



この作品はクリエイティブ・コモンズ・表示 - 継承 4.0 国際・ライセンスで提供されています。

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

EDGE Program funded by MEXT
Keio University
Global Innovator Acceleration Program
2015
Day 5 Prototyping and Testing

Graduate School of System Design and Management
EDGE Program Team

Keio EDGE Program 2015 Intensive Workshop

September

October

20th

21st

22nd

23rd

27th

4th

5th

Kickoff
&
Innovative
Thinking

Design
Thinking

Systems
Thinking

(Global
Innovator
Forum)

**Prototyping
and Testing**

Business
Synthesis

Design
Process
Exercise

to think innovative

to think human centered

to think as a system

“Innovatorship”

**do while thinking
think while doing**

to design a business

to tackle innovative
design challenge

**Do while thinking and
think while doing.**

**Build to think and
test to learn.**

~~Think and do.~~

~~Build to build and
test to check.~~

Prototyping and Testing

- As an important activity **to find the true value that you want to focus** as early as possible in the design process.
- Prototyping should always be followed by testing. Not just testing the prototype itself but **testing whether value can be created**.

What is “Prototype”

mockup? engineering model?

The Prototype mode is the iterative generation of artifacts intended to answer questions that get you closer to your final solution.

(d.school An Introduction to Design Thinking
PROCESS GUIDE)



Prototype is built to answer your questions!

Two types of questions prototype can answer: **Verification and Validation**

- **Verification**
 - You *verify* functionality of the design
 - You *verify* performance of the design
 - You *verify* against your intention
 - “Are we doing the **thing right?**” check
- **Validation**
 - You *validate* the design
 - You *validate* the concept
 - You *validate* against stakeholders and context
 - “Are we doing the **right thing?**” check

New smartphone App for kids



IDEO wrote not a single line of program to prototype their smartphone App user interface. Very cost and time effective prototype.

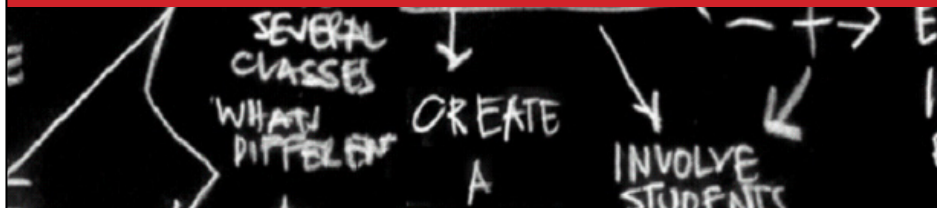
Reference: IDEO

Creatively confirmed how App would look and feel like in very early phase

Prototyping and Testing in d.school materials



An Introduction to Design Thinking PROCESS GUIDE





Prototyping

http://www.slate.com/content/dam/slate/blogs/the_eye/2013/10/23/131023_EYE_Elmo_Prototype%2032981.jpg.CROP.original-original.jpg

Prototype: “Build to think and test to learn”

WHAT is the Prototype mode

The Prototype mode is the iterative generation of artifacts intended to answer questions that get you closer to your final solution. In the early stages of a project that question may be broad – such as “do my users enjoy cooking in a competitive manner?” In these early stages, you should create low-resolution prototypes that are quick and cheap to make (think minutes and cents) but can elicit useful feedback from users and colleagues. In later stages both your prototype and question may get a little more refined. For example, you may create a later stage prototype for the cooking project that aims to find out: “do my users enjoy cooking with voice commands or visual commands”.

A prototype can be anything that a user can interact with – be it a wall of post-it notes, a gadget you put together, a role-playing activity, or even a storyboard. Ideally you bias toward something a user can experience. Walking someone through a scenario with a storyboard is good, but having them role-play through a physical environment that you have created will likely bring out more emotions and responses from that person.



Prototype: “Build to think and test to learn”

WHY prototype

To ideate and problem-solve. Build to think.

To communicate. If a picture is worth a thousand words, a prototype is worth a thousand pictures.

To start a conversation. Your interactions with users are often richer when centered around a conversation piece. A prototype is an opportunity to have another, directed conversation with a user.

To fail quickly and cheaply. Committing as few resources as possible to each idea means less time and money invested up front.

To test possibilities. Staying low-res allows you to pursue many different ideas without committing to a direction too early on.

To manage the solution-building process. Identifying a variable also encourages you to break a large problem down into smaller, testable chunks.



