

## FROM UX TO INSTRUCTIONAL DESIGN: SUPPORTING RURAL TEACHERS IN TRANSFORMING STUDENTS' READING INTERESTS INTO ACADEMIC SUCCESS

Zixi Li, Xiaoqian Niu, Botao Lu, Vincent Qiu, & Ying-Chen Huang, *University of Michigan*

This design case records a design competition project in which the team adapted various user experience (UX) design methodologies to instructional design in support of China's K-6 rural school teachers for the increasingly challenging teaching requirements on reading literacy. The solution landed on a mobile application design, YoungRead. The project is the winner of the University of Michigan Learning Levers Development Award and the Zell Lurie Institute Innovation and Entrepreneurship Award in 2020. This design case will describe the design process and how the adapted UX design model may be used in similar instructional design situations to facilitate under-resourced teachers in developing professional skills to bridge students' reading interests and academic achievement.

**Zixi Li** is a doctoral student of the Instructional Systems Technology Department, Indiana University, Bloomington. She holds her B.A. (University of Washington) in Communication and B.S. (University of Michigan) in Science of Information. Her research interests include self-directed learning, self-directed professional development, online language learning, open education, and instructional design practice.

**Xiaoqian Niu** studied user research in the master's program at the School of Information, University of Michigan. After graduation, she started her career as a product manager. With a passion for building tools to guide users to protect themselves online, now she works at Bytedance in Beijing, focusing on developing user-facing search safety features and internal risk detection tools for TikTok.

Copyright © 2023 by the International Journal of Designs for Learning, a publication of the Association of Educational Communications and Technology. (AECT). Permission to make digital or hard copies of portions of this work for personal or classroom use is granted without fee provided that the copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page in print or the first screen in digital media. Copyrights for components of this work owned by others than IJDL or AECT must be honored. Abstracting with credit is permitted.

<https://doi.org/10.14434/ijdl.v14i2.34837>

**Botao Lu** graduated from the University of Michigan, and currently works as UX Designer at MathWorks with a background in Journalism and Information Science. He enjoys working in multidisciplinary environment and believes diversity could drive innovation.

**Vincent Qiu** is a design, technology, and innovation consultant working in digital transformation and futurist strategy. He holds master's degrees in design science and information science from the University of Michigan, and his research interests include human-centered design, choice architecture, behavioral economics, and human-computer interaction.

**Ying-Chen Huang** graduated from University of Michigan, receiving her Masters' degree in Design & Technologies for Learning. Now, she is a trainee director in a school in Los Angeles, she not only leads global online courses but also designs learning materials and assessments for online and on-site classes. Before coming to The United States, she obtained her Bachelor's degree in Language Education and was an Elementary School Teacher in Taiwan. Her teaching philosophy is "Learn from the games", exploring rules and surprises through games and integrating them into daily life.

### INTRODUCTION

A design team of five graduate students with different expertise in information science, learning experience design, and engineering was formed in response to a competition call for inventing digital innovation in education. While the competition specified the goal as creating an interactive digital tool to support pre-K to 12 students learning, the design team had great flexibility to decide on the specific issues that they wanted to solve.

Through a series of research and design activities, the design problem that we choose to address was how to support K-6 teachers to provide quality reading education in rural China. With our deep knowledge of user experience design, the team collectively adapted user experience (UX) methods to leverage their individual expertise to empower quality education. By presenting our design procedure and outcome, we hope to promote an interdisciplinary approach to

learning design. More importantly, we want to inspire design under similar contexts to solve limited resource teaching professional development (PD) restrictions in other regions.

## DESIGN CONTEXT

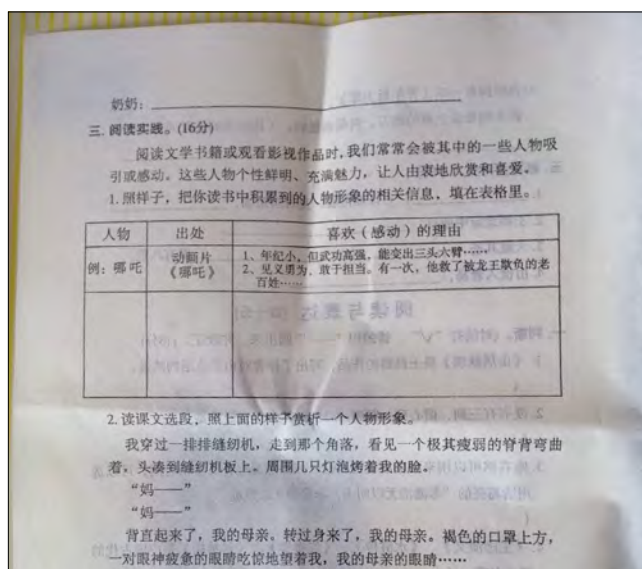
Though the multidisciplinary team has various bases of knowledge and experiences, we are all driven by the idea that quality education and culturally sensitive design are important in every country and community. Based on that big idea, a critical intersection of our past experiences was that we all had some volunteering or teaching experience in rural China and therefore shared common cultural knowledge. In addition, one of the team members volunteered at Dream Corps, a non-profit organization that's dedicated to donating books, opening school libraries, promoting reading activities, and providing training to K-6 rural teachers in China. Dream Corps mentioned that they would like to collaborate on implementation after reviewing our findings and design. Therefore, instead of ideating an innovation from nowhere, partnering with Dream Corps allows us to communicate with real-life stakeholders, understand users' needs through interviews and surveys, and have the opportunity to implement our design to make an impact.

After the first team meeting, we started an initial round of research to gain background information. Each team member independently completed an annotated bibliography on (a) the Chinese rural education situation; (b) rural education literacy; (c) Chinese rural education policy and practice; (d) Chinese rural education trends and issues. We found that there are about 40.5 million "left behind" K-6 students in rural China (UNICEF, 2018). These students face multi-faceted challenges to study well in their environment. Unlike children in urban areas, these left-behind children do not have parental support, and they have limited resources for personal digital devices, community libraries, or extracurricular classes. As a result, they rely heavily on their teachers and resources in school to learn.

In fact, both students and teachers face challenges. Teachers in rural China usually must teach multiple subjects due to the shortage of teachers. In some worst scenarios, there are rural one-teacher schools, where a single teacher is assigned to teach multi-grade students of all course subjects (H. Yang et al., 2018). Table 1 provides some context of the seven teachers we interviewed. For example, P3 must teach 2nd and 4th grade both Chinese and English at the same time. Similarly, P5 must teach the two subjects to 5th graders. P7 must teach English and Math to 4th and 5th graders. In addition, while these teachers are not equipped with sufficient educational training, they may have to wear multiple hats in school management, such as cooking, cleaning, and maintaining facilities.

TEACHER	MAJOR	SUBJECT	GRADE (CURRENT)
P 1	English Ed.	Chinese	2nd
P 2	Chinese Ed.	Chinese	2nd
P 3	Medicine	Chinese & English	2nd & 4th
P 4	Ed. Psychology	Math	5th
P 5	English Ed.	Chinese & English	5th
P 6	Education	Chinese	4th
P 7	English Ed.	English & Math	4th & 5th

**TABLE 1.** Seven teacher interviewees' major back in college, subject currently teaching, and grade(s) current teaching.



**FIGURE 1.** Example of a reading question on a reform exam. The question asks, "fill in the form with a character that you have read from literature books or TV shows." The three columns are titled Character name, Origin (sources), and why you like the character.

The 2019 Chinese exam reform brought even more critical challenges to rural teachers. The reform promoted critical thinking and required students to go beyond memorization. Students could not gain high scores on exams without in-depth interpretations of the in-class text. Hence, the teachers' teaching objective was to prepare students well in answering questions about textbook reading pieces. Yet the reform exams now have more analytical questions based on external readings. Therefore, teachers need to shift from lecturing the textbook readings to fostering critical thinking skills. Also, they must ask students to read more books in addition to the textbook.

With all this context we collected, we started with an initial problem statement: how might we help teachers to prepare students for reformed reading exams?

