“A Crime of the Spirit”:
Designing for and with Students Outside KU Leuven’s Central Library

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Abstract
In this paper, we explore the development and evaluation of the "University Library Split Game," an educational game designed for and with students outside KU Leuven's central library. Centered around Leuven's library and its renowned split between the late 1960s and 1980s, the game effectively illustrates why this history is still relevant to our user and how it can be employed to help them during their study breaks. After briefly introducing essential background information on both the library split and our target users, we delve into the methods and results of our final tests, the criteria employed to gauge the success of the game, and key insights and conclusions drawn from our observations.

Author Keywords
“University Library Split Game” ; Leuven; Louvain-la-Neuve; KUL; UCL; Spatial Inhibitor Model; User Engagement Model; User-Oriented Design

Introduction
The “University Library-Split Game” is an educational game developed for the 2023-2024 Design Thinking and Making course at KU Leuven. Centered around Leuven’s central library and its historic split between the late 1960s and 1980s, the game involves sorting or splitting movable books in accordance with a series of historic rules used during the library division (See Figures 2 and 3). Designed for and with students taking study breaks outside the library, the game offers a fun opportunity for these users to learn more about the library’s history and simultaneously rejuvenate their minds for more studying.

In this paper, we discuss the development and evaluation of the game in its final stages. Our primary goal is to illustrate not only the historical significance of Leuven's library split but also to demonstrate how it can be employed to fulfill the needs of contemporary users. After providing essential (but brief) background information on both the library split and our target users, we set the stage for an in-depth examination of the methods and results of the final tests. After this, we elucidate the criteria employed to gauge the success of the game and offer key insights and conclusions drawn from our observations.

The Split

During the 1960s, tensions between Dutch-speaking and French-speaking students at the Catholic University in Leuven began to significantly escalate. A key factor for this escalation was the increasing enrollment of Dutch-speaking students, who, for the first time, outnumbered their French-speaking counterparts (Coppens et al., 2005). Despite linguistic distinctions already existing in various university departments, many of these Dutch-speaking students perceived the institution as being predominantly "French-oriented" and sought to redefine its identity. Additionally, other factors – such as changes to the country's language laws – simultaneously contributed to heightened hostilities as the decade progressed. By 1968, a decision was made to address student protest through the physical separation of the university. It was determined that Dutch-speaking students would remain in Leuven, forming what would now be the Flemish university of KU Leuven (KUL), while French-speaking students would relocate to UC Louvain (UCL) in Louvain-la-Neuve. The latter was envisioned as a brand-new university and city specifically developed with these French-speaking students in mind (Coppens et al., 2005).

Considering KUL and UCL were two new, autonomous universities, it was decided that the collection of books at the original university's library would also need to be divided. The city's deep pride in the library – particularly after its post-WWII reconstruction – rendered this a somewhat sensitive issue, prompting discussions in local magazines and newspapers (See Figure 1). Nevertheless, following careful deliberations on a set of rules to ensure a "fair" division of books, a plan was implemented to execute the separation of the collection; on January 1st, 1971, the formal splitting of the library officially commenced.

FIGURE 1: Drawing by Pino Zie in *Pourquoi Pas?*, 7 January 1971. K.U.Leuven, Central Library, J612. Taken from Leuven University Library 1425-2000 edited by Chris Coppens, Mark Derez, and Jan Roegiers.

In terms of the guidelines developed to manage the split, the "odd-even rule" emerged as the most renowned and pivotal. To maintain a sense of arbitrariness, the rule stipulated that all books with even Call IDs would be allocated to UCL, while all odd ones would find a place at KUL (Coppens et al., 2005). Importantly, additional rules were implemented alongside this one to ensure that the integrity of series, such as encyclopedias, remained intact. Given the enormity of this task – with over one million books requiring allocation between the two institutions – the library division would extend until 1980.