Prototype: “Build to think and test to learn”

WHY do we prototype

Traditionally prototyping is thought of as a way to test functionality. But prototyping is used for many reasons, including these (non-mutually-exclusive) categories:

- Empathy gaining: Prototyping is a tool to deepen your understanding of the design space and your user, even at a pre-solution phase of your project.
- Exploration: Build to think. Develop multiple solution options.
- Testing: Create prototypes (and develop the context) to test and refine solutions with users.
- Inspiration: Inspire others (teammates, clients, customers, investors) by showing your vision.

Many of the goals of prototyping are shared across all four of the above categories.

We prototype to:

Learn. If a picture is worth a thousand words, a prototype is worth a thousand pictures.

Solve disagreements. Prototyping is a powerful tool that can eliminate ambiguity, assist in ideation, and reduce miscommunication.

Start a conversation. A prototype can be a great way to have a different kind of conversation with users.

Fail quickly and cheaply. Creating quick and dirty prototypes allows you to test a number of ideas without investing a lot of time and money up front.

Manage the solution-building process. Identifying a variable to explore encourages you to break a large problem down into smaller, testable chunks.



Prototype: “Build to think and test to learn”

HOW to prototype

Start building. Even if you aren't sure what you're doing, the act of picking up some materials (post-its, tape, and found objects are a good way to start!) will be enough to get you going.

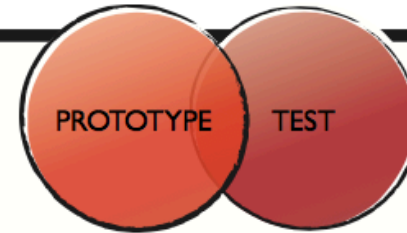
Don't spend too long on one prototype. Let go before you find yourself getting too emotionally attached to any one prototype.

ID a variable. Identify what's being tested with each prototype. A prototype should answer a particular question when tested. That said, don't be blind to the other tangential understanding you can gain as someone responds to a prototype.

Build with the user in mind. What do you hope to test with the user? What sorts of behavior do you expect? Answering these questions will help focus your prototyping and help you receive meaningful feedback in the testing phase.



Prototype: “Build to think and test to learn”

