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Chapter

Utilizing Design Thinking as a Compass to Develop a Personalized Flipped Learning Curriculum

Hisae Matsui

Abstract

This chapter illustrates the process of reforming the curriculum of a Japanese language course in a university through the process of design thinking and addresses its benefits and problems. Design thinking is a human-centered approach to problem-solving that involves processes of discovery, interpretation, ideation, experimentation, and evolution. By applying these processes, a curriculum reform led to the development of a prototype of a personalized flipped learning curriculum that addresses the diverse needs of students. The results of a survey conducted after implementing the new curriculum revealed areas that had improved and needed improvement, indicating that design thinking is an excellent guide for curriculum development. However, they also revealed limitations of applying design thinking, such as the difficulty of addressing the needs of students whose opinions were not able to be obtained.

Keywords: design thinking, curriculum development, personalized learning, flipped learning, world language education

1. Introduction

The first semester of the Japanese language program, JPN101, the first semester of the Japanese Language Program, opens the door to the Japanese language for most students. Many of them arrive on the first day of classes excited to begin their new journey. However, as with many other courses, there are obstacles along the way, and for some students, they may be too high to overcome. As a result, they were unable to complete the course despite still having an interest in the Japanese language and culture. For example, in Fall 2017, 12 out of 60 students dropped out of the course for various reasons. There is no doubt that learning a new language, especially one that is completely different from English, can be difficult, but by reforming the curriculum, we may be able to lower at least some of the obstacles—this is how this project began.

As with any other subject, there are many variables in world language learning, and there is no one solution that works for every world language classroom. Therefore, it is important to design components that target specific students in specific environments, and that is where “design thinking” comes in.
Design thinking is not a new concept. It was first introduced in 1969 by Simon as a “way of thinking” in the design process [1]. Subsequently, Rowe [2] expanded on the concept and described the approach as “a method of creative action.” The concept originated in architecture, design, and art; however, it has since been applied to the field of management [3].

Design thinking is a methodology that imbues the full spectrum of innovative activities with a human-centered design ethos [4]. It focuses on ideas and solutions (products, services, and systems) to “wicked problems”—the need to find viable and novel solutions for specific user groups [5]. Design thinking is an analytical and creative process that involves experimentation, modeling and prototyping, gathering feedback, and redesigning [6]. Innovation arises from a thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way a particular product is manufactured, packaged, marketed, sold, and supported.

While the implementation of design thinking in learning and education is increasing, published research is still relatively limited [7]. Some examples in the literature where design thinking has been used in the development of new curricula and in curriculum reform are in the fields of medical education, professional education, industrial engineering, and entrepreneurship education, as well as in language education [8–12]. Crites and Rye [12] report on the results of an exploratory case study based on the implementation of design thinking in a university’s language curriculum design process. They report that implementing DT has made the curriculum design process more collaborative, creative, and efficient. In addition, implementing DT from the earliest stages of curriculum design has allowed the DT philosophy to permeate future iterations of the course, leading to more consistent curriculum assessment and development [12].

Willness and Bruni-Bossio [13] introduce the curriculum innovation canvas, which is based on the principles of design thinking [13]. They claim that the canvas was created to provide a tool that promotes creativity and innovation, to provide a novel way of thinking about the curriculum development process, and to guide the planning and implementation of the resulting ideas rather than to perfectly match everyone’s context [13].

Given the nature of the design thinking described above, it is clear that although design thinking is not currently a popular method of curriculum development for world language courses, it can be an excellent framework. This chapter will describe how design thinking was applied to reform a world language curriculum and how the curriculum reform affected the learning experience of the students in the course.

2. Curriculum before the reform

Before the reform, the curriculum was a typical traditional curriculum of world language courses at the university level: there were “lecture days” and “drill days.” On “lecture day,” two or three grammar points were explained, and the students had a limited opportunity to practice forms orally. On “drill day,” the students had more opportunities to have pair/group oral practices.

The typical flow of the lessons is as follows (Figure 1).

This was our starting point. From the next section, the process of reform and how design thinking was applied will be explained in detail.
3. The process of design thinking

Although the design thinking process varies slightly depending on the resources, the concepts underlying these steps remain similar. In this project, the design process that the book, “Design thinking for educators [14]” suggested was adopted. The process has mainly five phases: discovery, interpretation, ideation, experimentation, and evolution. The following diagram shows these phases (Figure 2).

From the next segment, each phase will be explained briefly with what was done in this project as an example.