(Prototype 1 and Variant)

(Prototype 2 and Variant)

FIGURE 2: Early prototypes

Targeted Users and Early Prototyping

After bodystorming, deploying cultural probes, and interviewing students outside the library, we defined our target user as a 20-year old Flemish student who comes to KU Leuven's central library to study for long periods of times, who takes frequent breaks outside the library to eat a snack or drink some water, who is in need of a new form of entertainment on their breaks – especially one that is limited in time (10-15 minutes) and can rejuvenate them for more studying – and who is interested in learning more about the library in playful and tangible ways. Alongside this, we observed that our user is often competitive and seeks the joy of winning or completing a task. With these insights in mind, we conducted a series of group brainstorming sessions with our users and envisioned potential design ideas together. Ultimately, we decided to pursue a game-based device that focused on the rules used to split the library's collection.

In our earliest prototype (Figure 2), users were tasked with sliding books on movable sticks to either UCL or KUL. The goal was for them to guide the books to either side by moving the sticks at the bottom of the box; nevertheless, we quickly learned users preferred moving the books from the top, as it was easier for them to grab. This idea was then incorporated into our second (mid-fidelity) prototype which had a higher quality playing board, more books, and a button on the front. Later, an LCD screen was incorporated and a short description contextualizing the game.

A major drawback in these initial prototypes was the absence of a systematic method for users to effectively learn about the historical divide while playing *by themselves*. Users enjoyed sliding the books, but only did so based on verbal hints given by the designers overseeing each evaluation. Therefore, in our final prototype (Figure 3), we included two buttons that were connected to an LCD screen and run through an Arduino board. The "Hints" button on the left allows the user to learn more about the library and correctly separate the books in the game, while the "Check Answers" button allows them to verify their progress. Four books –with additional arrows used to clarify how they moved – were included, along with magnets for stabilization and touch sensors that ensure the "Check Answers" button correctly tracks the user's progress. (Please see our annotated portfolio for a more detailed discussion of each feature).

FIGURE 3: The final prototype

FIGURE 4: Location

Final Evaluation: Methodology

Our final prototype was evaluated by users on a Tuesday, Wednesday, and Saturday between 12:30 and 15:00 outside the library's central entrance. Using a table provided by the library staff (Figure 4), the prototype was left alone for user engagement while we "hid" in the surrounding area to observe users' interactions ("In the Wild Testing"). Additional signs were added to the table so passers-by knew the game could be physically touched without any problems. Considering we are students ourselves, "hiding" often involved pretending to be students on a break or, in other words, members of our user group. This meant we could sit on the steps nearby and capture key insights without raising suspicion from (potential) players.

Gathering insights from users while "hiding" involved two main methods: photography and an 'observation template' created in earlier evaluations (Figure 5). As one team member discreetly took photos using their phone, the other filled in the template. For the latter, this involved documenting crucial insights related to the users' appearance/approach, the context, and general atmosphere of each evaluation. For the evaluations on Tuesday, specific attention was also given to the functionality of the buttons and sensors (i.e., whether the user's responses were being correctly read by the sensors).

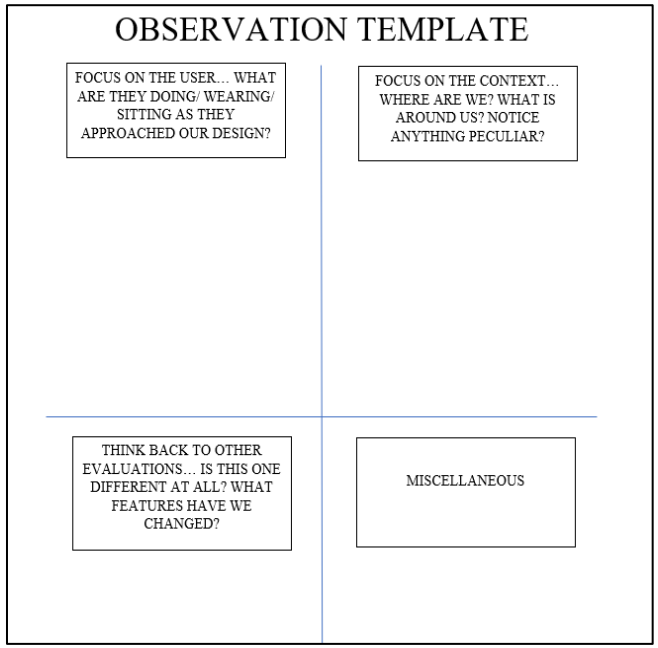

FIGURE 5: Observation template used during final evaluations

1. About the User

- What's your name?
- Are you a student at KU Leuven?
- What are you studying?
- Do you come here often? Why or why not?