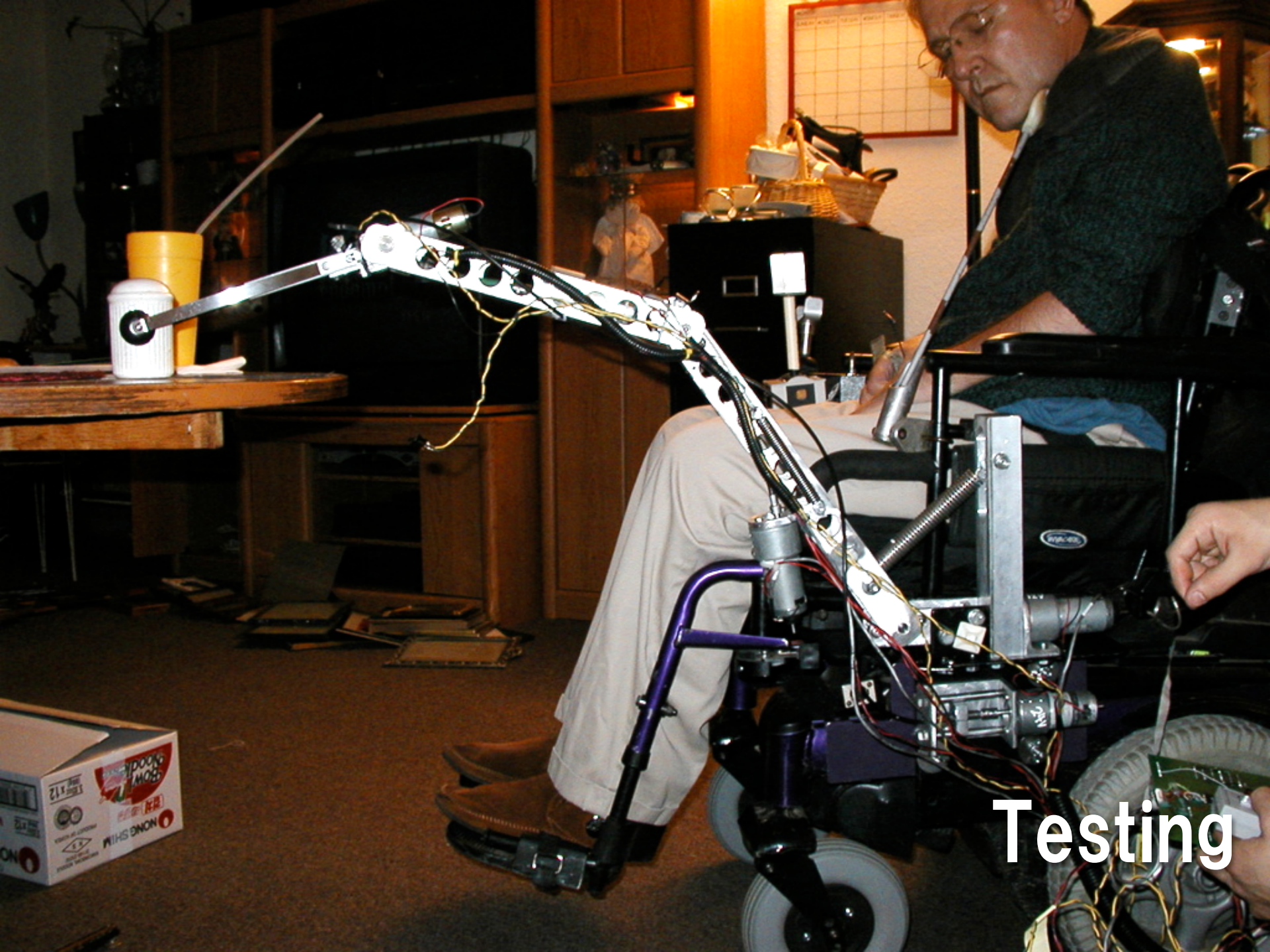


Transition: Prototype >>> Test

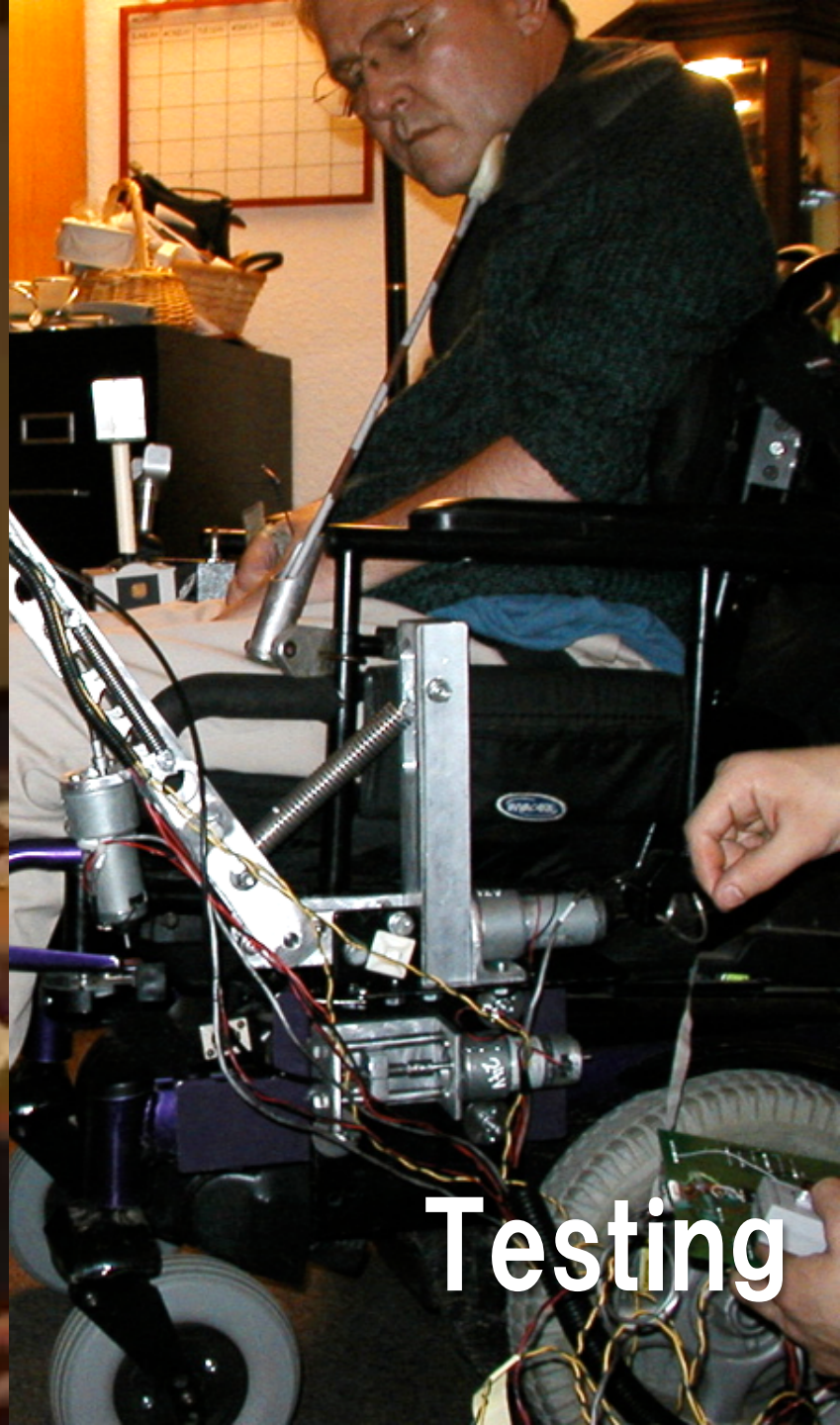
Prototype and Test are modes that you consider in tandem more than you transition between. What you are trying to test and how you are going to test that aspect are critically important to consider before you create a prototype.

