

**HO CHI MINH CITY NATIONAL UNIVERSITY  
UNIVERSITY OF NATURAL SCIENCES  
FACULTY OF INFORMATION TECHNOLOGY**



**PA3**

**PAPER PROTOTYPE &  
STORYBOARDING**

Subject: User Interface Design

**Instructor guides:**

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Ho Chi Minh City, August 10st, 2024

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## A. INTRODUCTION

### 1. Group information

GROUP 14			
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3	21127495	Lê Ngô Song Cát	<a href="mailto:lnsccat21@clc.fitus.edu.vn">lnscat21@clc.fitus.edu.vn</a>
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### 2. Assign task

No.	Responsibility	Task	Level of completion
1	Nguyễn Lê Anh Chi	2.3.6, 2.4.6	100%
2	Nguyễn Xuân Quỳnh Chi	2.2, 2.4, 3.2, 3.4	100%
3	Lê Ngô Song Cát	2.2.6	100%
4	Bùi Ngọc Kiều Nhi	1, 2.3, 3.3	100%

- Demo video: [\[21KTPM3 - Group14 - UI/UX\] PA3 - YouTube](#)

## B. PAPER PROTOTYPE & STORYBOARD

### 1. Introduction

#### 1.1. Purpose of the Report:

- This report presents paper prototypes and storyboards designed to address key issues in flashcard learning. The focus is on creating interactive, context-rich flashcards to enhance motivation and engagement.

#### 1.2. Object and Scope of Work:

- The report explores two main scenarios with multiple prototype solutions for improving vocabulary learning through contextual understanding and interactivity.

#### 1.3. Identified Problems:

- 1) Lack of Context for Words
- 2) Boring and Non-interactive Flashcards Design (leads to Lack of Motivation and Engagement)

### 2. Scenario 1: Identified Problem 1

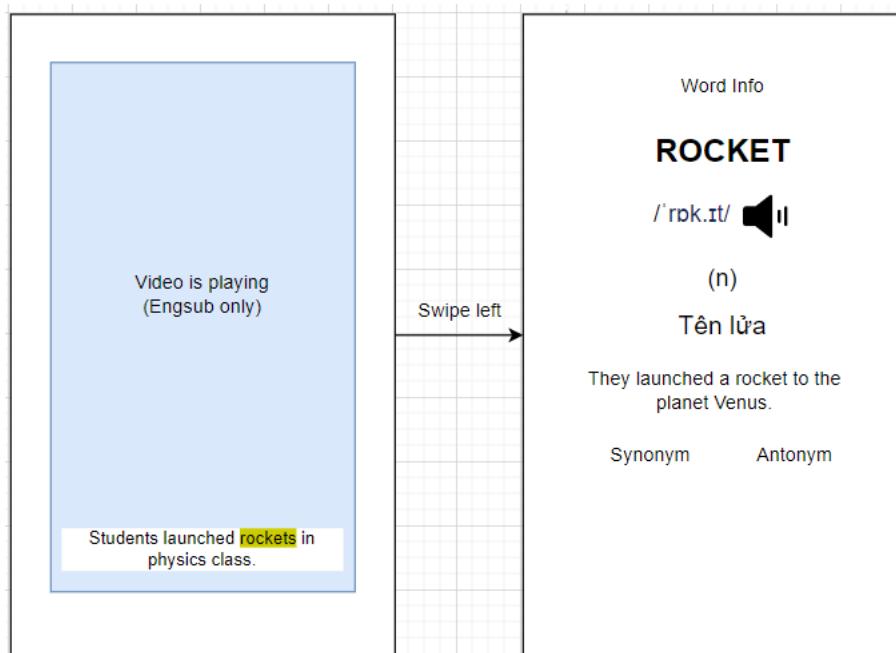
#### 2.1. Problem Description:

- Lack of Context for Words: Many users who have used traditional flashcard or any online flashcard apps have voiced their frustration about not knowing when or how to use the word in specific context. The concept of flashcards are really useful in helping users to remember the words but they are not given contextual meaning.

#### 2.2. Paper Prototype 1A:

##### 2.2.1. Sketch and Description

- **Adding contextual video to the flashcard:** Traditional flashcards typically have two sides: the front with the word and the back with its meaning or an example sentence, which lacks dynamic real-life context to help users understand how the word is used. Therefore, this app will add a video with English subtitles where the target word is highlighted to one side of the flashcard. This video could be a clip from a speech, a conversation, an interview, or another real-life scenario. Users watch the video to understand how the word is used in a practical, real-world situation. Below is the flashcard structure:
  - The first side displays a video providing context where the word is used with English subtitles only.
  - The second side contains detailed information about the word, including pronunciation, part of speech, the meaning of the word in Vietnamese, example sentence, synonyms and antonyms.



- **How users interact with different sides of the flashcard:** Users will first see a contextual video with English subtitles, where the target word is highlighted. Then, they swipe left to the second side of the flashcard to the third side of the flashcard, which contains detailed information about the word.

#### 2.2.2. Motivation

The motivation behind this prototype is to help users gain a deeper understanding of words through watching engaging, contextual videos.

#### 2.2.3. Problem Solved

**Lack of Context for Words:** The app provides contextual videos for words, helping users learn vocabulary more deeply.

#### 2.2.4. Strengths

- **Contextual Learning:** Users can learn vocabulary by watching real-life, visual contextual videos, which helps them gain a deeper understanding of the words, remember them longer, and apply them more effectively in real-life situations.
- **Improving Listening Skill:** Users practice their English listening skills by watching contextual videos. The more words they learn, the more they listen, which leads to rapid improvement in their listening abilities.

#### 2.2.5. Weaknesses

**Long video duration:** When users watch a video to learn the context of the word they are studying, if the video is too long, they may become frustrated and feel that it is time-consuming, leading them to not want to continue watching. Consequently, if users

encounter a word with a video that is too lengthy, they might prefer to skip it rather than watch it in its entirety.

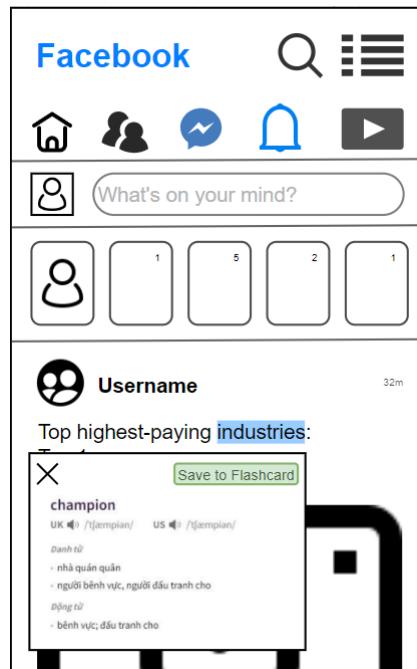
#### 2.2.6. Corresponding storyboard

**Link Youtube:** [https://youtu.be/\\_6XTtT8mnO0](https://youtu.be/_6XTtT8mnO0)

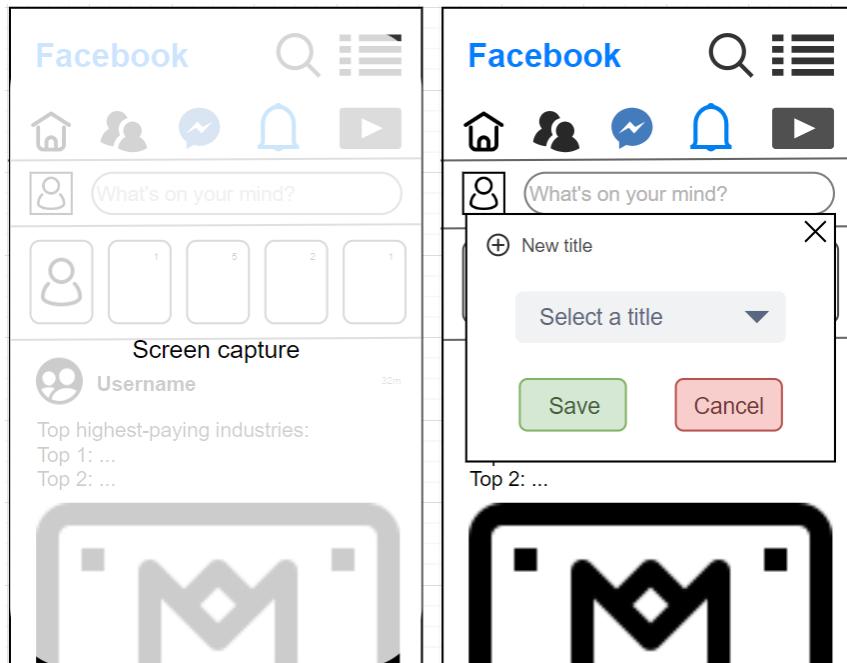
### 2.3. Paper Prototype 1B:

