

## **New Way to Learn \* New Way to Teach**

A Persuasive Website Design

for K-12 Educators' Engagement

(Characters:10'125, pages from sec 1 to 7: 29 pages)

**INFORMATION STUDIES, MASTER**  
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## **Abstract**

The aim of this project is to redesign a website in order to introduce Design Thinking methods for teachers in Denmark, that aim to develop students' 21st century competencies. This methodological approach of the research is based on the Design-Based Research framework in combination with the Double Diamond process. More specifically, the , users' needs and requirements were identified through qualitative research methods, utilizing three user interviews including a card sorting activity and series of open-ended questions of service exploration on how to digitize the handbook. The key theoretical focus on two main features were decided upon after a literature review of the persuasive design and also website personalization strategy. This project resulted in a low-fidelity website prototype that support the exploration of the chapter of literature and theories.

**Keywords:** 21st Century Learning, interaction design, Design-Based Research, DBR, Double Diamond, Design thinking in Education, Website Personalization, persuasive design

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## 1.Introduction

### 1.1 case description

At the end of the twentieth century and at the beginning of the 21st century, society has experienced rapid changes in both economics and technology. These have a considerable impact on the workplace, so it is important that the education system can prepare students to face these effects.. In Denmark, the interest in promoting 21st century skills has lead the the Center for Undervisningsmidler at University College Copenhagen to develop a website (<http://info.21skills.dk>), which aims to guide teachers and students cultivate the 21st century competencies. Regardless of the difference in definition mentioned above, their common spirit highlights the importance of educational transformation. However, the difficulty and challenge lies in the huge gap between learning innovation and teaching innovation, that is, the future learner's learning style needs to implement by the future educators.

This project is related to the GBL21 research project ([gbl21.aau.dk](http://gbl21.aau.dk)), which aims to promote Design Thinking in Danish elementary schools. Design Thinking is still a relatively unknown teaching method for many school teachers. In this way, the current project aims to provide resources, which can help teachers to get started with the basics of Design Thinking... etc

#### 1.1.1 BG1: 21st century skills

While many individuals and organisations have proposed 21st century skills that emphasise interdisciplinary concepts, many scholar has tried to compare different frameworks(Chris Dede, 2009, Voogt, J., & Roblin, N. P. 2012), here are three popular models:

- Framework for 21st Century Learning (The Partnership for 21st Century Skills)
- Four Keys to College and Career Readiness (David T. Conley and the Educational Policy Improvement Center)
- Seven Survival Skills (Tony Wagner and the Change Leadership Group at the Harvard Graduate School of Education)

According to the framework by Partnership for 21st Century Skills(Fig.1), there are 3 categories of 21st Century Skills included Learning skills, Literacy skills and Life skills ,



Fig.1 the framework by Partnership for 21st Century Skills

Although the general public believes that today's students face the problems of the complex world and need different skills from previous generations, there are still many debates about the skills of the 21st century - from how to define to how to teach these skills in the public education by appropriate application. Also because there is no clear consensus, this concept is often interpreted and applied in different ways, which may lead to confusion and inconsistency in the education scene.(Silva, E., 2008)

#### 1.1.2 BG2: Game-based Learning

In the technology era, learning methods have accelerated in a more integrated way. The most important and popular way of modern education system is the use of games in the learning environment, which not only affects the students' learning, but also affects the pedagogy of educators. Game-based learning (GBL) has been proven by many studies to be successful in improving learning and teaching.

James Paul Gee ( 2003 )published "What Video Games Have to Teach Us about Learning and Literacy" gradually gained attention by using games to help with learning. According to Mingfong Jan (2013), games are used to help people learn for three major reasons: motivation, content mastery, as well as higher order thinking and social skills.

However, under the influence of textbook Learning Culture, the school field is developed or applied by teachers to replace the traditional teaching method, but is mostly missing, because as a student in the educational context, players are usually not allowed to play games in their own game style. In addition, another challenge is to use the game to be a game for what it is not designed for. However, according to Thomas & Brown (2011), Instead of providing contents, games may be designed to provide rich and meaningful contexts for developing higher order thinking and social skills. So the Role of Teachers is to know how to become a "classroom game designer", this is also one of the missions that the website of this project is designed for, to make the teachers familiar with the trend of an innovative way to learn.

### 1.1.3 BG3: Design Thinking

Design thinking is future-oriented, concerned with “the conception and realization of new things,” and at its core is focused on “planning, inventing, making, and doing” (Cross, 1997, p. 1). In general, design is referred to as a generic activity (Lawson, 2006), a process, and a topic of study across disciplines that addresses complex human situations. Design is also defined as a space rather than a process, and design thinking is abductive (Cross, 2011; Dorst, 2011).

McLuskie, P., & McLuskie (2017) mentioned that Design Thinking is a complex and highly porous set of discourses which is still an emerging field, and the orthodoxy of pedagogy has not yet been established and is explores various teaching models and basic values and Ideologies. (Kimbell 2011) (Johansson-Sköldberg 2013). In addition, McLuskie, P., & McLuskie (2017)'s research also shows that dilemma of Design Thinking at the educational level may even be due to its utopian idealism at the language level. Claims to authenticity might continue to devalue and dismisses other forms of pedagogy relevant to teachers and learners.

### 1.2 Problem Statement and Research Questions

**“Change in Education depends upon what teachers do and think-it's as simple and as complex as that.” Fullan, M. (1991)**

In the 2014 Folkeskole reform, the tradition in Denmark of involving the relevant interest groups in developing policies for primary and lower secondary schools, longer school days provides some further potential opportunities for schools and students, this also means that teachers are typically required to be present for a longer time at school. (OECD Reviews of School Resources: Denmark 2016, p.23) The school week was lengthened to 35 hours a week, but schools and teachers were given more freedom to structure days and weeks differently. (Penn GSE, 2017) This means that educators were pushed to shift lessons to a “learning-by-doing” model, at the same time, some of them are easily misunderstood by the teachers’ resistance to dogma and their unwillingness to change their face. However, research shows that more problems actually involve multi-level social changes of the majority of teachers, process-related planning and coordination.

RQ1: How to design a website with the material of the design thinking for educators website in order to present teachers with the domain-knowledge of Design Thinking in a more interactive way?

RQ2: Is it possible to redesign the website using personalised strategy to stimulate the educators’ engagement based on user’s daily experience?

## 2.Literature review

In the following chapter, a literature search and its findings will be presented. The aim of the literature review is to investigate which existing literature has been written about **Persuasive Design** used in relation to website and the **Personalised experience in the information system**,

each has their purpose for finding relevant literature for this project. The area of **Persuasive Design** is important and having insight into the case because it seemed to be the intersection of human behavior, psychology, between the user and the system. By investigating how Design thinking in the education context is treated, with the use of card sorting approaches regards to an existing website, I sketched an understanding of how users' thoughts which could be used to help the teachers to overcome their learning curves and to form the mindset of the Design thinking. However, I also look for investigating how Personalised experience can be implemented through the use of website interactions.

## 2.1 Persuasive Design

### 2.1.1 summary

Based on psychology and social theory, persuasive design is a field of design practice that focuses on the impact of human behavior through the characteristics of a product or service. Persuasive design is often used for e-commerce, but it can also be used in any area where long-term involvement of the target group is required. Persuasion is a powerful force that changes the attitudes and behaviors of users.

### 2.1.2 challenges and suggestions

Anders Toxboe (2015) suggested a persuasive patterns with three common challenges when engaging users, which is divided into 3 different phases when users build relationship with the service or products:

1. Sign-up challenge: Try to communicate effectively from the customer's point of view and use persuasive design principles to focus on user interests, such as scarcity, completion, tunneling, the endowment effect and social proof, turning the user's intent into action.

2. First-time use challenge: Designing the right challenges and experiences for different user contexts. According to research statistics, the most popular incentives include Completion, Points, Levels, Status, (extra) Powers, Unlock features, Prolonged play, Self-expression and Achievements.

3. Ongoing engagement challenge: Although users understand the idea of your service, however, there

are still challenges about their motivation of using it for a long period of time. Since true intrinsic motivation and ongoing engagement, the key is utilizing the existing intrinsic motivation of your users.

Peep Laja (2013, 2019) also suggested 5 key principles of persuasive web design, a clear guideline and example which we could follow to create an experience in order to persuade the audience, I summarised as following list points:

1. Clarity above all



This is the most important thing for every page—which means that when we design the website, the content must be considered to provide answers to questions like:

- What is this site?
- What can I do here / is it what I'm looking for?
- Why should I do it / how is it useful to me?

## 2. Visual appeal

Google User Experience Researcher had 2 key findings from their study about “what makes people like a website”. Revealed that websites with low visual complexity (the simpler, the better) and high ‘prototypicality’ (how representative a design looks for a certain category of websites) were perceived as highly appealing. In other words, the key point is to make the web design simple and familiar.

## 3. Strong visual hierarchy

Visual hierarchy is one of the most important principles behind effective web design. It's the order in which the human eye perceives what it sees. If Certain parts of the website are more important than others (forms, calls to action, value proposition etc), make important links more prominent by size, colour, etc..

## 4. Conserve attention at all cost

This aspect is about the order where we place stuff. In the most recent study Therese Fessenden(2018) mentioned that users spent about 57% of their page-viewing time above the fold. 74% of the viewing time was spent in the first two screenfull. This research suggest that Content prioritization is a key step in your content-planning process. Besides, the tips to grab attention such like user-centric term, always WIIFM (What's in it for me). Another way to sustain attention is to help people choose something by filtering info, which is also an command method by UX designer in website.

## 5. One action per screen, when they're ready

This is mostly about the third factors in FBM, the triggers, which refers that start with a clearly defined most wanted action for each page – and optimize the journey of user experience for it.

### 2.1.3 Related theory

Persuasion itself is a process of leading an individual toward the development of new attitudes, or the reinforcement of existing behavior, Marja and Oinas-Kukkonen(2007) found that a growing number of information technology systems and services are being developed for persuasive purposes, Oinas-Kukkonen (2010) also stated that the within the field, related theories are from social and cognitive psychology, such as social psychology, cognitive consistency theory, the Theory of Reasoned Action, the Theory of Planned Behavior, Self-Efficacy Theory, and Cialdini's influence techniques.

## 2.2 Personalised experience in website design

### 2.2.1 summary

According to the report of 2018 Trends in Personalization (Researchscape International 2018), it's now estimated that some 45% of organizations have attempted to personalize their homepage. Personalization of websites has become an important issue in web modeling methods due to their big and heterogeneous audience (Garrigós, I., 2010). Associated from the concept of UCD, also known as website design personalization, there are wide-ranging features classified as personalization, from just show the name of user on a web page, to customize the navigation and product based on deep models of users' needs and behaviors. (J. Kramer, 2000)

### 2.2.2 challenge and suggestion

Some definition you'll find to describe website personalization as the process of creating customized experiences for visitors to a website. However, it's necessary to clarify the difference between "Personalization" and "Customization". A clear explanation is that, customization gives control to the user and personalization gives control to the site. Both can enhance users' experience, but only when carefully implemented (A. Schade, 2016). Although two strategies are both able to enhance user experience on a site, but the content behind the experience is more essential, in other words, if users have difficulties finding information, the solution may not be to implement personalization or customization, but instead to fix the underlying site structure or even the content that is presented. (A. Schade, 2016)

One of the typical challenges in personalization strategy is that most of the content creators often don't have a scalable way to target specific messages to those audiences when they try to create personalised experience..

### 2.2.3 Related theory

Personalization in website design is by no means a new concept, it's a way to build trust and remain the relationship between the content and their audience. Most related theory is in the field of E-commerce user experience, for example, the recommended list and the products inspired by your wish list shows on the homepage of Amazon.

## 2.3 Findings

Based on the positive findings as well as the challenges on the above chapter, we find that it's an essential element to be awareness that a website should be interactive by bringing more engagement to the target users, in this case, the main purpose of this GBL 21 project should try to identify the website itself as a medium of invitation, which could try not only introduce an combination of new ideas such as design thinking, game-based learning in a one-way communication form while the audience browse the content on the website, but put more efforts on design in a way of interacting with more engagement, including personalised the interaction and persuasive design strategy.