Examining these two modes in conjunction brings up the layers of testing a prototype. Though prototyping and testing are sometimes entirely intertwined, it is often the case that planning and executing a successful testing scenario is a considerable additional step after creating a prototype. Don't assume you can simply put a prototype in front of a user to test it; often the most informative results will be a product of careful thinking about how to test in a way that will let users give you the most natural and honest feedback.





Testing



Testing

Testing is an opportunity to learn about your solution and your user

WHAT is the Test mode

The Test mode is when you solicit feedback, about the prototypes you have created, from your users and have another opportunity to gain empathy for the people you are designing for. Testing is another opportunity to understand your user, but unlike your initial empathy mode, you have now likely done more framing of the problem and created prototypes to test. Both these things tend to focus the interaction with users, but don't reduce your "testing" work to asking whether or not people like your solution. Instead, continue to ask "Why?", and focus on what you can learn about the person and the problem as well as your potential solutions.

Ideally you can test within a real context of the user's life. For a physical object, ask people to take it with them and use it within their normal routines. For an experience, try to create a scenario in a location that would capture the real situation. If testing a prototype in situ is not possible, frame a more realistic situation by having users take on a role or task when approaching your prototype. A rule of thumb: always prototype as if you know you're right, but test as if you know you're wrong—testing is the chance to refine your solutions and make them better.



Testing is an opportunity to learn about your solution and your user

WHY test

To refine prototypes and solutions. Testing informs the next iterations of prototypes. Sometimes this means going back to the drawing board.

To learn more about your user. Testing is another opportunity to build empathy through observation and engagement—it often yields unexpected insights.

To refine your POV. Sometimes testing reveals that not only did you not get the solution right, but also that you failed to frame the problem correctly.



Testing is an opportunity to learn about your solution and your user

HOW to test

Show don't tell. Put your prototype in the user's hands – or your user within an experience. And don't explain everything (yet). Let your tester interpret the prototype. Watch how they use (and misuse!) what you have given them, and how they handle and interact with it; then listen to what they say about it, and the questions they have.

Create Experiences. Create your prototypes and test them in a way that feels like an experience that your user is reacting to, rather than an explanation that your user is evaluating.

Ask users to compare. Bringing multiple prototypes to the field to test gives users a basis for comparison, and comparisons often reveal latent needs.



METHOD

TESTING WITH USERS



WHY test with users

Testing with users is a fundamental part of a human-centered design approach. You test with users to refine your solution and also to refine your understanding of the people for whom you are designing. When you test prototypes you should consider both their feedback on your solution and use the opportunity to gain more empathy. You are back in a learning and empathy mode when you engage users with a prototype.