#### 2.3.1. Sketch and Description

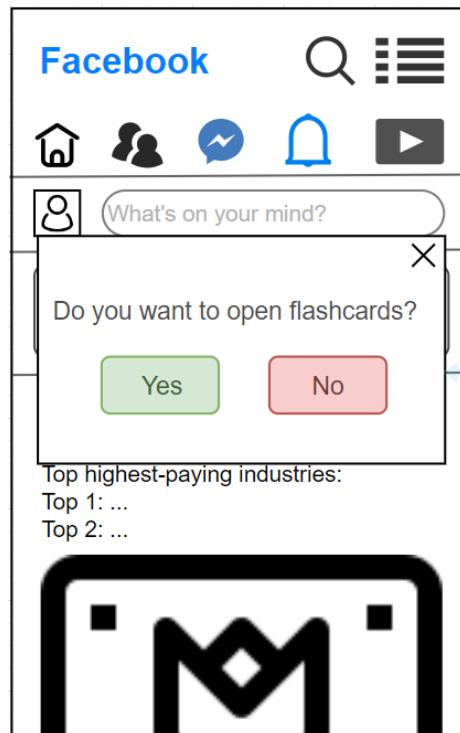
- Traditional flashcards are often limited in providing real-world context, which is crucial for understanding how words are used in practical situations. To address this, our app leverages *Optical Character Recognition (OCR)* technology, which operates in the background.
- **Key Features:**
  - o **Real-Time Word Detection:** While browsing any app, users can long-press on an unfamiliar word, and the OCR tool instantly detects it.
  - o **Pop-Up Information:** A pop-up appears showing the word's meaning, pronunciation, and part of speech. The user can save the word directly to their flashcards.
  - o **Enhanced Learning Context:** The flashcards include not just the word and its meaning but also a screenshot of the real-world context where the word was found, allowing users to revisit the exact scenario in which they encountered the word.
- By integrating OCR, this prototype transforms passive word encounters into active learning opportunities, enriching the traditional flashcard experience with dynamic, context-driven learning.
- This prototype involves the following steps:
  - 1) **Detecting New Words:** When a user encounters an unfamiliar English word in any application (e.g., Facebook, news app), they can long-press the word.
  - 2) **Pop-up Information:** A pop-up appears showing the word's definition, pronunciation, and part of speech. The user can save the word by clicking "Save to Flashcard".



- 3) **Screenshot Capture:** The system captures a screenshot of the current screen where the word was found.
- 4) **Choosing a Vocabulary Category:** The user is prompted to select or create a vocabulary category to save the word into.



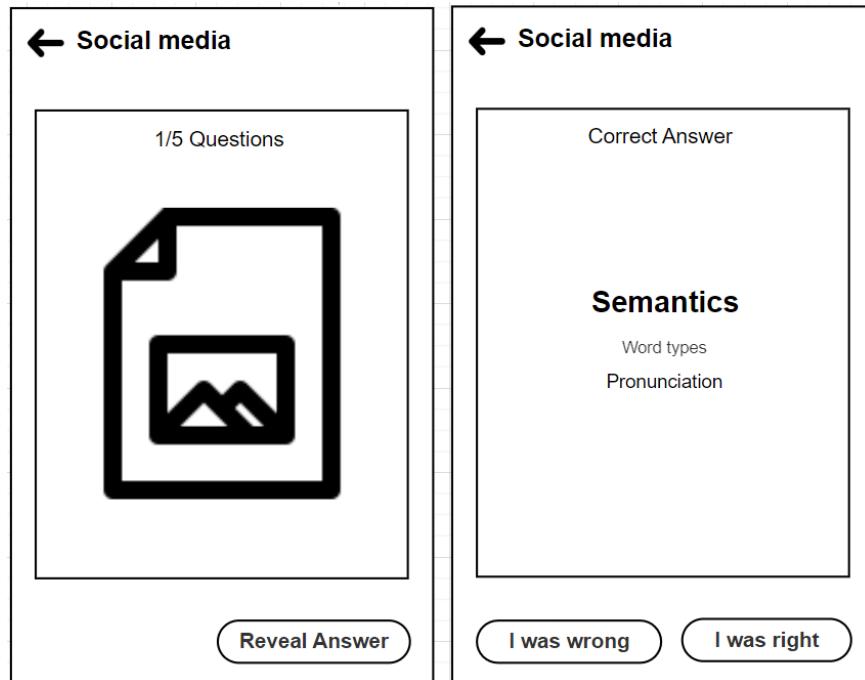
- 5) **Opening the Flashcard App:** After saving, the app asks if the user wants to open the Flashcard app immediately.



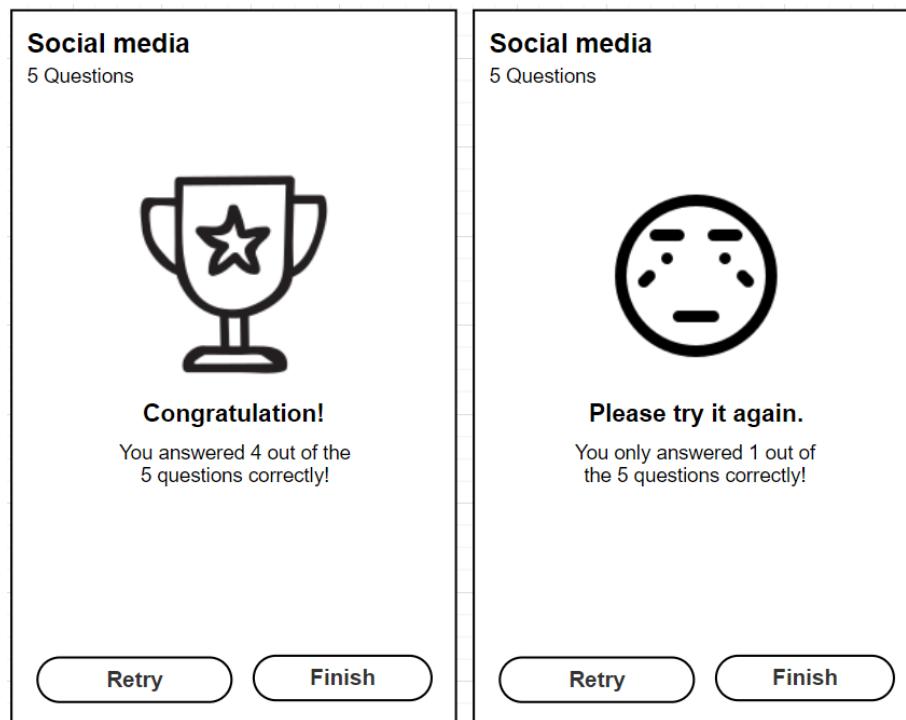
- 6) **Learning Session:** Inside the Flashcard app, users can select a vocabulary category. The flashcards in this category display the screenshot with the highlighted word in bold.



- 7) **Interactive Learning:** Users guess the meaning of the word and then click "*Reveal Answer*" to check their understanding. They choose "*I was right*" if their guess was correct or "*I was wrong*" if it was incorrect.



- 8) **Completion:** The session continues until all words in the category are reviewed. At the end, the system shows the number of correct answers. Users can choose to "*Finish*" or "*Retry*" the session.