The research above eventually argue that since users are various from a different context, the design challenge might be solved with creating a flexible system with customization so it will be relevant to individual positive experience. For example, Introducing the ability to share these customizations will allow users to find other users who share the similar experience.

### 3. Theory and assumptions

#### 3.1 Theories

##### **website hierarchy of needs**

The most famous theory about what humans require and motivation was posited by the psychologist A.Maslow(1943) called the hierarchy of needs. Based on Maslow's concept, there are several articles I found that try to create a related version to web development, usually called the website hierarchy of needs or the hierarchy of web(site user)needs, for example, here's a one developed by Eduardo Esparza in 2016.

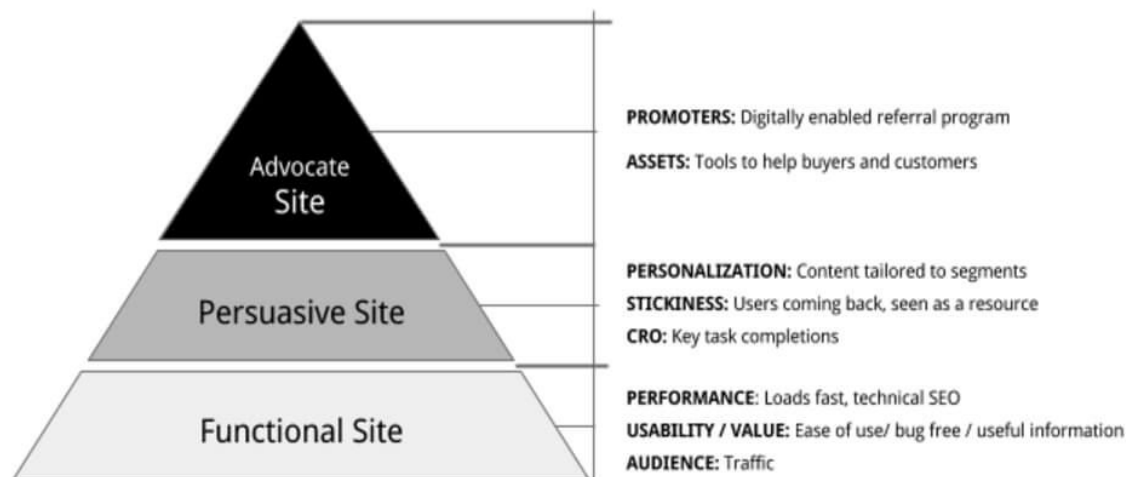


Fig.2 the website hierarchy of needs

##### **Fogg Behavior Model(FBM)**

Interactive information technology designed for changing users' attitudes or behavior is known as persuasive technology (Fogg 2003). Fogg founded the Persuasive Technology Lab at Stanford University and his research focus on credibility and behavioral design. In his model for driving behavioral changes – called The Fogg Behavior Model(FBM), behavior is a product of three factors: motivation, ability, and triggers, each of which has subcomponents. For example, subcomponents in motivation are Motivator #1: Pleasure / Pain, Motivator #2: Hope / Fear, Motivator #3: Social Acceptance / Rejection. The attempt to increase a user's ability, which might be hard to accomplish, Fogg suggest that designers must make the behavior easier to do. That is to say, persuasive design put much emphasis on the power of simplicity. Then about the triggers, there

are nine powerful words called Fogg's design mantra which suggest that” **put hot triggers in the path of motivated people.**”<sup>1</sup>

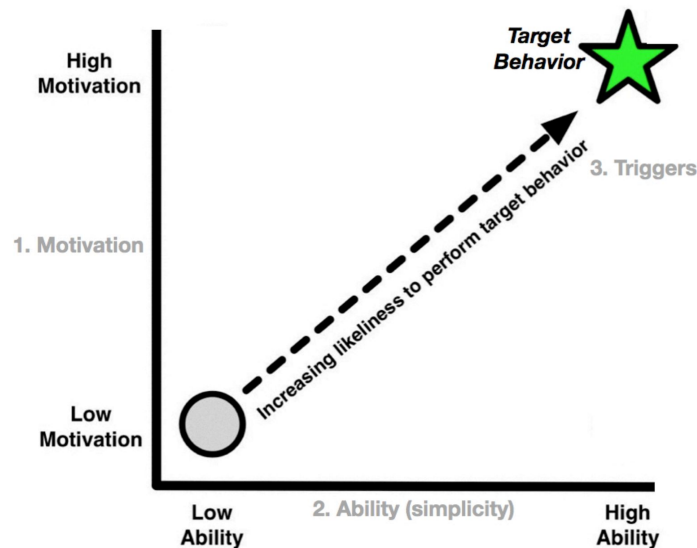


Fig.3 The Fogg Behavior Model has three factors: motivation, ability, and triggers

### 3.2 Assumptions

According to the background and problem descriptions of the previous two chapters, the focus of this project is not on the new concept (Design Thinking or Game-based learning) that the website wants to convey to the educators, but how these concepts win teachers' trust at the psychological level, these strategies to win trust could be achieved through information interaction designed of the website. Therefore, this project has three assumptions as the following:

3.2.1 A new method of pedagogy cannot be implemented only by information or providing a certain number of examples of a website. especially the Game-Based Learning is not only a form of activities, but also a pedagogical aspect should be serious considered. the content of “Design Thinking for Educators” in the handbook by IDEO as a main resource, should be transformed into another way with a persuasive technique.

3.2.2 Using the website as a medium, the key to the success of the new teaching method for teachers is the degree of user engagement. Therefore, the support of the interactive mechanism, as long as we enhance the users' engagement, it could bring the success for the educational reform.

3.2.3 From the experience of e-commerce interface that users are familiar with in their life, the integration of personalised experience design elements of the website is not only in line with the Fogg Behavior Model, but also helps to satisfy the users during the interaction.

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<sup>1</sup> "Quick Query: Dr. BJ Fogg on Fogg Behavior Model". Interview with Kevin Patrick Allen, December 15, 2009. <https://www.practicalecommerce.com/Quick-Query-Dr-BJ-Fogg-on-Fogg-Behavior-Model>

## 4. Methodology

This chapter will discuss and describe our research design, which contains the methodological research framework, our research approach along with the data collection methods involved in this project. Furthermore, a description of our participant criteria and sampling will follow. Lastly, a thorough explanation of the procedure of the chosen methods will be presented and reflected upon.

### 4.1 Research Design

Research designs are procedures for collecting, analyzing, interpreting, and reporting data in research studies. They represent different models for doing research, and these models have distinct names and procedures associated with them. I would like to introduce the DBR (design based research) methods in the project that connect theoretical research and educational practice. Much of the DBR literature attributes its beginnings to the work of Ann Brown and Allan Collins (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Collins et al., 2004; Kelly, 2003; McCandliss, Kalchman, & Bryant, 2003; Oh & Reeves, 2010; Reeves, 2006; Shavelson, Phillips, Towne, & Feuer, 2003; Tabak, 2004; van den Akker, 1999). DBR provide a lens for understanding how theoretical assertions about teaching and learning that can be transformed into effective educational settings. But it comes with some limitations such as lack of ownership, risk of not responding to user requirements, but this kind of limitations can be fulfilled by participatory design method, where stakeholders can be actively involved in a design process which helps to make sure the result meets the needs of the user. So that we believe as a problem driven approach Design based research is usually where we as a researcher not only pursue to understand, document and interpret but also to change and improve educational practice and opportunity. Depending upon the complexities and need for this case, participatory design would implement in the design phase to make the data analysis more meet the need of users.

The core value of participatory design, which is an outgrowth and form of user-centered design, is try to understand from the perspective of users about the meaning of their behavior and their views on things then build hypotheses and theories on the basis of this, eventually test-out the design solution and validate it, similar with the Double Diamond process in next paragraph.

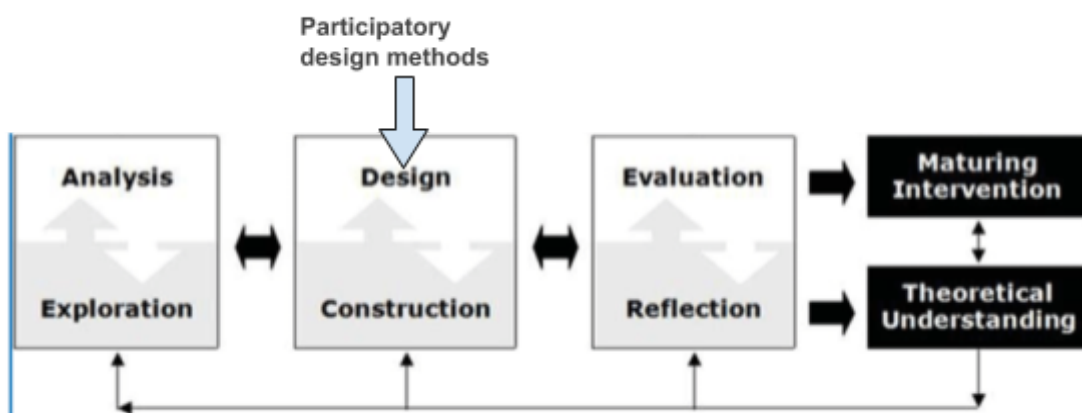


Fig.4 Research Design

#### 4.1.1 Research Framework

##### Double Diamond

Kayla's (2017) article mentioned that it is the most well-known design process model developed by the British Design Council in 2005, the model is divided into four phases: Discover customer problems, define specific customer problems, develop potential solutions to these customer problems, deliver feasible solutions to the problems, the diagram below shows how the concept works:

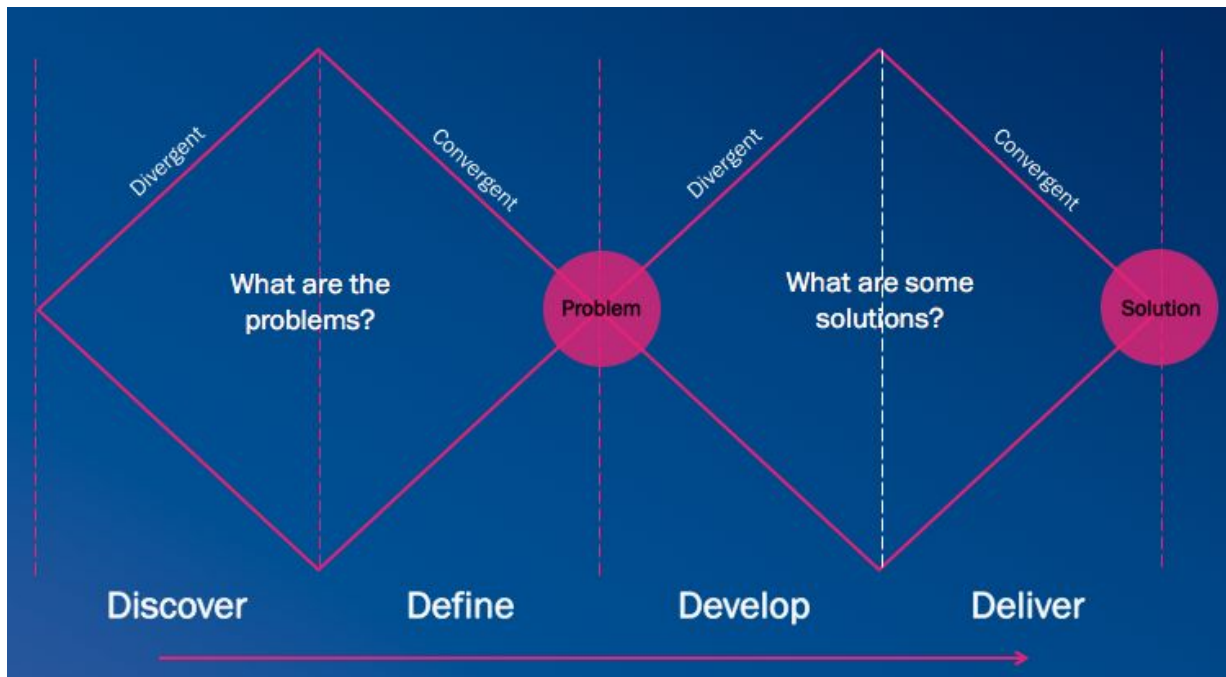


Fig.5 The Double Diamond process ( Illustrated by Kayla J. Heffernan)

#### 4.1.2 Research Approach

Psychology and social sciences in general have a long tradition of using qualitative methods.(Flick, 2018) Qualitative research usually focus on seeking information from the person who is experiencing or participating in the problem,in a sense match our project. Moreover, qualitative research is based on an in-depth analysis or understanding a small group of carefully selected sample individuals who rely on their experience, sensitivity, and related techniques for the researcher to effectively understand the behavior and motivation related to the subject. (H.Monique,H. Inge,B. Ajay, 2010 )Usually, qualitative studies are often used when the sample is small, which is also fit in this project, So,In order to gain the best result of our research problem, qualitative approach will be applied in the project. b Besides,

However, Lune & Berg (2016) also said that Qualitative research is a long hard road, with elusive data on one side and stringent requirements for analysis on the other.