**Do while thinking and
think while doing.**

**Build to think and
test to learn.**

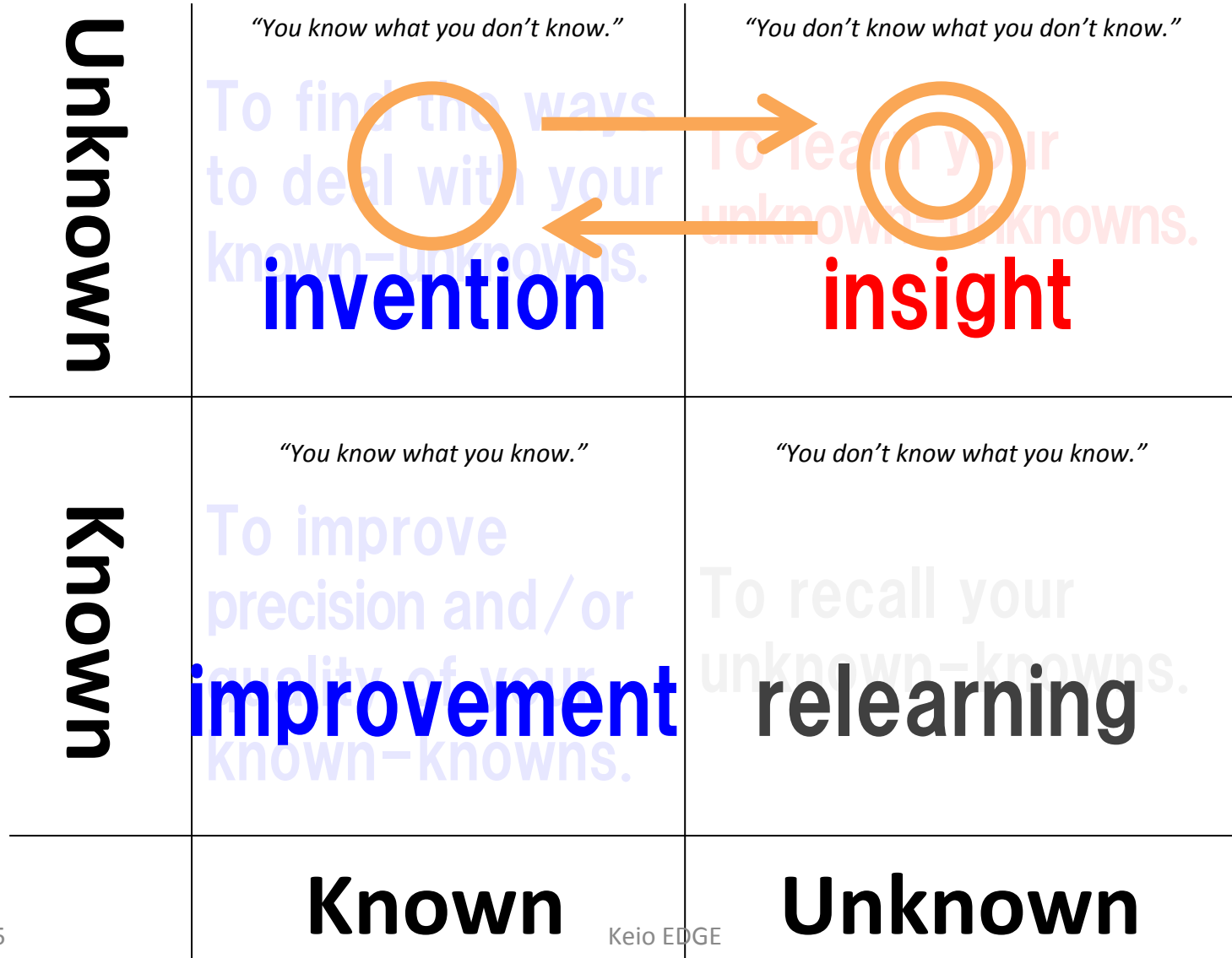
4 Types of Prototyping and Testing Purpose

Unknown	<p><i>"You know what you don't know."</i></p> <p>To find the ways to deal with your known-unknowns.</p>	<p><i>"You don't know what you don't know."</i></p> <p>To learn your unknown-unknowns.</p>
Known	<p><i>"You know what you know."</i></p> <p>To improve precision and/or quality of your known-knowns.</p>	<p><i>"You don't know what you know."</i></p> <p>To recall your unknown-knowns.</p>
	Known	Unknown

Important Mindsets for 4 Types of Prototyping and Testing

Unknown	<p><i>"You know what you don't know."</i></p> <p>To find the ways to deal with your known-unknowns.</p> <p>invention</p>	<p><i>"You don't know what you don't know."</i></p> <p>To learn your unknown-unknowns.</p> <p>insight</p>
Known	<p><i>"You know what you know."</i></p> <p>To improve precision and/or quality of your known-knowns.</p> <p>improvement</p>	<p><i>"You don't know what you know."</i></p> <p>To recall your unknown-knowns.</p> <p>relearning</p>
	Known	Unknown

