KAIST

CS492 Crowdsourcing - Final Project

Milestone 3

Idea Pitch

2016-10-20

Team **MEDDLER**

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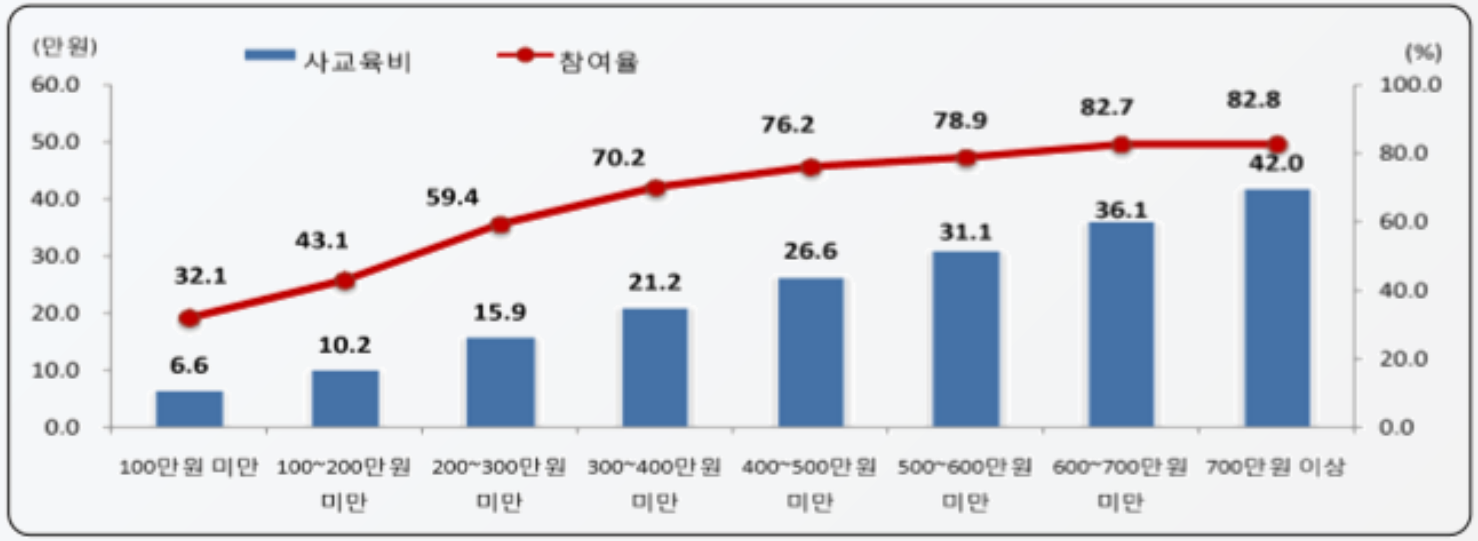
A

Problem Statement

Education As a Service

❖ Educational opportunity

- According to the survey of Statistical Office of Korea* (2016)



Private education costs increase as household income increases

*통계청 보도자료, "2015년 초·중·고 사교육비조사 결과," 2016(출처: 공공누리).
(A Report of National Statistical Office, "Private Education Costs of Korean Elementary, Middle, and High School Students in 2015)

Very Global Problem

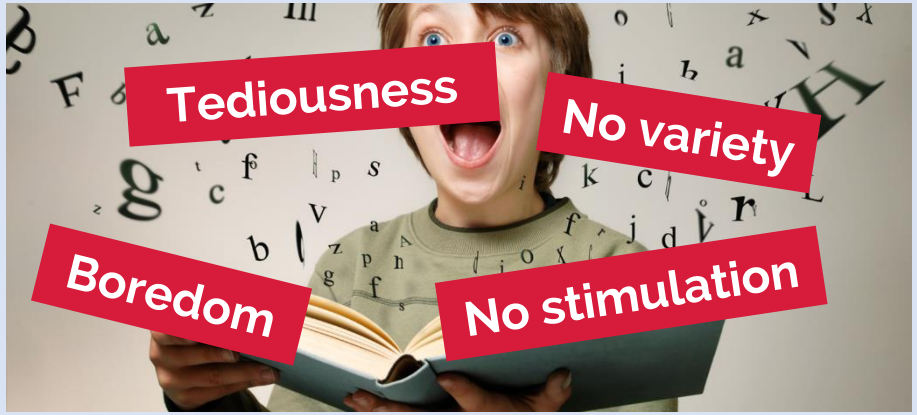
❖ Unfair and ineffective environment for learning

Unfair education environment

Regional/Economic differences
Different environment (time) for education

Ineffective learning materials

Fixed set of problems for learning
No proper stimulation for self-study



Specific Problems

We want to get learning materials "for free"

We need to study, anytime and anywhere

How can we enable learners to study easily in their daily lives?