#### 4.1.3 Reliability and validity

Triangulation is typically a strategy for improving the validity and reliability of research or evaluation of findings. Mathison (1988) elaborates this by saying: Triangulation has risen an important methodological issue in naturalistic and qualitative approaches to evaluation [in order to] control bias and establishing valid propositions because traditional scientific techniques are incompatible with this alternate epistemology. (p. 13)

To improve Reliability and Validity in the three interviews in this project, the following methods are used :

1. Creating a good interaction and interview atmosphere: It is very helpful for interviews, which can reduce the lack of information and exaggerated statements made by respondents because of nervousness or self-defense, so as to increase the richness and Reliability of information.
2. Apply clarification and verification skills: During the interview process, the researcher consciously inserts some key questions into other questions, so that the respondents can restate and verify the problem to ensure consistency.
3. Multiple methods of Collecting Information: Using "Triangulation" principle, in addition to the use of posters and post-it notes, the brainstorming method leaves the actual hands-on information, also uses the voice recording and time-lapse photography and photography to increase the validity of the data.
4. Interview outline and activity design: Same as the introduction of "Triangulation" principle. After the preliminary completion of the interview activity schedule designed according to the research purpose and problem before the interview, the review by the guidance professor and research partners and respondents will be reduced. Researcher biased, improving Reliability and Validity.

#### 4.2 Sampling and Participants

Qualitative researchers typically make sampling choices that enable them to achieve a deep understanding of whatever phenomenon and users. when recruiting participants In qualitative research, there are three sampling techniques we planned to implement in this project, which included purposeful, quota and convenience sampling :

Purposeful Sampling: participants are selected or sought after based on pre-selected criteria based on the research question. so we decided the selection criteria as the following 2 sections:

1. Expert who are familiar with the GBL 21 project and Design thinking process, and
2. Teacher who had experience in teaching career of K-12 education system in Denmark.

Quota Sampling: which is a sampling technique whereby participant quotas are preset before to sampling. In our case, we planned to have 5 interviewees included 3 are expected to be teachers

who teach on a daily basis and had experience of leading student with project is preferred, and better not to be familiar with the Design Thinking process, which matches the characters of the real users of this website. The other 2 are “expert teacher” of Design Thinking domain know how. However, due to the time limit and the resource we could reach, we only have three interviewees in total included two experts and one teacher.

Convenience sampling: a sampling technique that qualitative researchers use to recruit participants who are easily accessible and convenient to the researchers. In our case, the two experts we tried to contact is both staffs from AAU, and the teacher who had experience in Danish K-12 education system, is who the researcher meet from the Taiwanese community in Copenhagen.

Interviewee 1(expert in Design thinking ):

Interviewee 1 is is a Associate professor of Department of Communication and Psychology in Aalborg University Copenhagen. She is interested in the relation between technology, perception and cognition. Her research has been in various areas connected to play and playful processes.

“Thinking about planning this journey, thinking about how to provide them with the right tools to think about it as being more and more difficult, but also that they have more and more abilities to solve. This is something that I'm looking at. So this is not a game, but like a methodology.”

Interviewee 2( teachers in Danish education system)

Interviewee 2 is a special education teacher who had taught for more than 10 years in Taiwan and also had some experience for being an assistant teacher in Denmark’s public school, and she mentioned the moment of being valued in her career is “Especially parents with international backgrounds can feel the support from her to explain to her Danish colleagues about what their kids needs or the parents need. So, then I become a bridge for communicating for the Danish society and international background parents”

Interview 3 (expert as counselor for teachers):

Interview 3 has been teaching in the Danish school for 10 years, now working as a guidance counselor , the teachers support role for the last seven years.He now as a PhD. student in Aalborg University . He said “school is real life. It's maybe 12 years of their lives, let's do something, that they can also feel this is worth that while it's not wasted time” His hope is that we can take students to improve the world that we gave them. As a counselor who working in the City Hall government in a small municipality with around 30,000 people, he mentioned that “all these design thinking tools are difficult for them to handle. They haven't tried it before, they don't know how to do it. They don't know how the students would react to. And they get insecure. ”



### 4.3 Interviews design

|                           | <b>Intro</b>                                                                    | <b>part1:<br/>card sorting</b>                                                                                                                                                                                                                                                   | <b>part2:<br/>service exploration</b>                                                                                                                                                                                                                                                                    |
|---------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| duration<br>(mins)        | 15~20                                                                           | 15~20                                                                                                                                                                                                                                                                            | 15~20                                                                                                                                                                                                                                                                                                    |
| activities<br>instruction | Background<br>, experience<br>and stories<br>related to<br>Teaching<br>careers. | print out the title and the<br>content examples of the<br>website<br><a href="https://designthinkingforeducators.com/design-thinking/">https://designthinkingforeducators.com/design-thinking/</a><br><br>then ask the interviewees to do<br>optimized the info<br>architecture. | compared to the experience of<br>online purchasing, To observe how<br>the interviewee interact with the<br>toolkit handbook, and what<br>features would motivates them if<br>the material is going to be<br>digitized. find out the ways of<br>interacting that might increase the<br>users' engagement. |

## 5. Results and Analysis of data

### 5.1 Thematic Analysis

Themes is a pattern of shared meaning, organized around a core concept or idea, a central organizing concept (Braun et al. 2014). This approach aimed at identifying patterns across qualitative data. Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2018) After interview, the researcher take photos of what they write on the notes, then compared to the voice recording of the interview lead to a preliminary understanding of the valuable opinions of the interviewee, and then examines the content of the data in a sentence or a small paragraph of quotes. A topic or concept are named after a proper noun after in the themes.

Interviewee 1(expert in Design thinking ):

| Questions                                                                                                                                                                             | Quotes                                                                                                           | Theme            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------|
| Q1.<br>If we're trying to digitalised the<br>handbook of Design Thinking,<br>not just put the PDF on the<br>website, any ideas for the<br>interaction or ways to display<br>the info? | A1-1.<br>"what do I need with each<br>method , like what material or<br>knowledge need to be prepared<br>before" | Relevant content |
|                                                                                                                                                                                       | A1-2.<br>"So there's like preparation<br>before? And then what to keep                                           | Relevant content |

|  |                                                                                                                                                                                                                                                                                                                               |                 |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|  | in mind when I'm conducting it. And then also, I think what I'm missing is like, what about afterwards? Yeah."                                                                                                                                                                                                                |                 |
|  | A1-3.<br>" it's important to know what materials I should bring to the situation. I need to remember to have all the elements for building something"                                                                                                                                                                         | additional info |
|  | A1-4.<br>" if you have different filtering of the methods, you should be able to say, Okay, so what do I want to use it? Why I need to use it? ...<br>perhaps I needed something like really briefly, from 02 minutes to half, an hour, then I only see those...so there's like a different sortings. Yes, it would be nice." | data sorting    |
|  | A1-5.<br>"you also have the icons that you can click on. So choose the phase, choose certain kind of different filters, or you can combine two of those"                                                                                                                                                                      | data sorting    |
|  | A1-6.<br>"...And then when you read about it, then there's also kind of a context that you can read more about."                                                                                                                                                                                                              | additional info |

|  |                                                                                                                                                                                                                     |                   |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|  | <p>A1-7.</p> <p>"So each method, you can see that I tried this, and I liked it, or make a comment on the method. To write a comment, or you shared with someone else. Yeah, that would be nice. really helpful"</p> | share and comment |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|

Interviewee 2( teachers in Danish education system)

| Questions                                                                                                                                | Quotes                                                                                                                                                                                                                                                        | Theme            |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Q2.<br>compared to your online shopping experience, what might be helpful for you to reach your needs If we're trying to digitalised the | <p>A2-1.</p> <p>" Yeah. if you're a experienced teacher then I will say Okay, first it could be the activities is the single subject or multiple things several subjects put together. So already categorize a single subject or a multiple sub subject."</p> | data categorized |
|                                                                                                                                          | <p>A2-2.</p> <p>"when it's different subject work together like the math and the Danish and the English and biology will put together and then we have activities."</p>                                                                                       | data sorting     |
|                                                                                                                                          | <p>A2-3.</p> <p>"for example, I search for 3rd grade for English teaching and 4th for art, and then then they will automatically have something, if we can use this one as an idea for brainstorming , because this is what people used to go through"</p>    | data sorting     |

|  |                                                                                                                                                                                                                                                                                                                 |                  |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|  | <p>A2-4.</p> <p>"you can see what they usually need and then they will make a connection like subject based view, what you have viewed. The commercial site divides market because they use psychology. So that's why I think this is an easier way for a retired teacher Because this is the common sense"</p> | data categorized |
|  | <p>A2-5.</p> <p>"then I will design in the subject or age , for example, first to third grade, and the third to the sixth grade. categorize the users need to meet user friendly"</p>                                                                                                                           | data categorized |

Interview 3 (counselor for teachers):

| Questions                                                                                                                                                                   | Quotes                                                                                                                                                                                                   | Theme                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <p>Q3.</p> <p>If we're trying to digitalised the handbook of Design Thinking, not just put the PDF on the website, what might be helpful for the teachers' engagement ?</p> | <p>A3-1.</p> <p>"we're doing a lot of things and we have all these exercises that we're doing with the main underlying thing is need to open up to some ideas. I think that could be maybe helpful."</p> | messages with positive influence  |
|                                                                                                                                                                             | <p>"it's more easy to see where, where the teacher can do different things. So maybe it should be supplemented with kind of a what's the top priority for the teacher In this film? "</p>                | interactive way to show resources |

## 5.2 card sorting

Card sorting was originally developed by psychologists as a method to the study of how people organize and categorize their knowledge.(JR Wood,2008) Therefore, a number of card sorting methods have been used as research tools by psychologists and information designers. The Problems for information designers is if they could find information on web sites abound. Research stated the card sorting methodologies can help Web site developers structure a web site closer to how the intended users think about a topic, organize information for the Web site, and event.(Paul, ; Kevin and Donald( 2014) stated that most useful methods of user research in a UX design project 2008) is card sorting.

There are two primary types of card sorting. In **Open card sorting**, the most popular method, the participants are given cards with no pre-established groupings,which I would like to use In this project,otherwise, In **closed card sorting**, participants are asked to place cards into existing groups. The second is usually used to test early information architecture proposals.

According to the methods and the open-sourced excel file Donna Spencer (2009) suggested and shared, here is the step we proceed: the first step is to set up the card list , which is based on the content of the website: <https://designthinkingforeducators.com/design-thinking>

I name the card after the title they display, for example, here is the homepage and the way cards are named showed as the right side below.

