인공지능 특론

2020. 5. 2

윤 종 영

강의계획(안)

W1 (3/21)	인공지능의 개념
W2 (3/28)	인공지능의 역사
W3 (4/4)	인공지능의 현재
W4 (4/11)	인공지능의 미래
W5 (4/18)	인공지능 이론
W6 (4/25)	인공지능 기술
W7 (5/2)	인공지능의 한계와 효용
W8 (5/9)	중간고사

W9 (5/16)	인공지능과 기업전략
W10 (5/23)	인공지능 정책 및 법제
W11 (5/30)	인공지능과 문화컨텐츠
W12 (6/6)	인공지능 철학 및 윤리
W13 (6/13)	인공지능 시스템 디자인
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TOBY WALSH

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  - RISK #2: PAPERCLIPS EVERYWHERE
  - RISK #3: THEM OR US?
  - RISK #4: MOVING TARGET
  - RISK #5: INDIFFERENCE

- **<u>SHOULD YOU WORRY?</u>**

  - A more urgent risk is that we are already giving autonomy to stupid AI.

  - It is autonomy rather than AI that we really need to worry about.

  - We should definitely not be giving autonomy to systems with insufficient intelligence.

The New York Times

Self-Driving Tesla Was Involved in Fatal Crash, U.S. Says

A Tesla Model S, with its self-driving mode enabled. In a statement, the National Highway Traffic Safety Administration said it had sent an investigative team to examine the vehicle and the crash site in Williston, Fla. Jasper Juinen/Bloomberg

- **<u>OUR BIGGEST RISKS</u>**

    - Artificial Intelligence is NOT the biggest threat facing humankind today.

    - But we do need to worry about the impact AI will have on our societies.

    - It is much less clear that we are addressing these problems adequately.

    - Possibility of algorithmic discrimination:

        - Equal chances may no longer be given to everyone.
        - It's not that we'll program the machines to discriminate, but we might not program them well enough not to discriminate.

- **<u>THE SEA OF DUDES</u>**

  - "A sea of white dudes"

  - In 2016, only around 10 percent of AI researchers were women.

  - The gender imbalance starts at an early age.

  - Because of it, there will be questions not asked, and problems not addressed.

  - Other groups—black and Hispanic people, for instance—are also underrepresented in AI research.

- **HOW MANY JOBS ARE AT RISK?**

    - University of Oxford study (by Frey and Osborne) in 2013 predicts that 47 percent of jobs in the United States are under threat from automation over the next two decades or so.

    - There are a number of reasons why this will not translate into 47 percent unemployment.

- **SURVIVING THE REVOLUTION**

    - An "open" job

TRIANGLE OF OPPORTUNITY

- The geeks, the technically literate
- The emotionally intelligent
- The creatives and the artisans

AI AND WARFARE

https://futureoflife.org/open-letter-autonomous-weapons/

AUTONOMOUS WEAPONS: AN OPEN LETTER FROM AI & ROBOTICS RESEARCHERS

Click here to see this page in other languages: German Japanese Russian

Autonomous weapons select and engage targets without human intervention. They might include, for example, armed quadcopters that can search for and eliminate people meeting certain pre-defined criteria, but do not include cruise missiles or remotely piloted drones for which humans make all targeting decisions. Artificial Intelligence (AI) technology has reached a point where the deployment of such systems is — practically if not legally — feasible within years, not decades, and the stakes are high: autonomous weapons have been described as the third revolution in warfare, after gunpowder and nuclear arms.

Many arguments have been made for and against autonomous weapons, for example that replacing human soldiers by machines is good by reducing casualties for the owner but bad by thereby lowering the threshold for going to battle. The key question for humanity today is whether to start a global AI arms race or to prevent it from starting. If any major military power pushes ahead with AI weapon development, a global arms race is virtually inevitable, and the endpoint of this technological trajectory is obvious: autonomous weapons will become the Kalashnikovs of tomorrow. Unlike nuclear weapons, they require no costly or hard-to-obtain raw materials, so they will become ubiquitous and cheap for all significant military powers to mass-produce. It will only be a matter of time until they appear on the black market and in the hands of terrorists, dictators wishing to better control their populace, warlords wishing to perpetrate ethnic cleansing, etc. Autonomous weapons are ideal for tasks such as assassinations,

The New York Times

Opinion

How to Stop Superhuman A.I. Before It Stops Us

The answer is to design artificial intelligence that's beneficial, not just smart.

By Stuart Russell

Dr. Russell is a professor of computer science at the University of California, Berkeley.