Use smartphone!

We need to be motivated to learn

How can we provide the proper stimulation for learning?

Use crowds!

We need newer and more diverse problems

Where can we get a number of various problems?

Use crowdsourced problems!

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Why Do We Use Crowds?

Crowds can effectively stimulate learners to study in a person-to-person way.

Online social support has been used for shaping an individual's behavior[1].

Mutual support in a group can stem from altruism and group dynamics[2][3].

[1] Jaemyung Shin et al., "BeUpright: Posture Correction Using Relational Norm Intervention," CHI '16, 2016.
[2] Yeoreum Lee, et al., "Altruistic interaction design: a new interaction design approach for making people care more about others." In Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces (DPPI '11)
[3] Beauchamp et al., "Group dynamics in exercise and sport psychology." Routledge, 2014.

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B

Solution: **1-Day-N-Questions**

1-Day-N-Questions

Overall Goal

Crowdsourcing platform for study groups

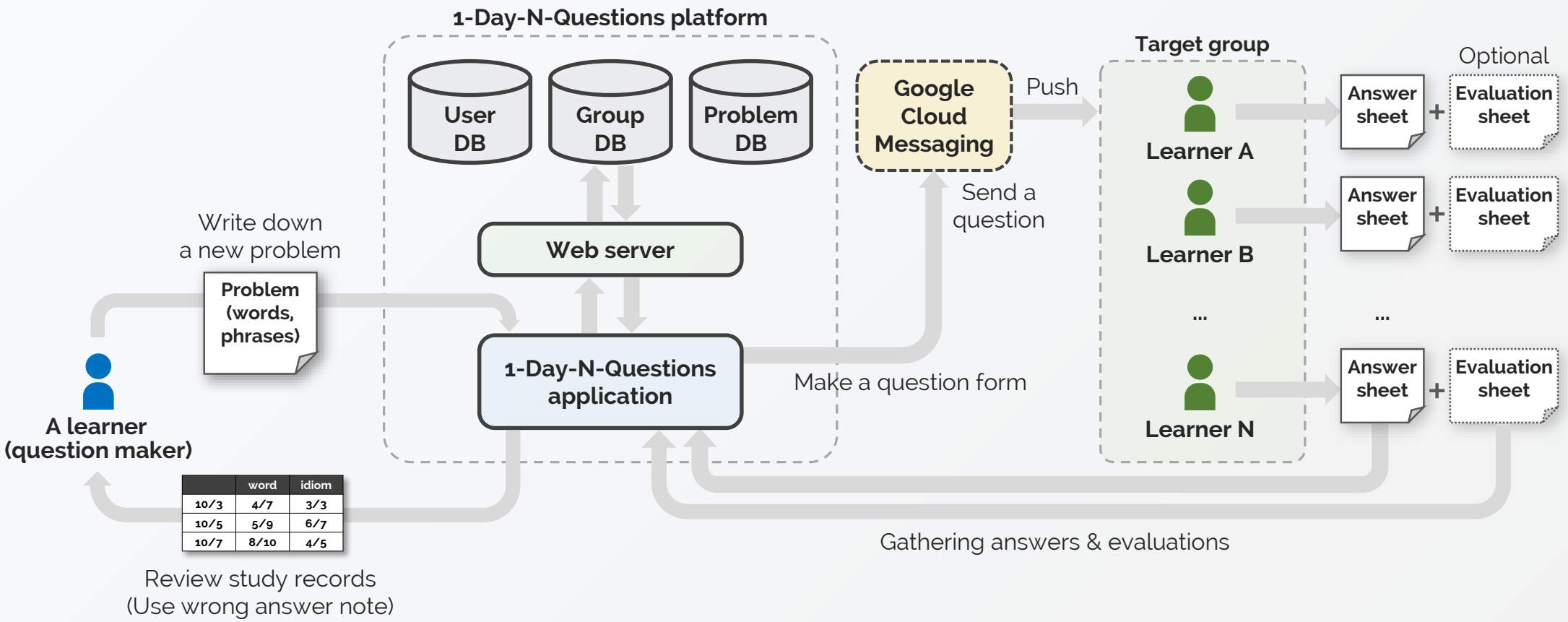
- Make & share a new problem as a worker
- Solve crowds' problems as a learner
- Evaluate crowds' problems for improvement
- Manage our own learning history for review

Project scope: A crowdsourced study group for studying English

"Bring 'a bit' of compulsory task (problems) to users who are already motivated to learn English (words, idioms, phrases, sentences, etc.)"

