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TC 841: Fall 2013

1 EXECUTIVE SUMMARY

Ethnographic research was conducted to inform the design of an interactive technology-supported experience that will encourage adult English as a Second Language (ESL) learners to practice their emerging English language skills together during free time.

The researcher employed a combination of convenience and purposive sampling, engaging in two observation periods at a local university. The researcher observed students enrolled in an intensive ESL program at the university as they ate lunch in the campus dining hall. The researcher paid special attention to the characteristics of the students including their dress style, communication style, use of technology during the meal, interaction with group members during the meal, time spent in the dining hall, and language use—particularly which students, if any, used English to communicate, when, and how.

1.1 CHARACTERISTICS OF POPULATION OBSERVED

Total Individuals observed	24
Groups observed	9
Max group size	4
Min group size	1
Average group size	3
Ethnicity	Asian
Age Range	18-24

Gender

9 Male, 15 Female
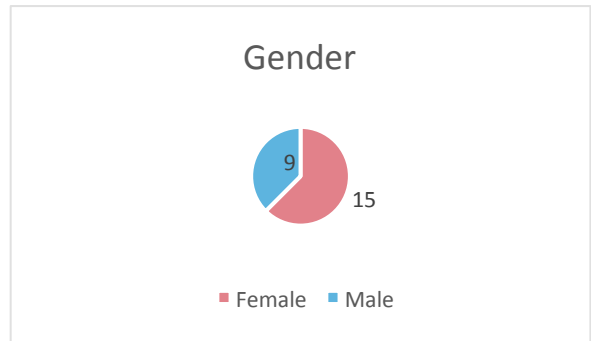
Subjects were chosen based on similarity to the target audience and initial design persona. Due to the apparent availability of subjects, and perhaps the makeup of the ESL program, all subjects were of Asian ethnicity and a strong majority were female. Students were observed and coded individually and based on seating.

1.2 SIGNIFICANT FINDINGS

Students were mostly casual. Students dressed in an overall casual style, typical of college-aged non-ESL students.

Students exhibited four basic communication styles. Students displayed four basic communication styles that seemed to correlate with other characteristics. These styles are useful for building personas.

Animated Alice	Uses mannerisms and seems deeply involved in communication, in addition to Friendly characteristics.
Friendly Fran	Openly smiles and/or laughs during communication, or makes others laugh. Seems pleasant, playful and/or warm during communications.
Reserved Rina	Does not express much emotion during the communication. Spends more time listening or focusing on something else.
Withdrawn Will	Does not express emotion or interest in communication. Spends the majority of time focusing on something else.

Student comfort levels related to communication levels. Students who interacted more and had friendly or animated styles of communication also seemed to be more comfortable in general. Other students appeared to change in affect, becoming more comfortable as they engaged in conversation longer.

Smartphones were widely used, but… they were not used often, on average. It also seemed that as student interaction increased, their interaction with technology decreased.
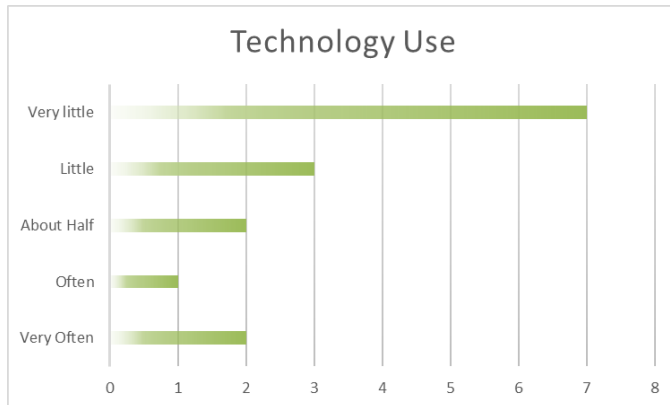
Technology Use

Used Smartphone		Avg Tech Use	Avg Engagement
Animated Alice	2/2	1.5	3
Withdrawn Will	2/3	2	n/a
Reserved Rina	5/8	1.25	2.63
Friendly Fran	6/11	1.27	3.72

Smartphone distribution was not even. More male students than female students used smartphones. Recall, this behavior was observed in a group with a sizable majority of female students.

Students do not stay in the dining hall longer than they have to. On average, students spent only about 30 minutes at their tables, and about 20 minutes of that was spent eating.

Students did use English, but… not many, and not often. Only 4 students used English, and three of those students were in the same group. They appeared to use English to communicate because it was a common language among them. All English users displayed friendly communication style and could be described by the Friendly Fran persona.

G/S#	Gender	Engagement	Comm Style	Affect	Affect Change
C1	Female	4	Friendly	Comfortable	Warming
C2	Female	2	Friendly	Comfortable	Even
C3	Female	4	Friendly	Uncomfortable	Warming
E1	Male	4	Friendly	Comfortable	Even

1.3 RECOMMENDATIONS

Based on the findings of this study, the following design recommendations are indicated:

- Design primarily for female users (without excluding male users).
- Keep the experience short and flexible.
- Give users full control over the timing of the experience.
- Gear the experience towards supporting conversation and interaction in the physical space.
- Encourage--and help--students to use English instead (of the languages they are more comfortable with).

- Do not require users to use only English during the experience.
- Do not require audio for the experience.
- Do not require users to speak (to the device) during the experience.
- Do not require every user to have a smartphone.

2 INTRODUCTION

This report presents the findings from an ethnographic research study conducted in two stages on October 11th and 16th 2013. Ethnographic research was conducted to inform the design of an interactive technology-supported experience that will encourage adult English as a Second Language (ESL) learners to practice their emerging English language skills together during free time.

The planned target users for this product are younger adult ESL learners (in about the 25-34 age range) with some prior experience studying English as a Foreign Language (EFL). Although these learners may have achieved a level of comfort using English before moving to a primarily English speaking country, many EFL students find that their formal study has not prepared them well for an immersive experience. They may have enough skills to get by, but often have difficulty communicating with native English speakers and navigating more complex interactions.

For ESL students seeking to form connections with native English speakers and classmates who speak other languages, English serves as a lingua franca. However, the difficulty of learning English becomes a communication barrier for many. In addition, many ESL students find ample opportunities to speak languages *other* than English—especially while studying in the United States. The size and diversity of the general population makes it likely that some ESL students will be able to find communities where their native language is spoken primarily, lessening the need to learn English. In addition, many ESL students join classes with other students who speak the same native language. Some students travel and live with older and younger family members who have less developed English skills.

Ethnographic research was chosen to collect information on the behaviors and characteristics of the target population in one of the contexts where the product may be used (while sharing a meal in the cafeteria). Research focused on observing qualitative and quantitative information describing communication, interaction, and use of technology among the target users.

3 METHODS

In order to conduct ethnographic research, the principal researcher visited the campus of a nearby university offering an English immersion study program. Students of this program are accepted from all over the world. Many join the program to enhance their skills prior to entering other college courses at the university. Some join the program to enhance their English skills for business use, others join the program while vacationing in the United States. While enrolled in the program, students are welcome to live on campus and use campus facilities, including the student dining halls.

The English immersion program follows a regular schedule, allowing for an hour and a half lunch break on weekdays. The principal researcher visited the campus on two occasions during this window to

complete observations of the student dining hall. The researcher used a combination of convenience and purposive sampling to complete this study. The English immersion program was chosen for proximity and likeliness of finding research subjects in or near the target demographic (being college-aged students, the research subjects were most likely in the 18 to 24 range rather than 25-34). During the observation periods, the researcher recorded only subjects appearing to be part of the English immersion program. The researcher recorded general characteristics of the research subjects as well as information about their interaction and technology use. The researcher relied on visual and auditory information to record qualitative and quantitative data. While the researcher watched for technology use and interaction, he listened for English spoken among the subjects. No identifying characteristics were recorded.

