**1. Introduction**

In Chapter 5, there are 4 main concepts proposed that illustrate what are bad designs, how to find them, and methods to improve them. Chapter 6 uses 5 main concepts related to designing thinking for discussing experience and providing guidelines about this field. For each concept, I will explain what it means, give an application example and show why it is important. The order of these main concepts being discussed is based on the order they appear in the book.

**2. Concepts**

1. Root cause analysis

(a) The concept of root cause analysis is an investigation process of finding the cause that is single and underlying, it is used to find violations and errors(Norman, 2013, p. 164). (b) One way to apply this concept in website design is by looking at source code when there is a problem. If there is a submit button not functioning, reviewing related source code and locating the problematic line is a good strategy. It eliminates other possibilities and parses the problem until root level. (c) Without root cause analysis, the submit button problem may be hard to solve. Since a submit function can be related to input, format, output, etc, it is inefficient by trying to replace or fix a random component. Therefore, the root cause analysis is important because it provides a guideline on how to locate problems.

1. Deliberate violations

(a) Deliberate violations are the accidents such as procedure and regulation violations caused by people’s intentions(Norman, 2013, p. 169). (b) Designers need to consider this concept during the design process. For example, in website design, attackers may input special characters intentionally to bypass authentication, which is known as SQL injection. (c) This is important because it is related to network security. The website will be vulnerable and unsafe without a proper reaction to deliberate violations.

1. Errors
   1. Slips

(a) The slips are the misalignment of people’s intention and actual action(Norman, 2013, p. 171). (b) If a button in the website is supposed to let users slide it to the left but only right slide action can be performed, it should be identified as a slip. It is because the design plan and available action are different. (c) If slips are being ignored, then the incorrect action may affect other processes. With the same example, if designers let the button slide to the left, they may find another button is unable to move since that space is reserved. Therefore, the concept of slips is important.

* 1. Mistakes

(a) Mistakes are unexpected outcomes from wrong goals or wrong plans(Norman, 2013, p. 171). (b) If a website is designed for medical records, but the final product is for medical supplies, then it can be defined as a mistake. Only something at the plan level can cause a severe problem like this. (c) If the concept of mistakes is ignored in website design, customers may find the product is not as expected: a medical supplies website can not be used as the website of a medical record. Therefore, it is important to think about this concept during website and technology designs.

1. Designing for error and resilience engineering

(a) The process of designing for error is predicting things that go wrong and deal with errors(Norman, 2013, p. 198), it is called resilience engineering when this idea is performed in large complex systems(Norman, 2013, p. 211). (b) In website design, this concept can be applied in the form of adding a redundant system. For example, if the login function relies on the authentication server, a backup authentication method can be introduced. So when the authentication server is down, the website can switch to the backup method to maintain normal operation status. (c) Without this concept, the website may not able to operate normally when an error happens. In the previous situation, users cannot log in with an offline authentication server, and the effect will be huge if the customer base is huge. Therefore, the thinking of designing for error and resilience engineering for large, complex systems is important.

1. Automation paradox

(a) Automation can increase efficiency and lower error rate, but it is not reliable when it fails because the impacts and consequences are unpredictable or unexpected(Norman, 2013, p. 213). (b) In website design, letting users auto-login can be considered an automation process. However, this can be a security breach. (c) This is important because the auto-login function can diminish users’ input time, but the lack of the requirement about login information makes the server unable to identify if users are themselves. It is important to measure the efficiency and the consequences, to make a better choice.

1. The double-diamond model of design

(a) The double-diamond model of design is a process to find the right problem and the right solution(Norman, 2013, p. 220). (b) If a third-party CSS file on the website makes everything disorganized, then the designers should consider using local CSS files in future designs. This is an example of the double-diamond model design thinking. (c) If designers find out the website is disorganized and start looking at files other than CSS files or using wrong methods such as changing CSS file providers or using new online CSS files, then time and effort will be wasted while problems may not be solved or will happen again in the future. Therefore, the double-diamond model is a practical and important process in design.

1. Human-centered design process

(a) Human-centered design process is an iterative cycle that contains four activities: observation, ideation, prototyping, and testing(Norman, 2013, p. 222). (b) In website design, this concept can be applied by following the process. For example, in an output function design, designers can look at other functions’ output formats, have an idea about what should be included in the output which is best for users, then develop a functional application and run tests on it. (c) Without the human-centered design process. Designers may start prototyping before ideation, with the same example, some new ideas may come up but the development is done and it is unable to be added at the time. Therefore, this concept and following the process is important.

1. Living with complexity

(a) Complexity and confusion can be independent. Complexity is common and essential while confusion is unnecessary(Norman, 2013, p. 247). (b) In website design, if multiple buttons are neatly listed, with proper function description on the side, then the complexity and understanding are both acquired. A large number of buttons refers to the complexity and the good affordance is against confusion. (c) If designers think this concept is not true and always use simple, primal solutions, then certain complex processes cannot be performed. For example, if designers only provide numbers for users to create their password instead of creating a system that allows numbers, letters, and special characters. Then the security level of the password is low and it is unacceptable for practical use.

1. Standardization

(a) Standardization refers to common standards and committees of a field. It is a form of cultural constraint(Norman, 2013, p. 248). (b) In website design, this concept can be applied by setting a common rule. A company can make their designers use the same font on all web pages designed by them. (c) For an international website, having English as the display language is a common standard. Without this option, many users may be unable to use the website effectively and the website does not qualify for international use. Therefore, standardization is an important concept in the design field.

**3. Conclusion**

All these concepts provide practices and discussions to support the main topic of the chapter they belong to. Concept 1 is the method to find concepts 2-3 and concept 4 is the idea of dealing with concepts 2-3, whether in large complex situations or not. For website design, these concepts in Chapter 5 provide a complete process in finding, distinguishing, and reacting to problems. Concepts 5 - 9 are ideas, practical principles, and realities in design fields proposed in Chapter 6. They provided a guideline in designing thinking, which can be practically used in website designs.

**4. References**

Norman, D. (2013). *The Design of Everyday Things*. [Revised & expanded edition]. Basic Books.