## DESIGN PROCESS

The design team followed a double-diamond design thinking model that was broadly used in the UX field to discover

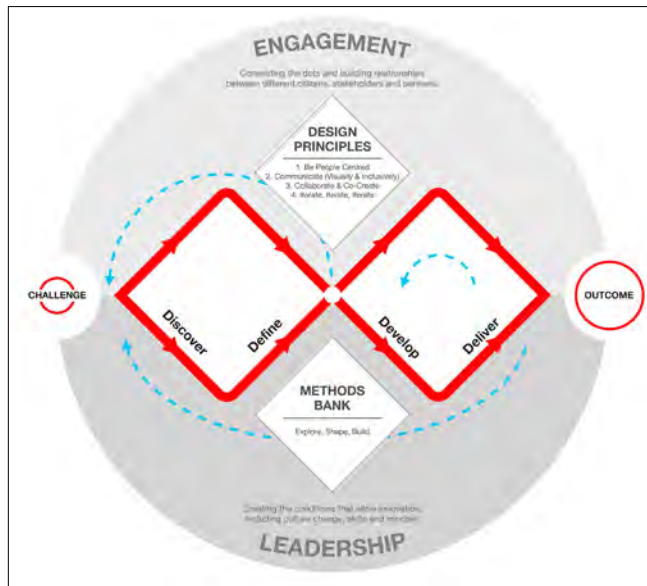


FIGURE 2. “Double Diamond Framework” by The Design Council is licensed under CC BY 4.0 (Design Council, 2007).

the problem and design a solution. Design thinking is an analytic and creative process that encourages experiments, prototype creations, feedback collection, and redesigns (Razzouk & Shute, 2012). Design thinking is a proven innovation methodology that leads to a better product, as it focuses on solving the root problem with creative solutions. The double-diamond model is a graphics-based model that was created by the British Design Council in 2005 (Design Council, 2007). It describes a design process of divergent and convergent stages, including discover, define, develop, and deliver (Design Council, 2007). In each diamond, we go through diverging and converging practices.

We adapted the double diamond design thinking model to suit our design situation. In total, we conducted 12 small exercises. We will provide detailed descriptions of some of the exercises which could be used for instructional design.

### Discover Stage

First, in the discover stage, we conducted a literature review, interviews, and a survey. We conducted the literature review first to have a macro-level understanding of the overall existing situations and issues. It followed with interviews to gather context-sensitive information and identify gaps that were not included in current studies and design considerations. A survey was conducted to collect and include broader stakeholders’ perspectives.

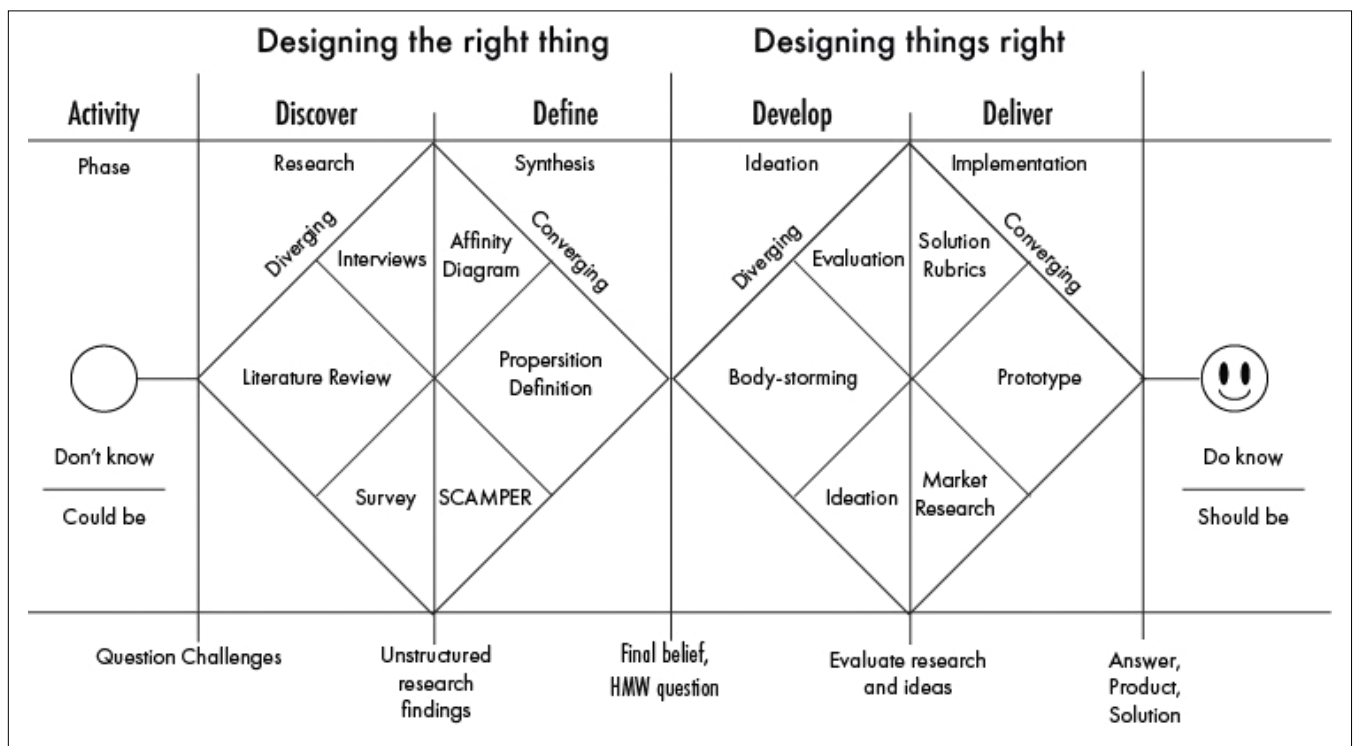


FIGURE 3. The Adapted Double Diamond Model.

### *Literature review*

The team used diverse design ideas from literature across all disciplines, including instructional design, UX design, professional development, reading comprehension, and rural education. In the second round of literature review, each team member conducted an annotated bibliography individually on scholarly articles that were associated with the following keywords: (a) rural teacher support (e.g., technology training support, therapy or psychological support training, and education or pedagogical training); (b) reading methods and activities; (c) remote education; (d) volunteer impact. Annotated bibliographies are documented in the team folder in Notion, a collaborative note-taking web application. The team also established mutual knowledge from the literature to create an interview protocol.

### *Conducting interviews*

Then, we conducted semi-structured interview with each of the seven teachers from rural elementary schools and four Dream Corps staff. Our interviews focused on the following five areas: students' backgrounds, teachers' instructional design goals, their familiarity with digital teaching tools, their performance review factors and pressure, and their feedback for Dream Corps volunteers. The following are examples of the interview questions:

- Students' background: how many students are left-behind students; are there a lot of dropout students and what are their reasons for dropping out of school at early ages; do their students have access to online learning materials (e.g., do they have their phones/ computers)?
- Performance review pressure that teachers face: what is being evaluated for their teaching performances; what has impacted their instructional design?
- Acceptance and knowledge about digital teaching tools: what, if any, media systems do you have in school/ and how do they use them?
- Volunteer feedback for Dream Corps organization and their volunteers: are volunteers helpful? what did they bring? what could they continue bringing to the local community?
- What are some of their instructional design goals: how would they measure students' critical thinking and reading comprehension skill? What are the gaps between teachers' existing and desired instructional outcomes?

By asking those questions, we hoped to find the constraints that we need to consider so that we could solve the right problem in a feasible way. We had one notetaker and one interviewer for each interview, an interview generally lasted 40-60 minutes. After 11 interviews, we had about 10 hours of materials to be summarized.

### *Survey findings*

Additionally, we created and sent a survey to other teachers so that we could design the solution with users in mind. The major takeaways are as follows:

- Teachers prefer to use the phone-view teaching materials more than the desktop view.
- Baidu search and governmental teaching resource websites are the main resources for teachers to prepare teaching materials.
- The most commonly used resource type is Word and PDF shared through WeChat.
- WeChat group is used as a virtual community of practice among teachers across schools.

### **Define Stage**

In the second stage, defining our problem, we used an affinity diagram to analyze our interview data. It is an interview synthesis method for identifying thematic patterns (Q. Yang et al., 2018). Given that the affinity diagram had a large amount of data, proposition definition and SCAMPER exercises were utilized in this stage to refine and accurately define the problem.

### *Interview analysis through an affinity diagram*

We conducted a debrief session right after each interview. In the debrief session, we recorded the important or interesting insights on sticky notes, one insight per sticky note. These insights became the base of our affinity diagram.