1-Day-N-Questions

Overall Approach



1-Day-N-Questions

Let's Think About Managing a Study Group

Set our group's goal

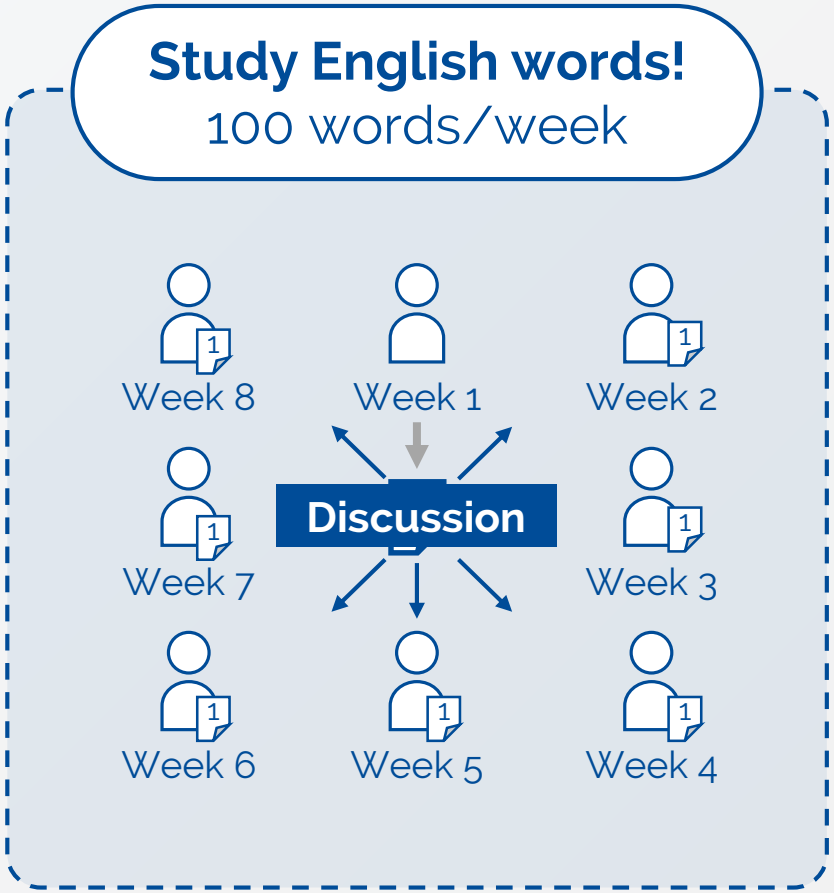
"Let's study a hundred English words a week!"

Recruit group members

"Join us, if you have the same goal as ours."

Manage study plans

- **Each member has to prepare a weekly test sheet.**
- **At the same time, other members have to study the words in advance.**
- **After every test, we will discuss some difficult problems that many ones give incorrect answers.**