2. Circumstances

- What are you doing out here?
- Why did you approach?
- Why did you complete the games? (Why didn't you complete the game?)

3. About the Game / Recommendations

- Did you use the Hints/Check Answers? Why or why not? If so, can you tell us what you learned about the historic rules of the library split?
- What are some things you liked about the game? Why?
- Can you give us some constructive criticism of the device/ your experience?

Figure 6: Interview Questions

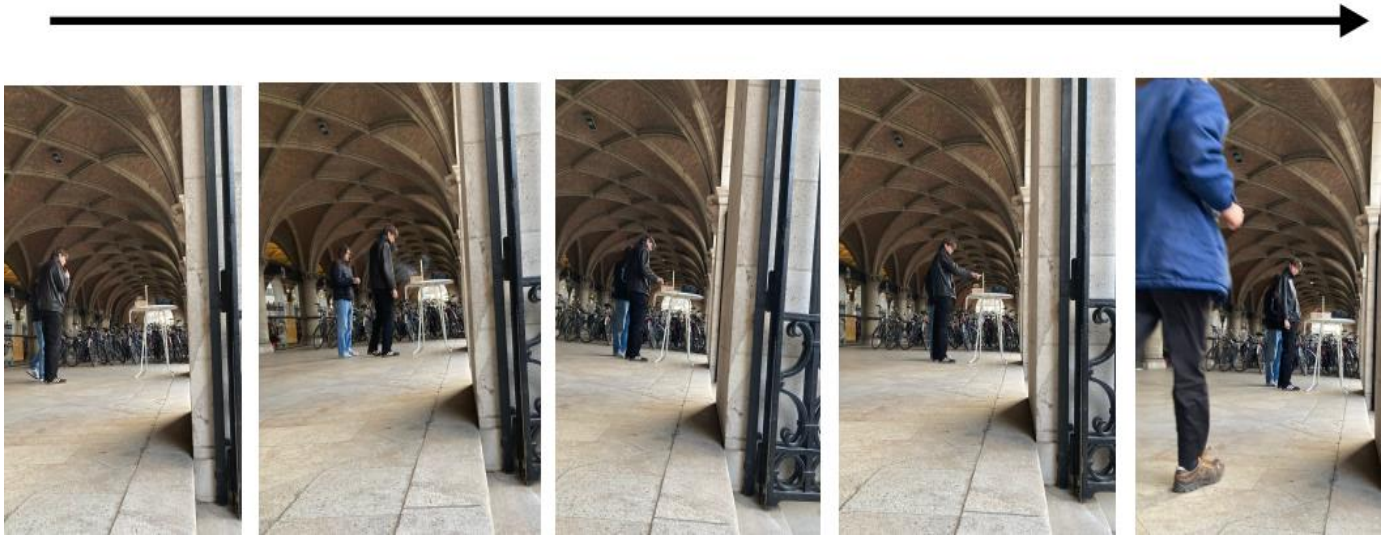

FIGURE 7: Timeline of evaluations. From secretly watching our users engage with the prototype to semi-structured interviews. "In the Wild" Testing.

As soon as players completed the game or began to walk away, the team member filling in the observation template would walk over and begin a semi-structured interview. Each interview was framed around a series of 10 questions (Figure 6), though deviation from these questions was allowable based upon users' comments or important insights noted while observing. If possible, the team member capturing photographs would begin writing down some key observations as the other member continued to lead the questioning. Following each interaction, we would then reflect upon the captured responses and consider what changes we could make for future interviews.