The affinity diagram is a bottom-up process that organizes a large amount of language data into groupings based on their natural relationships. We used this design exercise to identify our stakeholders' needs, goals, constraints, motivations, and frustrations. Specifically, we followed the following steps:

1. The team reviewed all the insight sticky notes and put similar insights together.
2. We created a one-sentence summary on each pink sticky note for the group.
3. We grouped pink sticky notes and summarized the key information on purple sticky notes.
4. We iterated and created a higher level of categorization and wrote them on the big blue sticky notes.
5. In the process of creating the notes, we freely moved around the sticky notes and reorganized them as we see fit.

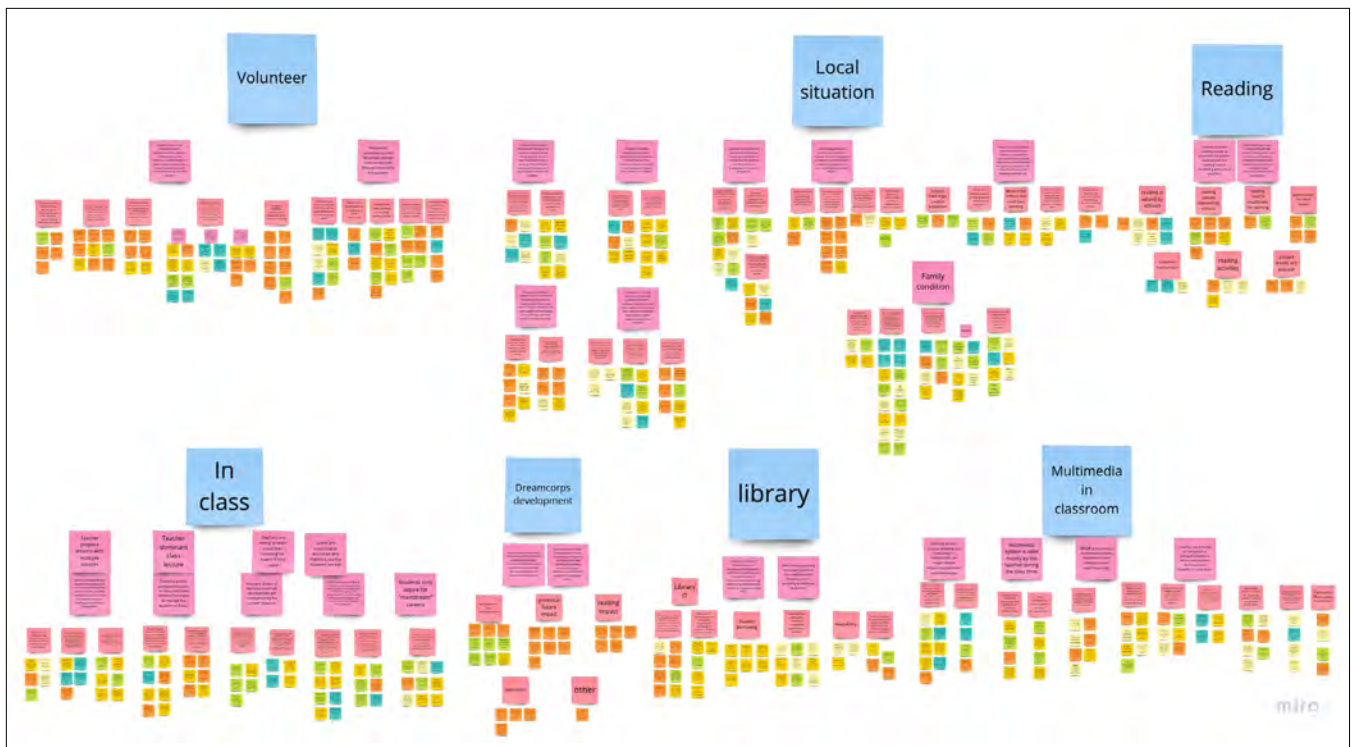


FIGURE 4. Affinity Wall.

We identified three key problems through the interview and affinity diagramming.

- Students cannot answer the more interpretative new Chinese exam questions well, leading to a lower exam grade.
- Teachers do not know how to nurture students' independent reading comprehension skills.
- Teachers do not see the benefit of students' existing reading interest reflecting on their Chinese exam performance.

**Proposition Definition**

With summarized themes and insights, we then did a proposition definition exercise to further define our problem. Proposition refers to a proposed solution or idea aimed at addressing a problem and uncovering any underlying issues or hidden nuances.

Through this exercise, we made the following definitions of our design:

- **Proposition:** It's an educational intervention that is innovative and easy to adapt which increases students' learning motivation, curiosity, and creativity.
- **Issue Definition:** Engage the issue of the gap between performance evaluation and students' interest, raising teachers' awareness about the limitation of required textbooks and the importance of extracurricular resources,

<p><b>Proposition</b></p> <p>It's a ... (kind of thing) That is/has ... (characteristics) Which shapes the world ... (What changes, Who changes...)</p>	<p><b>Issue Definition</b></p> <p>Engage the issue of ... Raising awareness about ... Which is shaped by ... (social, economic, other factors) Which matters because ... (insights) Which you are framing as a ... (kind of issue, an intervention, a challenge)</p>
<p><b>Actor (Human And Non-Human)</b></p> <p>Who and what will be affected by it Their current situation ... Their concern ... their dreams ...</p>	<p><b>Organizational/ Social Relations</b></p> <p>What wider social and organizational entities are involved? How does it shape organizational, social, cultural, political, economics, etc. practices?</p>

(Inspired By Lucy Kimbell, 2014)

FIGURE 5. The proposition definition template.

which are shaped by social expectation, educational structure and policy, and geographic differences.

- **Actors:** Our actors are students, teachers, schools, digital classroom tools (Banbantong), library system, and families. And our actors' current situation, concerns, and dreams are shown in Figure 6.
- **Organization/social relations:** Our organization/ social relations are the Ministry of Education, community centers, and NGO (Dream Corps) with children's focus; we want to break the social norms, such as grade-based evaluation, provide better childhood with happiness, personalities, and autonomy.