3.1 Discovery

As the name suggests, the main goal of this phase is to discover various issues surrounding the existing problem. During this stage, it is important to consider all the stakeholders involved and understand how they are interconnected by immersing oneself in context and learning from users, for example.
3.1.1 Application to this project

Mainly four activities were done during this phase: class observation of the current course, class observation of Japanese courses where more individualized instruction was offered, conducting a survey of all the students in the course, and interviewing five students from the course as well as instructors.

There were mainly two purposes in the class observation: 1. experiencing the class as a student, and 2. observing how class time was used, how the teacher and the students interact, and how the students interact with each other. Based on the observation, several students were selected for the interview. In design thinking, it is crucial to seek out extreme users, end users who are at opposite extremes and learn from the different issues, needs, and workarounds they have developed [15]; therefore, students who would be outliers on the survey were selected.

During the student interviews, the students were asked about their opinions of the course, how they prepared for the course as well as what their needs were. Similar questions were asked of the three instructors who co-taught the course.

The survey was also distributed to both the students who dropped out of the course and the students who finished the course. The former asked the reason for dropping out of the course, and the latter asked to evaluate the quality of teaching and learning of the course. As an instrument, the Teaching and Learning Quality instrument, which was developed by Frick and his colleagues [16] and revised in their later work [17], was used. The instrument attempts to measure the following factors via student ratings:

- Learning Progress: Student’s perception of his/her gain in knowledge or skill
- Academic Learning Time: Student’s perception of time he/she spends successfully on learning activities relevant to course goals.
3.2 Interpretation

In this phase, all the discovery from the previous phase was transformed into meaningful insights and actionable opportunities. It involves storytelling, as well as sorting and condensing thoughts until one would find a compelling point of view and clear direction for ideation [14].

3.2.1 Application to this project

The results of the survey to the students show that the students who completed the course felt that writing assignments after class was the heaviest and learning vocabulary items was the second heaviest workload of the course. The students who dropped out of the course had similar impressions, but learning vocabulary was the heaviest, and the writing assignment was the second heaviest (Table 1).

Some of the students mentioned in the survey that the workbook assignments were challenging because they were not ready to do the exercise on their own when they had to do it. Although Japanese verbs do not have complex verb conjugations that other languages have, they still have conjugations with which the students need to be fluent.

One student expressed his struggle in the survey as follows:

I just feel like I fell through the cracks in the course. Like I learned so much and I love the language and it’s important to me to learn it. But I was really struggling with the material and it’s fine to say “come to office hours” but at some point, I was so confused and behind that, I wasn’t sure exactly even where to start in office hours. I would have appreciated some optional resources for the grammar.

In the interviews with the instructors, all three instructors of the course were concerned that they sometimes could not do pair/group activities in class because the gap was so severe, especially when the activities involved newly introduced conjugations.

<table>
<thead>
<tr>
<th>Field</th>
<th>The students who completed the course (Mean)</th>
<th>The students who dropped out of the course (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework (Writing exercise)</td>
<td>6.21</td>
<td>6.33</td>
</tr>
<tr>
<td>Homework (Listening exercise)</td>
<td>5.21</td>
<td>5.17</td>
</tr>
<tr>
<td>Studying vocabulary</td>
<td>5.74</td>
<td>7.33</td>
</tr>
<tr>
<td>Studying grammar points</td>
<td>5.57</td>
<td>4.67</td>
</tr>
</tbody>
</table>

(1: very light; 10: very heavy).

Table 1.
The perceived workload for the learning activities.
It is a widely agreeable fact that there are differences in the speed of language acquisition among students. While some students “click” with newly introduced grammar points and learn the Japanese language writing system and vocabulary items without major problems, some students struggle with them. These voices indicate that some of the students did not have enough time and practice to reach the level where they could participate in pair/group practices in class and do writing practices after class.

The survey results and the findings from the interviews were summarized to shed light on the problems that need improvement. Furthermore, four composite character profiles were also created with the findings from in-depth interviews in the previous phase. The composite character profile is a (semi)-fictional character, which can be used to group interesting observations into one specific, recognizable character [18]. These characters were introduced in the meeting so that the instructors could put themselves in the students’ shoes.

3.3 Ideation

Ideation means generating lots of ideas. After identifying problem areas in the previous phase, the focus moves to idea generation. Brainstorming as a group is a crucial component of this step. Brainstorming encourages people to think expansively and without constraints.

3.3.1 Application to this project

The brainstorming meeting was held with all the instructors. In the meeting, each issue that came up in the previous phase was written on post-it notes and posted on the wall, and composite character profiles were shared to clarify the problems in the current curriculum. Several curricula were suggested during the meeting. These curricula were examined further to see if they were realistic or not, and one curriculum was chosen for the next phase.