Figure 7 details this process in full. In this instance, while "hiding" on the steps adjacent to the table, we noticed two students on a study break take interest in our prototype. We began to capture photos of their approach, as well as key observations, including the time of day (13:30), their activities (coming outside on a smoke break), their surroundings (no other students on break when they began), and more. After these students completed the game, we ran over to them for a semi-structured interview which lasted 5 minutes. Following this, we retreated to the steps, discussed the insights gained, and prepared for more users.

Depending on how each evaluation went, minor tweaks were made to the final prototype. This was particularly relevant for evaluations on Tuesday when the sensor placement occasionally needed readjustment. In these moments, the prototype was moved inside, quickly fixed, and then brought back to the table for more user evaluations.

Final Evaluation: Results

Assessing the results of the "University Library-Split Game" varies significantly based on the chosen analytical framework or perspective. In terms of functionality, for instance, the device performed rather poorly, whereas its overall usability could be considered excellent. In this section we discuss both of these frameworks and use qualitative and quantitative data as evidence, as well as key insights from established design models.

Functionality

As discussed earlier, the educational component of our game primarily revolves around the use of a "Hint" button that highlights a number of key rules used during the library's split. Users are meant to press this button three separate times in order to get three different pieces of advice for solving the game. The adjacent

FIGURE 8: Hints vs. Check Answers

"Check Answers" button can help the user track their progress – or even help them reorient their strategy if they are struggling – but it is intended to only work in compliance with the hints. For instance, Figure 8 shows one of the LCD messages used with the "Check Answer" button and its subtle reminder to utilize the hints.

Interestingly, we learned that while users are very interested in playing the game (see usability statistics), a relatively small percentage of them will actually utilize all three hints. In our final two days of evaluations

	Used Min. of 1 Hint	Used 3 Hints	Did Not Use Hints
User	7	3	0
Non-User	3	1	0

Table 1: Using Hints. Statistics taken from Wednesday and Saturday evaluations only. Users playing in pairs/groups counted at 1. Data based on interviews and observations.

we were surprised to learn that less than 25% of players used all three hints (Table 1). More commonly, users read one (maybe two) hint(s) before resorting to a series of educational guesses. The effects of this was confirmed in post-playing discussions with users – only a handful of players could tell us back the rules, indicating that they had learned something from the game. In interviews, we learned that one reason for this was the button itself. Held in place by tape and a styrofoam block, the Arduino board would not always read each button press, preventing the user from seeing the next hint in an easy fashion. More generally, however, we learned that the buttons themselves must somehow be reworked for the game to be considered functionally successful (more on this in Discussion).

FIGURE 9: User set on leaving the library; one of the estimated 95% who pass by without playing the game.

Usability

In terms of usability, the distinction between students on a break and students leaving the library plays a major role. In our final two days of evaluations, between 30-35% of students taking a break outside the library (i.e., 3-4 out of 10) played our game, while only an estimated 3%-5% of total people passing-by (all students and others) would engage with it. Students determined to leave the library – by foot or bike – regularly passed the game without even looking at it (see Figure 9). This was not surprising considering the game takes between an average of 10-15 minutes to play (the perfect amount of time for students on a study break). Occasionally, students walking into the library would stop to play the game too, but not at a significantly higher rate than the 3-5% estimate.

Of the students who played the game on a study break, we received strong, positive feedback (see Quote 1 and Quote 2). These players enjoyed sliding the books and found them easy to move once they were stabilized in the final prototype. In terms of location, users found the open-space and ability to play in a group also important. In Figure 10, a group of three students – which would grow to four (see "user timeline 2" in our photo documentation) – gathered around the table to play as a group. Interestingly, this was one of the few groups to utilize all three hints, and one participant even told us, she was surprised "to learn that the encyclopedias stayed together […] I was told all the books were separated." In the future, we would consider designing with a group-setting more in mind, as that might help students engage more with the hints.

"It's nice that you just have to sort it. It's easy to figure out how to play."