#### 2.3.2. Motivation

The motivation behind this prototype is to seamlessly integrate vocabulary learning into the user's daily digital activities. By allowing users to save and study words they encounter in real-life contexts, the learning process becomes more relevant and personalized, leading to better retention.

#### 2.3.3. Problem Solved

- **Contextual Learning:** This prototype addresses the issue of words being learned in isolation without context. By using real-life examples from the user's activities, the flashcards provide a richer understanding of word usage.
- **User Engagement:** It also solves the problem of low engagement with static flashcards by incorporating dynamic and interactive elements that make the learning process more engaging.

#### 2.3.4. Strengths

- **Contextual Understanding:** Users learn words in the context in which they were encountered, leading to better retention and application.
- **Easy Integration:** The process of saving words directly from any app makes it easy and convenient for users to expand their vocabulary on the go.
- **Customization:** The ability to categorize words into different groups allows users to organize their learning according to themes or topics relevant to them.

#### 2.3.5. Weaknesses

- **Complexity:** The process may be too complex for some users, requiring multiple steps to save and categorize words.
- **Distraction Risk:** Prompting users to open the Flashcard app immediately after saving a word could interrupt their current activity, which might be distracting.
- **Resource Intensive:** Taking screenshots and processing them could demand significant system resources, potentially slowing down the user's device.

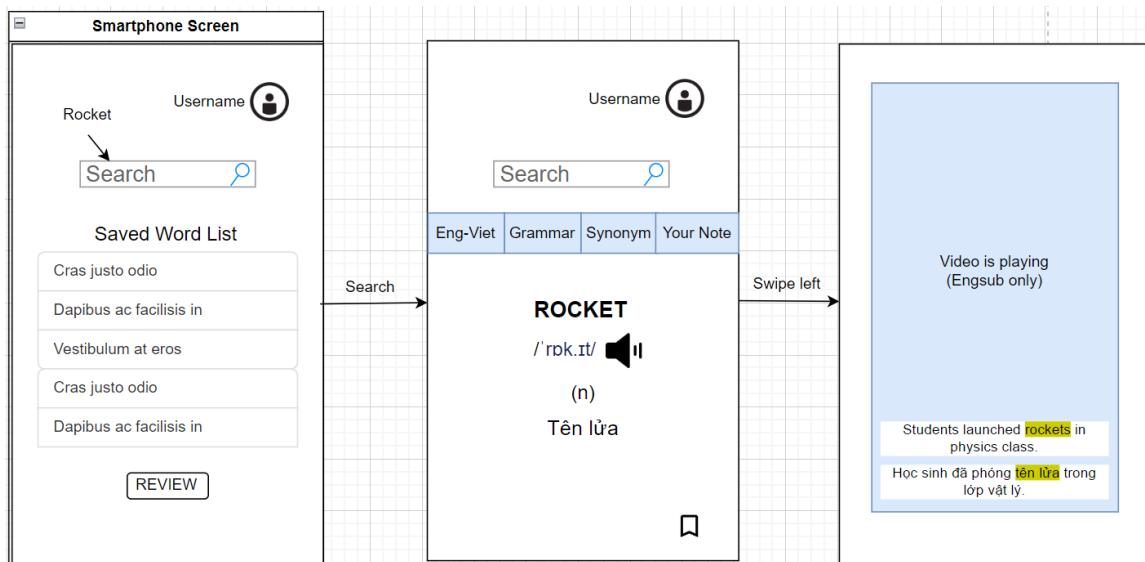
### 2.3.6. Corresponding storyboard

- **Link Youtube:** <https://youtu.be/ivAwv76Piqq>

## 2.4. Paper Prototype 1C:

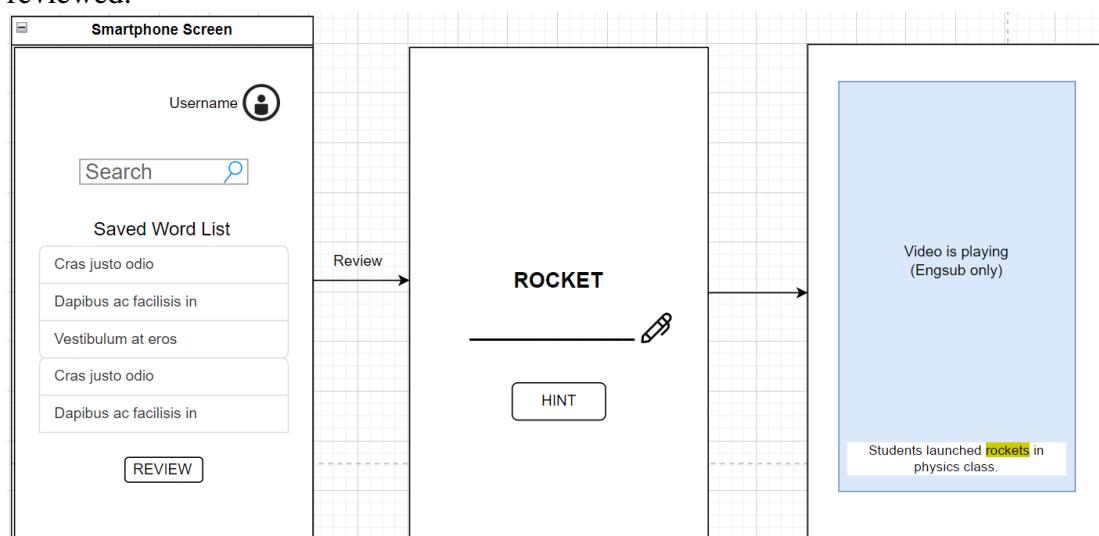
### 2.4.1. Sketch and Description

- **Create a search bar:** When users come across an English word that they don't know the meaning of, they can use this app to look up the word's meaning. Additionally, each word will have a contextual video with both English and Vietnamese subtitles and the user can watch the video to know how the word is used in a real-life situation.
- **Supporting feature:**  
**Save words to a personal list - Bookmark Icon:** This feature allows users to save the word they have just searched for if they want to review the word later. Words saved to the personal list will be reviewed in the "Review words" section.
- **Flashcards Structure:**
  - **First Side:** Detailed information about the word, including pronunciation, part of speech, the meaning of the word in Vietnamese, synonyms, antonyms, word forms in the past tense, past participle, present continuous, etc. if the word being learned is a verb. plural form if the word is a noun. These pieces of information are grouped into categories: Eng-Viet, Grammar, Synonym & Antonym. Additionally, there is a "Your Note" section that allows users to write personal notes.
  - **Second Side:** A video with both English and Vietnamese subtitles providing the context for the searched word, with the searched word highlighted.
- **Search Process and Word Saving Process:**
  - A user comes across the word "rocket" and doesn't know its meaning. They open the app and search for the word "rocket."
  - The search results display the first side of the flashcard of the word "rocket" which is detailed information about the word. If the user wants to watch a contextual video of the word, they can swipe left to the second side of the flashcard and watch the contextual video showing how "rocket" is used in a real-life situation.
  - If users are interested in the searched word and want to review it later, they can use the "Save words to a personal list" feature, which allows them to save the flashcard of the word.



- **Review Process:**

- When users select the "Review" button, they can review the list of vocabulary words they have saved during their search process.
- Users review saved vocabulary by answering the Vietnamese meaning of the word shown. When they begin reviewing learned vocabulary, the word will be displayed, and their task is to correctly fill in the Vietnamese meaning.
- If they can't recall the meaning, the app provides a hint feature. This feature allows users to rewatch the contextual video (with English subtitles only) of the word and use that to guess the meaning.
- After answering the meaning of the word, whether correct or incorrect, users can swipe left to review detailed information about the word as well as the contextual video (with English subtitles).
- The user can swipe up or swipe down to navigate through different words being reviewed.



#### 2.4.2. *Motivation*

The motivation behind this design is to help users personalize their deck of flashcards by providing a feature that allows them to search for words they don't know the meaning of and save those words to their personal flashcard list.