3.4 Experimentation

Experimentation brings ideas from the previous phase to life. Building prototypes means making ideas tangible, learning while building them, and sharing them with other people to understand how end users respond to the idea and how it can be refined to align with their needs optimally. The goal of prototyping is not to make a perfect representation but rather to make it tangible, actionable, and testable.

3.4.1 Application to this project

It would be ideal if there were an opportunity to run the prototype (the chosen curriculum from the previous phase) on a small scale; however, due to time constraints, the prototype was adopted as a new curriculum for Fall 2019.

In the new curriculum, the lecture-drill format was changed to the format that the students would practice only one target grammar point a day to avoid confusion that some of the students expressed during the interviews.

The flow of the class has changed drastically. The main issue that became clear in the previous phases was the achievement gap among students. Although it has been said that a substantial amount of time and exposure are needed for second language
acquisition [19], class time often does not provide them to the students. Therefore, the benefit of spending as much time as the students need to understand and make a form and meaning connection after the grammar point is introduced is clear. The old curriculum did not offer enough time for most of the students and did not accommodate individual differences among the students. As a solution, “flipped learning” was adopted as a framework of the curriculum.

According to the definition provided in the Flipped Learning Network [20], flipped learning is:

> a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter.” ([20] p. 1).

Direct instruction of the target grammar was moved to the outside of the classroom with options: watching a lecture video and reading the textbook to accommodate personal preferences. Google Forms, which gives instructional choices and small quizzes, and YouTube, which provides video lectures, were used for this part.

After the initial introduction stage on Google Forms, the students do online listening comprehension practices. The main goal of the practices is connecting form and meaning to what the students have just learned. The students would listen to a short sentence or conversation and choose the correct answer. Quizalize, an online platform for classroom polling and assessing, is used as the platform for this practice. By using its “mastery mode,” students can try as many times as they need to reach a 100% score. This is especially beneficial for students who need extra practice to process a newly introduced grammar point. By the time the students complete all the pre-class activities, they should have a basic understanding and some mastery of the grammar point.

In addition to the grammar introduction and practice, the students are expected to practice vocabulary items using Quizlet, a web-based study application, which can help the students memorize the vocabulary items at their pace.

In class, the main focus would be conversational activities in more authentic and realistic situations rather than simple repetitions that the students in a traditional class have to do. After practicing the target grammar point before class, the students are expected to be ready for these activities.

The class concludes with writing practices. Writing practices were often treated as homework in a traditional classroom; however, the results from the interview and survey show that the students who did not quite understand the grammar point struggled with writing assignments because they could not receive the support they needed. Writing practices are individual activities, and the instructor can easily see who needs support. The writing assignments come with answers, and the students can check their answers immediately after they finish. There are also more advanced writing practices for students who complete the first set of practices so that everyone in the class can use class time more efficiently (Table 2).

Here are a diagram and a chart of the flow of the class (Figure 3).

After the semester, the same survey as the one distributed in phase one was distributed to the students in the course. Five students were also invited for one-on-one interviews to investigate their learning experiences with the new curriculum. Furthermore, the instructors were interviewed as well for their insights about the new curriculum.
3.4.2 Results from the surveys and interviews

First, four elements of Teaching and Learning Quality were compared. As the graph shows, there are not many differences between the old curriculum (2017) and the new curriculum (2019). Academic learning time shows a slight decline from 4.08 to 3.91, and the other three aspects, learning progress, student satisfaction, and global quality, show slight increases. Overall, the quality of teaching and learning remained the same (Figure 4).

Next, the perceived workloads were compared. Homework (grammar) in the old curriculum means written homework, while homework (grammar) in the new curriculum means grammar lessons and small quizzes. As the graph shows, the workload for homework decreased; however, the one for studying vocabulary increased even though Quizlet sets were created to reduce the workload of the students. One student...
pointed out that “vocabulary gets pushed to the side to learn grammar” on the survey. This indicates that more integration of vocabulary into grammar activities is necessary (Figure 5).

Furthermore, the perceived effectiveness of learning activities was examined. Interestingly, although the students felt that studying vocabulary is heavy on their workload, they also felt that it helped their learning. The students found more value in studying grammar points and in-class activities; however, less value in the listening homework. In the interviews, several students expressed that listening practice was challenging because the speed of the clips was too fast, and simply repeating them multiple times sometimes did not help. Additional help, such as slowing down function or showing script, might be helpful for these students (Figure 6).

Figure 4.
Teaching and learning quality.