Prototyping and Testing: Keio EDGE focus



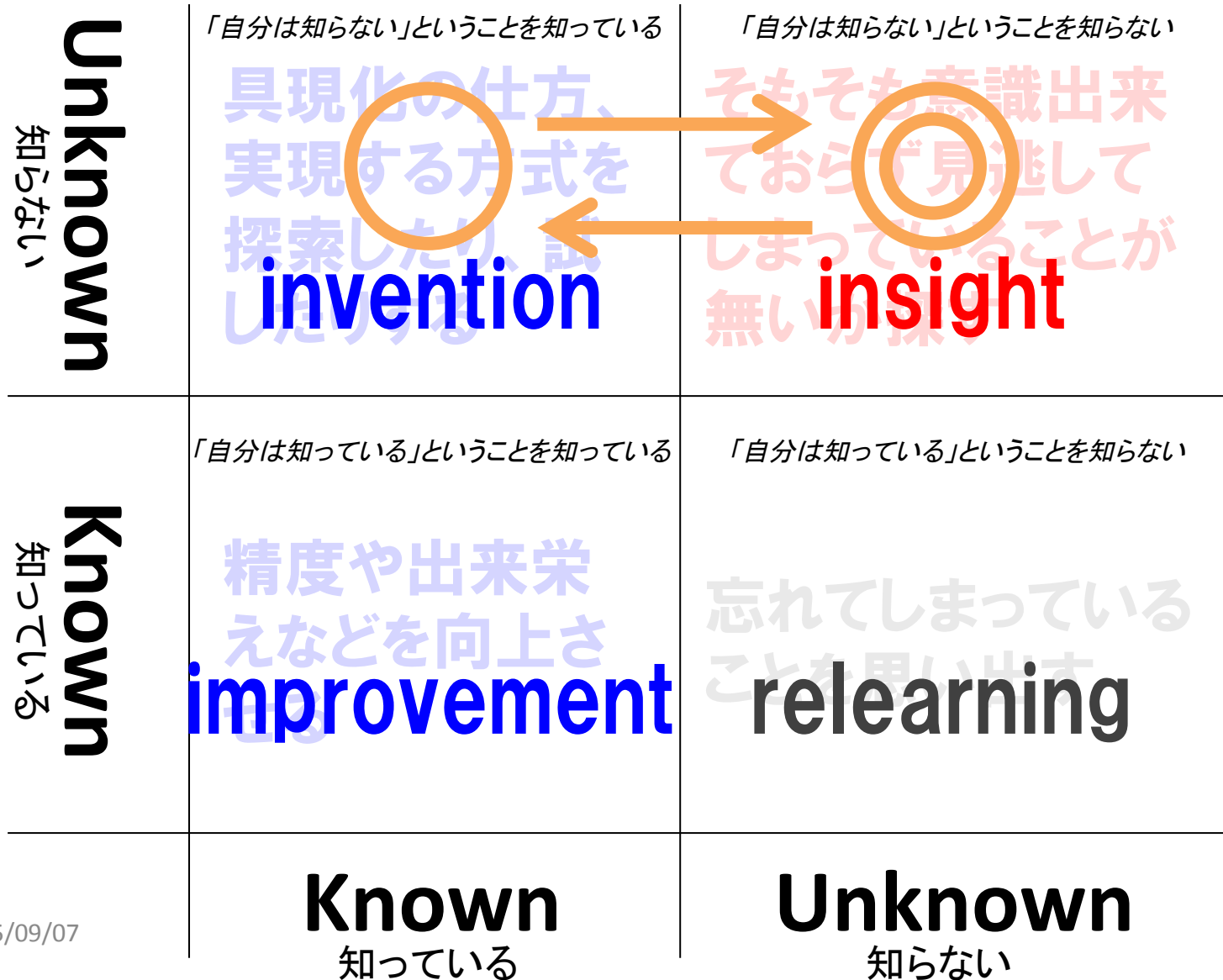
Prototyping and Testingの4タイプの目的

Unknown 知らない	<small>「自分は知らない」ということを知っている</small> 具現化の仕方、 実現する方式を 探索したり、試 したりする	<small>「自分は知らない」ということを知らない</small> そもそも意識出来 ておらず見逃して しまっていることが 無いか探す
	<small>「自分は知っている」ということを知っている</small> 精度や出来栄 えなどを向上さ せる	<small>「自分は知っている」ということを知らない</small> 忘れてしまっている ことを思い出す
	Known 知っている	Unknown 知らない

Prototyping and Testingの4タイプにおいてとくに重要なマインドセット

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Unknown</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">知らない</p>	<p>「自分は知らない」ということを知っている</p> <p>具現化の仕方、実現する方式を探索したり、試したがる</p> <p>invention</p>	<p>「自分は知らない」ということを知らない</p> <p>そもそも意識出来ておらず見逃してしまっていることが無い</p> <p>insight</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Known</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">知っている</p>	<p>「自分は知っている」ということを知っている</p> <p>精度や出来栄などを向上させる</p> <p>improvement</p>	<p>「自分は知っている」ということを知らない</p> <p>忘れてしまっていることを思い出す</p> <p>relearning</p>
	<p>Known</p> <p>知っている</p>	<p>Unknown</p> <p>知らない</p>

Keio EDGE 2015でとくに取り組んでほしいこと



Prototyping and Testing

EXERCISE INSTRUCTION

Prototyping and Testing Exercise: Team

- Give your team an awesome name!