#### 2.4.3. *Problem Solved*

**Lack of Context for Words:** The app provides contextual videos for words, helping users learn vocabulary more deeply.

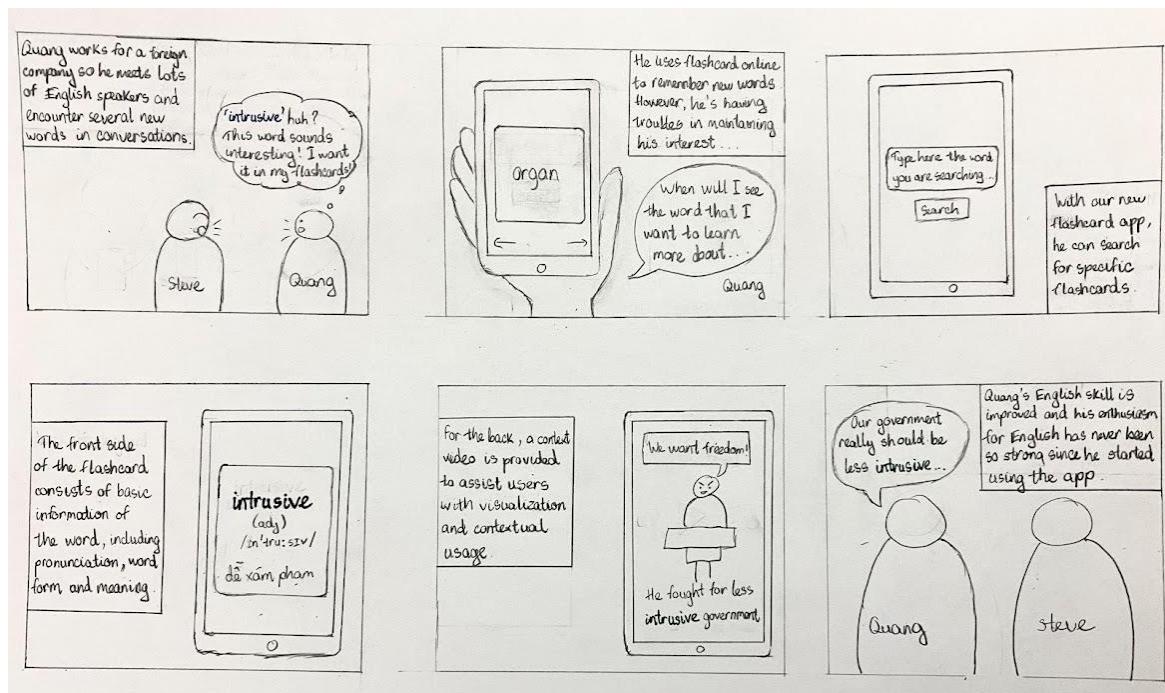
#### 2.4.4. *Strengths*

- **Contextual Learning:** Users can learn vocabulary by watching real-life, visual contextual videos, which helps them gain a deeper understanding of the words, remember them longer, and apply them more effectively in real-life situations.
- **Improving Listening Skill:** Users practice their English listening skills by watching contextual videos. The more words they learn, the more they listen, which leads to rapid improvement in their listening abilities.
- **Personal Flashcard Deck:** The app allows users to search for words they are interested in and save the words they find to their own personal list. This way, they don't have to study words they don't like.

#### 2.4.5. *Weaknesses*

- **Long video duration:** When users watch a video to learn the context of the searched word they are studying, if the video is too long, they may become frustrated and feel that it is time-consuming, leading them to not want to continue watching. Consequently, if users encounter a word with a video that is too lengthy, they might prefer to skip it rather than watch it in its entirety.
- **Limited Vocabulary Exposure:** The user's vocabulary list only includes the words they have searched for and saved. As a result, if they don't actively work on expanding their list, the words they learn will be quite limited. This design doesn't provide them with exposure to a wide range of vocabulary across different topics.

#### 2.4.6. *Corresponding storyboard*



### 3. Scenario 2: Identified Problem 2

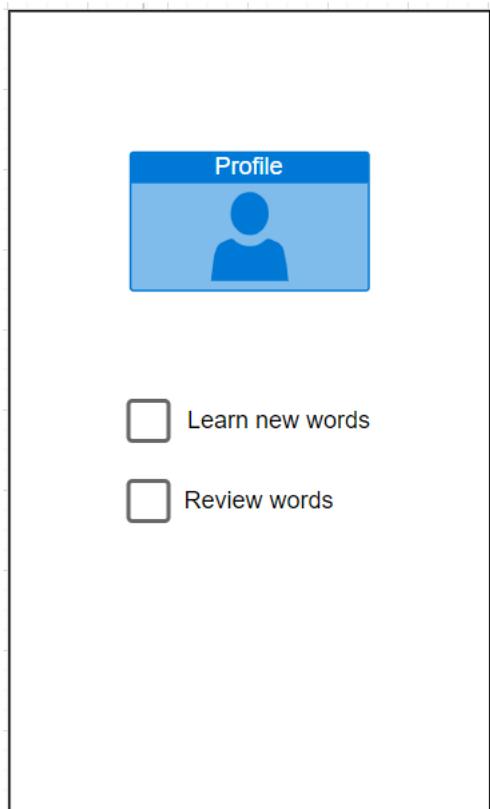
#### 3.1. Problem Description:

- Boring & Non-Interactive Flashcard: Considering the fact the concept of traditional flashcard appears to be boring in the long term for the majority of users, we propose to appeal to more users by combining multimedia resources and short contents which are trendy among young generation, motivating them to use the app more.

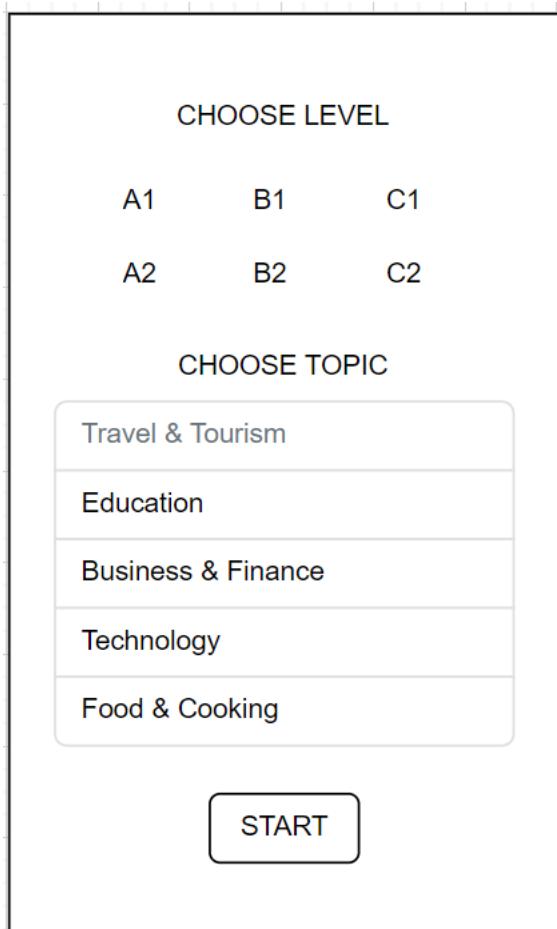
#### 3.2. Paper Prototype 2A:

##### 3.2.1. Sketch and Description

- The prototype describes the two most important functions of the vocabulary learning app: learning new words and reviewing previously learned words. These two functions correspond to the "Learn new words" and "Review words" options on the user's Home screen.