QUOTE 1

"I like that there are little book, it makes the game feel more personal."

QUOTE 2

FIGURE 10: Discovery Engagement. Multiple users engaging with our design at once (strong usability) without additional prompting.

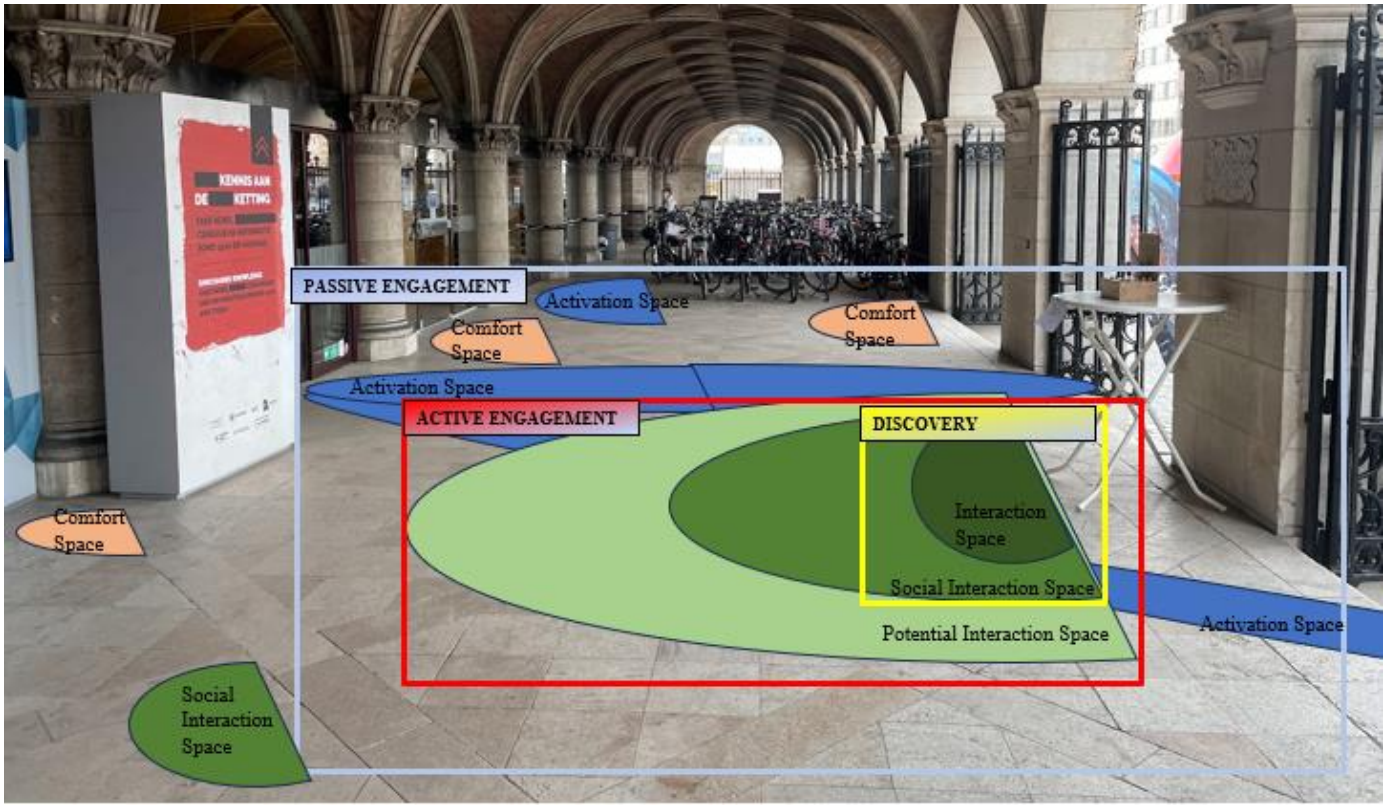

FIGURE 11: Spatial Inhibitors and User Engagement

Criticality

Figure 11 visually highlights some of the results discussed above. In terms of space, the image shows where students first become aware of the prototype (Activation Space) and the many different "Comfort Spaces" students can retreat too if they are interested in our game but too shy to immediately approach. For instance, in Figure 13, we see how two students can comfortably watch the game from a distance while maintaining the flexibility to stay or leave. Considering many students will take breaks at the same time, these available spaces expand our design's potential usability and help attract certain students who might not feel comfortable playing right away.