3.1 ENVIRONMENT

The semi-open floor plan of the dining hall divides the seating space into four distinct sections.
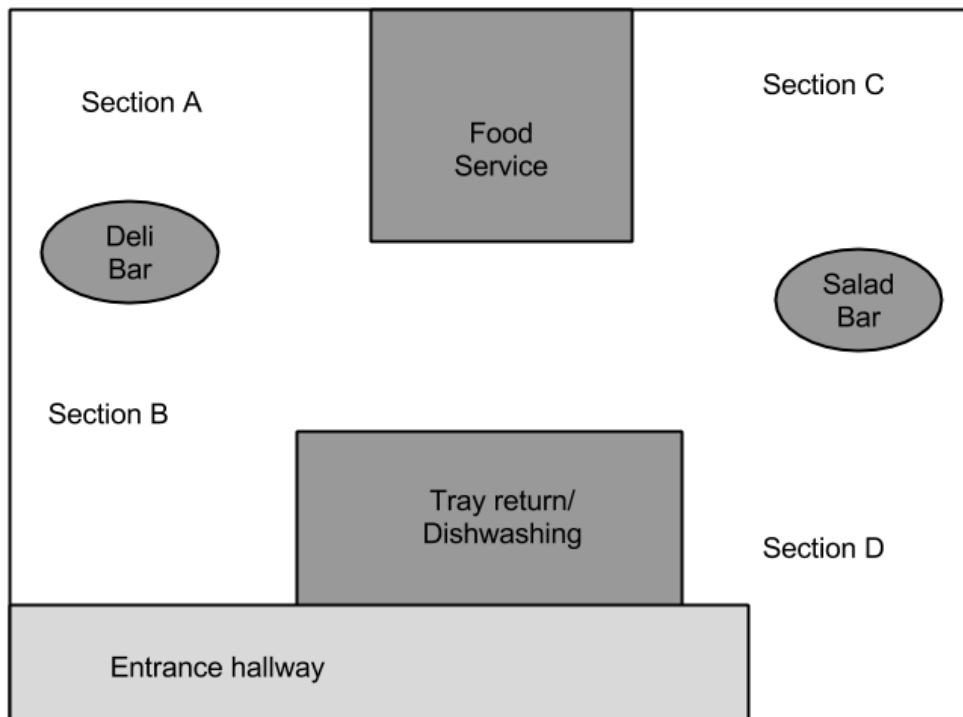

Figure 1: Dining Hall Floorplan

Two large rooms bisect the floor space, leaving a hallway between. Food counters and soda machines are set up a various points along the inside edges of the seating areas. Bench seats line the outside edges. Oval food stations bordered by partial dividers separate the two large halves of the dining hall into quarters. Two-person tables are set along the inside and outside curve of each divider. Four-person tables are set intermittently throughout the open areas of each section. These tables can be rearranged easily to form larger tables.

Because of the open style, the space becomes quite noisy, especially when a large crowd has gathered. As the crowd thins, the ambient noise lessens.
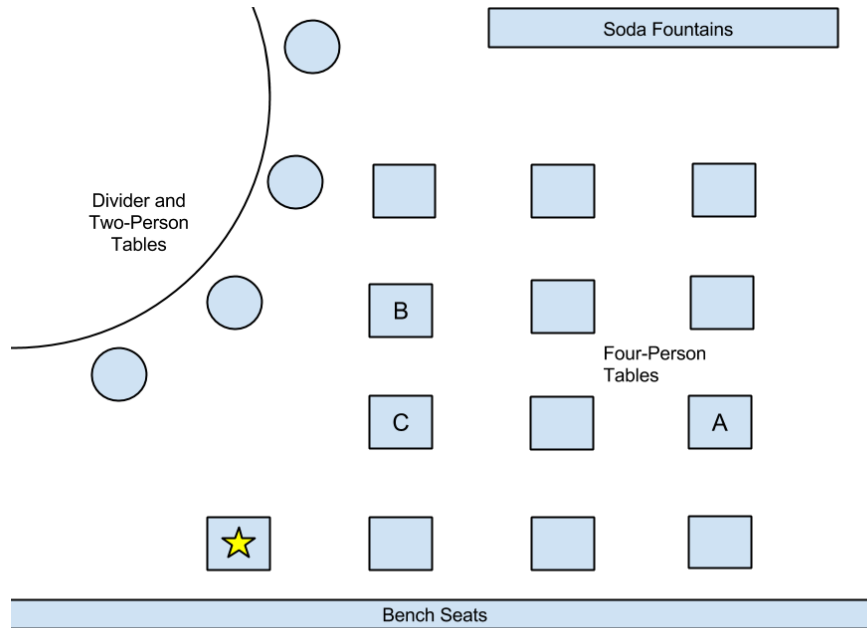
Figure 2: Section C Seating

During the first observation session, the principal researcher took a bench seat near the salad bar in Section C. This was the closest seat available to Group A (the first group observed), however it was not close enough in proximity to overhear the subject conversations, and not ideally suited for visual observation. Groups B and C formed in closer proximity to the researcher's location. He was able to hear pieces of conversations occurring in both groups.
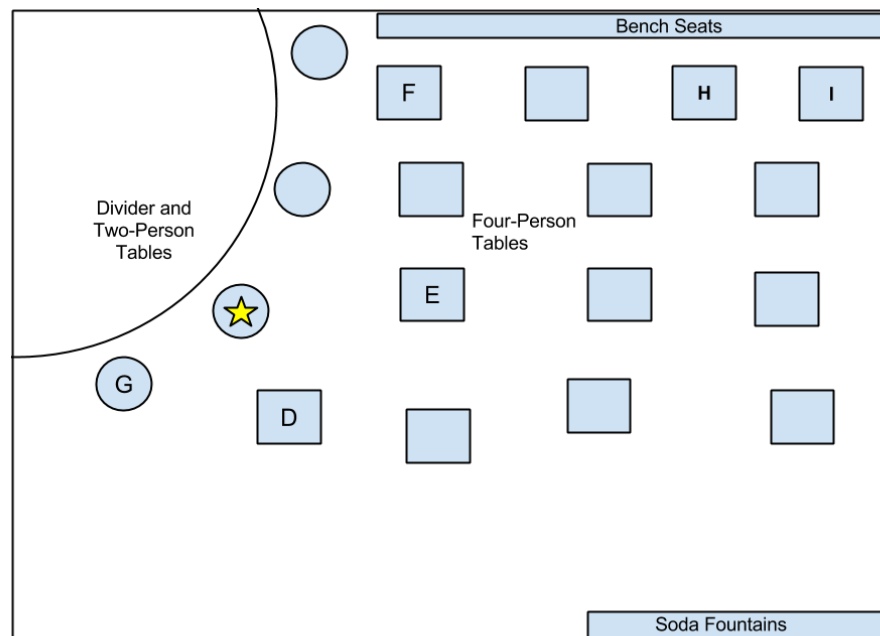

Figure 3:Section A Seating

During the second observation session, the researcher took a bench seat near the deli bar in Section A. This seat was selected for its availability and proximity to Group D. This location offered a good vantage

point for observation of this group and others that formed nearby. Groups F, H and I formed outside of ideal listening range, however the researcher was able to hear some of the conversations in groups F and H during passes and as students left the dining hall further into the observation period.

3.2 CHARACTERISTICS OF POPULATION

This section discusses general characteristics of the subjects observed, including gender breakdown and clothing style.

Total Individuals observed	24
Groups observed	9*
Max group size	4
Min group size	1
Average group size	3
Ethnicity	Asian**
Age Range	18-24

* Two individuals did not join groups, but were coded as groups of one member each.

** The program population is not exclusively Asian, however Asian students were the only members of the target population observed during the lunch periods.

Twenty-four (24) students were observed on an individual level and also as part of a geographic group formed by the students sharing a table with them. In all cases, students sharing tables did so voluntarily (even if somewhat reluctantly, in a few instances). Two students sat alone, however they were coded as members of groups of one. This was done in case additional students would be observed joining the individual students throughout the course of the observation. In a few other instances, groups were observed to form around students sitting alone. It was unclear whether these groups had been planned or formed spontaneously.

Nine (9) total groups were observed. The average group size was 3, with 1 being the smallest and 4 being the largest. It is very likely that the max size of 4 was due to the seating arrangement in the dining hall. The majority of available seats are at 4-person tables. Although the tables could be combined to seat larger groups, this was not observed in the target population (or the students in general).

All students observed appeared to be Asian and within the 18-24 age range.

3.3 GENDER

Gender	Total
Female	15
Male	9
Combined	24

Female students formed the majority of the observed group, representing 15 of the total 24 students, or about 62%. It is not clear, from this study, what, if anything, a higher percentage of female students may mean. It is possible that a higher percentage of female students are enrolled in the intensive program. It is also possible that more male students skip lunch or eat at other locations.