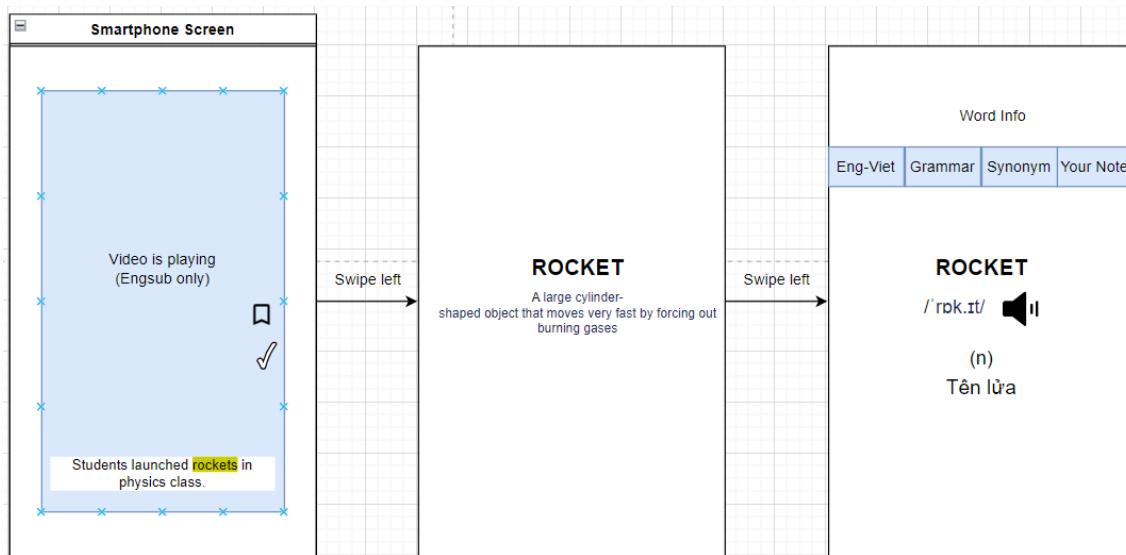


- **Vocabulary Difficulty Level and Topic Option:** In the "Learn new words" section, before starting to learn new words, users need to select the difficulty level of the words and the vocabulary topic they want to study. The design below places the options for selecting word difficulty and vocabulary topics on one screen. Users first select the difficulty level, then choose the topic.



- **Flashcards Structure:**

- **First Side:** A short video (under 60 seconds) with English subtitles (engsub) providing the context for the word, with the word highlighted.
- **Second Side:** The word and its meaning in English.
- **Third Side:** Detailed information about the word, including pronunciation, part of speech, the meaning of the word in Vietnamese, synonyms, antonyms, word forms in the past tense, past participle, present continuous, etc. if the word being learned is a verb. plural form if the word is a noun. These pieces of information are grouped into categories: Eng-Viet, Grammar, Synonym & Antonym. Additionally, there is a "Your Note" section that allows users to write personal notes.



– **Learning Process:**

- When a user starts to learn new words, they will first see the first side of the flashcard, which is the contextual short video with English subtitle where the target word is highlighted. They watch the video and rely on the context in the video to guess the meaning of the word.
- When users want additional hints to guess the word correctly, they swipe left to the second side to see English definition of the word. They read the definition to guess the Vietnamese meaning of the word.
- Then, when the user wants to find out the meaning of the word or confirm their guess, they swipe left once more to the third side of the flashcard, which shows the detailed information about the word.
- The user can swipe up or swipe down to navigate through different cards.

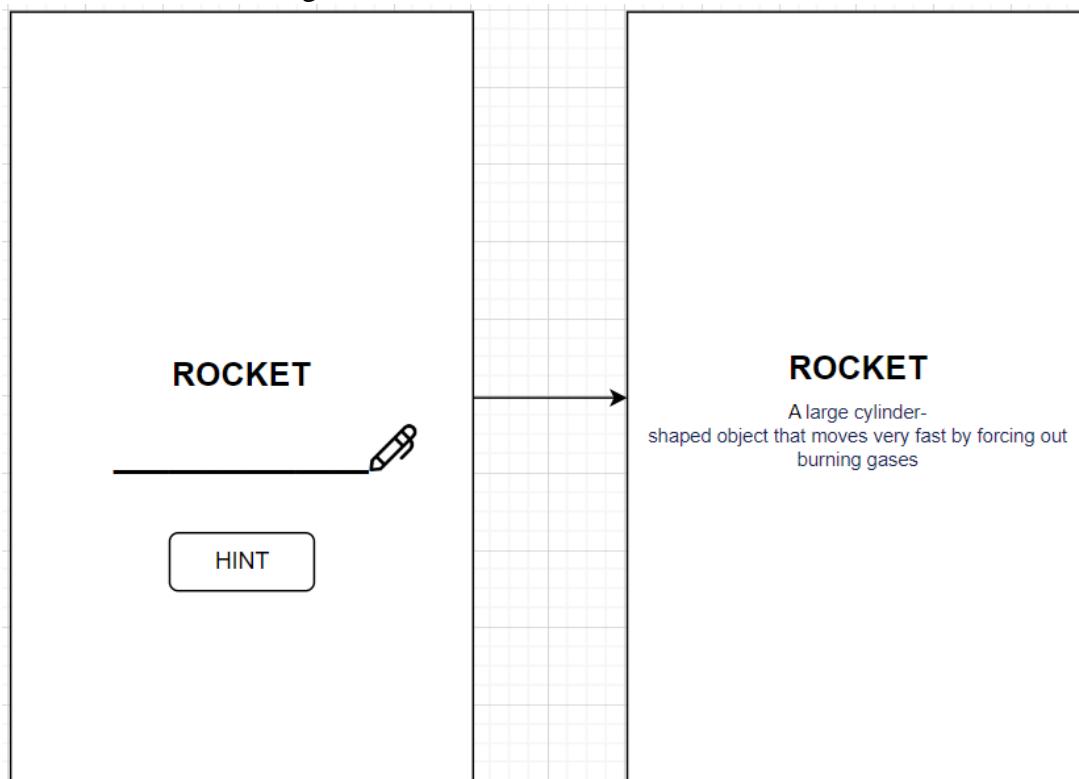
– **Supporting features:**

- **Save words to a personal list - Bookmark Icon:** This feature allows users to save vocabulary they want to learn. Words saved to the personal list will be reviewed in the "Review words" section.
- **Remove Known Words - Tick Icon:** During the process of learning new vocabulary, users may encounter words they already know. The app provides a "Remove known words" feature that allows users to remove known words from their current vocabulary list. The users will not see those words in future learning sessions.

→ *The swipe left-right interaction to view different sides of the flashcards, or the swipe up-down interaction when users are learning vocabulary, is designed similarly to how users navigate social media platforms like TikTok. Additionally, this app includes supporting features such as "Save words to a personal list" and "Remove known words," similar to features: adding videos to a favorites list and liking videos on TikTok.*

– **Review Process:**

- Users review vocabulary by answering the Vietnamese meaning of the word shown. When they begin reviewing learned vocabulary, the word will be displayed, and their task is to correctly fill in the Vietnamese meaning.
- If they can't recall the meaning, the app provides a hint feature. This feature allows users to view the English meaning of the word. They use the English definition to guess the Vietnamese meaning of the word.



- After answering the meaning of the word, whether correct or incorrect, users can swipe left to review detailed information about the word as well as the contextual video (with English subtitles).
- The user can swipe up or swipe down to navigate through different words being reviewed.

### 3.2.2. Motivation

The motivation behind this design is to help users personalize their vocabulary list by selecting the difficulty level of the words and the topics they want to study, and strongly sparking their interest and curiosity about the words they need to learn.

### 3.2.3. Problem Solved

**Boring & Non-interactive Flashcards Design:** The structure of the flashcards has been significantly altered from traditional flashcards, incorporating engaging multimedia elements that create excitement for learners.

### 3.2.4. Strengths

- **Increased Learning Engagement:** The design of the flashcards includes visual contextual videos, and the learning experience is like scrolling on TikTok, which enhances the learner's engagement and interest in studying. Additionally, the special design of the flashcards stimulates strong interest and curiosity from users:
  - The first side of the flashcards contains a video with English subtitles. Users use the context in the video to guess the meaning.
  - The second side shows the meaning of the word in English. Users once again rely on the English description of the word to guess its meaning, which enhances their deep engagement with the word.
- **Time Saving:** The "Remove known words" feature removes words that users already know, helping them save time in their learning process, enhancing the experience.
- **Complete and Detailed Word Information:** The third side of the flashcards provides very detailed and comprehensive information about the word, organized in a clear and easy-to-view manner.
- **Minimize Selection Actions:** The difficulty level of the words and the topic to be studied are displayed on a single screen, helping users avoid unnecessary repetitive actions.
- **Short video duration:** The video is short (under 60 seconds), which makes users feel that watching the video doesn't take too much time, so they are less likely to skip it and will watch it in full.