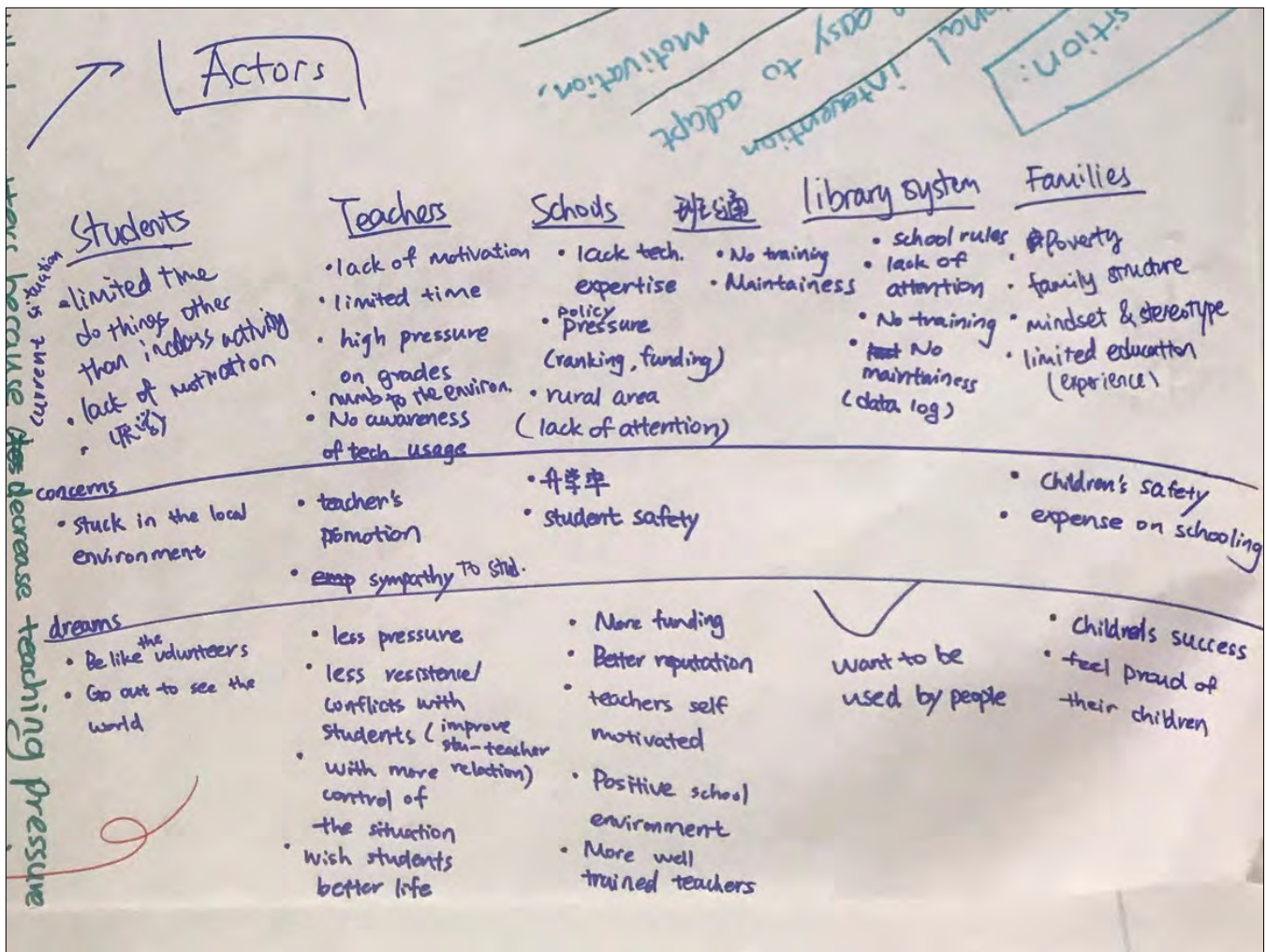


FIGURE 6. Actors' current situation, concerns, and dreams.



FIGURE 7. The team practiced SCAMPER.

SCAMPER

We used our refined proposition as the initial problem statement. Then we used the SCAMPER exercise to find the correct phrasing of our problem statement.

SCAMPER was first introduced by Bob Eberle to help students think out of the box, address targeted questions, and inspire creativity (Sirbiladze, 2017). SCAMPER stands for seven techniques: substitute, combine, adapt, modify, put to another use, eliminate, and reverse.

We used the SCAMPER technique to generate possible substitutes for the verb in the initial problem statement. Then we mixed and matched the response. By voting on the terms, we finally chose the most suitable statement. And at that point, we completed the discover and define stages in the double diamond design thinking process.

After conducting affinity diagram analysis, proposition definition, and the SCAMPER activity, our final problem statement was how might we help teachers to bridge students' out-of-class reading exploration and students' in-class success.

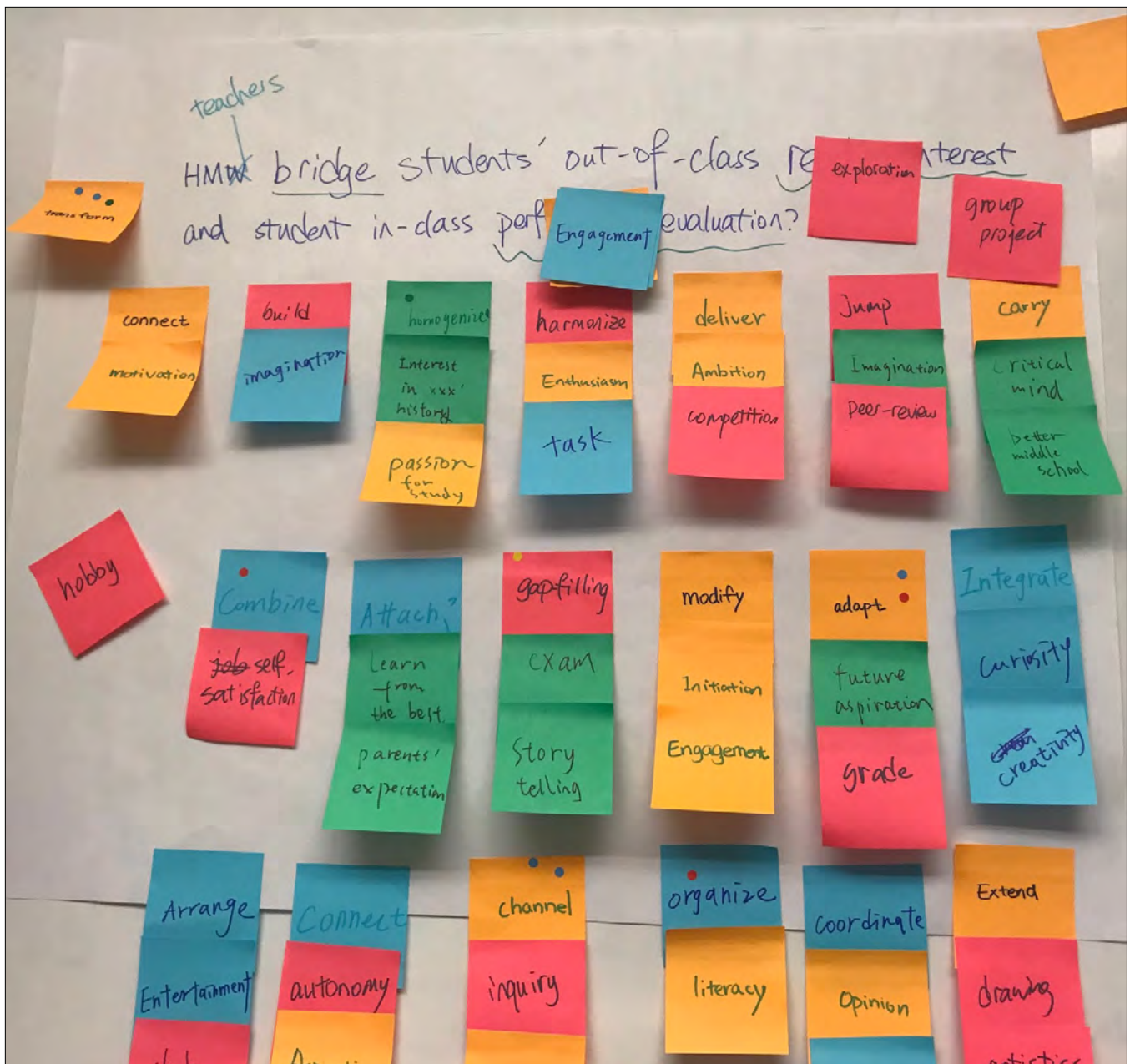


FIGURE 8. Result of SCAMPER.

### Develop Stage

After we defined the problem, we moved to the third stage, develop. We firstly utilized the bodystorming design technique to discover untapped design opportunities for our problem statement, followed by the "Crazy 8s" ideation to further push our thinking out of the box and start comparing and evaluating potential solutions.

Bodystorming is a technique that's like role-play. We named some use cases of the proposition. Each of our team members took turns to be the actors that we identified in the earlier exercise and bodystormed our use case solutions. By bodystorming, we were able to spot needs and pain points

that we did not count into our proposition. It provided accurate contextual feedback for an interactive design.

After discovering some design opportunities through body-storming, we conducted an exercise called "crazy 8s" to finish our last diverging piece: solution ideation.

This exercise is adapted from storyboarding, which visually presents information to create a narrative story. Compared with writing solutions, it helps to think through the context.

In our adapted Crazy 8s exercise, we allowed one minute for sketching out one solution, then moved on to the next solution when the minute is over. We repeated this process

eight times. In the end, each team member individually had eight solutions to solve the problem. With five of us, we have



FIGURE 9. Bodystorming activity.

40 solutions. This timed exercise pushed us to think actively and unconventionally from different perspectives.

After a round of storyboarding, the team debriefed as a group. Each team member shared their storyboards with the group. It allowed us to find possibilities to combine ideas and create more mature solutions.

Then, to challenge our mindset, after the debrief, we did another round of drawing and generated 20 more improved solutions.

To ensure that our design is feasible, the team also regularly included external evaluation with multidisciplinary experts, including international development researchers, applied computer scientists, the director of the Interactive Communications & Simulations (ICS) group, clinical professors, and mobile app developers.