Gender
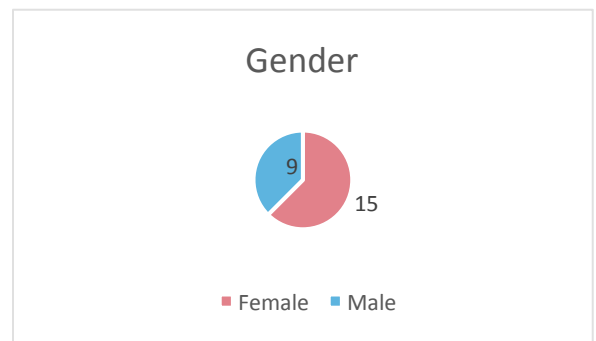
3.4 OBSERVATION CATEGORIES

The following categories of information were collected:

- **Group number:** each subject was assigned a Group number and Subject number to help with tracking. This information was also useful for determining average group sizes.
- **Gender:** was the subject male or female?
- **Ethnicity:** what was the subject's perceived ethnicity? (The researcher was unable to determine finer detailed information, such as nation of origin, from casual observation.)
- **Time Ranges:** in order to determine the total time a subject spent at a table, the arrival and departure times were recorded. In order to compare the total amount of eating time with time spent at the table, meal start and end times were recorded. Later, meal end times were compared to table departure times to determine the amount of "downtime", or time spent at a table after finishing the meal.
- **Dress:** what was the subject's overall style of dress? This information was coded primarily in general categories of Dress, Dress Casual, and Casual. More detailed secondary information was collected as well. All subjects fit into the Dress Casual and Casual categories, and dressed in line with contemporary college-student attire for the region of the United States where the study took place.
- **Affect/Demeanor:** general descriptive information about subject affect and demeanor was collected including whether the subject appeared comfortable or uncomfortable in the dining hall environment, whether the subject smiled and/or laughed, whether the subject seemed shy or uninterested in communicating. Information about observed changes in subject demeanor was also recorded. Affect/Demeanor information was later analyzed and organized into three separate categories more suitable for comparisons:
  - **Comfort:** indicating solely whether the subject appeared comfortable or uncomfortable
  - **Affect Change:** indicating whether and how the subject's affect changed throughout the observation. Affect Change was coded in the following ways:
    - **Warming:** the subject trended towards more comfortable/communicative
    - **Cooling:** the subject trended towards less comfortable/communicative
    - **Even:** the subject's affect did not change much during the observation
  - **Communication Style:** indicating the subject's apparent interest and involvement in communications. Communication style was coded in the following ways:
    - **Animated:** the subject used mannerisms and seemed deeply involved in communication, in addition to Friendly characteristics
    - **Friendly:** the subject openly smiled and/or laughed during communication, or made others laugh. Seemed pleasant, playful and/or warm during communications.
    - **Reserved:** the subject did not express much emotion during the communication. Spent more time listening or focusing on something else.
    - **Withdrawn:** the subject did not express emotion or interest in communication. Spent the majority of time focusing on something else.
- **Group engagement:** attempted to capture qualitative information about a subject's communication by ranking their apparent engagement in conversations with group members. This was coded using the following scale:

- o ***Very Often/Talkative (5):*** the subject initiated or responded to conversations frequently
- o ***Often (4):*** the subject initiated or responded to conversations a bit more than half of the time
- o ***About Half (3):*** the subject spent about half of the time in conversation
- o ***Little (2):*** the subject mostly responded to conversation prompts and spent a bit less than half the time in conversation
- o ***Very Little (1):*** the subject spent very little time in conversation
- o ***None (0):*** the subject engaged in no conversations

- ➢ ***Technology Use:*** attempted to capture qualitative information about a subject's technology use by ranking their observed interactions with devices such as smartphones, mp3 players, or electronic translators. This was coded cumulatively using the following scale:
  - o ***Very Often (5):*** the subject used technology for most or all of the time (either in frequent, quick uses, or long uses)
  - o ***Often (4):*** the subject used technology for a bit more than half of the time (either in frequent, quick uses, or long uses)
  - o ***About Half (3):*** the subject used technology for about half of the time (either in frequent, quick uses, or long uses)
  - o ***Little (2):*** the subject used technology a bit less than half of the time (either in frequent, quick uses, or long uses)
  - o ***Very Little (1):*** the subject used technology once or twice
  - o ***None (0):*** the subject used no technology

- ➢ ***Technology type:*** along with technology use, the researcher also recorded what types of devices and paraphernalia were observed.

4 FINDINGS

4.1 DRESS

	Dress Casual	Casual
Female	5	10
Male	1	8
Total	6	18

Overall, the students dressed in a casual style, similar to the clothing worn by non-ESL students observed in the dining hall. The majority of students, 18 out of 24, dressed in a casual style, wearing jeans, sneakers, sweatshirts and similar clothing. A quarter of students dressed in a dress casual style.

Female students dressed a bit more formally than male students. Five out of the fifteen female students wore dress casual, while only one out of the nine male students observed wore dress casual.

This could be interpreted in different ways. A higher likelihood of female students to dress with more style than male students could correlate with a greater consideration to appearance, indicating that females are more image conscious and want to stand out from the crowd. It is also possible that male students' choice of casual clothing displays a somewhat greater desire to fit in with the crowd, especially with other male students. This study did not collect nearly enough data to make meaningful conclusions on this subject, but it does present interesting possibilities.

4.2 COMMUNICATION (ENGAGEMENT WITH GROUP AND COMMUNICATION STYLE)

Observation data on students' communication styles can be organized into four categories: Animated, Friendly, Reserved, and Withdrawn. Personas built around these categories help to organize additional observations that will be explored throughout the report findings. Personas also serve as good reference points for further discussion, since communication style seems to correlate with other observations.

Animated Alice	Uses mannerisms and seems deeply involved in communication, in addition to Friendly characteristics.
Friendly Fran	Openly smiles and/or laughs during communication, or makes others laugh. Seems pleasant, playful and/or warm during communications.
Reserved Rina	Does not express much emotion during the communication. Spends more time listening or focusing on something else.
Withdrawn Will	Does not express emotion or interest in communication. Spends the majority of time focusing on something else.

Figure 4: Persona Descriptions

4.2.1 Communication Among Personas

	Avg Group Size	#Female	#Comfortable	Avg Engagement	Affect Change
Animated Alice	4	2/2	2/2	3	Warming
Friendly Fran	3	6/11	10/11	3.7	Even
Reserved Rina	3.5	6/8	5/8	2.6	Even
Withdrawn Will	1	1/3	1/3	n/a	Even

The table above shows a breakdown of students displaying common communication styles. It includes the average size of the physical group each student belonged to, the total number of students displaying each style, and the portion of students displaying that style who are female. It also shows corresponding affect information for each communication style including overall comfort level, average engagement score, and affect change trend.

4.2.1.1 Details of Personas

Animated Alice represents the smallest portion of the observed student population. The two students who were observed to be animated in conversations scored an average of 3 in group engagement. This represents a balance between one student's score of 4, or engaging others often in conversation, with the other student's score of 2, or engaging in conversation for a bit less than half the time. The animated students also appeared overall comfortable in the dining hall setting, and demonstrated a change in affect towards being more communicative. These students were part of a four member group composed of all female students.

Friendly Fran represents 11 students and the largest portion of the observed student population. This segment of the population had a slight majority of female members, appeared mostly comfortable, and mostly even. They engaged with other students more often, on average, than any other group.

Reserved Rina represents 8 students and the second largest portion of the observed student population. Reserved students tended to interact with other students less, at an average score of 2.6. They seemed less comfortable than other students, but slightly more likely than friendly students to join a group. Reserved students included a majority of female students. Like other groups, their affect remained even on average, however one member was observed cooling.

Withdrawn Will represents 3 students, as well as both students observed to be loners. On average, withdrawn students were less likely to join a group, however one withdrawn student was observed in a group. The two lone students were male. Because they had no group members to interact with, their engagement levels were not scored. Withdrawn students also appeared to be the least comfortable. Their affect remained even.