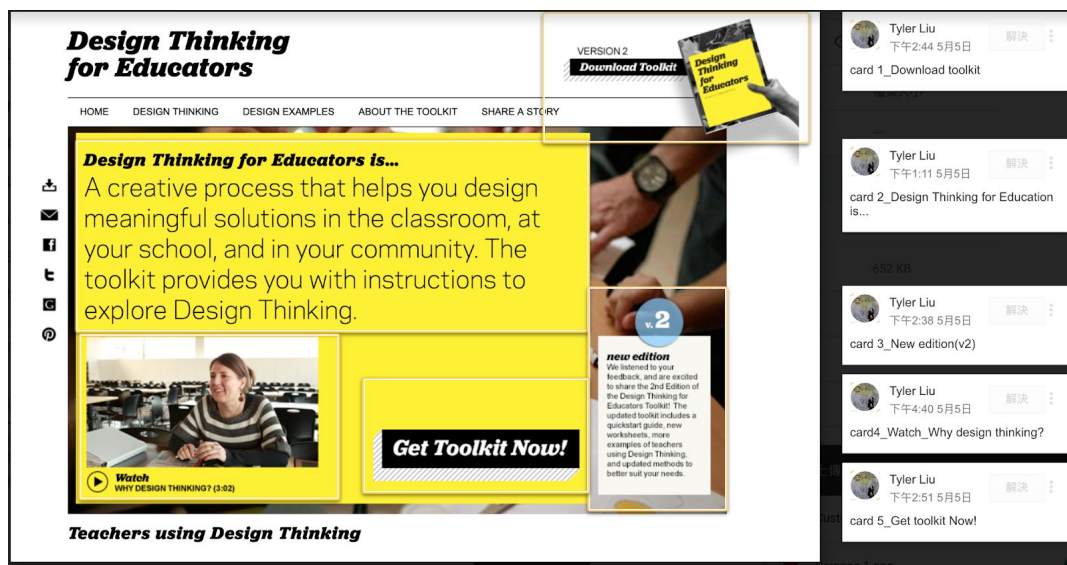


Fig.6 the website: <https://designthinkingforeducators.com/>

Then I create a list of cards for testing as following, from 1~20 cards,\_. The most important advantage of using paper is that participants have almost no learning curves. They just have to sort the cards into small piles. And it's a very flexible process where users can quickly change their minds or directly reinvent them.

| Card no | Card name                                                      |
|---------|----------------------------------------------------------------|
| 1       | Download toolkit                                               |
| 2       | Design Thinking for Education is...                            |
| 3       | New edition(v2)                                                |
| 4       | Watch_Why design thinking?                                     |
| 5       | Get toolkit Now!                                               |
| 6       | Teachers using Design Thinking                                 |
| 7       | What is Design Thinking?It is a mindset                        |
| 8       | Watch Maggie_video clips                                       |
| 9       | Watch Michael& Watch Patrick_video clips                       |
| 10      | What kind of challenges can be addressed using Design Thinking |
| 11      | School-designed                                                |
| 12      | Community-designed                                             |
| 13      | District-designed                                              |
| 14      | What is in the toolkit?                                        |
| 15      | Why was it made?                                               |
| 16      | Watch_context_video clip                                       |
| 17      | Watch_mindset_video clips                                      |
| 18      | Watch_profession_video clips                                   |
| 19      | Watch_practice_video clips                                     |
| 20      | Who made it?                                                   |



Fig.7 card sorting-naming and activities

here is the raw data we gathered from three interviewees:

| Card no | Card name                                                      | Sort1                                 | Sort2                   | Sort3             |
|---------|----------------------------------------------------------------|---------------------------------------|-------------------------|-------------------|
| 1       | Download toolkit                                               |                                       | Manual corporate guides | About the toolkit |
| 2       | Design Thinking for Education is...                            | What? My student as design thinkers   | Front page              | What              |
| 3       | New edition(v2)                                                |                                       | Introduction            | About the toolkit |
| 4       | Watch_Why design thinking?                                     | Why? Should your students design      | User feedback           | What              |
| 5       | Get toolkit Now!                                               |                                       | Manual corporate guides | About the toolkit |
| 6       | Teachers using Design Thinking                                 | How? Can I facilitate design thinking | User feedback           | How               |
| 7       | What is Design Thinking?It is a mindset                        | What? My student as design thinkers   | Mindset                 | What              |
| 8       | Watch Maggie_video clips                                       | What? My student as design thinkers   | Mindset                 | What              |
| 9       | Watch Michael& Watch Patrick_video clips                       | What? My student as design thinkers   | Mindset                 | What              |
| 10      | What kind of challenges can be addressed using Design Thinking | What? My student as design thinkers   | User feedback           | Why               |
| 11      | School-designed                                                | How? Can I facilitate design thinking | Share a story           | How               |
| 12      | Community-designed                                             | How? Can I facilitate design thinking | Share a story           | How               |
| 13      | District-designed                                              | How? Can I facilitate design thinking | Share a story           | How               |
| 14      | What is in the toolkit?                                        | Who and What? Is gonna help me?       | Manual corporate guides |                   |
| 15      | Why was it made?                                               | Why? Should your students design      | Motivation              | Why               |

|    |                              |                                       |                         |     |
|----|------------------------------|---------------------------------------|-------------------------|-----|
| 16 | Watch_context_video clip     | How? Can I facilitate design thinking | Motivation              | Why |
| 17 | Watch_mindset_video clips    | What? My student as design thinkers   | Motivation              | Why |
| 18 | Watch_profession_video clips | How? Can I facilitate design thinking | Motivation              | Why |
| 19 | Watch_practice_video clips   | How? Can I facilitate design thinking | Motivation              | Why |
| 20 | Who made it?                 | Who and What? Is gonna help me?       | Front page Introduction |     |

the next step is to standardise categories—give those with similar names or concepts a consistent name. This is the critical part that will make analysis easier as you can combine groups where participants used the same basic concept but a slightly different label. This is a tricky step and requires a lot of judgement .

| Sorter | Original category                     | Standardised category |
|--------|---------------------------------------|-----------------------|
| Sort1  | Why? Should your students design      | Why?                  |
| Sort1  | Who and What? Is gonna help me?       | Who and What?         |
| Sort1  | How? Can I facilitate design thinking | How?                  |
| Sort1  | What? My student as design thinkers   | What?                 |
| Sort2  | Mindset                               | What?                 |
| Sort2  | Motivation                            | Why?                  |
| Sort2  | User feedback                         | feedback              |
| Sort2  | Manual corporate guides               | toolkit guides        |
| Sort2  | Share a story                         | stories               |
| Sort3  | What                                  | What?                 |
| Sort3  | Why                                   | Why?                  |
| Sort3  | How                                   | How?                  |
| Sort3  | About the toolkit                     | toolkit guides        |

After standardised the category as the image above, we got this well- calculated sheet shows below, tto have a glance and make sure the ratio in this sorting is acceptable.



| Card no                                    | Card name                                      | Why?     | Who and What? | How?     | What?    | What?    | Why?     | feedback | toolkit guides | stories  | What?    | Why?     | How?     | toolkit guides | Categories for this card |
|--------------------------------------------|------------------------------------------------|----------|---------------|----------|----------|----------|----------|----------|----------------|----------|----------|----------|----------|----------------|--------------------------|
| 1                                          | Download toolkit                               |          |               |          | 67%      | 67%      |          |          | 100%           |          |          |          |          | 100%           | 2                        |
| 2                                          | Design Thinking for Education is...            |          |               |          |          |          |          |          |                |          | 67%      |          |          |                | 3                        |
| 3                                          | New edition(v2)                                |          |               |          |          |          |          | 50%      | 50%            |          |          |          |          | 50%            | 3                        |
| 4                                          | Watch_Why design thinking?                     | 50%      |               |          | 50%      | 50%      | 50%      |          |                |          | 50%      | 50%      |          |                | 6                        |
| 5                                          | Get toolkit Now!                               |          |               |          |          |          |          |          | 100%           |          |          |          |          | 100%           | 2                        |
| 6                                          | Teachers using Design Thinking                 |          |               | 67%      |          |          |          | 33%      |                |          |          |          | 67%      |                | 3                        |
| 7                                          | What is Design Thinking?It is a mindset        |          |               |          | 100%     | 100%     |          |          |                |          | 100%     |          |          |                | 3                        |
| 8                                          | Watch Maggie_video clips                       |          |               |          | 100%     | 100%     |          |          |                |          | 100%     |          |          |                | 3                        |
| 9                                          | Watch Michael& Watch Patrick_video clips       |          |               |          | 100%     | 100%     |          |          |                |          | 100%     |          |          |                | 3                        |
| 10                                         | What kind of challenges can be addressed using | 33%      |               |          | 33%      | 33%      | 33%      | 33%      |                |          | 33%      | 33%      |          |                | 7                        |
| 11                                         | School-designed                                |          |               | 67%      |          |          |          |          |                | 33%      |          |          | 67%      |                | 3                        |
| 12                                         | Community-designed                             |          |               | 67%      |          |          |          |          |                | 33%      |          |          | 67%      |                | 3                        |
| 13                                         | District-designed                              |          |               | 67%      |          |          |          |          |                | 33%      |          |          | 67%      |                | 3                        |
| 14                                         | What is in the toolkit?                        |          | 50%           |          |          |          |          |          | 50%            |          |          |          |          | 50%            | 3                        |
| 15                                         | Why was it made?                               | 100%     |               |          |          |          | 100%     |          |                |          |          | 100%     |          |                | 3                        |
| 16                                         | Watch_context_video clip                       | 67%      |               | 33%      |          |          | 67%      |          |                |          |          | 67%      | 33%      |                | 5                        |
| 17                                         | Watch_mindset_video clips                      | 67%      |               |          | 33%      | 33%      | 67%      |          |                |          | 33%      |          |          |                | 6                        |
| 18                                         | Watch_profession_video clips                   | 67%      |               | 33%      |          |          | 67%      |          |                |          |          | 67%      | 33%      |                | 5                        |
| 19                                         | Watch_practice_video clips                     | 67%      |               | 33%      |          |          | 67%      |          |                |          |          | 67%      | 33%      |                | 5                        |
| 20                                         | Who made it?                                   |          | 50%           |          |          |          |          |          |                |          |          |          |          |                | 1                        |
| <b>Cards in this category</b>              |                                                | <b>7</b> | <b>2</b>      | <b>7</b> | <b>7</b> | <b>7</b> | <b>7</b> | <b>3</b> | <b>4</b>       | <b>3</b> | <b>7</b> | <b>7</b> | <b>7</b> | <b>4</b>       |                          |
| <b>Cards with high agreement (&gt;75%)</b> |                                                | <b>1</b> | <b>0</b>      | <b>0</b> | <b>3</b> | <b>3</b> | <b>1</b> | <b>0</b> | <b>2</b>       | <b>0</b> | <b>3</b> | <b>1</b> | <b>0</b> | <b>2</b>       |                          |
| <b>Cards with medium agreement</b>         |                                                | <b>6</b> | <b>2</b>      | <b>7</b> | <b>4</b> | <b>4</b> | <b>6</b> | <b>3</b> | <b>2</b>       | <b>3</b> | <b>4</b> | <b>6</b> | <b>7</b> | <b>2</b>       |                          |
| <b>Cards with low agreement (&lt;25%)</b>  |                                                | <b>0</b> | <b>0</b>      | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b>       | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b>       |                          |

### 5.3 Main findings

the most valuable insight from our interviewee is that the attitude or the character expressed by the website between the interaction from users and the site itself. Is it humble? or hard to understand? In other words, “a way to build trust and remain the relationship between the content and their audience”(see section 2.2 personalised experience in website design) and “because it's a tool, but if this is a tool so it's not a teaching book. People don't want to learn a new skill by using this”(interviewee 2) Every step the users take should make them feel comfortable, welcomed, even willing to learn more, that meet the purpose of persuasive design and principles Peep Laja(2013, 2019) suggested, especially the visual appeal(simple and similar), the 3 phases persuasive patterns which Anders Toxboe (2015) suggested also offer an insight and support that if we implement the interactive elements which e-commerce sites to maintain the level of customer engagement, it might have the great chance to help teachers who try to get more familiar with the new pedagogical method meeting their mental state and learning needs, One the most valuable insight for the project is that “stickiness” In the 2nd level of website hierarchy of needs, the mission is to focus on getting users to come back to your site on a regular basis to solve problems, self educate, and continue their surfing journey.