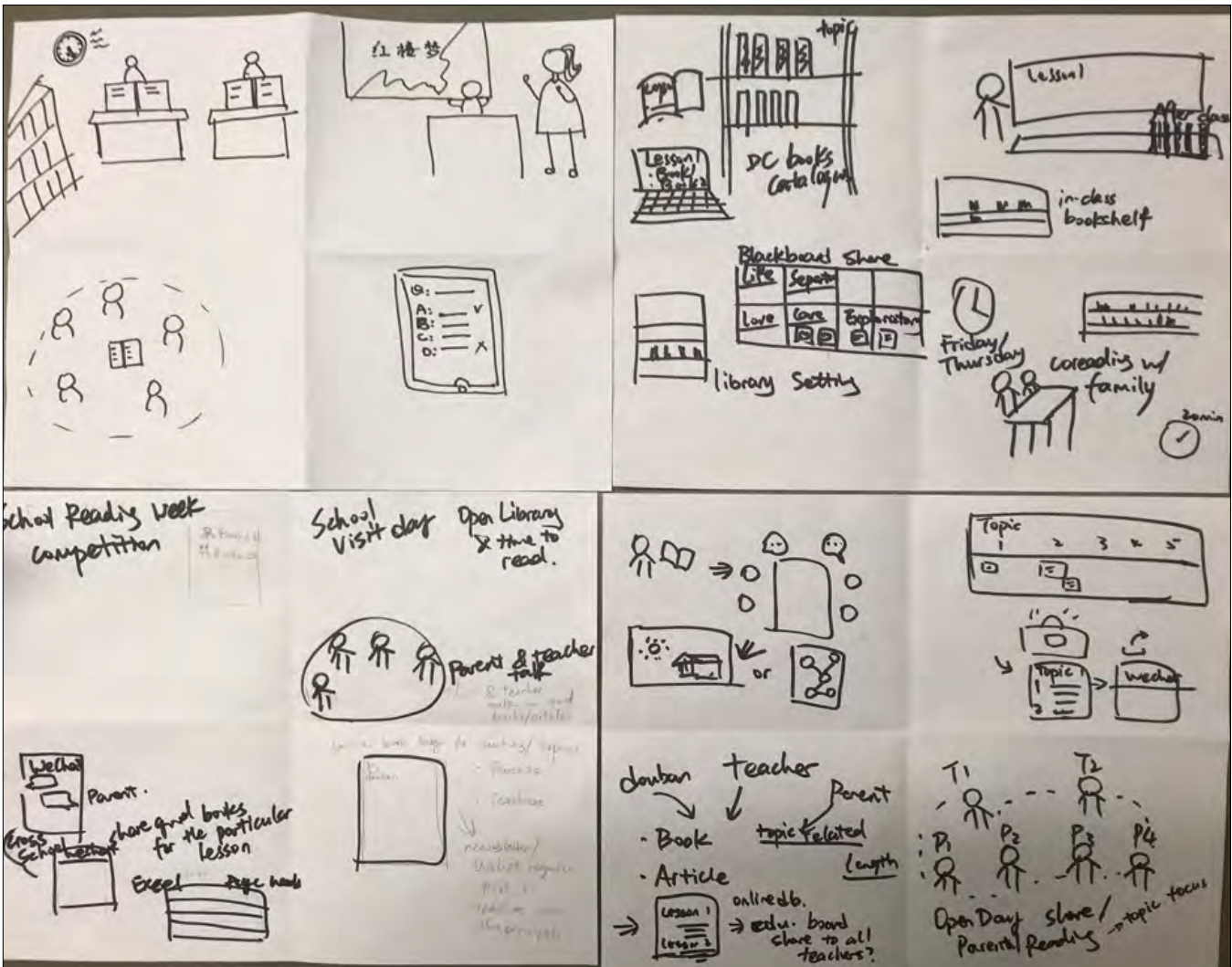


FIGURE 10. Examples from the “crazy 8s” ideation process.



Criteria (Chinese reading)	Feasibility (1-5)	Family Involvement (1-5)	Complexity (1-5)	Specificity (1-5)	Expense (1-5)	Broad app (1-5)	Technology (1-5)	Teacher's burden (1-5)	Direct impact (1-5)	Exam needs (1-5)	Dream Corps (1-5)	Total Score
Rating	4	2	3	3	4	2	4	5	4	4	3	
super easy-to-use powerpoint	5	3	4	4	4	4	4	4	5	3	5	136
use phone to shoot teacher's guide to autdigitize	4	1	5	4	4	4	5	3	5	3	4	132
students roleplay with textbook displayed on the smartboard	5	2	4	5	4	3	4	3	4	4	5	128
Badge to track and reward reading	5	1	3	5	4	3	5	3	2	1	4	110
WeChat/ Online Forum for different school teachers and admins to discuss about tech issues	5	1	5	1	5	5	5	2	2	1	1	106
Wechat exchange school work, headmasters can also work on IT issues and reading	5	1	3	3	5	4	4	3	3	3	4	113

FIGURE 11. Weighted evaluation rubric.

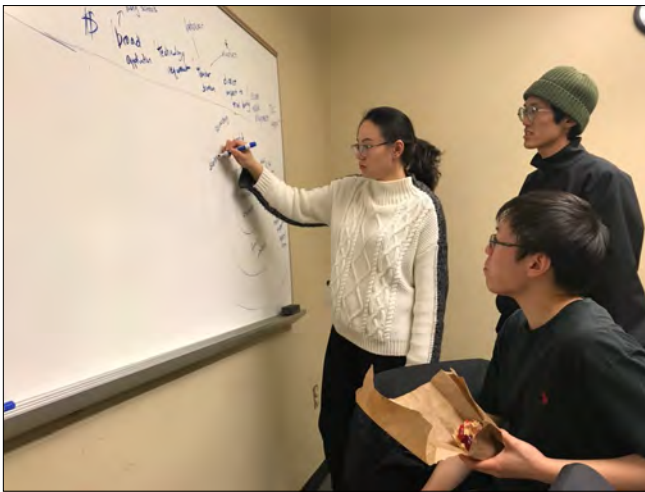


FIGURE 12. The team rated the criteria on a whiteboard.

### Deliver Stage

We developed a solution rubric and a market study based on the storyboard to analyze our ideas more systematically, which led to the creation of the final prototype.

The evaluation rubric was based on our formative research and discussion. We believed that the ideal solution should meet the following criteria:

1. Have a direct impact on students' learning,
2. Alleviate teachers' instructional burden and provide alignment with exam needs,
3. Be cheap and simple to develop and implement,
4. Require minimal-to-moderate technology setup and Dream Corps support,
5. Be targeted to students' grade level,
6. Be translatable to other schools, and
7. Involve students' families in their learning.

We used weighted grades, so the important criteria were evaluated with higher points. For example, as indicated in the Figure 11, teachers' burdens is regarded as the most important criterion, resulting in a rating of 5 points. Secondary considerations such as feasibility, expense, technology requirements, direct impact on student learning, and alignment with exam needs are accorded a rating of 4 points. We scored and ranked all 60 solutions to find the best one.



FIGURE 13. Competitor analysis.

Legend of the comparison matrix	YoungRead	豆猫doiban	豆猫doiban	newsela	101教育PPT	深智者的资料库
Key Dimensions / Competitors	Current	Social Catalog	Social Catalog	Teaching Resources	Teaching Resources	Teaching Resources
Chinese Adaption	✓	✓	✗	✗	✓	✓
Text Comment	✓	✗	✓	✓	✓	✓
Curriculum Alignment	✓	✗	✗	✓	✓	✓
Book Records	✓	✓	✓	✗	✗	✗
Catalog System	✓	✗	✓	✓	✗	✗
Picture Comment	✓	✓	✗	✗	✗	✗
Reading Activities	✓	✗	✗	✓	✗	✗
Current System Integration	✓	✗	✗	✗	✓	✗
Teaching Instruction	✓	✗	✗	✗	✗	✗

FIGURE 14. Marketing potentials.

Based on the rubric, we proposed our solution as a cataloging mobile application that can be accessed through the teacher's WeChat account. The phone app for professional development will facilitate rural elementary school teachers to fully search the school's library collection, match readings with activities, and share self-reflections related to reading

activities. Detailed design considerations and presentations are addressed in the design decision section.