4.2.1.2 Insights on Communication Among Personas

There appears to be a correlation between communication style and engagement. Students who become physically involved in conversations by responding to statements or punctuating expression by smiling, laughing, or using mannerisms and gestures also tend to engage in conversation more with their partners. Students who appear more reserved, engage less. This could signify that the experience design should allow for or even encourage physical involvement in conversations.
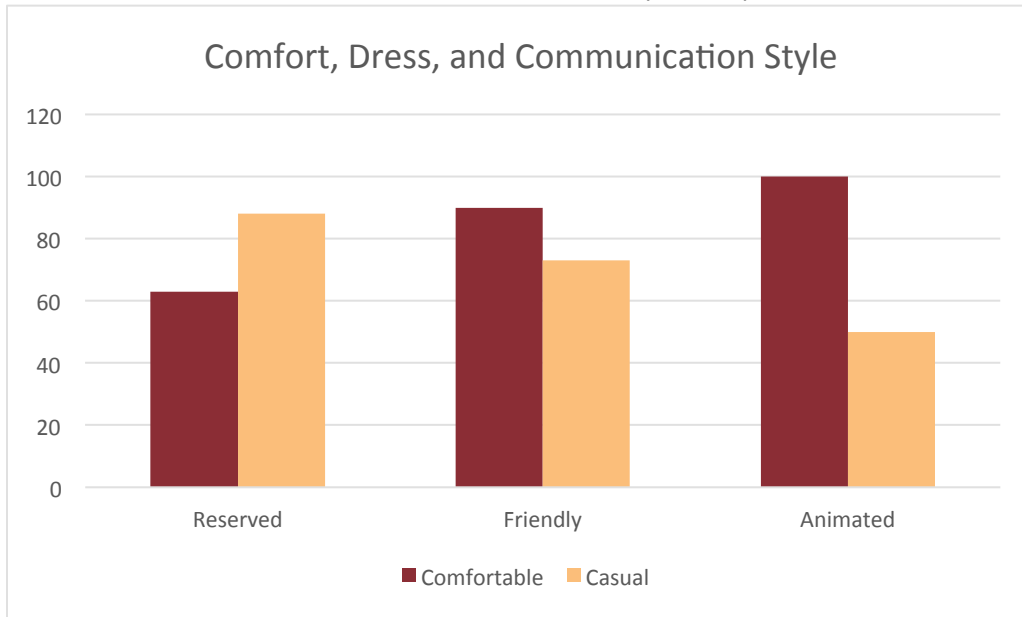
4.2.2 Dress style of Personas

	Avg Group Size	#Female	#Comfortable	Avg Engagement	Dress
Reserved Rina	3.5	6/8	5/8	2.6	Casual
Friendly Fran	3	6/11	10/11	3.7	Casual
Withdrawn Will	1	1/3	1/3	n/a	Casual
Animated Alice	4	2/2	2/2	3	Split

The table above compares students' observed communication styles with dress style and overall comfort level. The majority of reserved students, 7 of 8, dressed casually. These students engaged in conversations, on average, less than half of the time, and a sizable portion of them appeared uncomfortable (3 out of 8).

Friendly students were much more comfortable (10 out of 11) but only slightly more formal (3 wore dress casual).

Withdrawn students were the most uncomfortable (2 out of 3) and less casual (2 out of 3). Of the two uncomfortable students, one wore casual (Subject F1) and the other wore dress casual (Subject I1).

While both animated students were comfortable, they were split between casual and dress casual.

4.2.2.1 Insights on Dress Styles of Personas

When compared, students appear to become less casual as they become less reserved. This could indicate that a dressier style of clothing signals a higher level of comfort and willingness to communicate. This trend was not as apparent in withdrawn students, who dressed about as casually as friendly students, but were much less comfortable and communicative. However, these students may have dressed casually out of a greater desire to "fit in" with other students. The same could be true for reserved students. As students become friendlier and more animated (perhaps also more outgoing) they may dress less casually out of desire to "stand out" from other students.

4.3 TECHNOLOGY USED

Technology use among the target population was observed to determine what (if any) types of technology ESL students use during lunch breaks in the dining hall. The technology research goal was also to observe how often students used the technology during lunch. Technology use observations were scored in a similar fashion to engagement in conversations.

4.3.1 Types of technology observed

A majority of students were observed using technology during the lunch break. Specifically, 15 out of 24 students, or about 62% were observed using smartphones. A few students also used ear buds or headphones with their smartphones.

It is important to note that while an overall majority of students had smartphones, the distribution by gender is different.

Smartphone Use By Gender
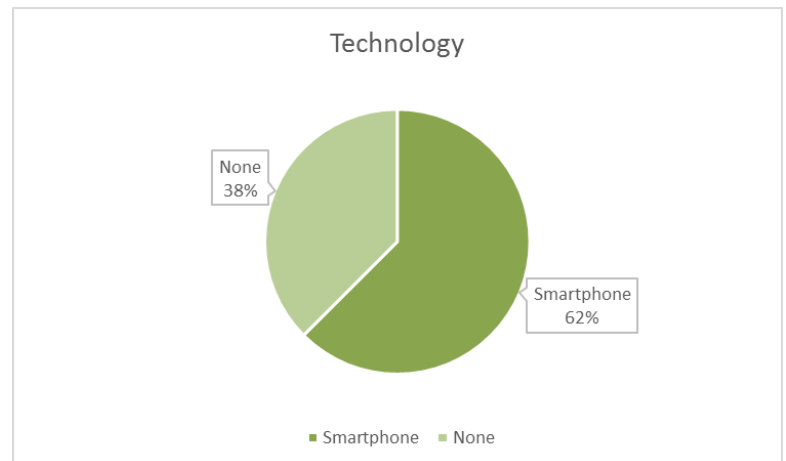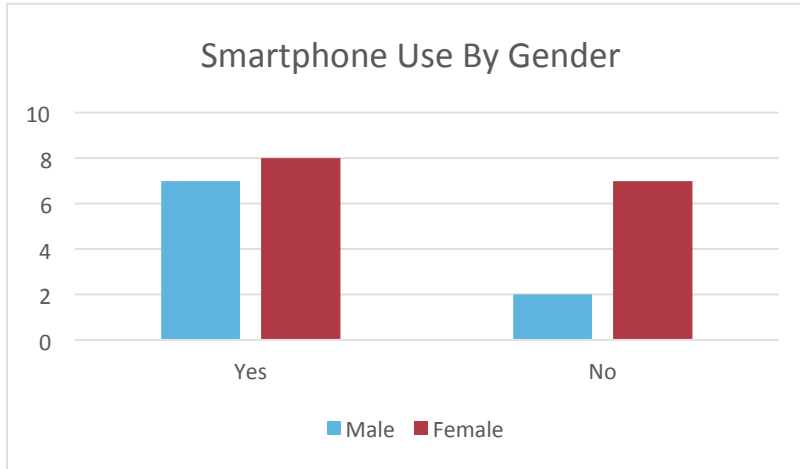
While 8 female students were observed to use smartphones, they represented only slightly more than half of the total female population of 15. Conversely, many more male students were observed to use smartphones than not—only 2 of the 9 total male students did not use smartphones.

4.3.1.1 Insights on Types of Technology Used

The unequal distribution of cell phone use, especially given the larger number of female students in the sample, indicates that the design should consider limited availability of technology among female users.

4.3.2   Technology use

Although a majority of students were observed to have smartphones, students used them surprisingly little.
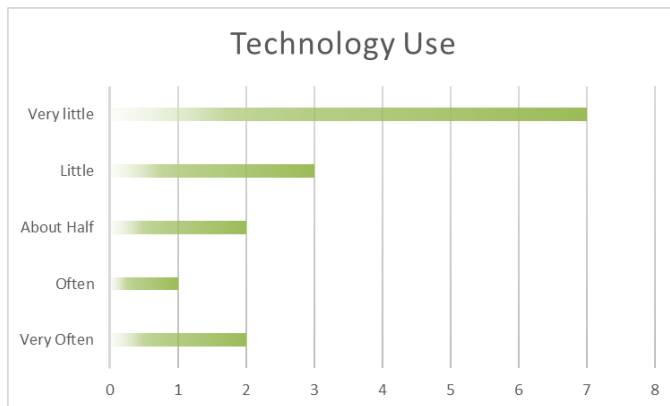
Technology Use

Of the 15 students observed to use technology during the lunch, 7 students used their smartphones once or twice during the meal. Of the remaining 8 students, 3 used their smartphones a bit more often, but less than half of the time. Two (2) students used their smartphones for about half of the time they spent at the table. Only three students used their smartphones more than half of the time.

4.3.2.1 Insights on Overall Technology Use

The design should not assume students are willing and able to use technology much more often than they already do. An ideal design might be one that allows for quick use or short bursts of interactivity with the device.

4.3.3 Technology use among personas

Examining technology use in relation to communication style yields interesting results.