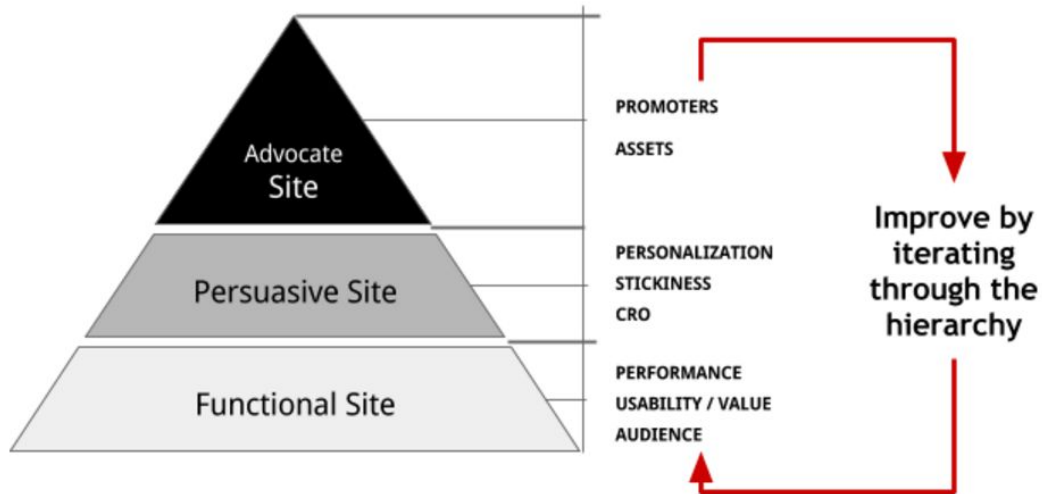


Fig.8 advice for website hierarchy of needs

Another advice is that never thought it's a single direction trip when improving the site based on the website hierarchy of needs, that is to say, it is an iterative approach which always can be improved.

Moreover, the Fogg Behavior Model (FBM ) could also help to offer an insight of conversion goal to this project with various perspectives such as three factors: motivation, ability, and triggers, from the data we gathered from interviews, it could easily tell that The resistance promoted by the GBL 21 program lies in the usability and accessibility of resources such as textbooks(the content of handbook must be reorganised as a digital version) and cases, testimonies and last but not least: whether the new teaching method brings positive feedback and forms a positive influence of group diffusion.

## 6. design proposal

Following by the main findings in last paragraph, there are some Design Strategy (DS )in the project

DS1:Relevant content , DS2:additional info, DS3:data sorting, DS4:share and comment, DS5:data categorized, DS6:messages with positive influence, DS7:interactive way to show resources

### 6.1 Navigation strategy: megamenu

Based on the data gathered from three interviews and the card resorting activities sort by the standardised category which mentioned in section 5.2, about how to introduce Design Thinking on the menu in the navigation bar, we would like to propose is based on the sheet show as below:

| Card no | Card name                                                      | Sort1         | Sort2          | Sort3          |
|---------|----------------------------------------------------------------|---------------|----------------|----------------|
| 1       | Download toolkit                                               |               | toolkit guides | toolkit guides |
| 2       | Design Thinking for Education is...                            | What?         |                | What?          |
| 3       | New edition(v2)                                                |               | feedback       | toolkit guides |
| 4       | Watch_Why design thinking?                                     | Why?          |                | What?          |
| 5       | Get toolkit Now!                                               |               | toolkit guides | toolkit guides |
| 6       | Teachers using Design Thinking                                 | How?          | feedback       | How?           |
| 7       | What is Design Thinking?It is a mindset                        | What?         | What?          | What?          |
| 8       | Watch Maggie_video clips                                       | What?         | What?          | What?          |
| 9       | Watch Michael& Watch Patrick_video clips                       | What?         | What?          | What?          |
| 10      | What kind of challenges can be addressed using Design Thinking | What?         | feedback       | Why?           |
| 11      | School-designed                                                | How?          | stories        | How?           |
| 12      | Community-designed                                             | How?          | stories        | How?           |
| 13      | District-designed                                              | How?          | stories        | How?           |
| 14      | What is in the toolkit?                                        | Who and What? | toolkit guides |                |
| 15      | Why was it made?                                               | Why?          | Why?           | Why?           |
| 16      | Watch_context_video clip                                       | How?          | Why?           | Why?           |
| 17      | Watch_mindset_video clips                                      | What?         | Why?           | Why?           |
| 18      | Watch_profession_video clips                                   | How?          | Why?           | Why?           |
| 19      | Watch_practice_video clips                                     | How?          | Why?           | Why?           |
| 20      | Who made it?                                                   | Who and What? |                |                |

In addition to reclassification, also try to combine with images and supporting text(DS2:additional info) to help reduce the difficulties of understanding

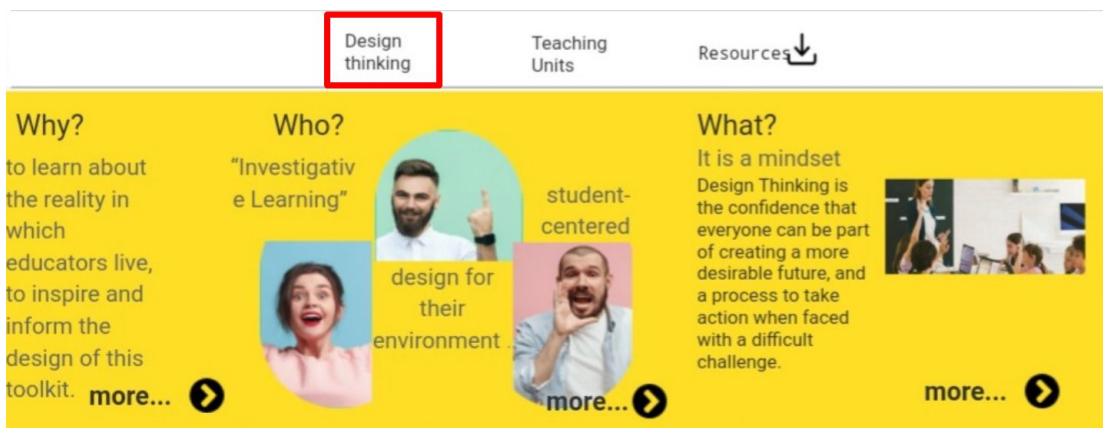


Fig.9 prototype-menu1

Moreover, DS5:data categorized is one of the main issue that users decide whether they would like to engage more or not, therefore, here is the idea that inspired from the interview: “for example then I will design in the subject or age , for example, first to third grade, and the third to the sixth grade. categorize the users need to meet user friendly” (interviewee 2 )

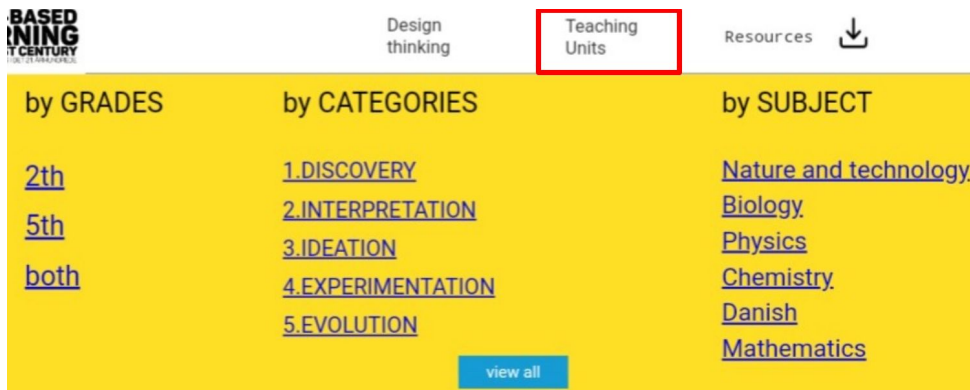


Fig.10 prototype-menu2

By implement the material of the hand book as the resources of the website, in addition to download the PDF, when observing interaction with the design thinking handbook, some insight like "Use the symbol. The thing that not so small . Because this is for all people , you have to be this. Yeah. So you can say okay, three times the size. This is too small."(interviewee 2) match the experience when interviewee browse the EC website like Amazon.com as below,

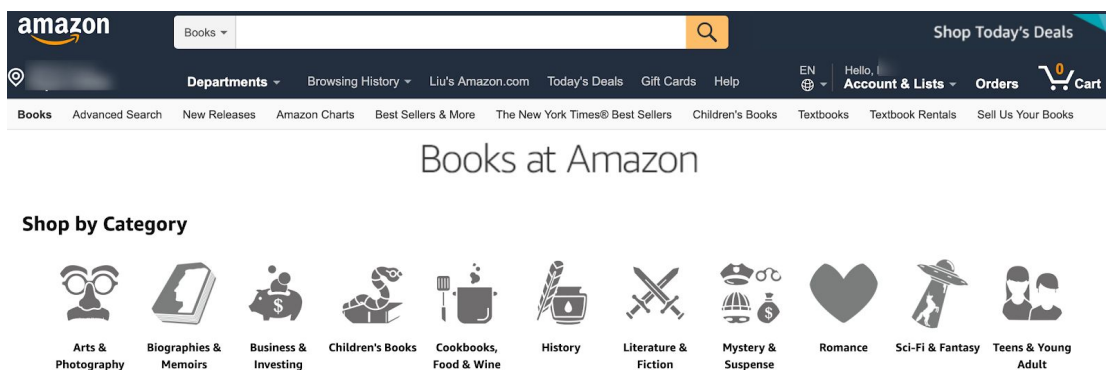


Fig.11 amazon-menu1

These lead to the purpose of the menu prototype like this, use large images and icons to bring more universal and intuition for the interface.

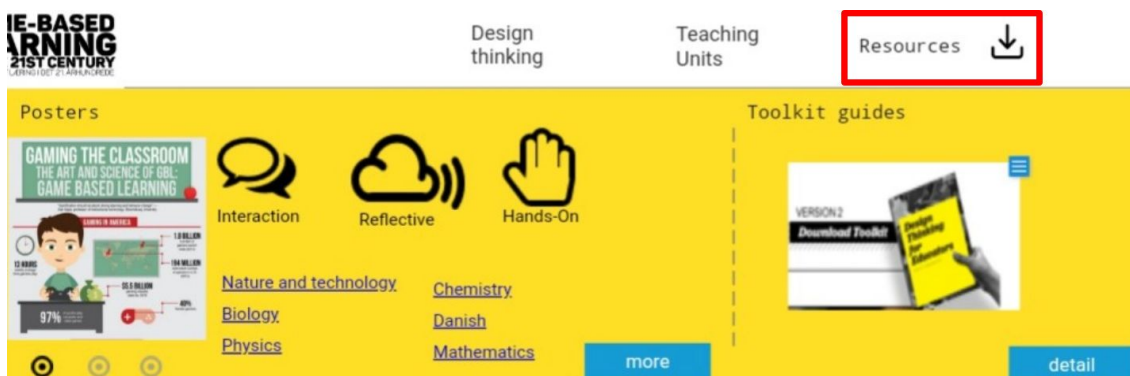


Fig.12 prototype-menu3

## 6.2 website interaction(DS7:interactive way to show resources, DS4:share and comment)

with the purpose of guiding users go through this domain knowledge of Design Thinking based on their needs, an example of what the effect could be improved if the mouse moveover on the five phase of the design thinking shows as image below: a series of supportive activities