### 3.2.5. Weaknesses

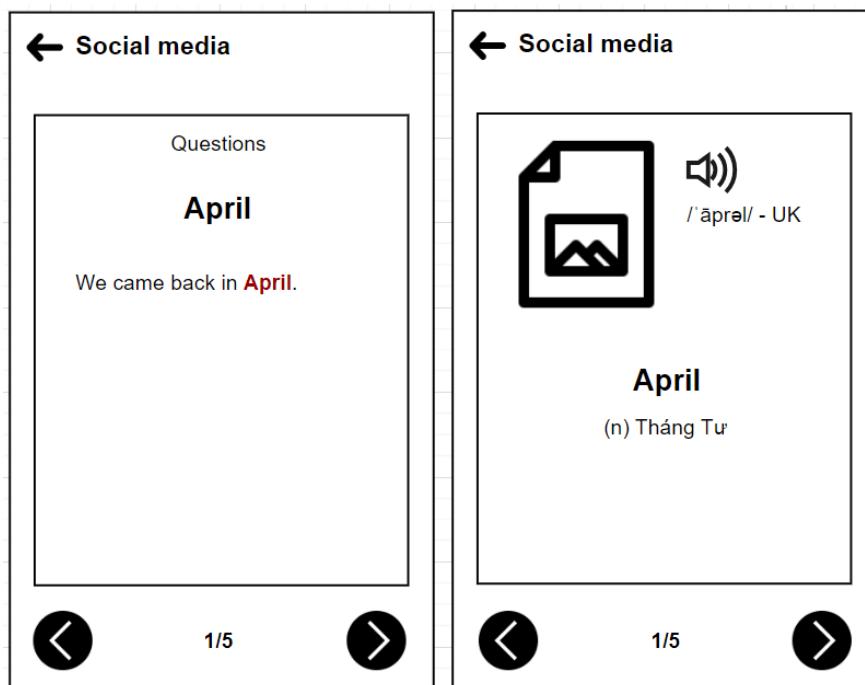
**Boring Vocabulary Hints:** During vocabulary review, if users can't remember a word, they can use a hint. However, the hint is simply the English definition of the word, and this method does not help users recall the word effectively. Furthermore, this hint requires users to read more text-based information, which may lead to feelings of frustration.

## 3.3. Paper Prototype 2B:

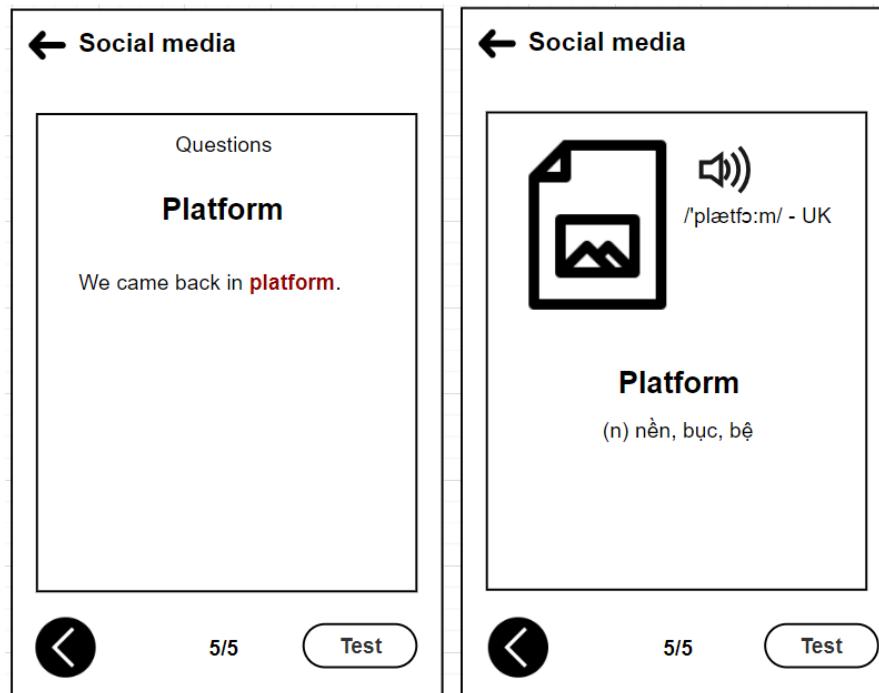
### 3.3.1. Sketch and Description

- **Key Features:**
  - o **Contextual Flashcard Creation:** When a user encounters a new word in any app, they can long-press on the word, and the OCR tool detects it instantly.
  - o **Context Sentence Integration:** The OCR tool captures the word along with the sentence in which it was found. This sentence is then used as the front side of the flashcard, providing immediate context for the word.
  - o **Interactive Flashcard Structure:**
    - + **Front Side:** Displays the word and its original context sentence, with the word highlighted in bold.
    - + **Back Side:** Shows an illustrative image, pronunciation, meaning, and part of speech, offering a comprehensive learning experience.

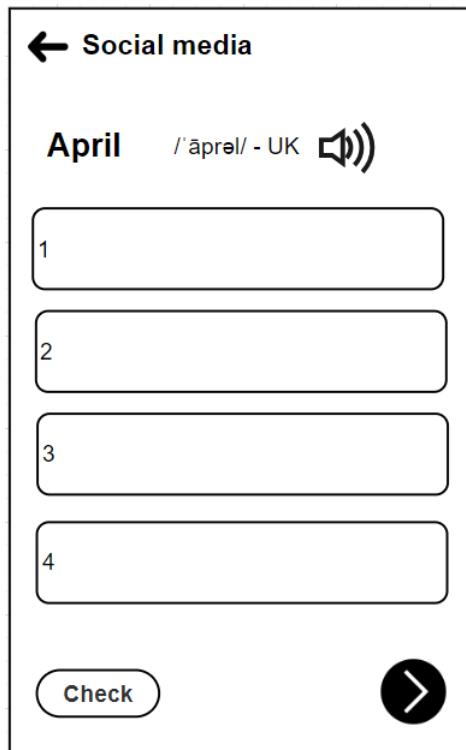
- By embedding context sentences directly into the flashcards, this prototype ensures that learners not only memorize words but also understand how they are used in real-world scenarios.
  - This prototype involves the following steps:
- Detecting New Words:** While browsing any app, the user encounters an unfamiliar English word. They long-press on the word.
  - Pop-up Information:** A pop-up appears displaying the word's meaning, pronunciation, and part of speech. The user selects "Save to Flashcard" to save the word.
  - Screenshot Capture and Categorization:** The system captures a screenshot of the current screen and prompts the user to choose or create a vocabulary category to save the word into.
  - Flashcard App Interface:** When the user opens the Flashcard app, they see their vocabulary categories. The user selects a category to begin studying.
  - Flashcard Learning Session:**
    - **Front of Flashcard:** The front side of the flashcard displays the word and a sentence with the word highlighted in bold.
    - **Back of Flashcard:** Swiping to the back reveals an illustrative image, the word's pronunciation, meaning, and part of speech.



6. **Navigating Between Flashcards:** The user clicks on the next arrow to move to the next word in the category.



7. **Knowledge Test:** After reviewing all the words, the user can click "Test" to check their knowledge.
  - o **Test Interface:** The screen displays a word, its pronunciation, and four multiple-choice options.
  - o **Answer Check:** After selecting an answer, the user clicks "*Check*" to see if they were correct, and then clicks the arrow to move to the next question.



8. **Completion and Review:** Once all words in the category have been tested, the system shows the number of correct answers. The user can choose "Finish" to end the session or "Retry" to review the test.

### 3.3.2. Motivation

The motivation behind this prototype is to enhance the learning process by providing a more traditional flashcard experience with an added layer of interaction. The inclusion of example sentences and images helps reinforce word meanings and usage in a more engaging way.