In terms of user engagement, our evaluations and subsequent design study also revealed key moments in user involvement. In Figure 12, we see a student who has entered potential interaction space and actively en-

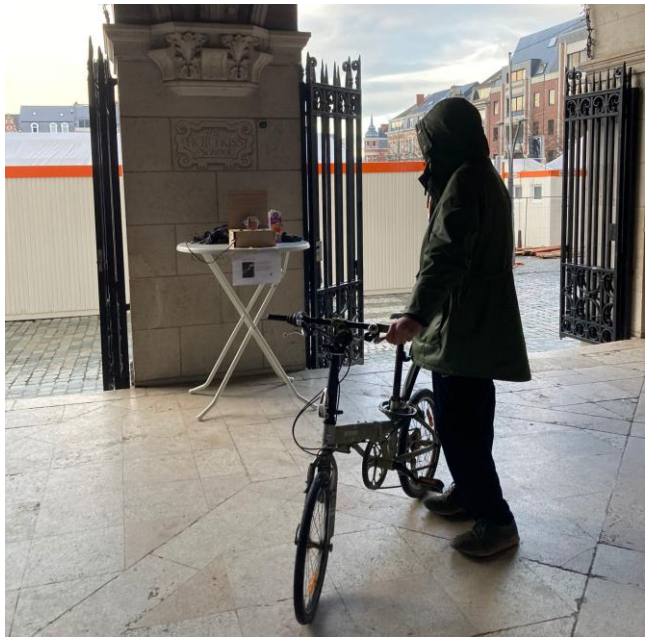

FIGURE 12: Active Engagement; Potential Interaction Space

gaged with the prototype by reading the description. In this state, the user can either withdraw to passive engagement or move into discovery engagement. Interestingly, we learned that if students decide to move into the state of discovery engagement there is a high chance they will play the game until completion (see Discussion, Claim #1 for more information).

While Figure 13 shows the positive effects of having many comfort spaces available to our users, it also gives a glimpse at how the honeypot effect could potentially influence our prototype's reception. In "Uncovering the Honeypot Effect", Wouters et al. define the honeypot effect as a "social learning influence that causes individuals to be affected by the mere and passive presence or activities of others, regardless of any competition, reward or punishment" (2016, pg. 5). In other words, it is the movement from passive to discovery engagement (or from being a bystander to an actor) based on the participation of others (in our case, those playing the game). While the bystanders in Figure 13 never actually became actors, dropping out as audience members, we did notice two instances of the honeypot effect in our final evaluations. Interestingly, in each case, the active users at the time were part of large groups (3 or more players). While these two cases might add up to a rather low percentage overall, it still reveals important information regarding user engagement and the general success of our prototype.

Figure 13: Users watching from Comfort Zone and the Honeypot Effect.

Discussion

Following our evaluations, we formulated the following three claims regarding our prototype:

- *Claim #1: When users start playing, they do not drop out until the game is complete.*
- *Claim #2: During the week, users feel more comfortable playing in groups.*
- *Claim #3: Deploying the prototype on the weekend reveals a more international-based user group.*

Claim #1: When users start playing, they do not drop out until the game is complete.

Interestingly, in our final two days of evaluations, every user who started th "University Library Split Game" played until they had correctly sorted the books (Table 2). In fact, the only user who abandoned the game early was a tourist who had to keep moving with his tour group. While we needed to intervene and help on 3 of these evaluations (mainly because of technical difficulties), users regularly desired to complete the game on their own. This is insightful considering how little each player utilized the hints and reveals our success in formatting the prototype as a game.