1-Day-N-Questions

Let's Think About Managing a Study Group

Set our group's goal → **Motivation of crowds**

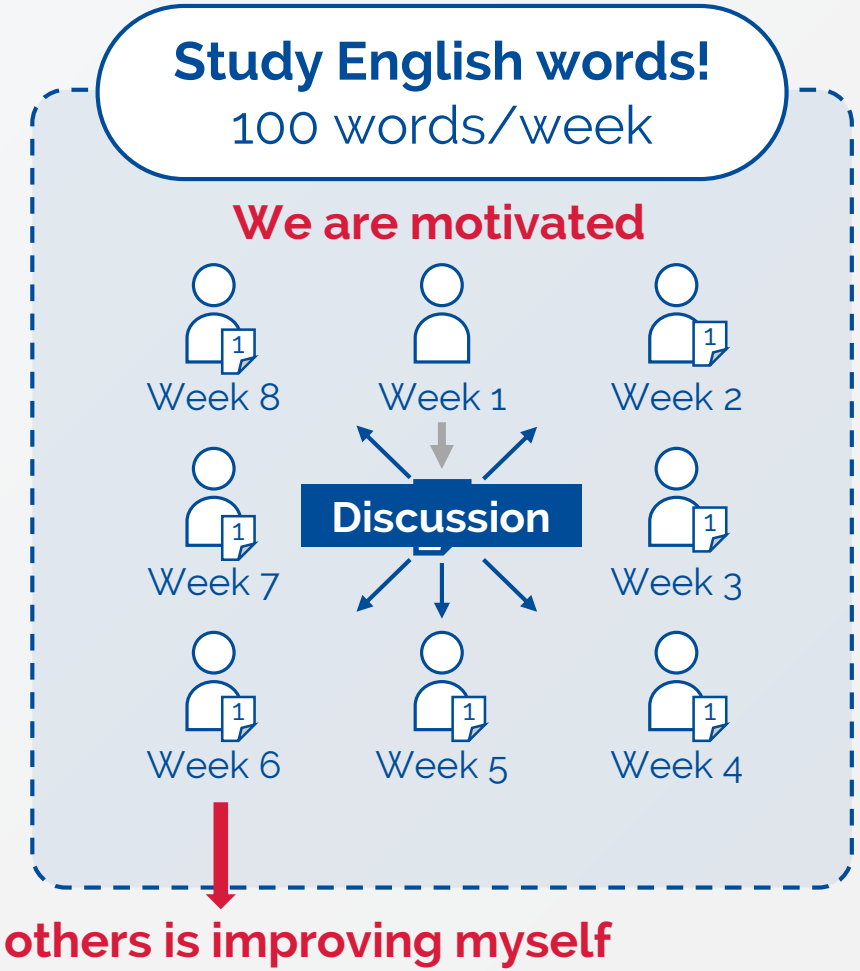
"Let's study a hundred English words a week!"

Recruit group members → **Crowdsource based platform**

"Join us, if you have the same goal as ours."

Manage study plans → **A sense of duty & rules for crowdsourcing**

- **Each member has to prepare a weekly test sheet.**
- **At the same time, other members have to study the words in advance.**
- **After every test, we will discuss some difficult problems that many ones give incorrect answers.**



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Tasks & Requirements

Task 1

❖ Task 1. Making a new problem

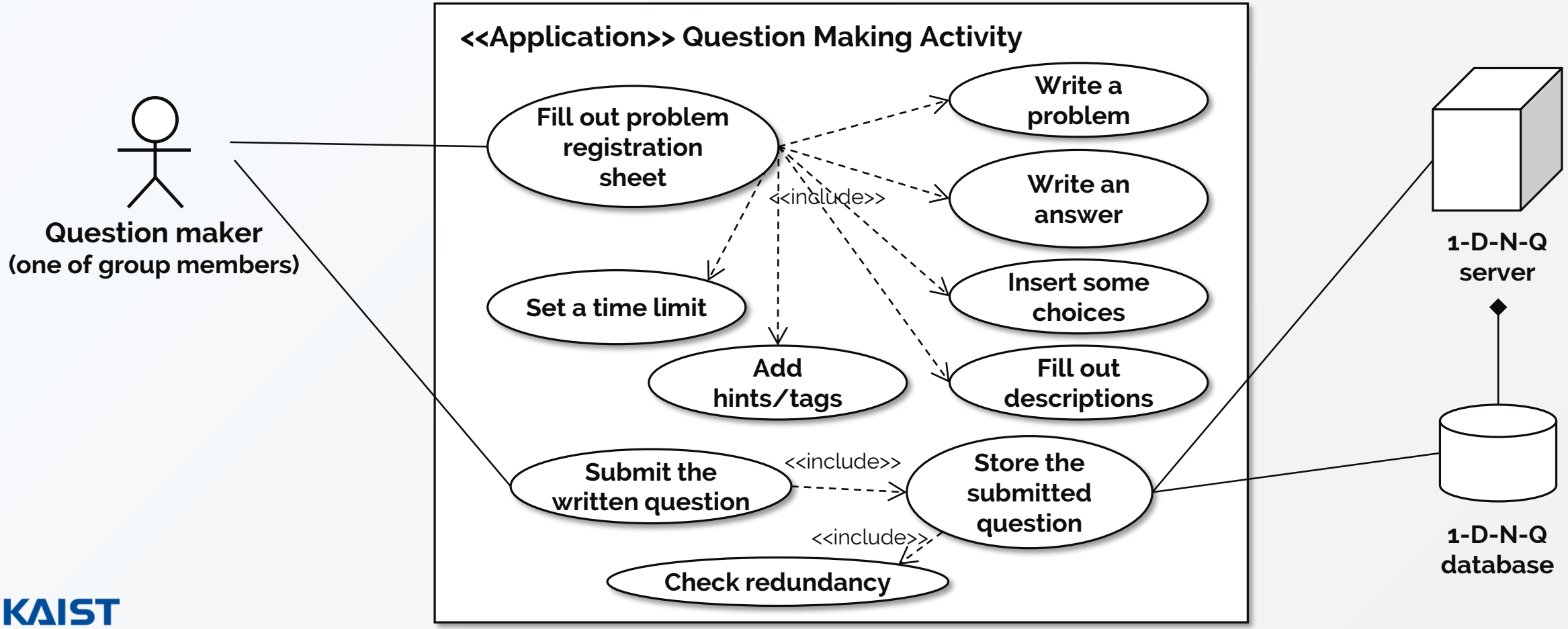
- Motivation: Adding a new problem (word, phrase) into my database plays a role in construction of a crowdsourced question pool.
  - A learner just wants to collect words in a workbook for memorization and review.
  - Learners don't notice that they are making questions for others.