### 3.3.3. Problem Solved

- **Enhanced Engagement:** By adding example sentences and images, the flashcards become more engaging and informative, helping users better understand and remember new words.
- **Active Recall:** The testing feature encourages active recall, a critical component of effective learning, by prompting users to actively retrieve information from memory.

### 3.3.4. Strengths

- **Rich Content:** The inclusion of sentences and images provides a deeper learning experience, making it easier for users to understand and remember new vocabulary.
- **Interactive Learning:** The ability to flip the flashcard and take a test keeps the learning process dynamic and interactive, improving user engagement.
- **Customizable Categories:** Allowing users to categorize words helps them organize their learning according to personal preferences or themes.

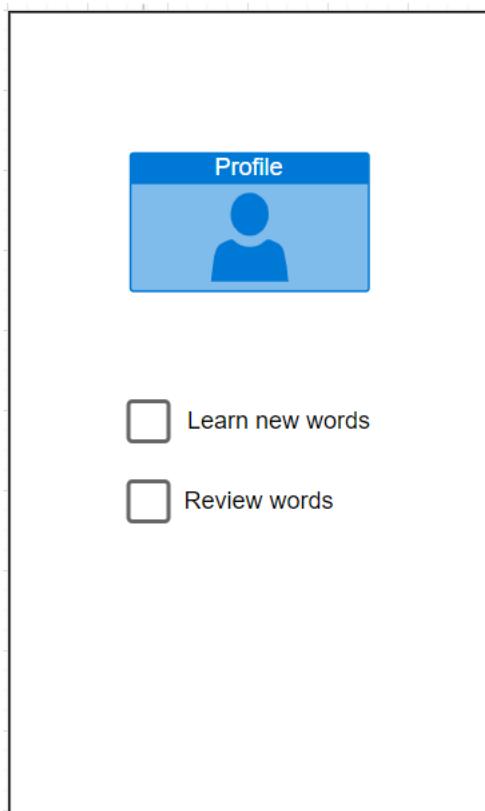
### 3.3.5. Weaknesses

- **Complex Navigation:** The process of flipping flashcards and navigating between different screens might be cumbersome for some users.
- **Overload of Information:** Displaying too much information on the flashcards might overwhelm users, especially if they are beginners.
- **Limited Real-World Context:** While sentences and images are helpful, they may not fully capture the real-world context in which the word was encountered.

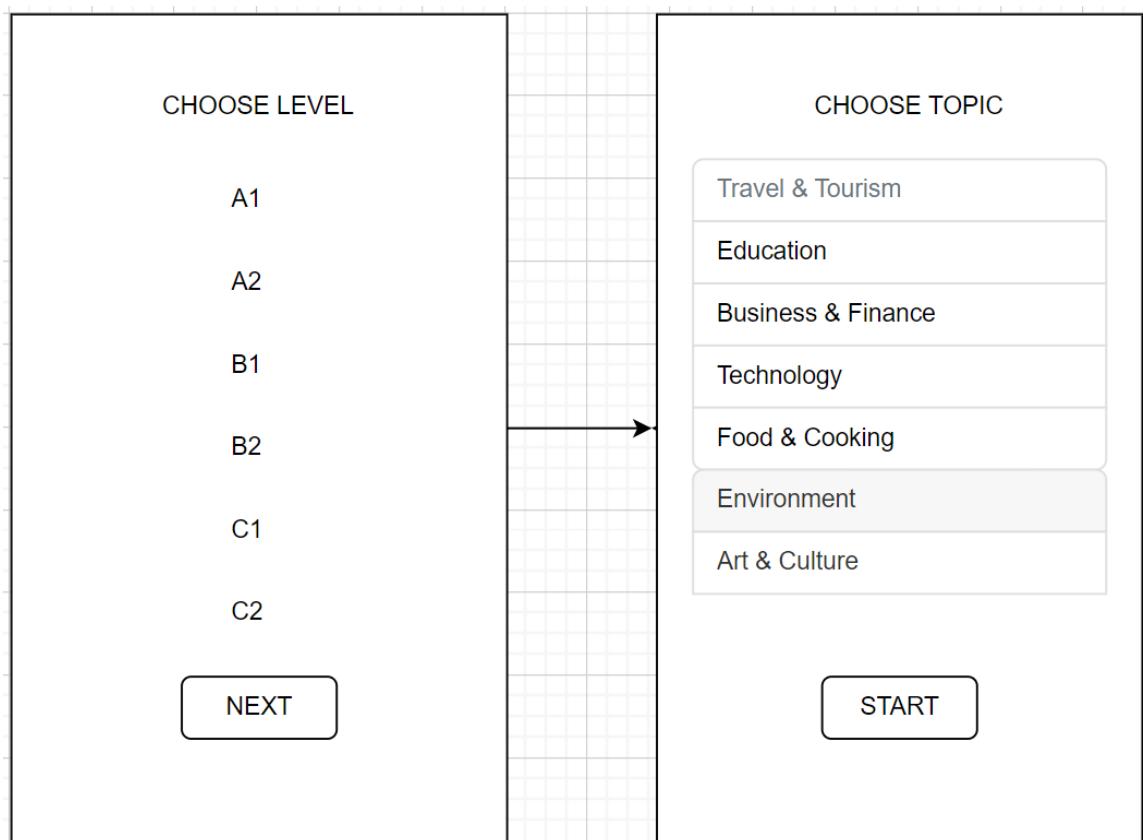
## 3.4. Paper Prototype 2C:

### 3.4.1. Sketch and Description

- The prototype describes the two most important functions of the vocabulary learning app: learning new words and reviewing previously learned words. These two functions correspond to the "Learn new words" and "Review words" options on the user's Home screen.