Before we finalized our product ideas, we also conducted competitor analysis to evaluate the market potential for our designed app named YoungRead.

YoungRead sits at the intersection of three existing yet disjointed systems: the library systems, the teaching resources websites such as Hujiang (沪江小学), which provide slides for textbook readings, and the social cataloging sites such as GoodReads, where people can post reviews and share comments on the books that they read. Figure 14 shows the market advantage YoungRead has.

We prototyped YoungRead in Figma. We firstly built a rough wireframe and then moved to a well-defined prototype

## DESIGN SOLUTION

YoungRead, our final design solution, is a mobile application that serves as a digital coach for teachers in their daily work so that they do not need to travel to other places for professional development. Based on the data we collected, WeChat is the most popular mobile app that teachers used in life and for work. Therefore, we designed YoungRead in a way that teachers can log in through their WeChat accounts, phone numbers, or other popular social media accounts (e.g., Tencent Technology's communication platform QQ).

YoungRead has three key features. The first feature is that YoungRead matches the books in the local library collection that align with the curriculum goals. Based on interviews, one interviewee said, "We need to extend from the textbook. Chinese class needs to learn extra-curricular knowledge now." Another interviewee mentioned that "I seek out

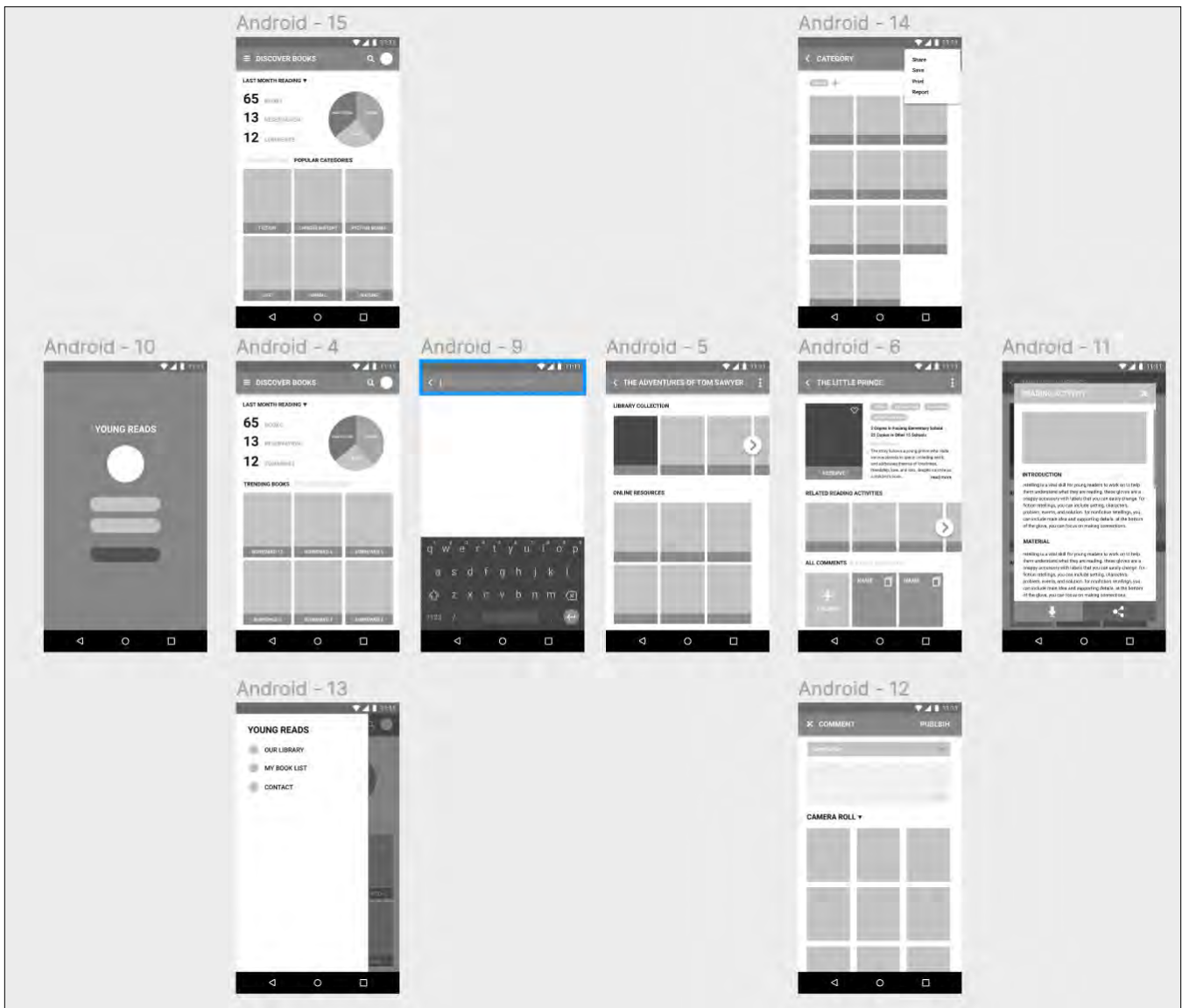
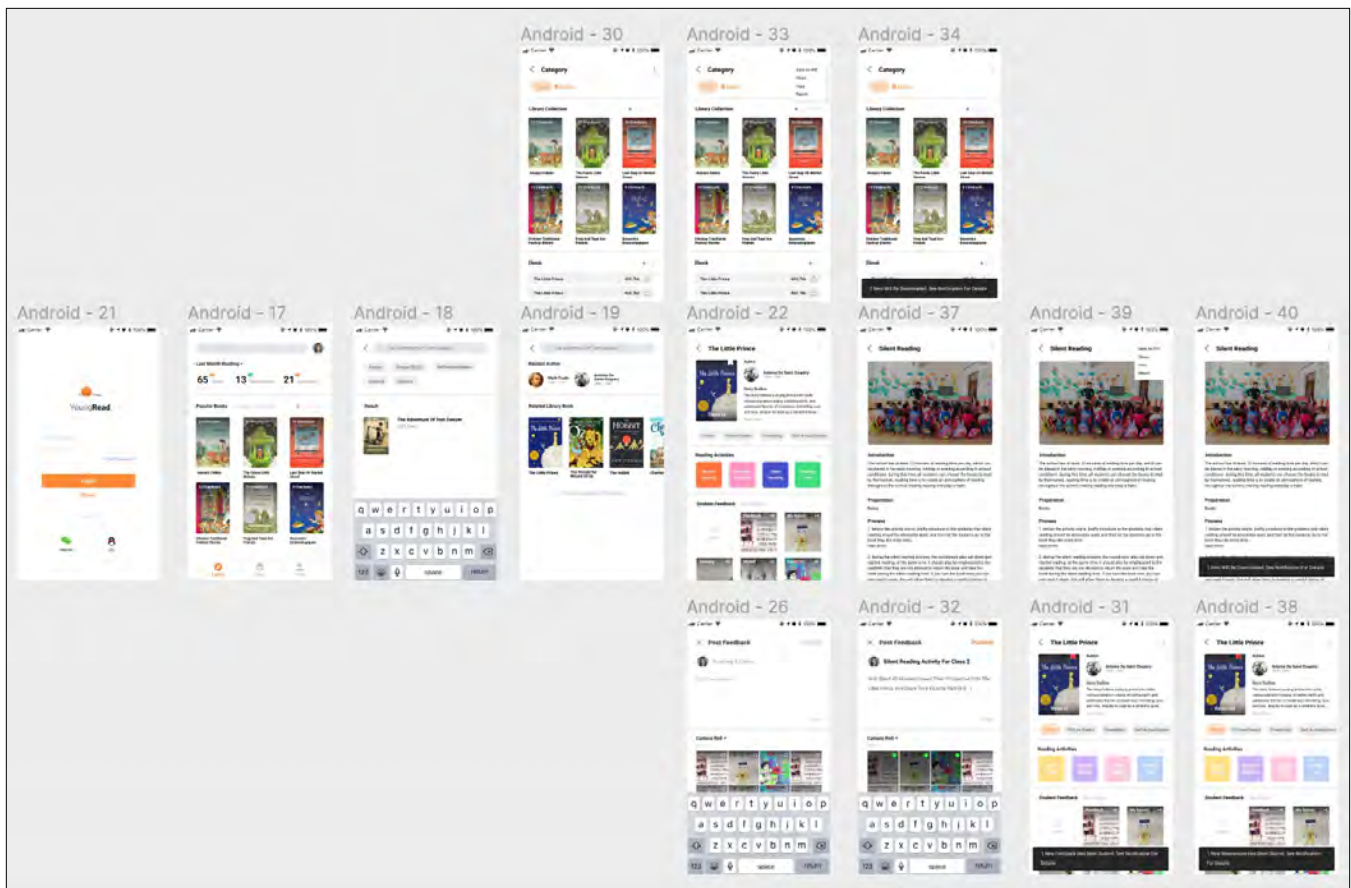


FIGURE 15. YoungRead wireframe overview.



