be mixed unless it’s unavoidable in order to simplify the separation process. When considering what wood to use, I decided that there was no need to use a rare wood that would likely have had to have been shipped into the country as this would cause unnecessary environmental damage. I also needed to consider how the material would be processed, for example metal needs a lot higher temperatures to work with than plastics so needs more energy to provide that initial heat which is often created using fossil fuels.

How I could improve my design experience

With respect to my lamp project, I think that if I had worked more from the perspective of the engineer I may have created a more useful product. If I could do it again I would incorporate a dimmer switch so that the light emitted can be varied as its intended use was to be a nightlight. I think when I was doing the project I was mainly looking at it from the point of view of the industrial designer as I put a lot of consideration into the aesthetics and desirability. In order to make my A level design more sustainable, I could use another of Papanek’s ideas (1994), which is to use scrap materials that are left over from production to create other products. For example, the circles cut out to make the frame could be used as counters in a game, or they could possibly be used to make jewelry with. An option to make my design more sustainable would be to use recycled materials to create the product,

this option was a bit limited in school but a possibility would be to create the frame and counters out of recycled polymer.

Conclusion

I have looked into the concept of wicked designs and understand how they make it hard for designers to fully satisfy the need when addressing this type of problem. They involve many complications that often lead to more, and it makes it hard for designers to create acceptable solutions. To ensure that they do the best that they can designers should understand the nature of wicked problems and all that they entail. I have looked into the roles of the industrial designer and the engineer and have related them to my work to understand the difference between the two, also how the tasks of the two sometimes overlap. I have seen how sustainability is an important factor that affects the way designers need to approach their tasks, and that they need to consider the products implications early on in the design rather than just at the end. I have examined all of the above factors and related them to my work where possible. I have also looked to see where I could improve what I have done in the past with what I have found out.

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