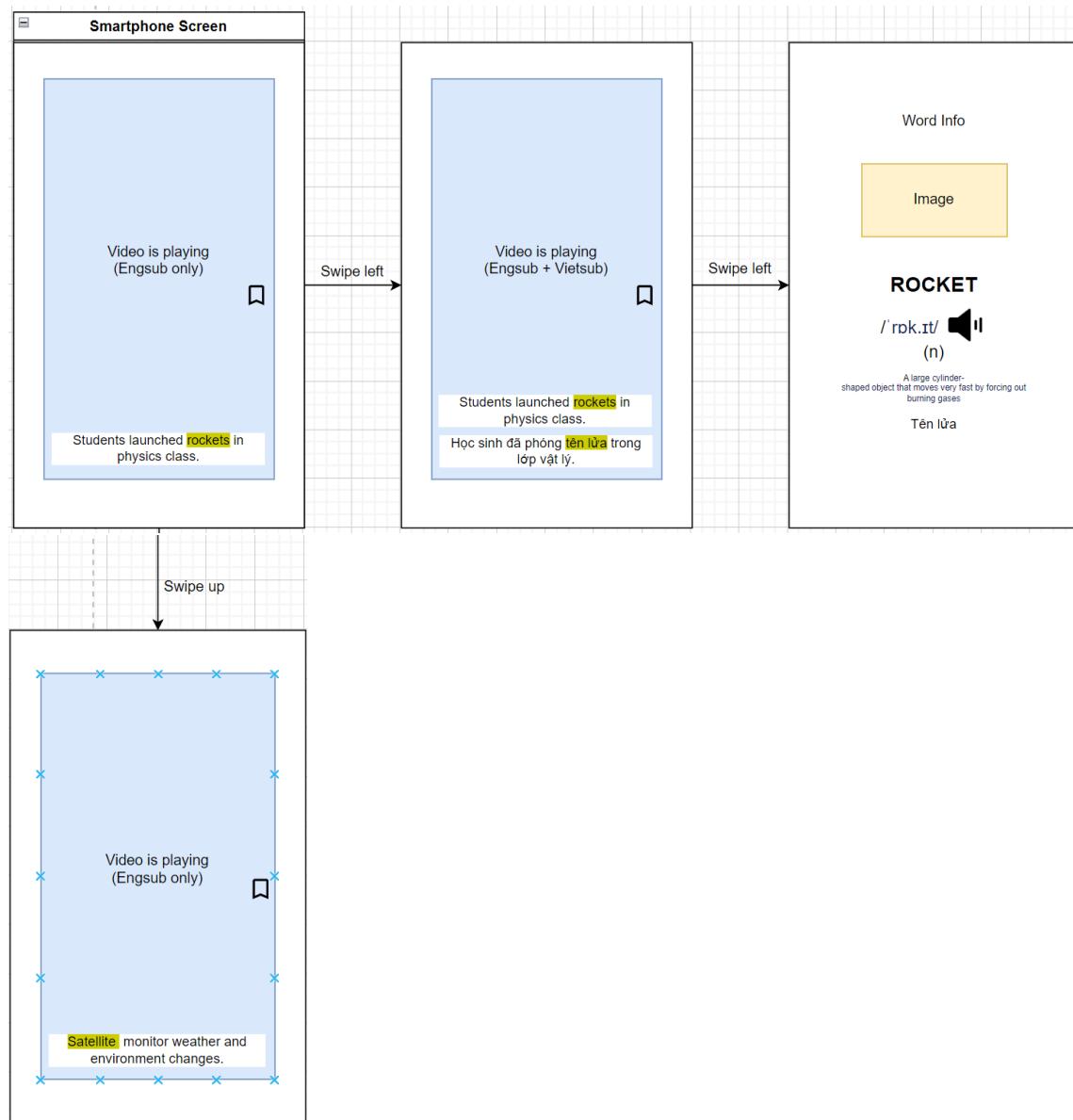


- **Vocabulary Difficulty Level and Topic Option:** In the "Learn new words" section, before starting to learn new words, users need to select the difficulty level of the words and the vocabulary topic they want to study. The design below places the options for selecting word difficulty and vocabulary topics on two separate screens. Users first select the difficulty level, then choose the topic.



– **Flashcard Structure:**

- **First Side:** A short video (under 60 seconds) with English subtitles (engsub) providing the context for the word, with the word highlighted.
- **Second Side:** The same video, but with both English and Vietnamese subtitles (vietsub), with the word highlighted in both languages.
- **Third Side:** Detailed information about the word, including an image, pronunciation, part of speech, the meaning of the word in English, and the meaning of the word in Vietnamese.



– **Learning Process:**

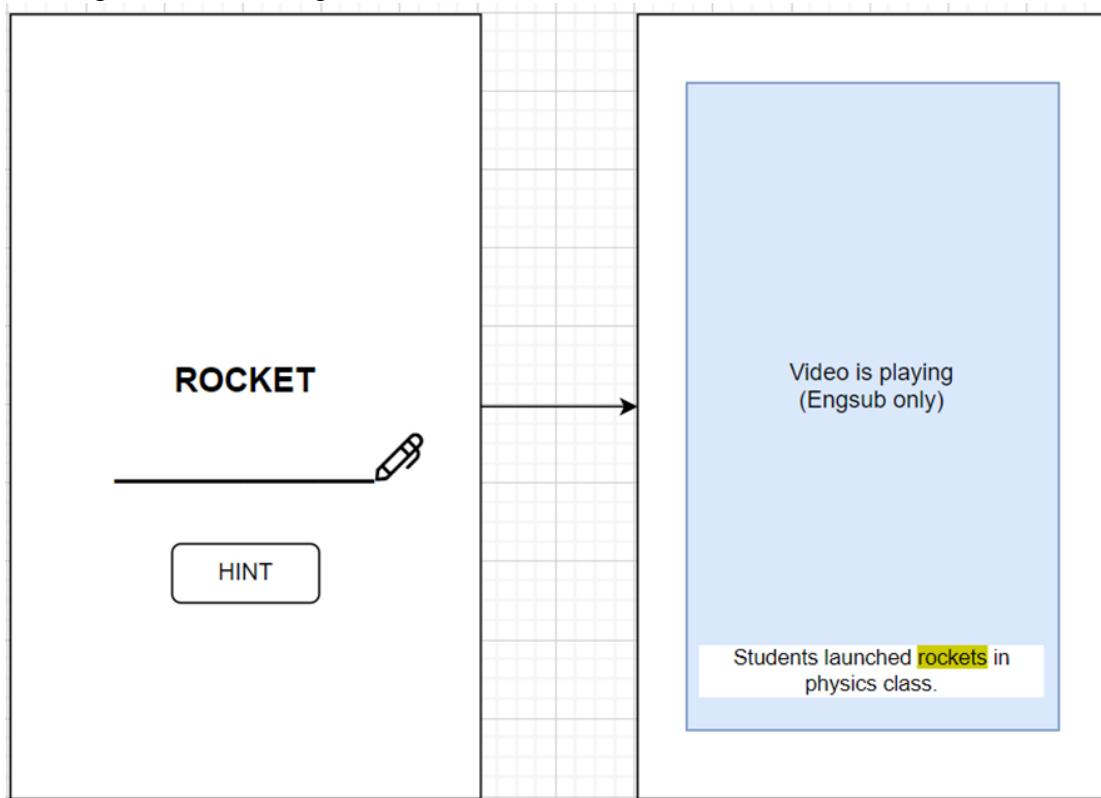
- When a user starts to learn new words, they will first see the first side of the flashcard, which contains contextual short video with English subtitles where the target word is highlighted. They watch the video and guess the meaning of the word.
- When they swipe left to the second side, users will see the contextual video with both English and Vietnamese subtitles where the target word is highlighted. Users can find out the Vietnamese meaning of the word through Vietnamese subtitles.
- Then, when users swipe left again to the third side of the flashcard, they will see detailed information about the word they are studying.
- The user can swipe up or swipe down to navigate through different cards.

– **Supporting features:**

**Save words to a personal list:** This feature allows users to save vocabulary they want to learn. Words saved to the personal list will be reviewed in the "Review words" section.

– **Review Process:**

- Users review vocabulary by answering the Vietnamese meaning of the word shown. When they begin reviewing learned vocabulary, the word will be displayed, and their task is to correctly fill in the Vietnamese meaning.
- If they can't recall the meaning, the app provides a hint feature. This feature allows users to rewatch the contextual video (with English subtitles only) of the word and use that to guess the meaning.



- After answering the meaning of the word, whether correct or incorrect, users can swipe left to review detailed information about the word as well as the contextual video (with English subtitles).
- The user can swipe up or swipe down to navigate through different words being reviewed.

#### 3.4.2. Motivation

The motivation behind this design is to help users personalize their vocabulary list by selecting the difficulty level of the words and the topics they want to study, and sparking their interest and curiosity about the words they need to learn.

#### 3.4.3. Problem Solved

**Boring & Non-interactive Flashcards Design:** The structure of the flashcards has been significantly altered from traditional flashcards, incorporating engaging multimedia elements that create excitement for learners.

#### 3.4.4. *Strengths*

- **Increased Learning Engagement:** The design of the flashcards includes visual contextual videos, and the learning experience is like scrolling on TikTok, which enhances the learner's engagement and interest in studying.
- **Interesting vocabulary hints:** During vocabulary review, if users can't remember a word, they can use a hint. The hint is the context video that the user previously watched in their learning process, which is interesting, effective, and helps users remember the vocabulary more deeply.
- **Short video duration:** The video is short (under 60 seconds), which makes users feel that watching the video doesn't take too much time, so they are less likely to skip it and will watch it in full.

#### 3.4.5. *Weaknesses*

- **Repetitive Selection Actions:** When users are learning new words, they are required to first select the difficulty level of the word and then choose the topic they want to study. These two selections are on separate screens. However, the difficulty level of a word does not change frequently, while the topic can vary quickly according to the user's preferences. This can cause frustration for users repeatedly selecting the difficulty level each time they learn new words.
- **Flashcard Structure Not Optimized:** During the vocabulary learning process, when users swipe to the second side of the flashcard with both English and Vietnamese subtitles, they already know the meaning of the word. As a result, they may skip the third side, which provides detailed information about the word, and move on to the next word. This leads to the third side of the flashcard being underutilized and becoming redundant.