	Finished Playing	Stopped Early
User	10	0
Non-User	3	1

Table 2: User Completion Rates. Statistics taken from Wednesday and Saturday evaluations only. Users playing in pairs/groups counted at 1. Data based interviews and observations

Considering how committed users are to solving the game, we could attempt to rework our "Hints" button in the future by making it mandatory. In other words, we could try creating a code that forces the user to press the "Hint" button before being able to check their answer again. In essence, this would force the user to learn in their attempt to win the game. Of course, this strategy runs the risk of angering users and potentially demotivating them from playing; more testing would need to take place to know for sure.

Claim #2: During the week, users feel most comfortable in groups.

Figure 14: A group of students playing together

Throughout the development of "The University Library Split Game", we observed that students who take breaks outside the center entrance of the library often do so in groups of two or more. In our final evaluations, roughly 3 out of 5 users played with their friends, especially between the hours of 13:30-15:00. In Figure 14, for example, we see a group of four students playing the game together. Interestingly, one of these players joined late and, while the others had already played it, they waited and watched her play. One reason why they stayed (according to the users) was because they wanted to see how well she did it compared to them (i.e. how long it took her to solve the game).

Knowing that our user is both competitive and interested in playing with others, another way we could encourage players to use the hints is by making the game more multi-player. While players can currently work together to separate the books, there is no inherent competition between them (unless they each try on their own, which rarely happened except for the instance described above). Perhaps there would be a way to have one student learn the rules and subtly challenge the friend along the way or make each player responsible for a separate university.

Claim #3: Deploying the prototype on the weekend reveals a more international-based user group.

Only in the final weekend of the course were we able to deploy our prototype on the weekend; interestingly, when we did, we encountered more international students who were willing to play by themselves. As Flemish students left for the weekend, the spatial inhibitors and zones of engagement evidently changed. Comfort and Interactive Spaces seemingly expanded for international students who had yet to play our game during

FIGURE 15: An international student playing by themselves on the weekend

the week. Considering we only witnessed this shift in the final week, we cannot definitely state the catalyst responsible for this change: these students may simply have different study habits than Flemish students or different class schedules. Nevertheless, we would have valued the opportunity to do additional weekend testing. After interviewing one of these players, we also learned that these students knew significantly less about the general tension between Dutch and French speakers during the mid-to-late 20th century than our defined user, perhaps making them an ideal candidate for future designing.

Reflection

Through the development and evaluation of the "University Library Split Game", we take pride in successfully developing a design that could be played by our users. By the final presentation, we had created a functioning prototype that many different players were able to engage with *by themselves*. Nevertheless, the timing of this was rather late. When evaluating earlier prototypes, we frequently resorted to "Wizard-of-Oz" testing which ultimately delayed key "In the Wild" insights till the final weeks. For instance, it was only after solving issues with the sensors that we could test the device without any intervention. While we are proud of what we accomplished, we wish we could have made some of these final adjustments earlier.

Reflecting on this course's methodologies, the Empathizing stage of design thinking was a recurrent and crucial approach for our group. We frequently practiced bodystorming, observation, and interviewing with our users. At the same time, we struggled to find a strong Point of View (Define). We believe it was not a lack of effort or empathizing, but rather a struggle in understanding the key needs we should focus on. However, by the end of the course, we feel as if we gained a stronger grasp on how to develop a POV.

Alongside Empathizing and Defining, The Prototyping and Testing stages were significant to our project and demanded extensive afternoons of work. This was particularly true when we started coding and placing the sensors within our prototype. On top of this, problems often surfaced only after testing. For instance, we were shocked when we learned users generally played without hints, something we simply assumed users would utilize from the beginning. Despite these challenges (and the many others reflected on throughout this paper), we are both proud of solving many issues on time.

In conclusion, our knowledge has significantly increased throughout this course. Design emerges as a dynamic and problem-solving approach with circular but interconnected series of phases. This structure enables us to jump between phases, consider the users' needs, and foster collaborative idea-sharing. Recognizing the importance of shared-thought with users, we have observed how open discussion boosts our creative perspective and leads to progressed projects.

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