**FIGURE 16.** YoungRead prototype overview.

reading materials with particular themes. The themes covered topics like respecting parents, understanding the truth, and developing a moral foundation for being a human.”

To match books in the school library that correspond to the learning objectives, designers contacted the Dream Corps volunteers to connect with teacher research groups (TRG), an official government organization in China that is committed to teachers’ professional development. Because TRG is an authentic organization, we believed that they can provide some of the most accurate matching lists that best support the learning objectives.

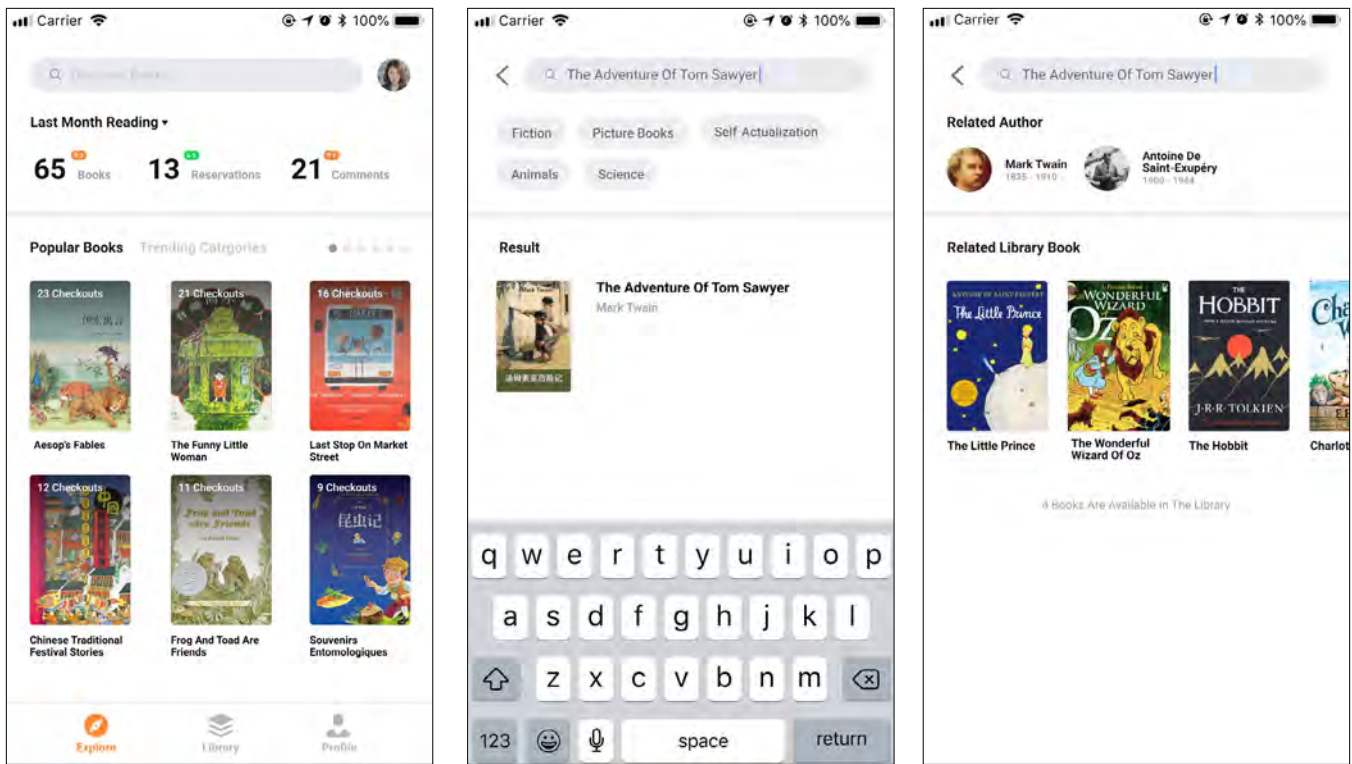
We proposed a use case that took the example of Yaya, a Chinese teacher from rural Hunan Province. Recently, Yaya is going to teach Tom Sawyer, a required textbook reading, and she wants to help her students to explore similar external readings. Therefore, she logs in to the YoungRead on her phone and types in Tom Sawyer. Then, she sees a relevant book that her school library has, the Little Prince. The Little Prince is recommended as relevant because of the same topics of friendship and self-actualization.

The second feature is that YoungRead matches readings with activities. Through our interview, we found that rural teachers have limited professional development opportunities to

learn about new reading activities. One of the interviewees said, “I want to learn from the volunteer teachers how they created those reading activities that got our kids so excited and interested in the classroom.”

YoungRead can link readings with activities. In Yaya’s case, after she clicks on the Little Prince in YoungRead, she sees four reading activities that she could use to engage students to read a book. She skims the preparation checklist, process overview, and question prompts. She can download and print the PDF version to prepare for her lessons. And through YoungRead, she can reserve the Little Prince in the school library system for the students to read.

Finally, the third key feature is that teachers can use the platform as a community of practice where they can share their reflections on their teaching practices and even upload photos of their students’ activities. The rationale for designing this feature was based on our major survey finding that when teachers find good teaching materials, 76.47% of them would save the resources on their phones, and 41.18% of teachers like to share their resources with other teacher groups. Therefore, with this feature, novice teachers and teachers with limited resources can get inspired by the activities and feedback shared by experienced teachers. During this process, teachers get ideas and encouragement



**FIGURE 17.** YoungRead key feature one demonstration. The initial screen presents the primary interface of YoungRead, providing teachers with the ability to browse books using the search bar. The subsequent screen showcases the user's journey while browsing "The Adventure of Tom Sawyer." Lastly, the third screen exhibits the search results for related authors and library books associated with "The Adventure of Tom Sawyer." Note: this app has the Chinese version, and we provide the English version for the international audience of this journal.

from the community. It breaks the constraints of physical location.

In Yaya's story, after she adapts some activities provided by YoungRead, she shares the benefits and challenges of these activities on YoungRead, which help her think critically about her own teaching practice and contributes new knowledge to the community.