	Used Smartphone	Avg Tech Use	Avg Engagement
Animated Alice	2/2	1.5	3
Withdrawn Will	2/3	2	n/a
Reserved Rina	5/8	1.25	2.63
Friendly Fran	6/11	1.27	3.72

The above table shows the number of students who own smartphones in relation to their observed communication style. It also compares average technology use scores with average group engagement scores among communication styles. More detailed descriptions appear in the following paragraphs.

Animated Alice scored an average of 3 in group engagement and 1.5 in technology use. This indicates that although both animated students were observed using smartphones, on average, they used their phones very little, and engaged in communication with other group members about half of the time. In terms of actual observed behavior, one of the animated students only used her phone before her other group members arrived.

In contrast, Withdrawn Will scored a two in average technology use, but did not receive a score in group engagement. In terms of actual observed behavior, one of the withdrawn students sat alone during his entire time at the table and spent the entire time browsing his smartphone while eating.

Friendly Fran represents a larger number of students and the group with smallest relative number of smartphone users—of the 11 friendly students, only 6 used smartphones. On average, this group scored a 1.27 in average technology use and 3.72 in average engagement, indicating that, on average, friendly students used technology very little and instead spent more time engaged in conversations.
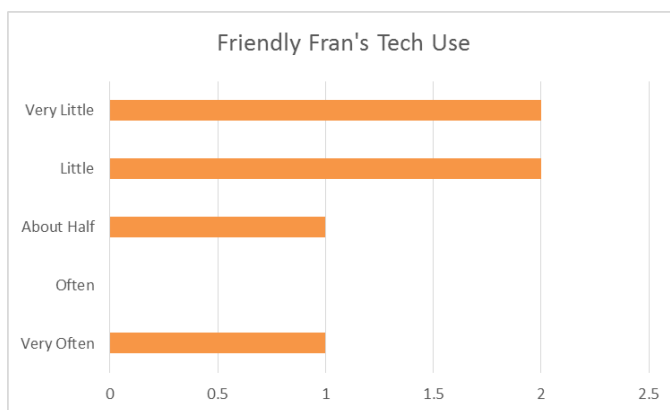
A detailed look at technology usage among Friendly Fran members shows that of the 6 students who used smartphones, only 1 used them more than half of the time. The majority used them less than half of the time.

Reserved Rina had an average technology use of 1.25 and an average engagement score of 2.63. This indicates that although reserved students on average engaged less in conversations than friendly students, they were about as likely (or slightly less) to use technology. The low average in usage is due partially to the low number of reserved students observed using technology. Even among the 5 reserved students who did use smartphones, the preference seemed to be for less usage.
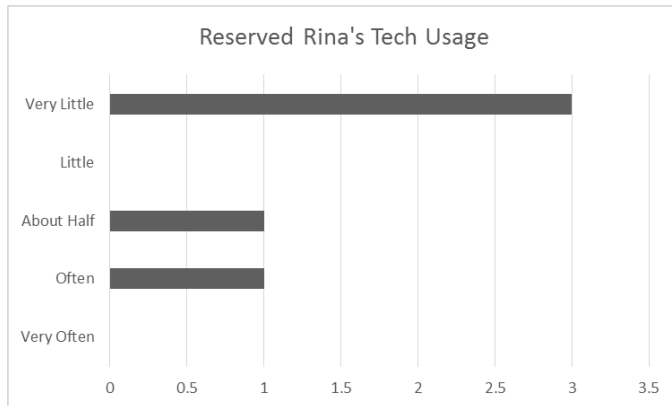
A detailed look at technology usage among Reserved Rina members shows that of the 5 students who used smartphones, three used them very little, and only one more than half of the time.

4.3.3.1 Insights On Technology Use Among Personas

On average, high technology use appears to correlate with low communicativeness and vice versa. This would make sense, as students more interested in conversing with others would spend more time doing that and less using technology. Since, the goal of the product focuses on facilitating conversation, the design might benefit from a less technical approach. The design should not require heavy engagement from students with a device. If possible, the design should allow for multiple users on one device.

4.3.4 Time and manner of technology use

4.3.4.1 How did students use technology?

When examining technology use, it is also important to consider how students used the technology.

Quick Check	Browsing	Listening to Music	Texting
7	6	2	1

Of the 15 students observed using smartphones, 1 was observed texting, 6 appeared to be browsing, and 2 may have been listening to music (they were observed to have headphones or ear buds). Seven (7) of the students made only quick checks of their phones. (Some students were observed using technology in multiple ways.)

4.3.4.2 When did students use technology?

Students were observed using technology before, during, and after their meals.

| Before	During	After
2	9	6

Of the 15 students observed using smartphones, 2 were observed using their phones before the meal, 6 were observed using their phones after, and 9 were observed using their phones while eating. (Some students were observed using technology at multiple points.)

Based on the above observations, students were more likely to use their phones for brief periods, quickly checking for messages. They mostly did this after finishing their meal, before leaving the table, but many checked their phones while eating as well. Several students all used their phones for extended periods, apparently browsing them, during breaks in their meal and after finishing.

4.3.4.3 Insights On Time and Manner of Technology Use

When considered with observed communication behaviors, students (when part of a group) were more interested in speaking with group members (or in eating their meals) than they were in using technology. However, they did use technology intermittently. This adds further support to a design of short experiences, or experiences that users can pause and resume freely.

4.4 ENGLISH USE
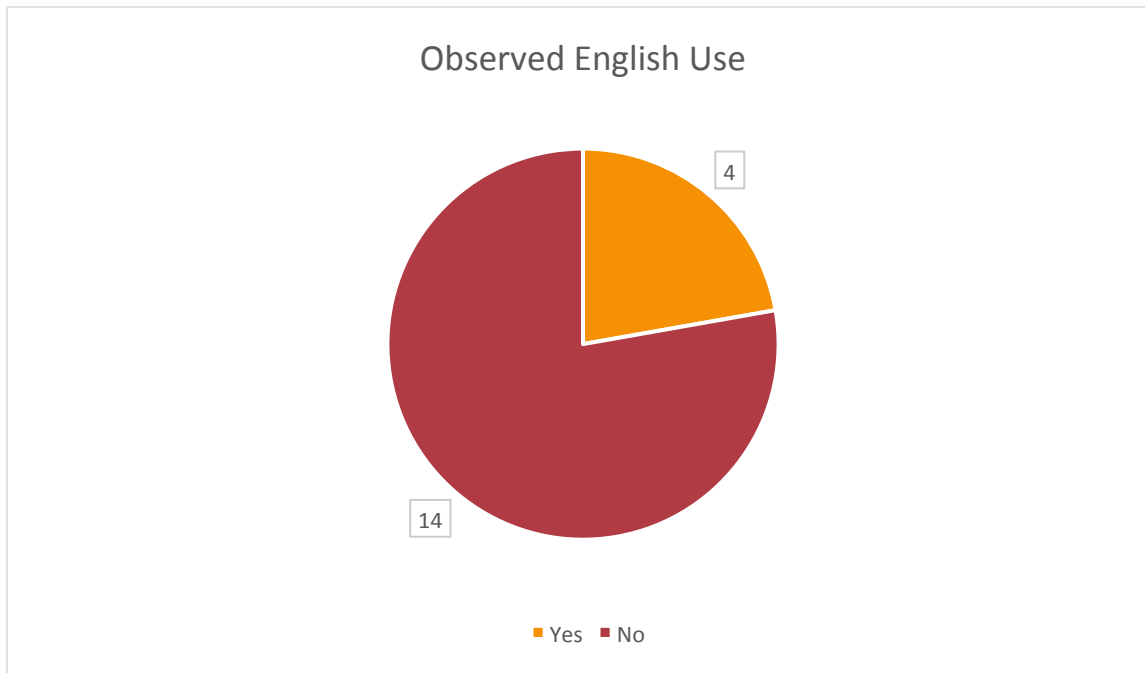
One of the primary facets of the design goal is to encourage the continued use of English outside of the classroom, so English use was a key observation category. The researcher wanted to determine, first of all whether or not ESL students used English to communicate with each other during breaks outside of class.

Of the 24 students observed, 4 had to be excluded from English usage observation because it could not be determined whether or not they spoke English. Another 2 students were excluded because they were not part of a group. Of the remaining 18 students, only 4 were observed to use English. The majority of students did not use English to communicate with other group members.

4.4.1   English User Characteristics

English use was observed in two geographic groups of students: group C, observed on October 11th and group E, observed on October 16th.