Prototyping and Testing Exercise: Context

- You are a team to design a **value providing solution** around the desk for following person and condition.
- **He/she is trying to read an article written in foreign language.**
- **He/she sometimes wants to highlight the article with multiple markers.**
- **He/she sometimes wants to look up in Google and write notes on Evernote with the laptop sitting in front of him/her.**

Prototyping and Testing Exercise: Context

- Your providing value can be
 - pain reliever(s)
 - gain creator(s)
 - or their combination.
- You can imagine someone like *me* as your target.
 - always busy
 - not a student, a professional
 - reading foreign language article is not so much of a problem but not a piece of cake
 - also works late at night
 - good at computer and other gadgets

Prototyping and Testing Exercise:

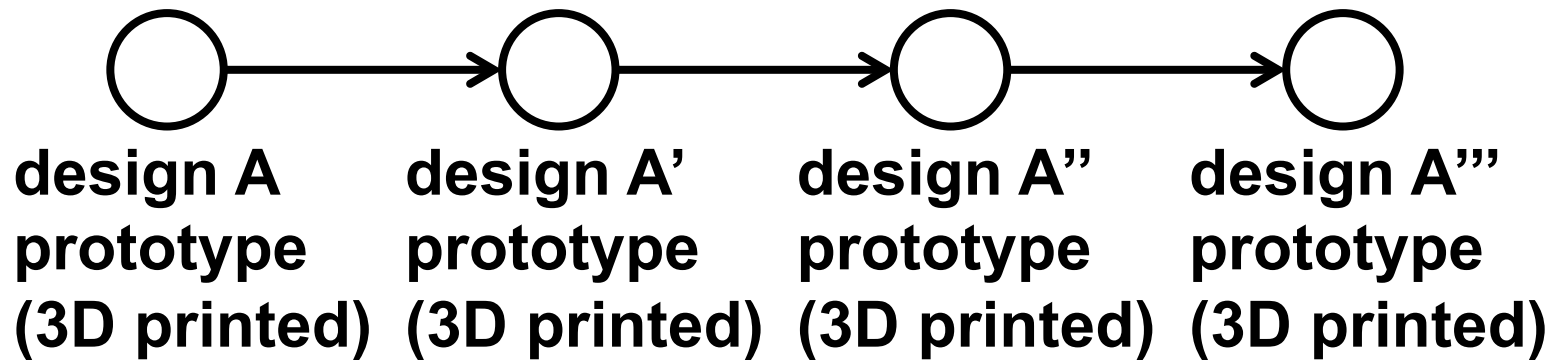
Things to do but not necessarily in this order!

- Identify value you are going to create
 - pain relief?
 - gain creation?
- Identify questions
 - “do my users ...?”
 - ...
- Identify how to test
 - with who?
 - what to bring?
 - what to record?
 - how to do?
 - ...
- Identify what to build
 - functional, non-functional?
 - experience?
 - feel?
 - ...
- Build
 - with what?
 - to what extent?
 - ...
- Test
 - ask what?
 - record
 - ...