Figure 5.
Perceived workload.
The main purpose of the curriculum reform was to offer a firm understanding of the grammar points so that the students will be able to utilize them and express themselves in real-life situations. Therefore, the survey also asked how much the students understood and utilized the grammar points after lectures as well as after practice. The graphs indicate that while the students in the old curriculum show higher scores on understanding and utilizing the grammar points after lectures, the students in the new curriculum show higher understanding and utilization after practice. One student mentioned during the interview that he wished he could ask questions when questions arose, which is so easy during in-class lectures. A discussion forum was set up for this purpose, but the students did not use it as intended. Having a better form of communication outside of the classroom would solve this problem (Figures 7 and 8).

All the students who shared their opinions during the interviews and quite a few students on the survey expressed their preference for the flipped learning format. No one on the survey expressed his/her preference for the traditional one. The main reasons for the preference were being able to have more speaking practice time and being able to prepare for what was coming in class, even if the grammar point was difficult. Although several improvements seem to be necessary, the overall structure of the curriculum was perceived positively among students. There were still students who dropped out of the course during the semester, but the percentage went down from 20% (12 out of 62 students in 2017) to 15% (eight out of 52 students in 2019).

One main issue that the instructors and some of the students who had interviews felt was that it is very easy to get behind. If a student comes to class without doing homework, he/she can easily get behind in class. One of the students expressed that it was very challenging to keep up with homework, which was assigned every day. The students have to juggle so many “balls” during the semester, and sometimes it is hard to find time to finish homework. Grammar point handouts were prepared for those students, but not having quizzes every day might be a better fit with a realistic (not “ideal” as instructors may imagine) student life.
3.5 Evolution

Evolution is the development and changes that happen to the proposed solution after implementation. Change often happens over time, and reminders of even subtle signs of progress are important.

3.5.1 Application to this project

The findings and thoughts mentioned in the previous phase will be shared with instructors and go back to phase two to plan further implementations. The implementations which do not need preparation time were applied in the subsequent course, and the implementations which require time to prepare will be applied from the Fall 2020 semester.
4. Discussion

Given its human-centered nature with a focus on the end users, design thinking can have a tremendous impact on curriculum development. The survey is undoubtedly a powerful tool to evaluate the current curriculum; however, it may not be sufficient for significant reform. Class observations and in-depth interviews, especially with extreme users, were powerful tools for the interpretation and ideation phases. Curricula are almost always made by instructors or administrators who have expertise in the area of study and also tend to believe what they are doing is good for their students. It is not always the case. Seeing a class from a student’s point of view and having empathy with students are often missing in curriculum development. The curriculum should be designed for the end users, students in this case. In this project, the process of design thinking became a compass for curriculum development.

Even after thorough discussion and consideration of students’ needs, the idea might not work as expected. In this project, for example, listening practice materials were newly created with the intention of offering input as many times as the students need. However, it turned out that merely repeating is not enough for some of the students. This shows the importance of the final phase, “Evolution.” Changing once is not the final stage. The curriculum is and should be fluid and change often over time.

Design thinking also encourages collaboration. The views of multiple perspectives and great minds are always stronger when solving a challenge than just one [14]. In this project, fortunately, four instructors taught the same course. Their multiple viewpoints brought many great ideas to the table. Although it was hard to find time when everyone could meet during the semester, it was definitely worth having the meetings as a great team.

One problem arose during the process. As several works of literature point out, one of the main concerns of flipped learning is that if a student comes to class without any preparation, he/she gets behind easily. There were instances like that during the semester. Vices from these students are desperately needed to prevent that from happening; however, several requests for the interviews had never been responded to, and the interviews with these students never happened. It is not certain that they responded to the survey either due to the anonymity of the survey. Without hearing their voices, it is hard to accommodate their needs. Assuming the problems from their learning paths is the only thing that can be done. This could be one of the limitations of design thinking.

5. Conclusion

In a traditional classroom, it was difficult to accommodate everyone in the class. The majority of the voices from the students might have been heard, but minor voices have often been ignored. Considering the limited in-class time and resources, it is reasonable for us to accommodate the majority. Now, with the advance of technology, the range of accommodation keeps expanding, and these minor voices can be heard. In this project, “the extreme users” provided us with inspiration that we probably could not gain from the survey.

Technological tools, which were adopted for this curriculum, were selected to accommodate a variety of students’ needs; however, it does not mean that they are the best tools for any educational setting. Students from different student bodies in different learning environments may appreciate different tools. We are on a journey to
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finding an optimal curriculum with optimal tools in a given environment or situation. Technology keeps advancing, and our students keep changing; therefore, it is crucial to keep listening to what the students say and finding the best solution available with or without technology, which design thinking has lots to offer.

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