The Engineering Design Cycle

Test & Evaluate

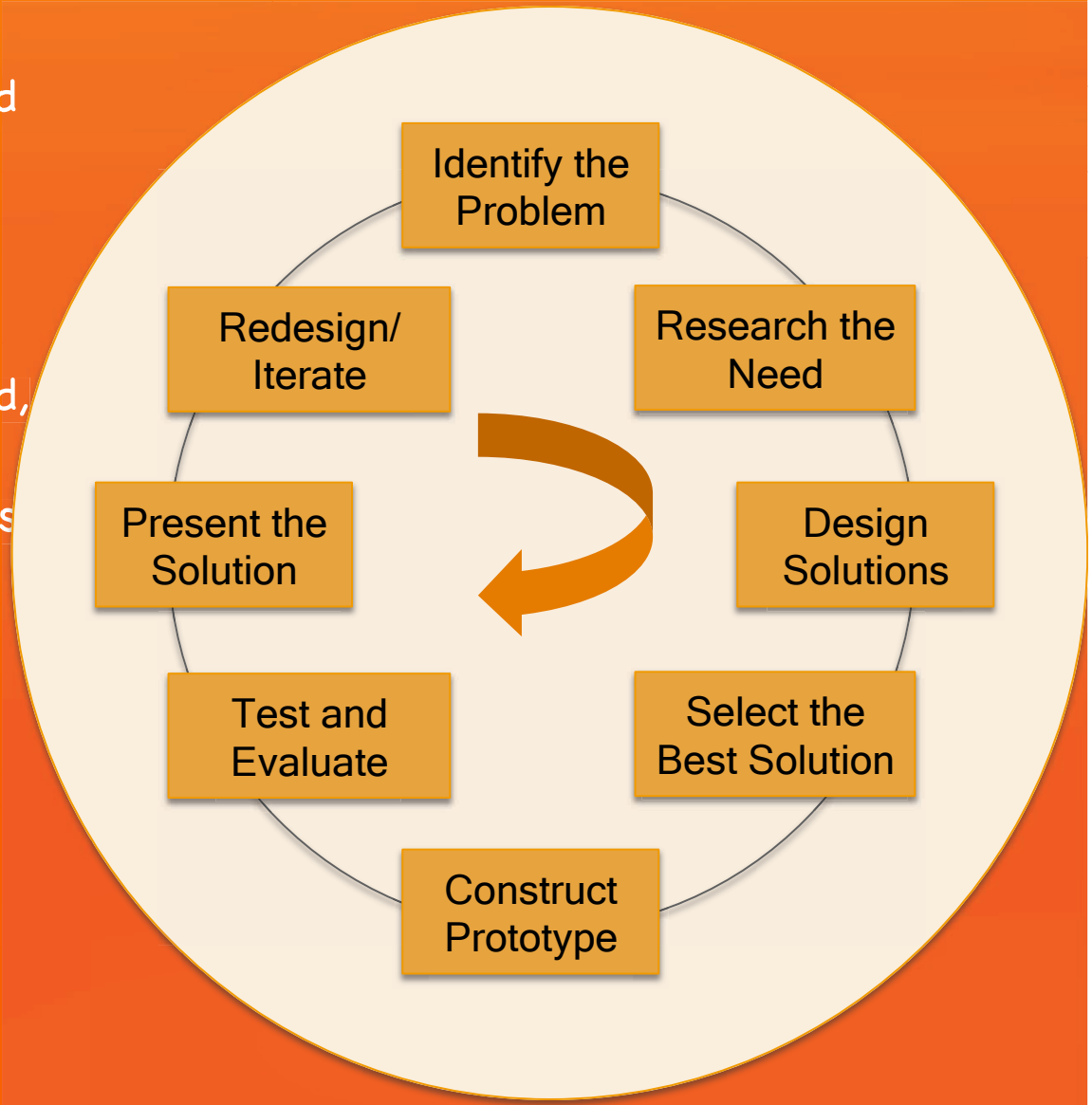
User Level

Finally, a functional design - but how do we know that it will actually get used?

Let's ask our users!

The Engineering Design Cycle

A problem has been identified and researched. The need to solve it has been proven with credible sources, and a range of solutions identified. The best of the bunch has been selected and prototyped, then tested, evaluated, and possible redesigned multiple times



User Level Testing

1. Choose potential users that are would-be customers
2. Place the users in a realistic environment for testing
3. Watch the user
4. Ask the user for specific feedback

User Testing and Evaluation

Once a system or design is thoroughly tested and evaluated to verify its functionality, it is time to show the design to potential users.

Step 1:
Identify Potential Users:

- Who is most likely to use this design, and of those people, who can afford the design?
- Where can these potential users be found?

Example:
Air Quality monitoring system for bicycle use

Potential Users:
Bike commuters in a major city

Target 3-5 users for each round of tests!
There is no such thing as too many testers, so test as much as possible.

User Testing and Evaluation

Step 2:
Present your solution to your users/testers in a representative "problem" environment – where the user would use the system in "real life".