• **ITERATION!!**

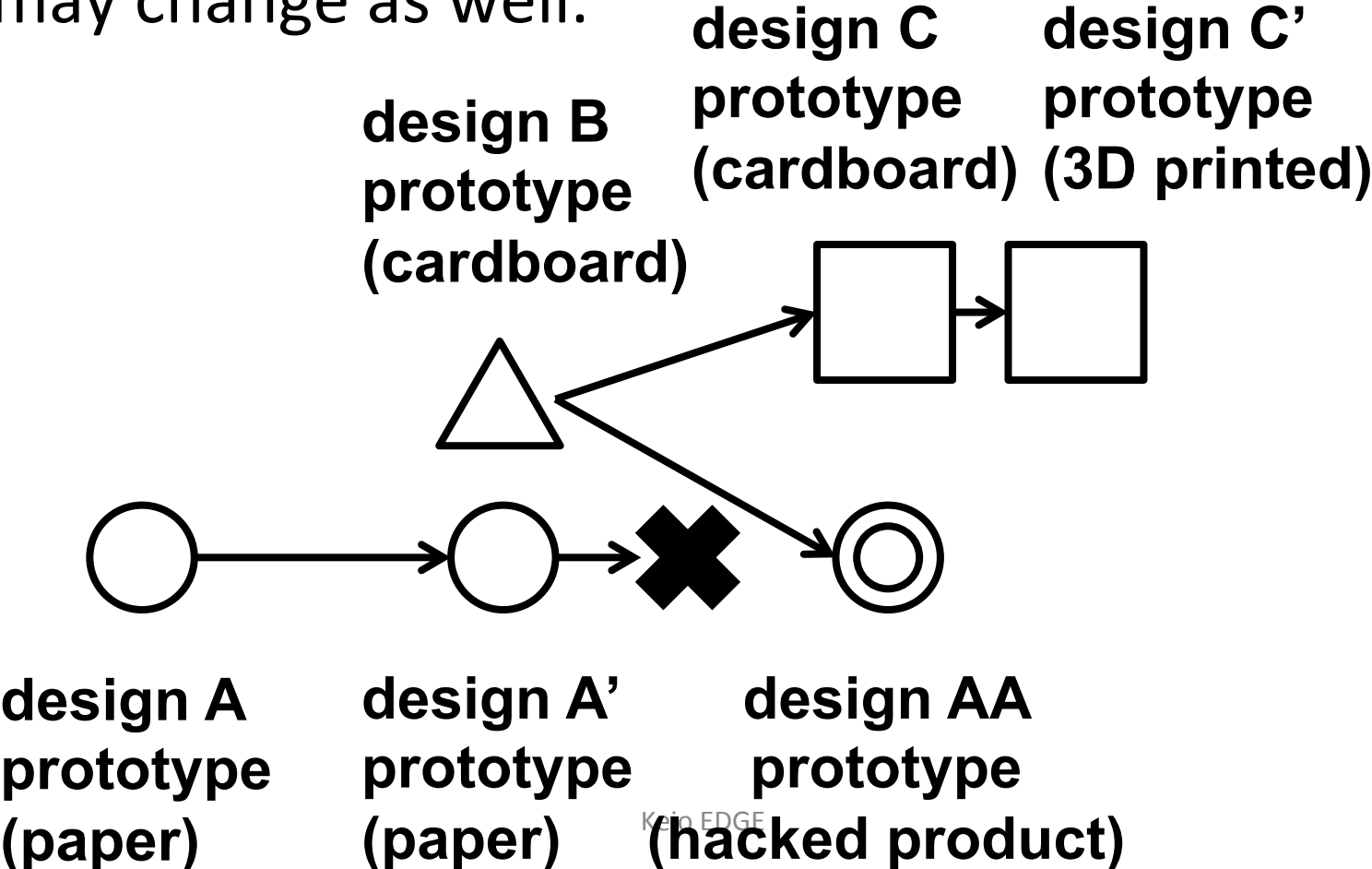
Prototyping and Testing Exercise: Iterating

- It is **NOT** about continuous improvement of your design.



Prototyping and Testing Exercise: Iterating

- You **obtain insights** from building and testing and your iteration proceeds.
- Your design changes and your creation measure may change as well.



Prototyping and Testing Exercise: Understand your team's capability of building/making stuff

- Talk with you team and find out what your team can do **NOW**.
- **DON'T** spend a lot of time learning a **new technique** (ex. 3D CAD modeling).
- Start from what you can do and when you think it is necessary, **make a decision** to invest your most precious resource, time.
- We have TAs to support your prototyping with **digital fabrication tools**.

Prototyping and Testing Exercise: Record

- Record your **prototyping process** and your **design evolution/revolution**.
- Record your **testing activity** and **results**.
- Don't forget to record your **findings** and **insights**.

- Try to **visually organize** above information as you proceed. (e.g. on a whiteboard paper with post-it notes)

- Use your smartphone for pictures and movies.
- We have some digital camera and video camera you can use.

Prototyping and Testing Exercise: Schedule

- 13:30 – 2 minutes presentation from each team on “**What was learned from prototyping and testing so far**”.
- 15:30 – 2 minutes presentation from each team on “**What was learned from prototyping and testing so far**”.
- 17:00 – 2 minutes presentation from each team about “**How your solution can provide a value to your target**”.