❖ Requirements

- [Req 1-A] Our system must provide a submission form for a user to fill out or customize a problem (e.g., word, phrase, idiom, sentence, etc.).
- [Req 1-B] Each problem (question) has to contain question maker's real-name and time limit.
- [Req 1-C] Our system must check the redundancy of written problems and filter out them in real-time.

Task 1

❖ Use case diagram of Task 1



Task 1

❖ Aggregation method

- Submitted problems by multiple crowds are stored in 1DNQ server and user's local DB at first, and they are distributed to a group later.
  - Our system should transform the stored problems to the questions for a test.
  - The distribution is conducted by 1DNQ server using an algorithm, which considers the individual levels of learning.

❖ Quality control

- Simple problem-registration form
- Distribution based on users' real-names
- Real-time redundancy check

Task 2

❖ Task 2. Solving and evaluating problems

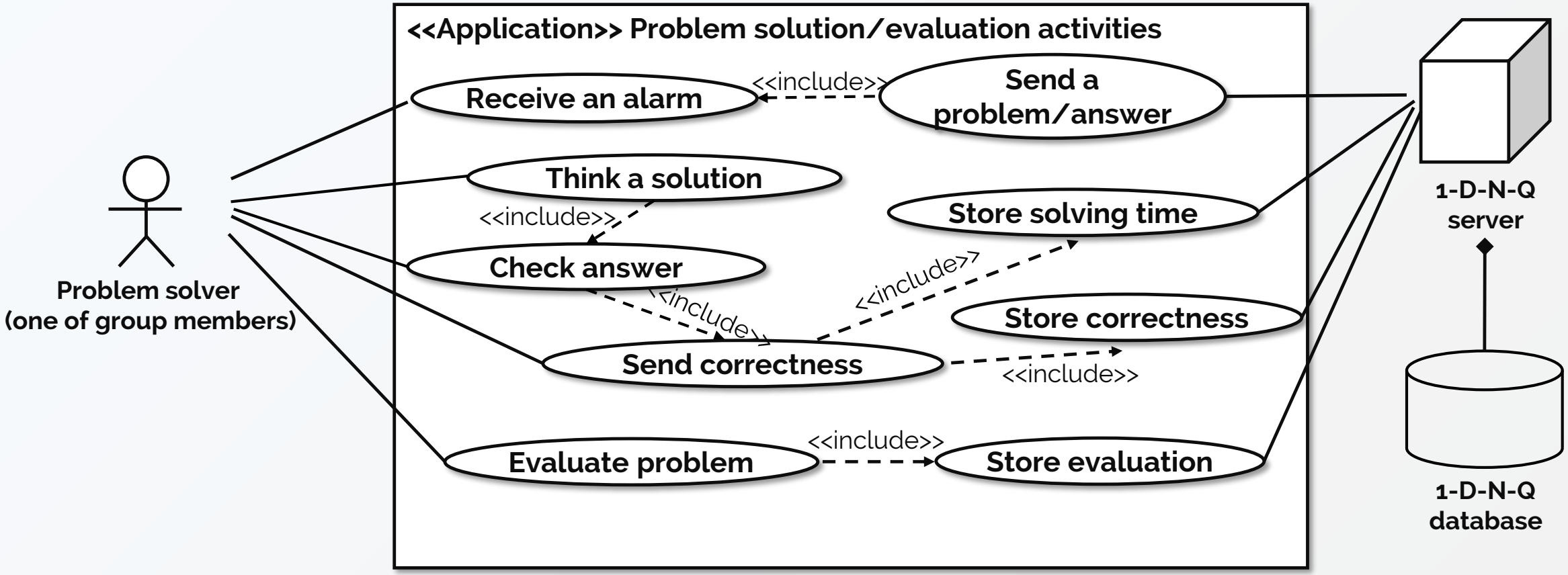
- Motivation: Users want to solve problems in an adequate level.
  - Let users to solve problems and evaluate them for user and problem evaluations.