## MAJOR DESIGN CHANGES

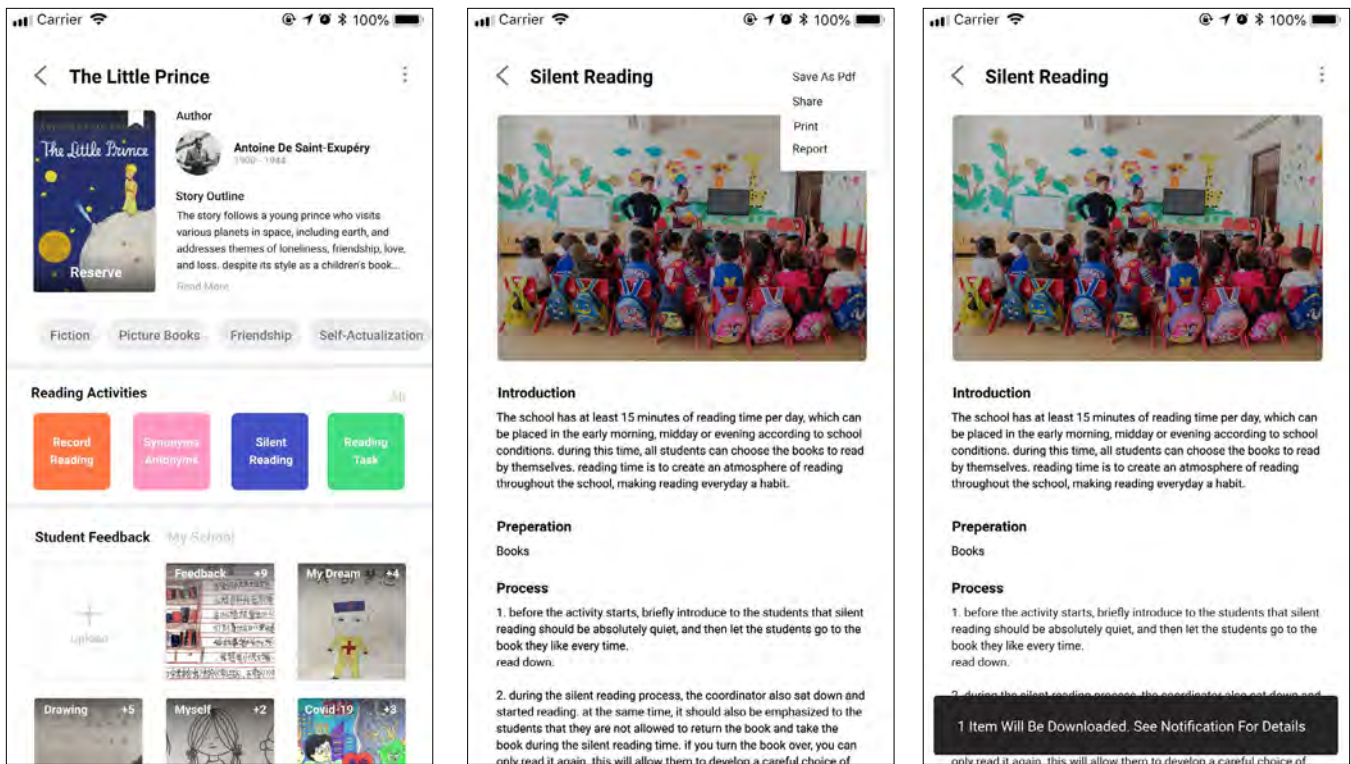
A significant change we made was altering our solution from the student's perspective to the teacher's perspective. To comply with the competition criteria to involve students in the invention, key feature three was initially designed as a feature used by students on the YoungRead platform for peer feedback and reflection from students' perspectives. However, as our data was collected from teachers and volunteers, it made more sense to focus our solution based on the teachers' perspective. Therefore, before implementing our solution with Dream Corps, we modified the feedback feature for teacher usage.

## THE UNIQUENESS OF THE CASE

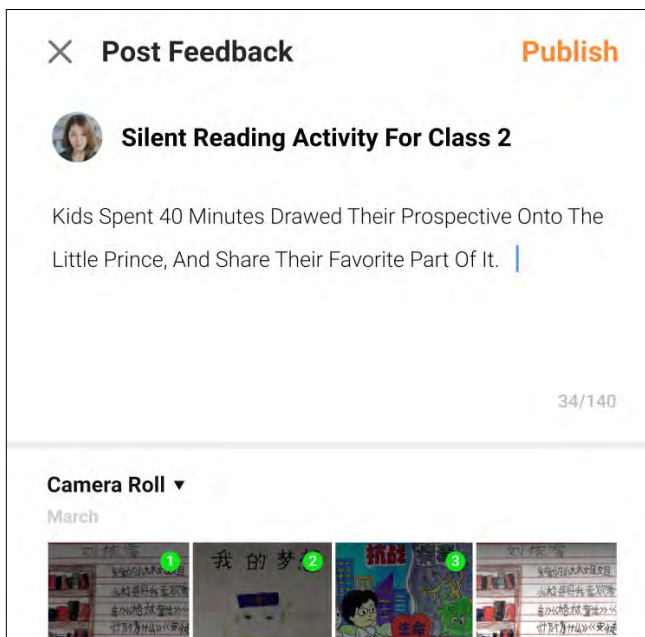
This design was unique in two dimensions. First, the project would not happen without the multidisciplinary and

multicultural team members who have the same interest in the rural education topic. In our first team meeting for the design competition, we quickly identified that we all wanted to create something to support education equity and inspire learning. Though the team members all come from different places, including mainland China, Taiwan, and the United States, where the education system and cultural context are dramatically different, we all shared the same interest to support rural education. In addition, because four of us have graduate degrees in information science, and the fifth member came from a learning experience design background, the intersections of our backgrounds allowed us to use the design thinking process of discover, define, develop, and deliver with the diverging and converging practices in each of the stages.

Secondly, the context of the problem was unique. Different from the context in many other countries, mobile devices, and internet access are highly available in China. Before we designed our wireframing, we sent out a survey to over 150 teachers and received responses from 15% of the sampling frame. Over 80% of the teachers use mobile phones to prepare for teaching; they usually search on Baidu, province-level education department websites, and WeChat pages and groups for teaching materials. Thus, compared with regions where the internet was expensive and where



**FIGURE 18.** YoungRead key feature two demonstration. The initial screen is displayed upon the teacher’s selection of “The Little Prince,” a book related to “The Adventure of Tom Sawyer.” This page presents comprehensive information about the book, including author details, story outlines, keywords, suggested reading activities, and feedback. Moving to the second screen, detailed information about the silent reading activities can be accessed by selecting the blue button in the first screen under the reading activities section. In the upper right corner, the teacher has options to save the reading activity details as a PDF, share it with others, obtain a print version, or report errors. Finally, the third screen exhibits a confirmation message received when the teacher selects the option to save the activity details as a PDF.



**FIGURE 19.** YoungRead key feature three demonstration. The depicted screen showcases the page where the teacher provides feedback on the implementation of reading activities in the classroom through YoungRead.

people did not use mobile devices as a part of their daily life, the high engagement of mobile phones and internet access in the local context enable us to develop our solution in the form of a mobile website so that it’s usable and useful for our targeted audience.

## LIMITATIONS

Given the context that this design was initiated as a design competition project, our goal was not to develop a fully functional product but rather to explore the design process and investigate various possibilities to enhance teaching and learning (e.g., features that can potentially benefit teachers’ remote PD). As a student team without a developer, we were unable to produce a front-end system design within the roughly three-month design time restriction. Therefore, rather than a fully developed mobile application with a database, our design outcome ended up as a high-fidelity prototype.

## REFLECTIONS

Other studies have not been able to support the rural teacher professional development needs in China, but a team like ours was able to foster collective knowledge from teamwork,

as each team member shared knowledge of UX design principles and methodologies, multidisciplinary backgrounds, as well as common cultural understanding of teaching in rural China. This design case contributes to the current field of instructional design by identifying culturally sensitive needs and developing a multidisciplinary team structure that can address equity needs in rural communities.

## REFERENCES

Design Council. (2007). *Eleven lessons: Managing design in eleven global companies-desk research report*. Design Council. [https://www.designcouncil.org.uk/fileadmin/uploads/dc/Documents/ElevenLessons\\_Design\\_Council%2520%25282%2529.pdf](https://www.designcouncil.org.uk/fileadmin/uploads/dc/Documents/ElevenLessons_Design_Council%2520%25282%2529.pdf)

Design Council. (2019). [Picture of Design Council's evolved Double Diamond]. *The Design Council*. <https://www.designcouncil.org.uk/our-resources/framework-for-innovation/>

Razzouk, R., & Shute, V. (2012). What is design thinking and why is it important? *Review of educational research*, 82(3), 330-348. <https://doi.org/10.3102/0034654312457429>

Sirbiladze, K. (2017). SCAMPER technique for creative thinking. In *Economics, Finance, and Management in the 21st Century: Analysis of Trends and Prospects for Development* (pp. 37-40). Financial Council of Ukraine.

UNICEF. (2018). *An Atlas of Social Indicators of Children in China 2018*. <https://www.unicef.cn/en/atlas-2018-en>

Yang, Q., Scuito, A., Zimmerman, J., Forlizzi, J., & Steinfeld, A. (2018, June). Investigating how experienced UX designers effectively work with machine learning. *Proceedings of the 2018 Designing Interactive Systems Conference* (pp. 585-596). <https://doi.org/10.1145/3196709.3196730>

Yang, H. H., Zhu, S., & MacLeod, J. (2018). Promoting education equity in rural and underdeveloped areas: Cases on computer-supported collaborative teaching in China. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(6), 2393-2405. <https://doi.org/10.29333/ejmste/89841>