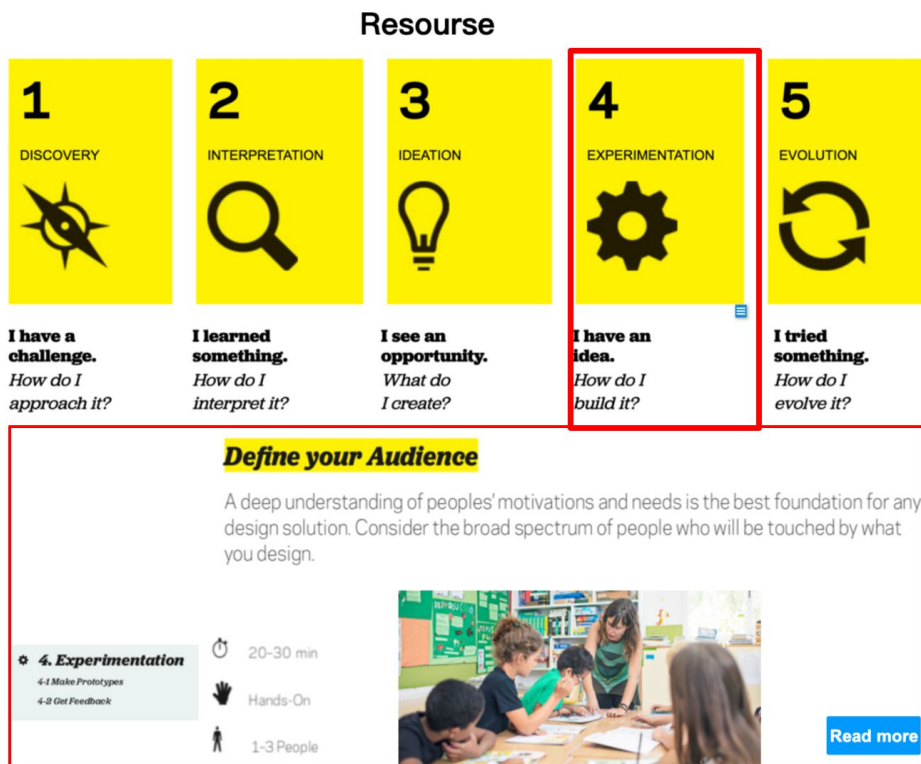


Fig.13 prototype-Recourse

### 6.2.1 video content:

There are high ratio of video content in the designthinkingforeducators.com website (6 in Homepage,3 in DESIGN THINKING page,4 in ABOUT THE TOOLKIT page ), if this type if content is considered as way to introduce a new method to the teachers, Interactive content would works better than regular content because it's more engaging.

"it's more easy to see where, where the teacher can do different things. So maybe it should be supplemented with kind of a what's the top priority for the teacher In this film? "(interviewee 3)

Therefore, interactive video bridges the gap between normal video and artificial intelligence to create a unique user experience, in this case, we create interactive quiz with user-friendly application EDPUZZLE , to create more easier way to engage users with videos by adding questions at any time during the video; tracking users' progress and collects feedbacks.

Keywords:

whole site

Search



## Emily Pilloton: Teaching design for change

Designer Emily Pilloton moved to rural Bertie County, in North Carolina, to engage in a bold experiment of design-led community transformation. She's teaching a design-build class called Studio H that engages high schoolers' minds and bodies while bringing smart design and new opportunities to the poorest county in the state.

Video

Slides

Recommend

OPEN ENDED QUESTION - Guest mode (progress won't be saved)

what do you think about" the probably most important point no2: Design with, not for "among these six design directives could be related to Gmae-based learning?

Rewatch

Skip

Submit

Emily Pilloton: Teaching design for change

#design\_as\_education

#redesigning\_education

#design\_for\_education



Fig.14 prototype-the interactive video resource

### 6.2.2 PDF content

Not only the video material could add more interactive function through the 3rd party plugin service, the PDF file could also consider the similar way to create more engagement, included add to list, share, recommend from other users or system.

## Design Thinking Toolkit

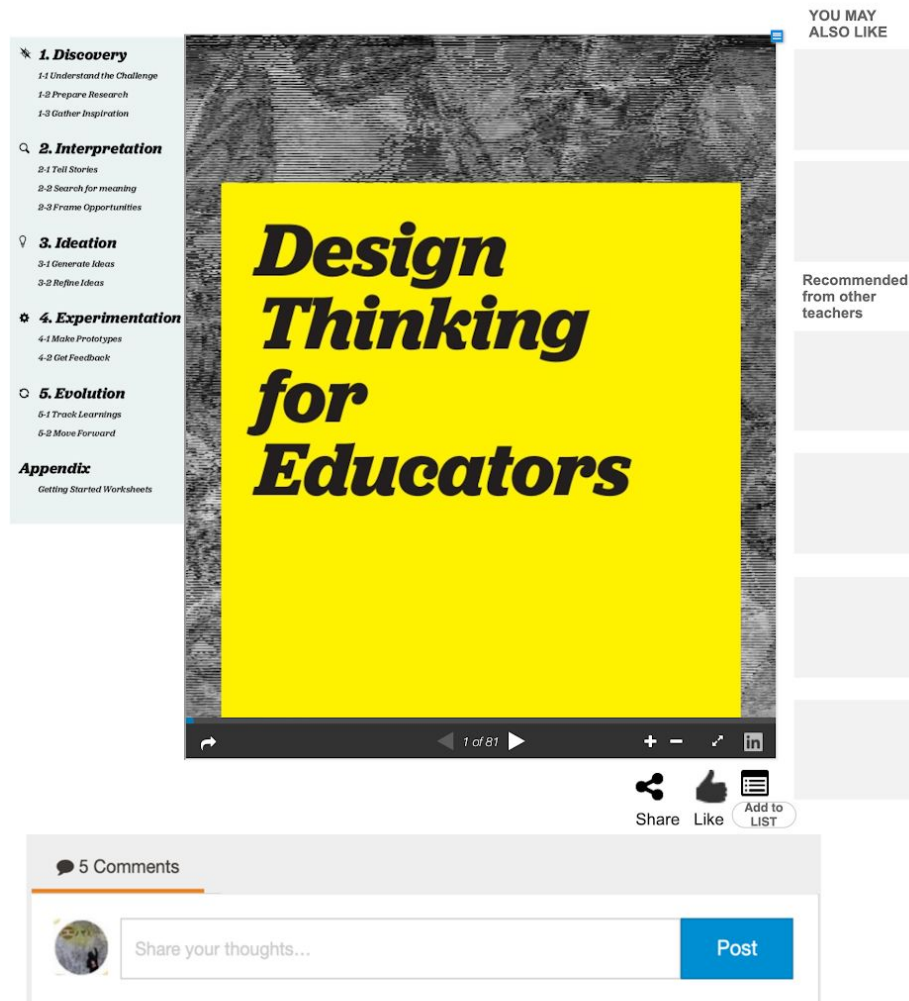


Fig.15 prototype-the PD Fresource

### 6.3 how to developing teaching Units: e-commerce personalised concept

- Quick info card

According to one of the expert's interview data of the service exploration part, we discussed topic about how to turn the handbook into a digital format with interactive function if she as a teacher trying to prepare for her curriculum, what she needs with each methods is not only show with icons, but purpose, outcomes and tips, also she need to know like what material or knowledge need to be prepared before.

*"for instance, I was running a course of in that course, it was really important that students had some data, some statements from users. And we didn't have time for the students to go out and make these data. So I had to bring this data I wanted. So as a preparation, I need to have certain materials because it's not there in the classroom. "(interviewee 1)*



This prototype page also combined with the e-commerce experience, which occurs in the scenario that teachers pick up different methods and resources they are interested, with this list, there is personalised service like adding notes and a pop-out quick info card to help with them to be sure and awareness what they are choosing to learn.(meet with DS7:interactive way to show resources, DS1:Relevant content ,DS2:additional info)

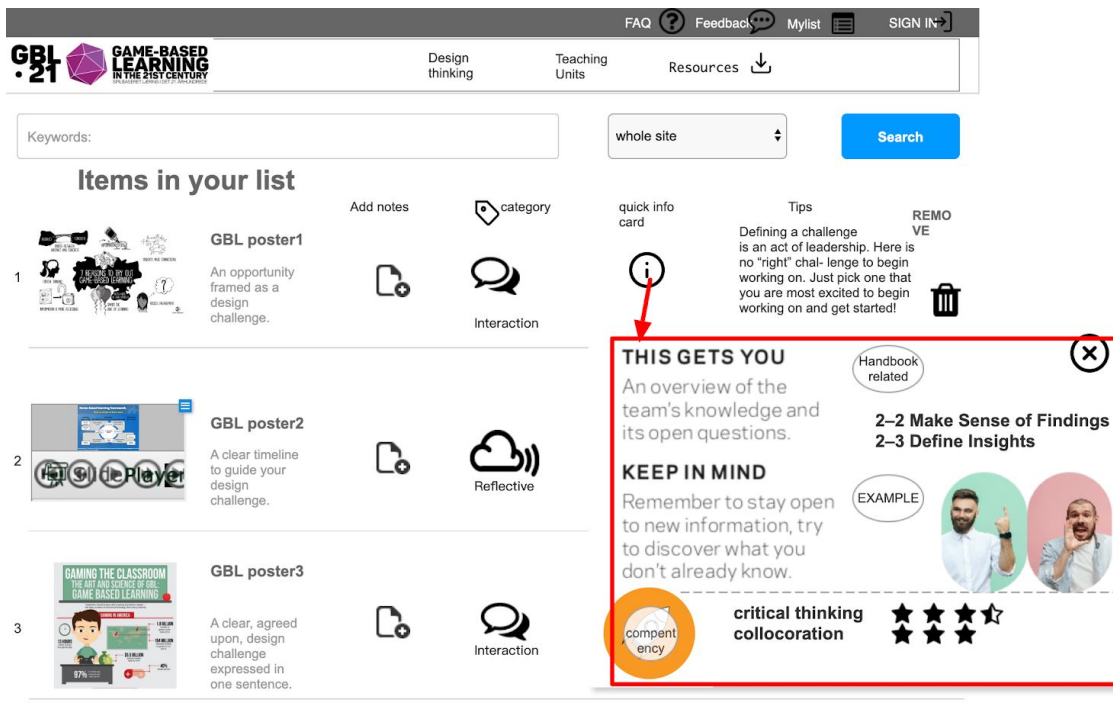


Fig.16 prototype-My list

#### 6.4 Data sorting and personalised

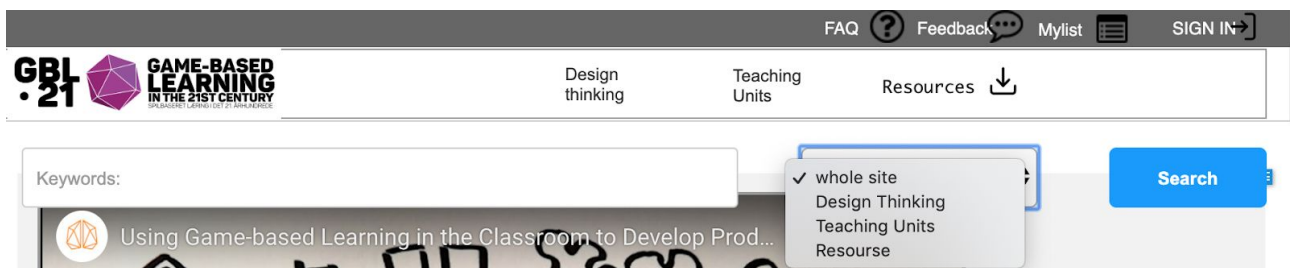


Fig.17 prototype-search bar

#### 6.5 Testimony (DS6:messages with positive influence)

Researchers have suggested that while usability is still important for effective Web site design, it is no longer the key differentiator.(Chu, Deng, & Chuang, 2014 ) Using images and testimonials from authority figures in the industry is also a great way of leveraging trust. (Lisa Ross, 2018) This is an command skill of show other users' positive experience, to convince the potential users to get more confident for their upcoming challenge, in this case, to join the GBL 21 project.