❖ Requirements

- [Req 2-A] Our system must perform an automatic process for users to receive problems.
  - An alarm system to let users know a problem receipt with a pop box
- [Req 2-B] Our system should provide a simple user interface to solve problems to enable self-evaluation based exams.
- [Req 2-C] Our system should provide a way to evaluate given problems.
  - Three choices (easy-normal-hard) for problem evaluation

Task 2

❖ Use case diagram of Task 2



1-Day-N-Questions

Task 2

- **Aggregation method**
  - Data aggregated in a solution phase
    - Gathering whether an user is right and solving time
  - Data aggregated in an evaluation phase
    - Gathering evaluations for a problem
  - Data will be aggregated for user and problem evaluations
    - Aggregating data by an user and a problem
- **Quality control**
  - Data to filter out: “Bad” problems and malign evaluations
  - A problem solver can report “bad” problem providers
  - A problem provider also can report malign evaluators

Task 3

❖ Task 3. Checking user's own record for learning improvement

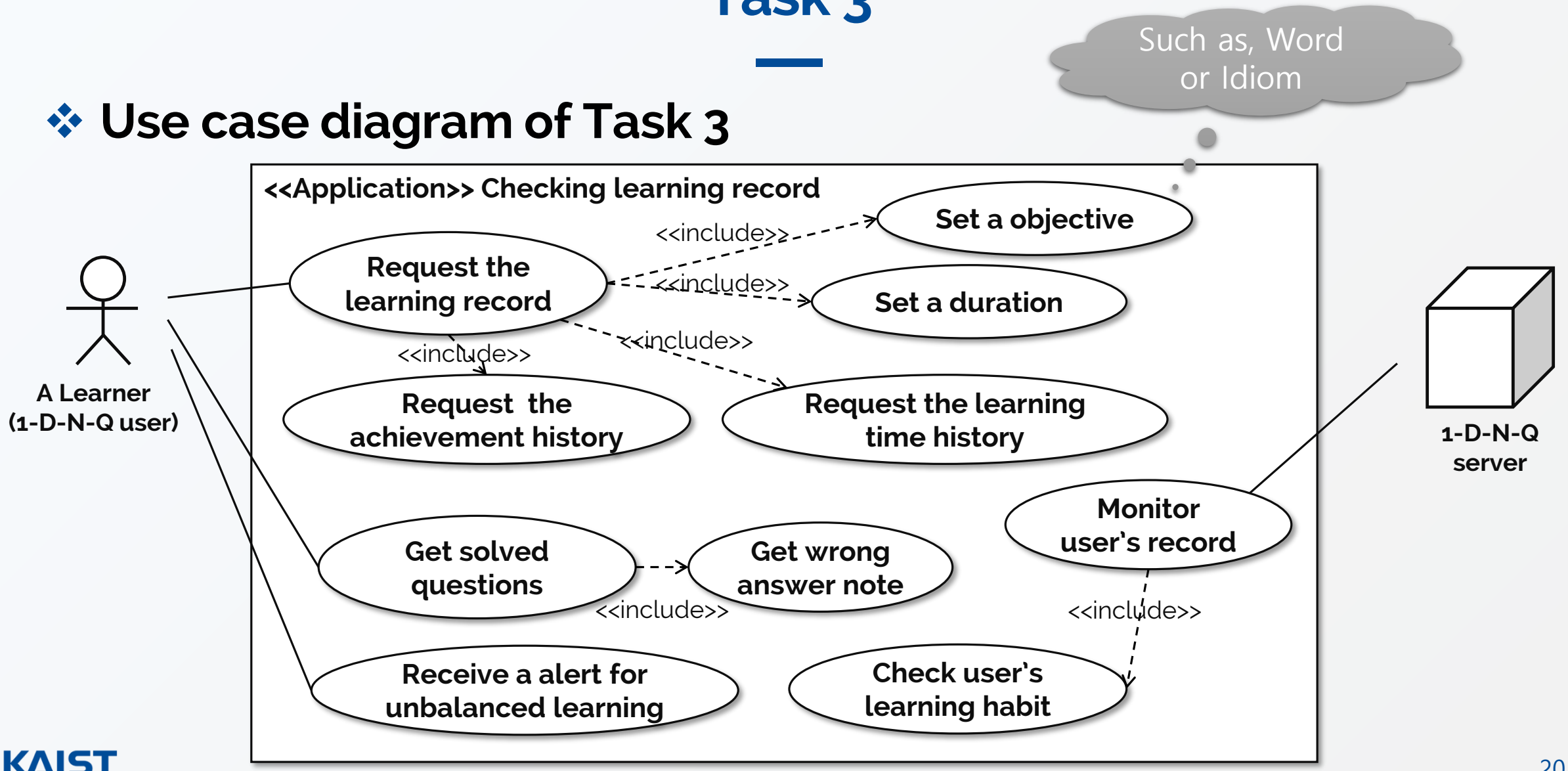
- Motivation: Learners need feedback about their learning behavior.
  - To motivate themselves
  - To monitor their learning patterns