4.4.1.1 Group C Characteristics:

#	Gender	Dress	English Used?	How?	Group Engagement
1	F	Casual	Yes	With group	4
3	F	Dress Casual	Yes	With group	4
2	F	Dress Casual	Yes	With group	2

Group C was all female. Most members (2 out of 3) wore dress casual clothing. All three members used English to communicate with each other. However, two of the members, subjects C1 and C3, were much more engaged in the conversation than subject C2, and so, used more English.

4.4.1.2 Group E Characteristics:

#	Gender	Dress	English Used?	How?	Group Engagement
1	M	Casual	Yes	With non-ESL student	4
2	M	Casual	No	n/a	4

Group E was all male. Both members wore casual clothing. The group members were not observed to use English to communicate with each other. However, one of the members, subject E1, was observed to use English to speak with a non-ESL student who visited the table. Both group members were highly communicative in their own language.

4.4.1.3 Average English User Characteristics:

Avg Group Size	#Female	#Casual	Group Engagement
2.7	3/4	2/4	4

On average, English speakers observed were in groups smaller than the max size, were mostly female, dressed less casually, and engaged in conversation often with other group members.

4.4.1.4 Average Non-English User Characteristics:

Avg Group Size	#Female	#Casual	Group Engagement
3.4	10/14	11/14	3

In comparison, non-English speaking students observed were in larger groups than English speaking students. The majority again were female (although, it should be considered that female students outnumbered males in the entire sample). Non-English speaking students dressed more casually and on average, engaged in conversations with group members less often.

It should be noted that only students observed to be speaking a language other than English were considered for this comparison. Group A members were excluded, since it could not be determined what language(s) they were using. Groups G and I were also excluded; as groups of one, it could not be determined what language(s) they might use to communicate given the opportunity.

4.4.2 English Use and Communication Style

Communication style and affect were observed to be important factors for English usage.

G/S#	Gender	Engagement	Comm Style	Affect	Affect Change
C1	Female	4	Friendly	Comfortable	Warming
C2	Female	2	Friendly	Comfortable	Even
C3	Female	4	Friendly	Uncomfortable	Warming
E1	Male	4	Friendly	Comfortable	Even

As the above table shows, the only common factor among English users (other than using English) was communication style.

4.4.2.1 Insights on English User Characteristics

All English users could be categorized as having a friendly communication style, meaning they were observed to openly smile and/or laugh during communication, make others laugh, or otherwise seem pleasant and warm during communications.

Two of the English users showed a warming change in affect over the course of the conversation. They were observed to become more communicative as the meal (and conversations) progressed. However, one member, C3, appeared significantly more uncomfortable than the others. This took the form of nervous smiling and laughter, likely as a result of limited skills and/or confidence using English to communicate. Despite the difficulty, subject C3 showed a desire to communicate and a willingness to use English, even if imperfectly. It was not clear from this observation what the backgrounds of the group C members were, nor what other languages they may have proficiency in. It seems likely, however, based on observed circumstances and conversation that the students used English out of necessity, as a common language. This could also be the driving factor of subject E1's English use while speaking with a non-ESL student.

Based on the above observations, it seems that using English makes some ESL students uncomfortable, especially in casual social settings. However, students will use English when their desire to communicate outweighs the pain points (and risk of embarrassment) of using a new language. The design should focus on alleviating the stress of using English to communicate, perhaps by creating a starting point and structure for user social interaction and by lowering the impact of mistakes.

4.4.3   English Users and Friendly Fran
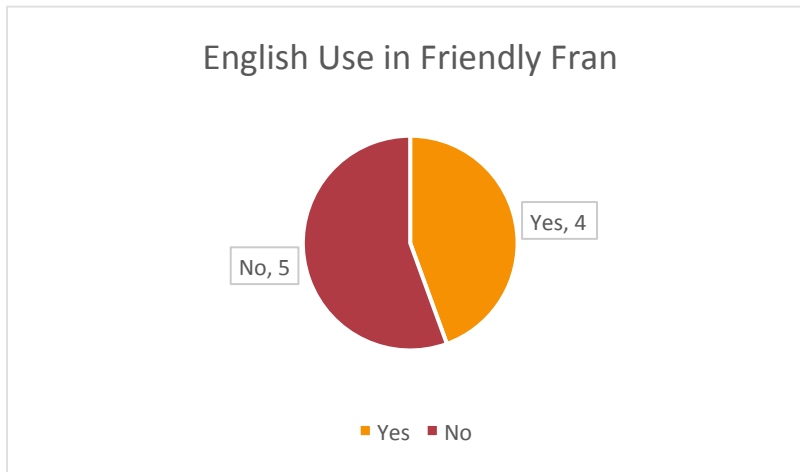
Of the 11 students observed to have a friendly communication style, 2 were removed from analysis of English usage because it could not be determined whether or not they used English. Of the remaining total of 9 "friendly" students, 4 were observed to use English.

4.4.3.1 Comparison of English Usage in Friendly Fran:

	Avg Group Size	#Female	#Comfortable	Avg Engagement	Affect Change
English Users	3.4	3/4	3/4	4	Split
Friendly Fran	3.4	2/5	5/5	3.8	Even

Compared with other friendly students, English users had a higher relative number of female members, a slightly higher average engagement score, and were somewhat less comfortable. Friendly English users also showed more changes in affect than friendly non-English users.

4.4.3.2 Insights on English Use in Friendly Fran

This seems to indicate that female students using a friendly communication style were the most likely to use English in intergroup communication. Because they may also be more likely to become uncomfortable as a result of using English to communicate, they are likely to have the most interest in a product that facilitates communication in English.

4.4.4   English Use and Technology

Technology use is another key consideration for the design goal. Research objectives included determining what kinds of technology students used and how often. Comparing that information with English use and communication style shows interesting behaviors.

4.4.4.1 Technology use among English speakers:

G/S#	Gender	Engagement	Tech Use	Tech Type
E1	Male	4	5	Smartphone
C1	Female	4	0	None
C3	Female	4	0	None
C2	Female	2	0	None

The table above compares group engagement score with technology use among English speakers. The sole male subject was the only English speaker observed to use a smartphone (and he used it very often

during the lunch break). Interestingly, while he used his smartphone very often, he seemingly breaks the trend of high engagement predicting low technology use. The female English speaking students appeared just as engaged overall, but were not observed using technology.

4.4.4.2 Technology use among Non-English speakers:

Avg Group Size	#Female	Avg Engagement	Avg Tech Use	#Smartphone
3.4	10/14	3	1.4	11/14

On average, non-English speakers were observed to use smartphones very little, although the majority (11 out of 14 students) had smartphones available. On average, they also engaged in conversations about half of the time.

4.4.4.3 Friendly Fran, English Use, and Technology:

Smartphone Use Among Friendly English Speakers

Yes, 1

No, 3

Smartphone Use Among Friendly Non-English Speakers

No, 1

Yes, 4
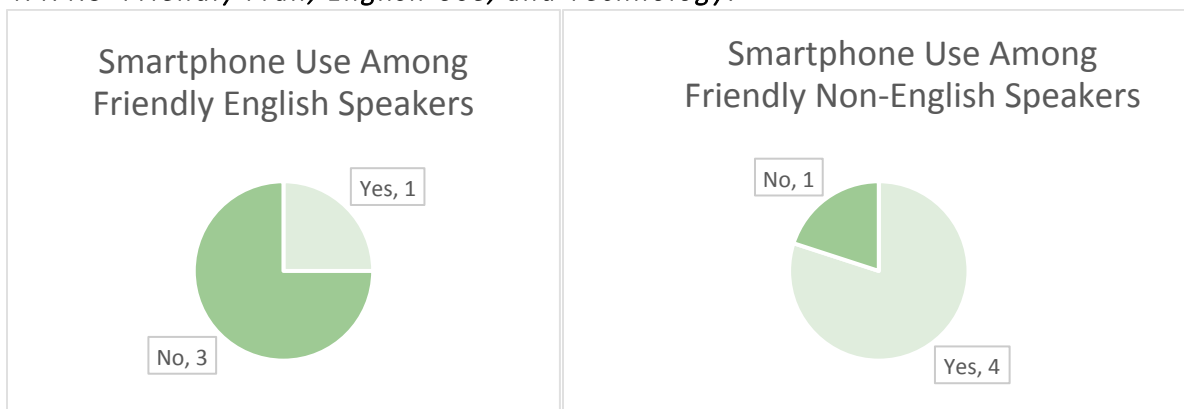
	Avg Group Size	#Female	Avg. Engagement	Avg. Tech Use	#Smartphone
English Users	3.4	3/4	4	1.25	1/4
Friendly Fran	3.4	2/5	3.8	1.4	4/5

Examining technology use among friendly English speakers and friendly non-English speakers shows that while average engagement stays about the same, average technology use increases slightly among non-English users. Four out of the five friendly non-English speakers used smartphones while only one of the four friendly English speakers did.