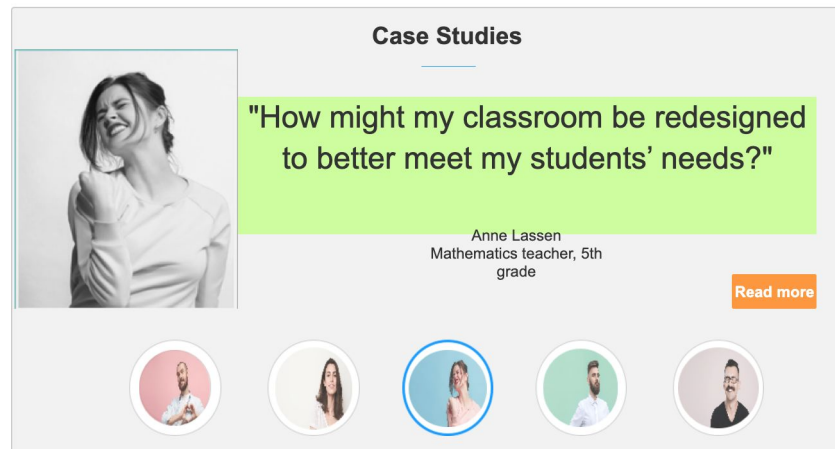


Fig.18 prototype-testimony on home page

## 7. Discussion and Conclusion

### 7.1 Overall findings and limitations

The previous version of writing and prototype is planned to focused on how to implement the gamification concept and mechanism to improve the web site, however, This made a fundamental mistake is to violate the spirit of UCD. This mistake also has the opportunity to get advice and improvement in the discussion with the supervisor, re-examine the interview data and research background, and decide to return to the core value of the website as the communication medium. Consider literature research and theoretical assumptions on psychological , behavioral change, and persuasive design.

one of the limitations is that data in this project is not enough(only have 3 interviewees, lack of 2 teachers without knowledge background of Design Thinking as the proposal in the middle of the semester), Another one is due to the limit of resources , I did not have the chance to conduct the full using usability testing from all of interviewees.

### 7.2 Conclusion

The conclusion aims to answer our research question. In combination with our project goal of improving user motivation and willingness, what needs to be done is to use persuasive design and personalised experience to convince users by their own engagement. Researchers have pointed out that growing number of information technology systems and services are being developed to change users' attitudes or behavior or both (Oinas-Kukkonen & Harjumaa, 2009) , that is to say, in order to optimize and enhance the interaction with the website information of Design Thinking for Educators which is provided as a reference material in our project , the content of “Design Thinking for Educators” in the handbook by IDEO as a main resource, should be transformed into another interactive way with the persuasive techniques as my assumption. This also answer my first research question about how to design a website with certain material in a more interactive way. Furthermore, to response the 2nd research question, with the support from literature and theories, to redesign the website using personalised strategy to stimulate the educators’ engagement based on user’s daily experience is indeed one of the principle in The Fogg Behavior Model(FBM), which is the factor of ability, the service exploration questions we had during the interviews actually brought



great insights for the prototype we proposed, and that echoed Fogg's suggestion of familiarity and simplicity in persuasive design theory, by extracting the neglected innovative service of users' daily experience with ecommerce service, the project could have achieved the goal of the website hierarchy of needs (Eduardo Esparza, 2016)by enhance the level of stickiness and how to create personalised function.

### 7.3 Future Research

For developing a web design by this kind of research project, although there are some issues of the research limit mentioned in section 7.1 for this paper, it is important to address how future research could be beneficial for the website. Here lists three aspects that could be researched in the future: user testing, layout and evidence.

#### 1.plan for further testing

Based on the Double Diamond of design framework, Continuous measurement and improvement is very important, that is to say, this model is not linear in any way. So we must move back and forth between these stages to fully understand what the problem is and how they solve the problem or improve the existing solution.(Rebeca Costa, 2018)

#### 2.face to face usability test

In response to the second research limitation, in fact, I have produced an online questionnaire for the website prototype, but because of the complexity and the need to assist in the explanation of the guidance can not be met, so did not get enough ease of use satisfaction test samples, if there is Opportunities should consider face-to-face ways to improve.

#### 3. combined with behavior changing process: the curriculum design system

one of the insight we got from our interviewee and supervisor is that it's better to skip the idea of gamification mechanism or design a scenario of the service journey related to the curriculum design process in their real word, because of the complexity that it's not the main purpose of the website, however, this is not been proved by any participants from the GBL 21 project(I don't have the chance to reach the teachers who really join the GBL 21 project), if you consider the theoretical part of persuasive design and FBM, it might be extra efforts for the teachers to have their curriculum design practices in the website as I've been told, but also could be a chance to think about what is teachers' challenge when they are actually performing their curriculum design activities, then to help them with our website service.

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card sorting

[http://maadmob.com.au/resources/cardsort\\_analysis.pdf](http://maadmob.com.au/resources/cardsort_analysis.pdf)

card sorting result

<https://docs.google.com/spreadsheets/d/19sUp4DphhMAHO5QoGmOr9-4IX3QeAklyWu0OUC7ZTI/edit#gid=279023679>

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Mega Menus Work Well for Site Navigation

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## 9. Appendices

### 9.1 Documentation of interview process

<https://photos.app.goo.gl/eCjXuE7gntwsPzfV8>

### 9.2 Transcription of interview audio

the Background experience and story

<https://docs.google.com/spreadsheets/d/1-b68D1AyNxk4H8Frrkms47V9bErj2XlcUAYXBy8eavU/edit#gid=1833240422>

| Interview 1:Stine                                                                                                                                              |                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Questions                                                                                                                                                      | Transcription                                                                                                                                                                                                                                                            |
| if we're trying to digitalised the handbook of DesignThinking, not just put the PDF on the website, any ideas for the interaction or ways to display the info? | "what do I need with each method , like what material or knowledge need to be prepared before"                                                                                                                                                                           |
|                                                                                                                                                                | "if I was to choose a method , it wouldn't mean a lot for me if it's was difficult, It means a lot to me, the time is certainly important."                                                                                                                              |
|                                                                                                                                                                | "I would also be interested in what kind of knowledge required"                                                                                                                                                                                                          |
|                                                                                                                                                                | "This is like, a pedagogical knowledge when you when you do some kind of activities with students and kind of methods. Like I know, when I do certain methods, most students think this part is difficult to be aware to help them, this kind of pedagogical knowledge." |

|  |                                                                                                                                                                                                                                                                                                                                                                 |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>"for instance, I was running a course of in that course, it was really important that students had some data, some statements from users. And we didn't have time for the students to go out and make these data. So I had to bring this data I wanted. So as a preparation, I need to have certain materials because it's not there in the classroom. "</p> |
|  | <p>" like certain materials not there in the classroom or I need to make sure that the computer have loaded. ""So there's like preparation before? And then what to keep in mind when I'm conducting it. And then also, I think what I'm missing is like, what about afterwards? Yeah."</p>                                                                     |
|  | <p>"these icons did not show the purpose, that show like, this is kind of what kind of activity is how much time does it take."</p>                                                                                                                                                                                                                             |
|  | <p>"this is the purpose. This is the outcome. This is really important to me, when I'm choosing the method because it's like, what is it? I'm trying to learn something about it?"</p>                                                                                                                                                                          |
|  | <p>" it's important to know what materials I should bring to the situation. I need to remember to have all the elements for building something"</p>                                                                                                                                                                                                             |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>" if you have like different filtering of the methods, you should be able to say, Okay, so what do I want to use it? Why I need to use it for interpretations? And if I somehow kind of sorted, then I see all the methods for interpretation, or, and then perhaps I needed something like really briefly, from 02 minutes to half, an hour, then I only see those, I don't like something really hands off, because you're thinking too much. And I see those. so there's like a different sortings. Yes, it would be nice."</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Interview 2: Joanne                                                                             |                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Questions                                                                                       | Transcription                                                                                                                                                                                                                                    |
| How to categorize the methods in a user's friendly way?                                         | " Yeah. If you if you're a experienced teacher then I will say Okay, first it could be the activities is the single subject or multiple things several subjects put together. So already categorize a single subject or a multiple sub subject." |
|                                                                                                 | "when it's different subject work together like the math and the Danish and the English and biology will put together and then we have activities."                                                                                              |
| compared to your online shopping experience, what might be helpful for you to reach your needs? | "it shows what is a popular item in this moment. So that's why I said Easter because so we have the season, about time. So we have some package people to feel supportive, because they give it the supportive information"                      |

|                                                                                       |                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                       | "for example, I search for 3rd grade for English teaching and 4th for art, and then then they will automatically have something, if we can use this one as an idea for brainstorming , because this is what people used to go through"                                                      |
|                                                                                       | "you can see what they usually need and then they will make a connection like subject based view, what you have viewed. The commercial site divides market because they use psychology. So that's why I think this is an easier way for a retired teacher Because this is the common sense" |
| How to digitize the hand book, any ideas compared to your online shopping experience? | " for example then I will design in the subject or age , for example, first to third grade, and the third to the sixth grade. categorize the users need to meet user friendly"                                                                                                              |
|                                                                                       | because it's a tool but if this is a tool so it's not a teaching book.<br>People don't want to learn a new skill by using this,                                                                                                                                                             |
|                                                                                       | "use color psychology to invite a teacher to use it.user friendly based with friendly color. Yellow is very tiring to stare more than the 12 seconds"                                                                                                                                       |
|                                                                                       | "Use the symbol. The thing that not so small . Because this is for all people , you have to be this. Yeah. So you can say okay, three times the size. This is too small."                                                                                                                   |

| Interview 3: Erik                                                                                                |                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Questions                                                                                                        | Transcription                                                                                                                                                                                                                                                                                                                                          |
| What might be helpful for get the teachers' attention in the front page?                                         | "we're doing a lot of things and we have all these exercises that we're doing with the main underlying thing is need to open up to some ideas. I think that could be maybe helpful."                                                                                                                                                                   |
|                                                                                                                  | "it's more easy to see where, where the teacher can do different things. So maybe it should be supplemented with kind of a what's the top priority for the teacher In this film? "                                                                                                                                                                     |
|                                                                                                                  | " Some keep in mind that keep in mind, okay. Somebody, somebody that should be happy to follow? Yeah. Because it's very good idea with just a simple tip"                                                                                                                                                                                              |
|                                                                                                                  | "maybe this could be kind of as a think of a portal, where the teacher can go in and the students can also go in and do something. So maybe this could also be useful for students to pinpoint what what have we done? Where are we in this phase?"                                                                                                    |
| I get the new idea from you, about students could be user on this, in your opinion, what's the scenario of this? | "the way you can create that kind of interaction was to have maybe the teacher is the one who was giving the students the assignment, right? These five choose between one, pick them up, we have these choose between one, but the students upload a picture or something to document between each phase place where we now what are your thoughts? " |
|                                                                                                                  | "I'm kind of against, I'm not against what I'm, I'm thinking that when you use GBL , it should be the challenge. It should be for fun.<br>I think that rewards can be both intrinsic and extrinsic in some way,"                                                                                                                                       |



|                                                                               |                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | <p>"if you do something very well, and you get a positive critique on that. And you understand what you've done well. So you get happy, because the teacher is giving you a good critique. If you get a point, or a badge it for me, it makes the whole thing muddy."</p>        |
| Any thoughts About the idea of mechanism of Gamification used in the website? | <p>"I think you have to be careful with it. Okay. Because the, you know, teachers profession, they should be interested in this. It should be because it, it fulfills some of teacher concern."</p>                                                                              |
|                                                                               | <p>"understanding what teachers actually want to see, maybe a better way and finding out how they can achieve that through this mighty little bit, then gamified"</p>                                                                                                            |
|                                                                               | <p>"Otherwise, you should just say, Okay, what is the challenge for this for the teachers? Okay, the challenge is this. Yeah. How can they can achieve it? what's the challenge for the teachers and then frame that as the kind of game that we're working towards? Right."</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>"you can make game where there was no where the teachers actually play for fun, and</p> <p>For the wrong kind of amusement, you could say, Okay, we have this is challenges. How do we address this? And then every time you have into a phase, or that you could have a little game guy, you know, we always have the friendly helper comes out and said, we've worked with this. Did you</p> <p>see how these exercises help? The the students under understand your challenge, right? And you're going to have multiple choices? Which they could be the answer. And then they could get like, the points for how they answered, you know, maybe you have to work on this to maybe it didn't work for you this time. Or maybe it did great.</p> <p>So the teachers played for fun, and they understand, okay, I can choose between these three methods, if I choose, because once you get points, I'm just going to choose the best. Like, but if I choose to actually turn the play with this little character, I'm going to choose what honest for me, but but you know, they decide whether they if they're playing good points, or whether they're trying to, to be honest. Because then it's not dangerous. In a sense. They won't feel threatened by it."</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