Oct. 8, 2019

https://www.nytimes.com/2019/10/08/opinion/artificial-intelligence.html

Research Priorities for Robust and Beneficial Artificial Intelligence

Stuart Russell, Daniel Dewey, Max Tegmark

■ *Success in the quest for artificial intelligence has the potential to bring unprecedented benefits to humanity, and it is therefore worthwhile to investigate how to maximize these benefits while avoiding potential pitfalls. This article gives numerous examples (which should by no means be construed as an exhaustive list) of such worthwhile research aimed at ensuring that AI remains robust and beneficial.*

Artificial intelligence (AI) research has explored a variety of problems and approaches since its inception, but for the last 20 years or so has been focused on the problems surrounding the construction of intelligent agents — systems that perceive and act in some environment. In this context, the criterion for intelligence is related to statistical and economic notions of rationality — colloquially, the ability to make good decisions, plans, or inferences. The adoption of probabilistic representations and statistical learning methods has led to a large degree of integration and cross-fertilization between AI, machine learning, statistics, control theory, neuroscience, and other fields. The establishment of shared theoretical frameworks, combined with the availability of data and processing power, has yielded remarkable successes in various component tasks such as speech recognition, image classification, autonomous vehicles, machine translation, legged locomotion, and question-answering systems.

AI'S FAILURES

The New York Times

Microsoft Created a Twitter Bot to Learn From Users. It Quickly Became a Racist Jerk.

Tay's Twitter account. The bot was developed by Microsoft's technology and research and Bing teams.

- **AUGMENTING INTELLIGENCE**

- **SOCIETAL GOOD**

    - Example: Computational sustainability at Cornell University

        - Machine-learning methods to predict and map poverty in developing countries, using readily available satellite imagery.

        - Optimization techniques to move Citi Bikes around New York City to balance demand.

- **<u>STUDYING THE IMPACT OF AI</u>**
  - MIT, Future of Life Institute, Max Tegmark, 2014
  - Cambridge, Leverhulme Centre for the Future of Intelligence, Huw Price, 2015
  - Oxford, Strategic Artificial Intelligence Research Centre, 2015.
  - UC Berkeley, Center for Human-Compatible AI, Stuart Russell, 2016
  - University of Southern California, Center for Artificial Intelligence in Society, Milind Tambe, 2016
  - Carnegie Mellon, Center for Ethics and Computational Technologies, 2016
  - University of New South Wales, Centre for the Impact of Artificial Intelligence and Robotics

Design Thinking

열린 공간에서 자유로운 의견을 교환하여 사용자 중심의 문제를 찾아내는 것

What is Design

Experience Design

"The role of a designer is that of a very good, thoughtful host anticipating the needs of his guests"