❖ Requirements

- [Req 3-A] A learning record must include an improvement history.
  - Visualization of the level of achievement to motivate learning
- [Req 3-B] A learning record must provide a distinctive dimensions of learning status.
  - Multi-dimensional learning objectives
- [Req 3-C] Our system must provide an alert for unbalanced learning.
  - Based on the level of achievement and importance, or engaged time,

Task 3

❖ Use case diagram of Task 3



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Limitations & Future Work

Limitations

- **In Task 3, we have not designed a way to play with information gathered by self-evaluations.**
  - some data can be used for the quality control or construction of problem sets in a group.
    - E.g. Wrong answer note, which is a set made by a user, can represent 1) difficulty and 2) importance level of problems. Thus, it might be aggregated into a compiled important problem set (i.e., golden data) for a group.

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Development Plan

Task Responsibilities

Tasks	Young-Min	Sunggeun	Sungjae
Platform design			
Application development			O
UI/UX	O		
Server development	O		
Database structure development		O	
Algorithm design		O	
Experiment / Analysis			
Experiment design			O
Progress of experiment	O	O	O
Experiment analysis			O

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CS492 Crowdsourcing - Final Project
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Idea Pitch – 1 Day N Questions

Thank You.

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Crowdsourced Approach

❖ Why do we use crowdsourcing for the problem?

	Easy access to new problems	Diversity/Variety of the problems
Without crowds	• Those who want to study something have to purchase some textbooks/ workbooks. → Expensive • Or, they have to take private educations/lessons. → Expensive	• Automated machine cannot create a set of diverse problems for specific learners. → No creativity • A certain person or group has the limits of diversity → No diversity
With crowds	**Lowering the cost of access to study** • Crowdsourced platform can reduce the cost to get the problems or the answers for the education.	**Creative & diverse problem set** • The more creative workers can help, the more effective and diverse problems can be made and shared.

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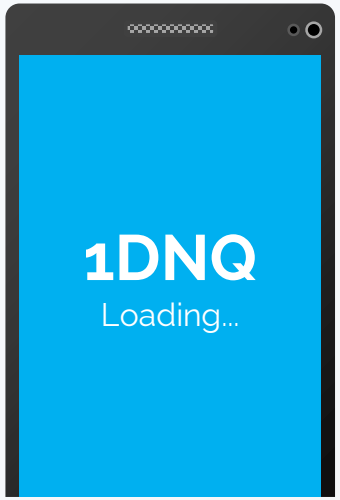
Appendix - Workflow