data of Card sorting activities

| Card no | Group                                 | Card name                                                      | Participant |
|---------|---------------------------------------|----------------------------------------------------------------|-------------|
| 15      | Why? Should your students design      | Why was it made?                                               | Stine       |
| 4       | Why? Should your students design      | Watch_Why design thinking?                                     | Stine       |
| 14      | Who and What? Is gonna help me?       | What is in the toolkit?                                        | Stine       |
| 20      | Who and What? Is gonna help me?       | Who made it?                                                   | Stine       |
| 6       | How? Can I facilitate design thinking | Teachers using Design Thinking                                 | Stine       |
| 11      | How? Can I facilitate design thinking | School-designed                                                | Stine       |
| 12      | How? Can I facilitate design thinking | Community-designed                                             | Stine       |
| 13      | How? Can I facilitate design thinking | District-designed                                              | Stine       |
| 16      | How? Can I facilitate design thinking | Watch_context_video clip                                       | Stine       |
| 18      | How? Can I facilitate design thinking | Watch_profession_video clips                                   | Stine       |
| 19      | How? Can I facilitate design thinking | Watch_practice_video clips                                     | Stine       |
| 2       | What? My student as design thinkers   | Design Thinking for Education is...                            | Stine       |
| 7       | What? My student as design thinkers   | What is Design Thinking?It is a mindset                        | Stine       |
| 8       | What? My student as design thinkers   | Watch Maggie_video clips                                       | Stine       |
| 9       | What? My student as design thinkers   | Watch Michael& Watch Patrick_video clips                       | Stine       |
| 10      | What? My student as design thinkers   | What kind of challenges can be addressed using Design Thinking | Stine       |
| 17      | What? My student as design thinkers   | Watch_mindset_video clips                                      | Stine       |

| Card no | Group             | Card name                                                      | Participant |
|---------|-------------------|----------------------------------------------------------------|-------------|
| 2       | What              | Design Thinking for Education is...                            | Erik        |
| 4       | What              | Watch_Why design thinking?                                     | Erik        |
| 7       | What              | What is Design Thinking?It is a mindset                        | Erik        |
| 8       | What              | Watch Maggie_video clips                                       | Erik        |
| 9       | What              | Watch Michael& Watch Patrick_video clips                       | Erik        |
| 10      | Why               | What kind of challenges can be addressed using Design Thinking | Erik        |
| 15      | Why               | Why was it made?                                               | Erik        |
| 16      | Why               | Watch_context_video clip                                       | Erik        |
| 17      | Why               | Watch_mindset_video clips                                      | Erik        |
| 18      | Why               | Watch_profession_video clips                                   | Erik        |
| 19      | Why               | Watch_practice_video clips                                     | Erik        |
| 6       | How               | Teachers using Design Thinking                                 | Erik        |
| 11      | How               | School-designed                                                | Erik        |
| 12      | How               | Community-designed                                             | Erik        |
| 13      | How               | District-designed                                              | Erik        |
| 3       | About the toolkit | New edition(v2)                                                | Erik        |
| 5       | About the toolkit | Get toolkit Now!                                               | Erik        |
| 1       | About the toolkit | Download toolkit                                               | Erik        |

| Card no | Group                   | Card name                                                      | Participant |
|---------|-------------------------|----------------------------------------------------------------|-------------|
| 2       | Front page Introduction | Design Thinking for Education is...                            | Joanne      |
| 20      | Front page Introduction | Who made it?                                                   | Joanne      |
| 7       | Mindset                 | What is Design Thinking?It is a mindset                        | Joanne      |
| 8       | Mindset                 | Watch Maggie_video clips                                       | Joanne      |
| 9       | Mindset                 | Watch Michael& Watch Patrick_video clips                       | Joanne      |
| 15      | Motivation              | Why was it made?                                               | Joanne      |
| 16      | Motivation              | Watch_context_video clip                                       | Joanne      |
| 17      | Motivation              | Watch_mindset_video clips                                      | Joanne      |
| 18      | Motivation              | Watch_profession_video clips                                   | Joanne      |
| 19      | Motivation              | Watch_practice_video clips                                     | Joanne      |
| 6       | User feedback           | Teachers using Design Thinking                                 | Joanne      |
| 10      | User feedback           | What kind of challenges can be addressed using Design Thinking | Joanne      |
| 3       | User feedback           | New edition(v2)                                                | Joanne      |
| 14      | Manual corporate guides | What is in the toolkit?                                        | Joanne      |
| 1       | Manual corporate guides | Download toolkit                                               | Joanne      |
| 5       | Manual corporate guides | Get toolkit Now!                                               | Joanne      |
| 11      | Share a story           | School-designed                                                | Joanne      |
| 12      | Share a story           | Community-designed                                             | Joanne      |
| 13      | Share a story           | District-designed                                              | Joanne      |

### 9.3 mock-ups of low-fidelity

<https://zd3s7q.axshare.com/home.html>

Screenshot:home

GBL

**GAME-BASED  
LEARNING**

[FAQ?](#) [Feedback](#) [Mylist](#) [SIGN IN](#)

---

Keywords:

whole site

[Search](#)

Using Game-based Learning in the Classroom to Develop Productive Struggle

How can productive struggle foster the learning process in students' classroom experiences?

● ● ● ●

### Case Studies

"How might my classroom be redesigned to better meet my students' needs?"

Anne Lassen  
Mathematics teacher, 5th grade

[Read more](#)

Resource

## 1

DISCOVERY

I have a challenge.  
*How do I approach it?*

## 2

INTERPRETATION

I learned something.  
*How do I interpret it?*

## 3

IDEATION

I see an opportunity.  
*What do I create?*

## 4

EXPERIMENTATION

I have an idea.  
*How do I build it?*

## 5

EVOLUTION

I tried something.  
*How do I evolve it?*

**1. Discovery**  
 1-1 Understand the Challenge  
 1-2 Prepare Research  
 1-3 Gather Inspiration

**Review the Challenge**

A clearly defined challenge will guide your questions and help you stay on track throughout the process. Spend time with your team to create a common understanding of what you are working toward.

10 min  
  
Reflective  
  
2-3 People

[Read more](#)

**PROJEKTBJDR AGERE**

**PROJECT PARTNERS**

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TOP

## Screenshot: Why? motivation

GBL

GAME-BASED LEARNING

THE EDUCATOR

Design thinking

Teaching Units

Resources

FAQ

Feedback

My list

SIGN IN

Keywords:

whole site

Search

### Motivation of the project


What value can design thinking offer to educators? What makes the design process relevant in an education context?

To find out, we spent time in classrooms, teacher's lounges, and hallways of private, public, and charter schools. We met teachers and administrators and spoke with professionals that work with educators. Our goal was to learn about the reality in which educators live, to inspire and inform the design of this toolkit.

Seven Reasons to Pilot Game-Based Learning with Your Students

Case Studies

稍後觀看 分享



SEVEN REASONS TO PILOT GAME-BASED LEARNING

add a comment

Like

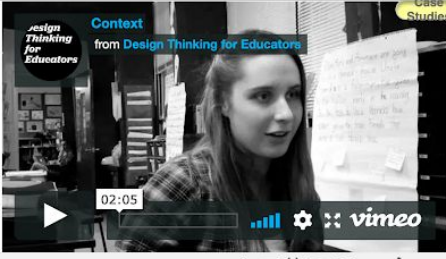
Add to LIST

sign in to add#

Context from Design Thinking for Educators

Case Studies

02:05



Context of Design thinking

add a comment

Like


Add to LIST

sign in to add#

Profession from Design Thinking for Educators

Case Studies

01:54



Profession of Design thinking

add a comment

Like


Add to LIST

sign in to add#

Practice from Design Thinking for Educators

Case Studies

02:08



Practice of Design thinking

add a comment

Like

Add to LIST

sign in to add#



# Problem Solving Curriculum

■ Asking open-ended questions



## Case Studies

What kind of challenges can be addressed using Design Thinking?

Educators across the nation have been using Design Thinking to solve challenges in their work. Projects range in scope and scale including design solutions- from curriculum, to space, to processes and to systems—addressing problems in the classroom and across entire districts.



Michael Schurr  
N.Y.

Michael Schurr, a 5th grade teacher in New York, realized that he never asked his students what would make them comfortable in the classroom. He decided to talk directly with his students to figure out the best design for their environment.

ING



Ormondale Elementary School  
C.A.

The faculty at Ormondale Elementary School in California wondered if they were preparing their students well for the future. They decided it was time to collaboratively design an approach to teaching and learning that they felt was updated and relevant for the 21st century.

ING



Howard County  
Public School System  
Maryland

With a movement toward student-centered and personalized instruction, the Howard County Public School System in Maryland is using Design Thinking to tackle next generation curriculum redesign incorporating 21st Century skills.

ING

LOAD  
MORE



## Screenshot: What?

FAQFeedbackMylistSIGN in

Design thinkingTeaching UnitsResources

Keywords:  whole site

### What is Design Thinking?

It is a mindset  
Design Thinking is the confidence that everyone can be part of creating a more desirable future, and a process to take action when faced with a difficult challenge. That kind of optimism is well needed in education.

It's Human-Centered. Design Thinking begins from deep empathy and understanding of needs and motivations of people—in this case, the students, teachers, parents, staff and administrators who make up your everyday world.  
It's Collaborative. Several great minds are always stronger when solving a challenge than just one. Design Thinking benefits greatly from the views of multiple perspectives, and others' creativity bolstering your own.  
It's Optimistic. Design Thinking is the fundamental belief that we all can create change—no matter how big a problem,

design Thinking for Educators

Maggie

from Design Thinking for Educators

00:55

vimeo

add a comment

Case Studies

Maggie's Story

#design\_as\_education  
#redesigning\_education  
#design\_for\_education

Add to LISTsign in to add#

design Thinking for Educators

Michael

from Design Thinking for Educators

00:53

vimeo

add a comment

Case Studies

Michael's Story

#design\_as\_education  
#redesigning\_education  
#design\_for\_education

Add to LISTsign in to add#

design Thinking for Educators

Patrick

from Design Thinking for Educators

00:43

vimeo

add a comment

Case Studies

Patrick's Story

#design\_as\_education  
#redesigning\_education  
#design\_for\_education

Add to LISTsign in to add#



## Screenshot: Teaching units

GBL  
GAME-BASED  
LEARNING  
LITERACY

Design thinkingTeaching UnitsResources

FAQFeedbackMylistSIGN in

Keywords:  whole site


Teaching Units

View by 

by GRADES


by CATEGORIES

by SUBJECT




Pharrell Williams  
Support Text

MORE DETAILS




Pharrell Williams  
Support Text

MORE DETAILS




Pharrell Williams  
Support Text

MORE DETAILS




Emily Pilloton:  
Teaching design for change

MORE DETAILS




Pharrell Williams  
Support Text

MORE DETAILS




Pharrell Williams  
Support Text

MORE DETAILS



Pharrell Williams  
Support Text

MORE DETAILS



Pharrell Williams  
Support Text

MORE DETAILS

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# District-designed

How might we redesign our approach to curriculum development and delivery to center around the needs and desires of our teachers and students?