Charles Eames

What is GOOD Design

Not necessarily pretty, but innovative and effective

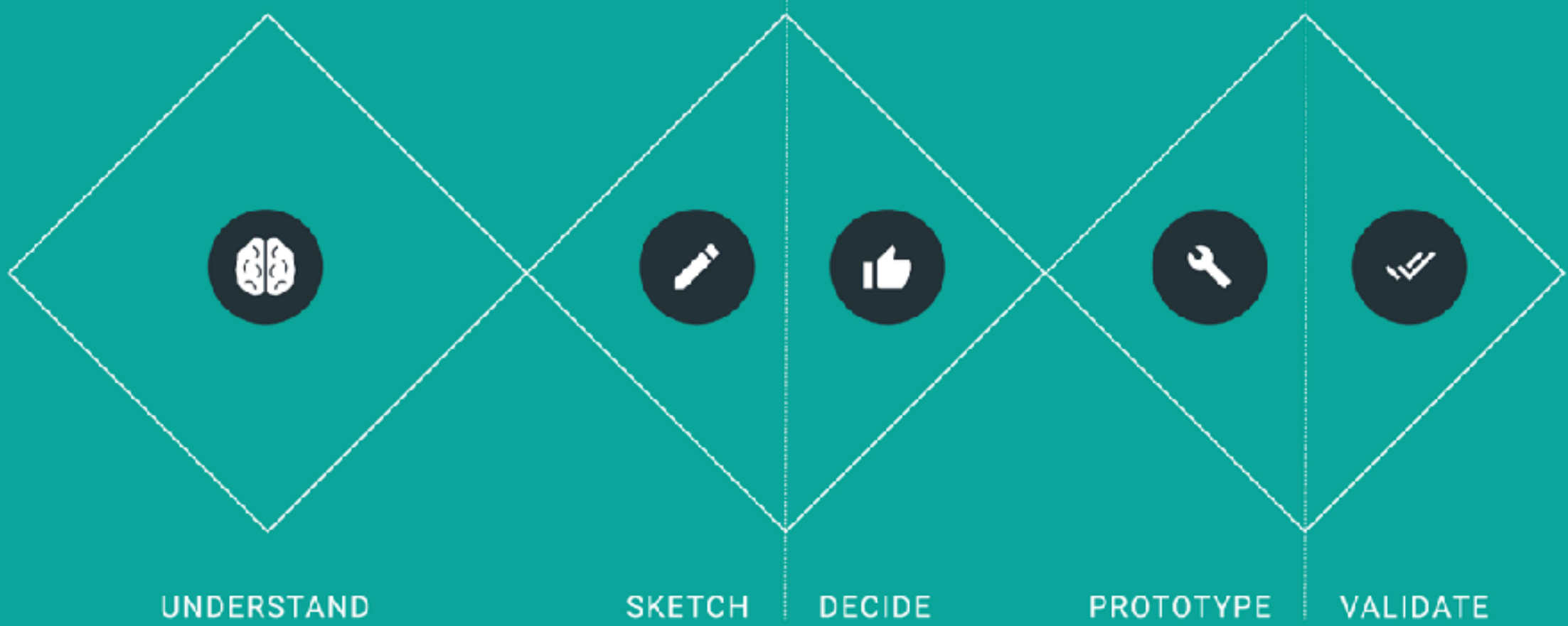
Design is a way of thinking

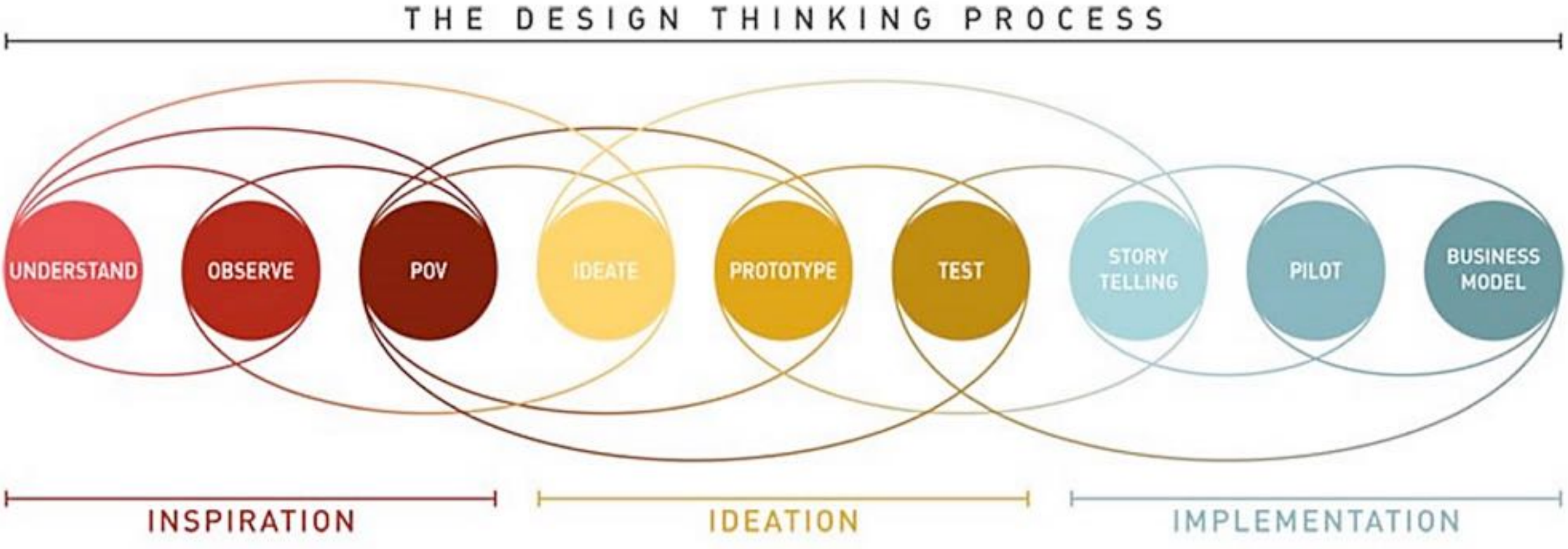
We solve problems with Design

Designing is the act of defining vision of what you want to create, not simply creating something in response to a demand.