4.4.4.4 Insights on English Users' Technology Habits

This sample size is likely too small to accurately define trends in usage. However, what might be taken away from the observation is that male students were slightly more likely than female students were to have and use technology. It was also observed that students using English in conversation did so without the aid of technology. The design should consider preferences of both genders, but aim to support more personal interaction between users than interaction between the user and the device.

4.5 Time Spent in Dining Hall

When considering the overall dining hall experience of ESL students, it is important to look at time. Part of the research goals of this observation was to log the amount of time students spent at their tables,

the amount of time students spent eating, and any downtime between when students finished eating and left their tables.

Average Times Spent in Dining Hall
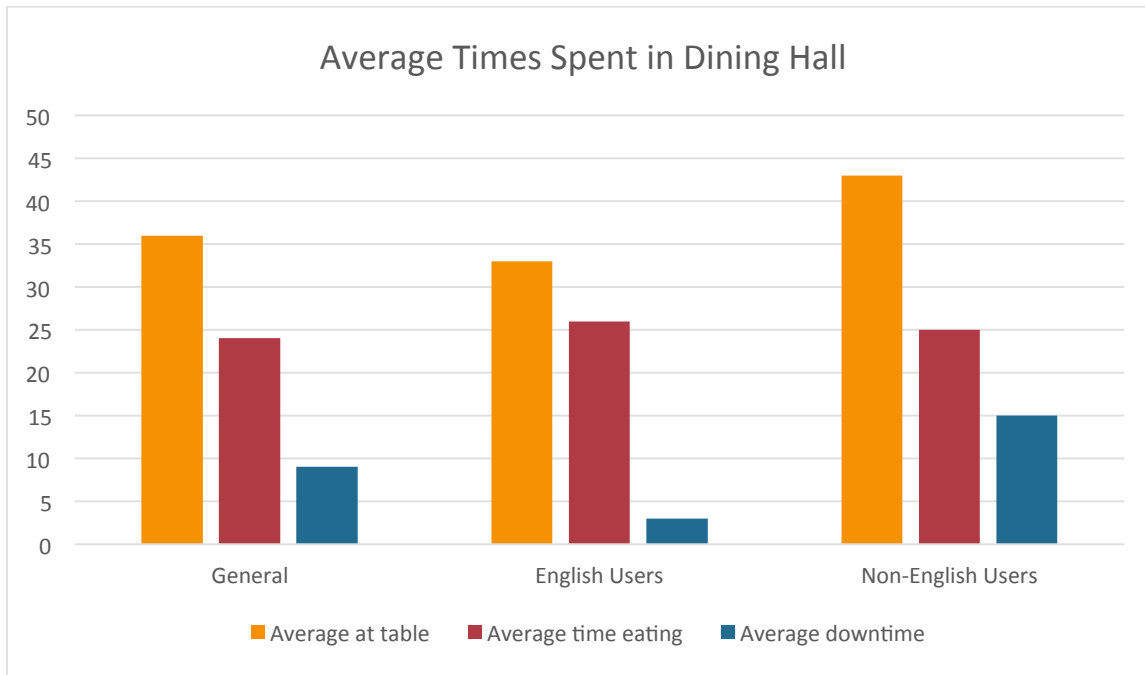
On average, students spent 36 minutes at their tables. They spent most of that time—on average, 24 minutes—eating, or eating while doing other things such as conversing with others, checking smartphones, or studying. Most students left their tables soon after finishing eating. On average, students had only about 9 minutes worth of downtime.

English User Times
On average, English speaking students spent 33 minutes at their tables, 26 minutes eating, and had only 3 minutes worth of downtime.

Non-English User Times
In contrast, non-English speaking students had much higher average table times and downtimes. Their average table time was 43 minutes and average downtime was 15 minutes.

4.5.1 Average Times in Dining Hall Of Personas

Times by Communication Style
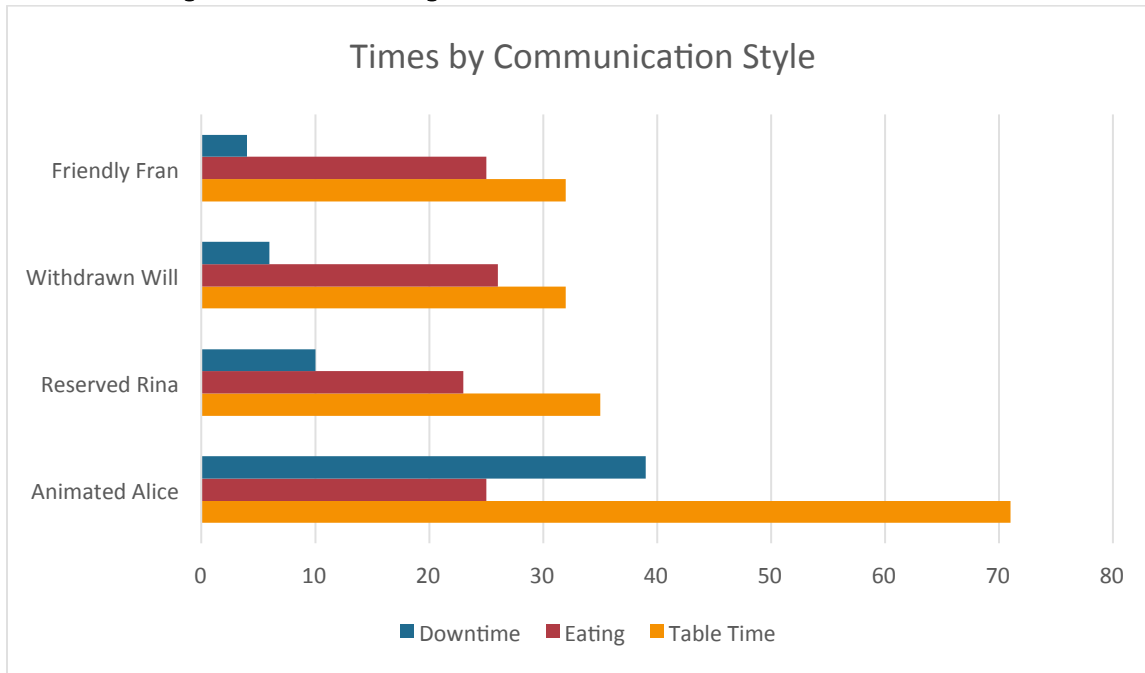
The chart above compares the average times each of the four communication styles spent in the dining hall. Animated students spent the longest, by far, in the dining hall. It should be noted, however, that these students were part of a group that spent an abnormally long time in the dining hall compared to others (over an hour). Friendly students spent the least amount of time in the dining hall, with an average of 32 minutes. They were also the least likely to linger after finishing eating—they had an average of only 4 minutes downtime.

	Avg Table Time	Avg Eating	Avg Down	Avg Group Size	#Comf.	Avg Engmnt
Animated Alice	71	25	39	4	2/2	3
Reserved Rina	35	23	10	3.5	5/8	2.6
Withdrawn Will	32	26	6	1.3	1/3	n/a
Friendly Fran	32	25	4	3.2	10/11	3.7

The table above shows the average times of each group along with other information for comparison. Animated students were part of a 4 person group, engaged in conversation, on average, about half the time and were completely comfortable. In terms of actual observed behavior, members of Geographic group B spent about 39 minutes at their table *after* finishing eating. Most of this time was spent in conversation and not technology use.

In contrast, withdrawn students were observed to be uncomfortable and spent only an average of 32 minutes at their tables. Reserved students, observed to be somewhat more comfortable, and engaging more in group conversations for part of the time, stayed a bit longer. They also spent less time eating and more downtime.

Friendly students, though comfortable and communicative on average, spent only an average of 32 minutes at their tables, with an average downtime of only 4 minutes. This could be due to the fact that this group included the only English speaking group, geographic group C.