Example:
Carpal Tunnel Monitoring System

Testing Environment:
Using a computer at a desk
Texting on a Smartphone

User Testing and Evaluation

Step 2:
Present your solution to your users/testers in a representative "problem" environment – where the user would use the system in "real life".

Example:
Eyeglass compliance monitoring

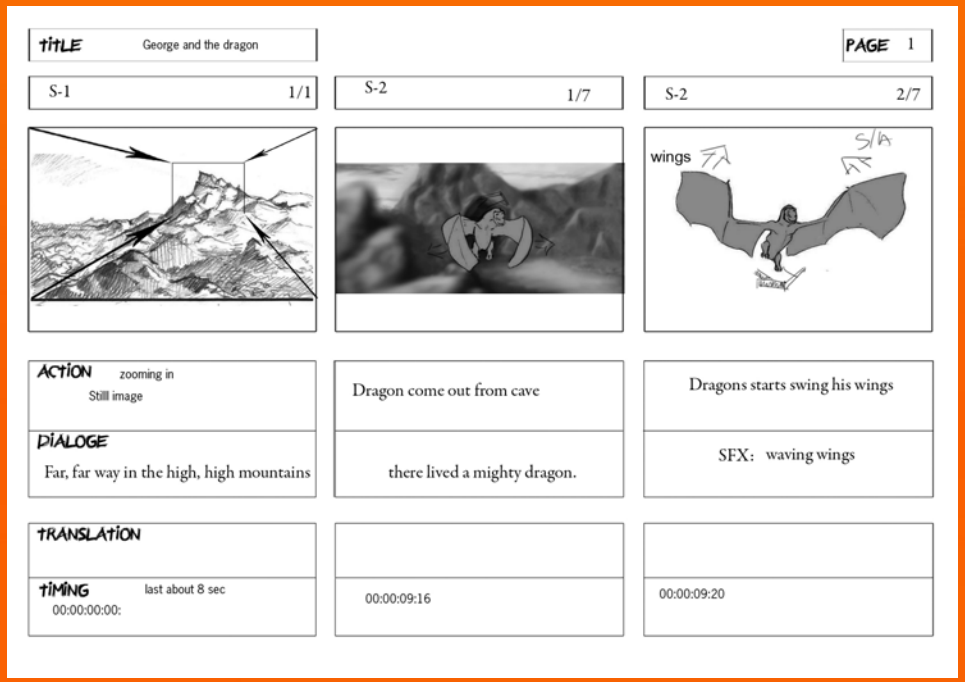
Testing Environment:
Driving a vehicle
Using a computer

User Testing and Evaluation

Step 2:
Present your solution to your users/testers in a representative "problem" environment – where the user would use the system in "real life".

Sometimes, a storyboard helps situate the user in the environment so that the user test does not go astray!

A storyboard is a series of illustrations or images that allows someone to pre-visualize a situation. In this case, the situation would be the context in which the design tester is using the design.

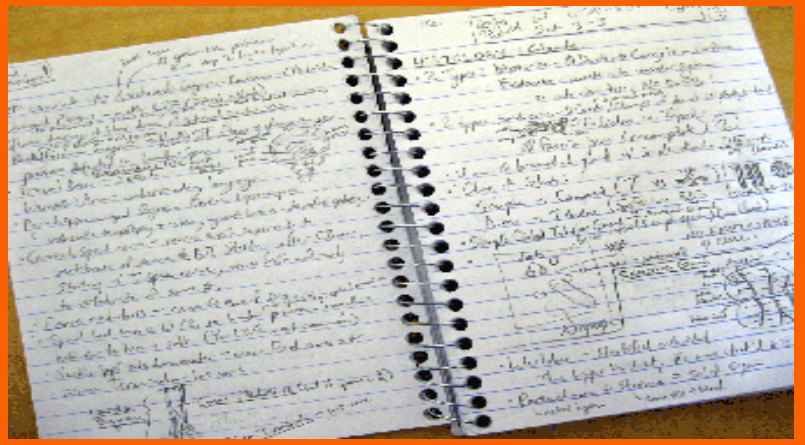


User Testing and Evaluation

Step 3:
Watch what your users do with the design:

- How do they interact with the design?
- Do they use the design properly?
- Where do they get confused?
- What information do they glean from the system? Is it what you intend?
- Do they seem interested in the system? Bored? Confused?

Write down what you observe, while refraining from interpreting what you observe until later!



User Testing and Evaluation

Step 4:
Ask your users to complete a short survey or series of questions about the design:

- Written, or
- Verbal

Use a combination of close-ended, multiple choice or Likert-scale questions and open-ended questions that seek to identify both the "good" and the "bad" in the design.

Examples of Close-Ended Questions

Likert Scales

Please circle the number that represents how you feel about the computer software you have been using

I am satisfied with it
Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

It is simple to use
Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

It is fun to use
Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

It does everything I would expect it to do
Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

I don't notice any inconsistencies as I use it
Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

It is very user friendly
Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

Examples of Open Ended Questions:
Would you use this design in your daily life? Why or why not?
What do you like most about this design?
What do you like least about this design?

Test, Evaluate, Redesign....

A Prototype must be tested:

- Not only at a functional level (does it work as intended?), but also:
- at a user level (will a potential customer use it as intended?)

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