When we create new things- technologies, organizations, processes, environments or systems — we engage in design. **A culture of inquiry and action**, we identify that culture as **The Design Way.**

DESIGN METHOD




THE DESIGN THINKING PROCESS
UNDERSTAND
OBSERVE
POV
IDEATE
PROTOTYPE
TEST
STORY TELLING
PILOT
BUSINESS MODEL
INSPIRATION
IDEATION
IMPLEMENTATION

Empathize

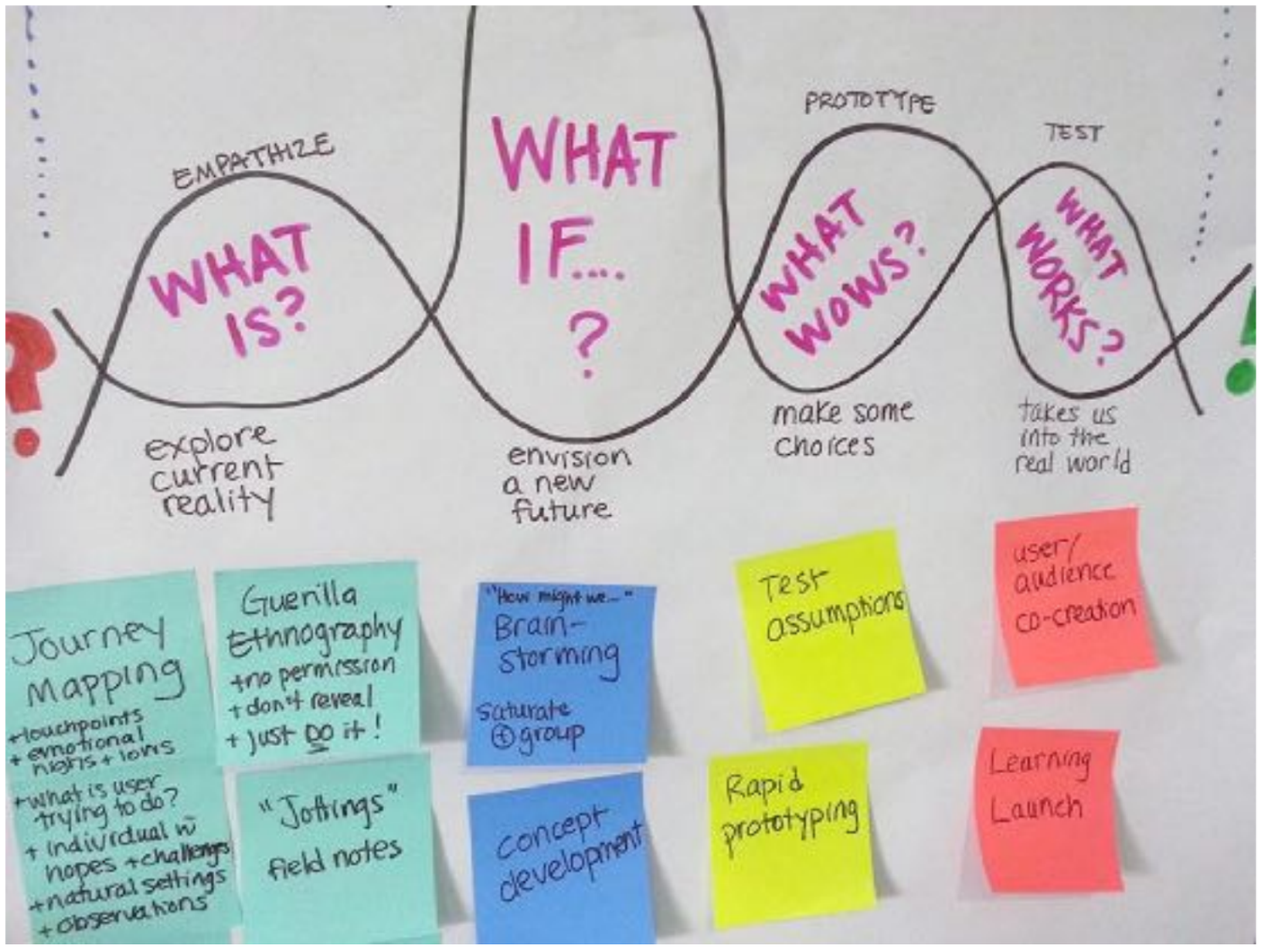
Define

Ideate

Prototype

Test

Realize



- What is?

Exploring the current reality

- What if?

Envisioning alternative future

- What wows?

Getting users to help us make some tough choices

- What works?

Making it work in market, and as a business

Activity

Explore current reality (as many as you can)

해결하고 싶은 문제들 발표

각자 하나의 문제 선정

Idea Pitching

팀 결정 (?)

공지사항

- 다음주 (5/9) : 중간고사