G/S#	Gender	Engagement	Total Table	Eat Total	Downtime Total	Affect	Comm Style	English used?
C1	Female	4	32	20	4	Comfortable	Friendly	Yes
C2	Female	2	32	20	4	Comfortable	Friendly	Yes
C3	Female	4	26	20	4	Uncomfortable	Friendly	Yes

A detailed look at the group member data shows that students C1 and C2 arrived at their table first. C3 joined later, which prompted the use of English. At that point the students only spent 20 minutes eating lunch and conversing intermittently. Student C3, while happy to communicate with the others, struggled with limited English skills. After finishing eating, the group members left the table together soon after. It appears that the decrease in comfort caused by the difficulty of using English to communicate may have also shortened the table time (and discussion) time correspondingly.

Analysis of the geographic group that spent the longest amount of time in the dining hall supports this.

G/S#	Gender	Engagement	Total Table	Eat Total	Downtime Total	Affect	Comm Style	English used?
B1	Female	4	72	25	39	Comfortable	Animated	No
B2	Female	4	69	25	39	Comfortable	Reserved	No
B3	Female	2	69	25	39	Comfortable	Animated	No
B4	Female	3	42	25	12	Comfortable	Friendly	No

Student B1 was observed at her table alone, initially, but she was soon joined by the other group members. Together, the group spent a total of 25 minutes eating and another 12 in conversation before one of the members left. The remaining members continued to stay at the table conversing for an additional 27 minutes. Their total downtime was 39 and total table time, together was 69 minutes. All group members appeared to be comfortable, most were engaged in conversation, some even became animated, but none of the members used English to communicate.

4.5.2   Insights on Time Spent in the Dining Hall

It is possible that factors such as comfort level, engagement, and group size all contribute to longer stays. It makes sense that students who feel comfortable and engaged in interesting conversation will stay at the table longer than students who are uncomfortable or not engaged in conversations. This indicates that in order to encourage more time spent on task, or engaged in the experience, the design should aim to make students feel comfortable and support their engaging in an interesting conversation-based activity.

It is also important to consider that other factors may impact time spent in the cafeteria. Students may have appointments, errands to run before returning to class, homework to do, or any number of other things needing their time. On average most students did not spend more than about 30 minutes in the dining hall, and most of that, they spent eating. While it is possible the product could entice students to stay longer, the design should aim to work within the students' current schedule. Ideally, the design should give students the ability to customize and control the amount of time they spend engaged in the

experience. A modular, scalable design could work well for this, allowing students to complete short activities during downtime, or in short rounds or turns while they are eating.

5 LIMITATIONS

This study observed an ESL population for only a total of two and a half hours, spread over two days. It involved only Asian students and predominantly female Asian students, as these were the students observable and most easily identifiable in the research location. Groups of students, likewise, received much of the focus during observations in part because of the social aspect of the design, but also because groups of ESL students were easier to identify in the lunch crowd than single students. While the observed population shared some similarities with the original design persona, further research of more diverse ESL students could reveal different findings.

The characteristics of the research space—namely the ambient noise in the dining hall—combined with the low number of researchers involved (1) could have led to somewhat skewed results, especially in the area of English usage. The researcher could not be sure that no English was used in many of the groups; his findings reflect assumptions based on intermittent, small samples of conversation heard in passing and after ambient noise lessened.

While this research study observed many qualitative aspects of ESL student behavior in a relevant context, the product design would benefit from more detailed quantitative information about group makeup, including country of origin, English skill level, and technology use.

6 OVERALL RECOMMENDATIONS

6.1 PERSONAS AND TARGET USERS

After considering the findings, Friendly Fran seems like the best persona to focus on for design considerations. To begin with, Friendly Fran includes the student who most closely represented the initial persona for the target audience—subject C3.

G/S#	Gender	Engagement	Comm Style	Affect	Affect Change	English Used?
C3	Female	4	Friendly	Uncomfortable	Warming	Yes

Subject C3 was observed to engage in conversation often with other group members using more of a reserved communication style at first that warmed to a friendly style as she interacted more with group members. She was also observed to use English to communicate, although her low skill level led to her appearing somewhat uncomfortable. Regardless, her desire to communicate and willing to use English to do so were apparent.

Friendly Fran seems to best represent the target audience as it (she) describes students who are likely to engage in conversation with group members, but may feel uncomfortable doing so. Reserved Rina represents another likely user group, as it describes students who are willing to engage in conversation with group members, though somewhat less willing and likely more uncomfortable doing so than

Friendly Fran. A product designed to encourage and perhaps facilitate social interaction focused on improving English skills could help to relieve some of those awkward and uncomfortable feelings.

Animated Alice, representing an extreme of the communication style chart, would be less likely to use a product focused on English communication. Animated Alice is already focused on communication and highly interested in social interaction—in her own language. It is possible that the aspects of the product designed to aid in practicing English communication may interest her as a student. However, it seems likely, given her interest in communication and the amount of time she is likely to spend conversing with group members, that if she wanted to practice using English outside of class, she would do so. She may find that her own or others' lack of English skills creates too much of a barrier to engaging in the kind of communication she wants to, and so avoids it.

Withdrawn Will, representing the opposite extreme of the communication style chart, would likewise be less likely to use a product focused on English communication. Withdrawn Will does not communicate much when part of a group, and is not likely to join a group in the first place. However, he is more likely to use a smartphone while eating and might become interested in the product because of its technical nature. It could also create an icebreaker or a segue into more social interaction with classmates.

6.2 DESIGN RECOMMENDATIONS

The following design recommendations are indicated based on the findings:

- **Design primarily for female users (without excluding male users)**. While it is true that overrepresentation of female students in the sample size may have skewed findings, it is also true that female students appeared a bit more likely to be interested in communicating with others and to spent more time doing so. The aesthetic should reflect a contemporary American "dress casual" design, reflecting the style of more communicative female students. The aesthetic should focus on comfort, ease of use, and practicality while including expressive, tasteful flourishes. It should not take a tech heavy approach or require an abundance of interaction with technology.
- **Keep the experience short.** While it is possible that students could spend upwards of an hour in the dining hall—and one group of students did—the majority of students seem to prefer spending about 30 to 40 minutes at their tables, including eating time.
- **Give users full control over the timing of the experience.** Following the above recommendation, it is important to remember that while students had much flexibility with table time, the preference is to not hang around much longer than 10 minutes after finishing the meal. This means that if students give the product their full attention, they will have only a small window of time to use it. Alternatively, they could use the product in short turns as they complete another activity (like eating).
- **Gear the experience towards supporting conversation and interaction in the physical space.** Most of the students observed conversing with others had the opportunity to focus on technology instead, but they chose the former. It is likely that students who already spend time conversing with others would want substitute a solitary experience instead.
- **Encourage--and help--students to use English instead.** The problem observed for the majority of students was not a lack of interest in communicating as much as it was a lack of using English to communicate. The students who did use English only appeared to do so out of necessity (it

was the only common language between them) and did not spend much time doing so. It also appeared to make the conversation difficult and less enjoyable than conversations observed in other groups. Therefore, the product design should aim to make speaking English more fun or attractive and strive to guide students in building English skills.

- ***Do not require users to use only English during the experience.*** Following the above recommendation, users should be required to use only English during the experience. It is presumed that students enter an immersive English learning experience out of a desire to improve their skills by only using English. However, the observed students of this program seemed much more inclined to use more familiar languages in communication outside of class, unless they needed to use English. In the observed context, the product would best serve as a supplementary activity to the classes the students are already taking. It would provide more benefit as a kind of bridge, easing and encouraging development of the students' English skills. To accomplish this, the product should offer multiple language features allowing users to view instructions and other prompts in more familiar languages if they wish. It should also scale to match the current skill level of users and guide them to improve, and potentially could benefit from integrated translation tools.

- ***Do not require audio for the experience.*** Although the table placement and seating arrangement in the dining hall are conducive to small group conversation, the open design of the space leads to distracting ambient noise. Therefore the product should not require the user to play audio. If it includes audio, it should give users the option of turning it off and/or using other means to receive information from it. Only a few students were observed using headphones, so it does not seem likely that a majority will have them available or want to use them with the product.

- ***Do not require users to speak during the experience.*** Speaking English appeared to cause some difficulty for students and appeared to lower the comfort level of one. The ambient noise in the dining hall could potentially cause problems for any kind of voice recognition feature in the product. Therefore, users should not be required to enter voice inputs.

- ***Do not require every user to have a smartphone.*** Based on the observation findings alone, it remains unclear how common smartphone ownership among target users is. However, it does seem apparent that target users are less inclined to use smartphones during meals. Because target users already sit in close proximity, it is recommended that product design allow for multiple users to experience the product through one shared smartphone.