I want to write down a word in my vocabulary notebook using 1DNQ app

Learner **A**



1-Day-N-Questions
Workflow

Target study group

Learner **A**

Learner **B**

Learner **C**

Learner **D**

1-Day-N-Questions
Workflow

I want to write down a word in my vocabulary notebook using 1DNQ app

Learner **A**

Learner A's new word

Target study group

Learner **A**
Learner **B**
Learner **C**
Learner **D**

1-Day-N-Questions
Workflow

Learner **A**

Learner A's new word

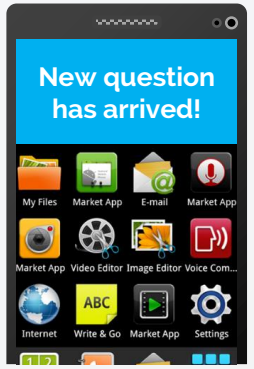
Target study group

Learner **A**
Learner **B**
Learner **C**
Learner **D**

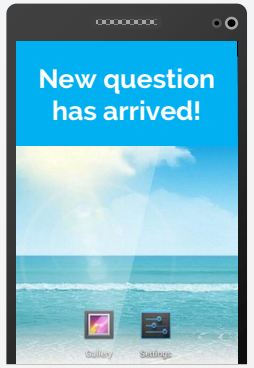
New word

New word

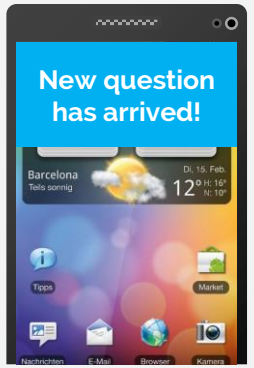
New word



Learner **B**



Learner **C**



Learner **D**

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1-Day-N-Questions
Workflow

Learner **A**

Target study group

Learner **A**

Learner **B**

Learner **C**

Learner **D**

Learner **B**

Learner **C**

Learner **D**

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1-Day-N-Questions
Workflow

Learner **A**

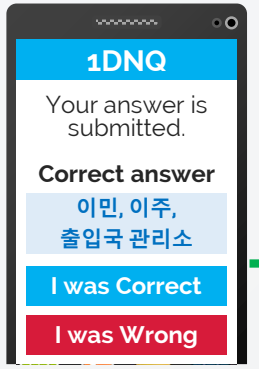
Target study group

Learner **A**
Learner **B**
Learner **C**
Learner **D**

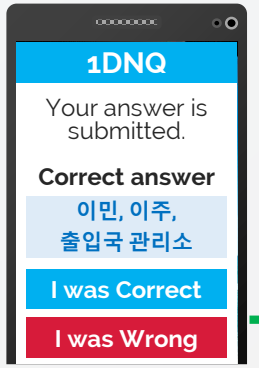
Answer

Answer

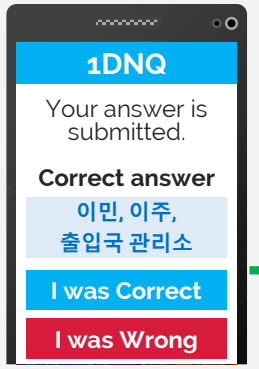
Answer



Learner **B**



Learner **C**



Learner **D**

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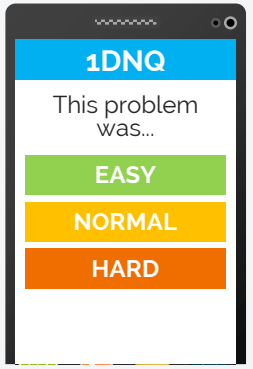
1-Day-N-Questions
Workflow

Learner **A**

Target study group

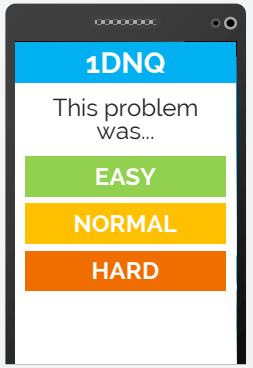
Learner **A**
Learner **B**
Learner **C**
Learner **D**

Evaluation



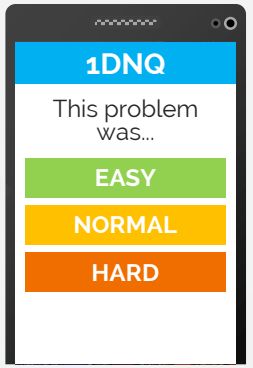
Learner **B**

Evaluation



Learner **C**

Evaluation



Learner **D**

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