

IxD  
ART 484

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project EMU

team cell-mates

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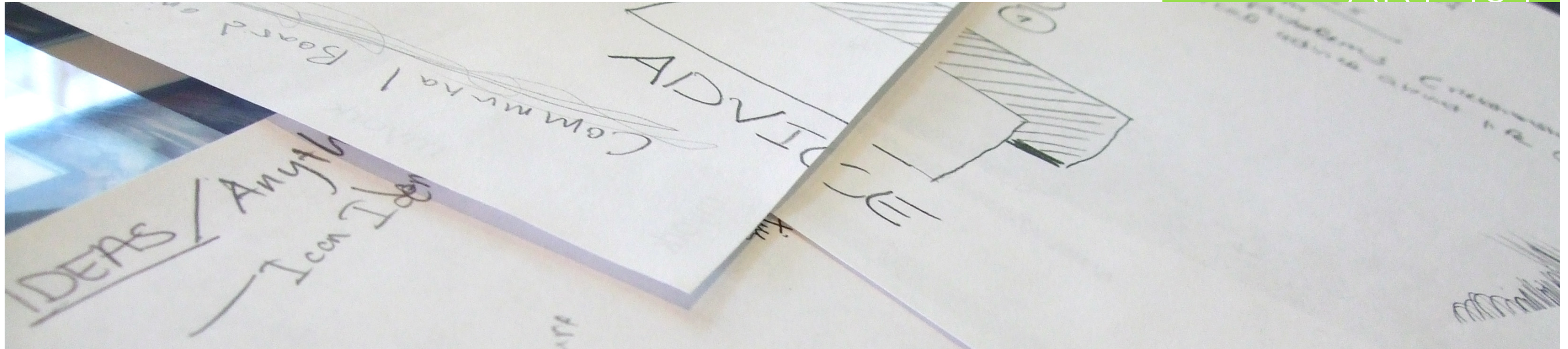
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## Executive Summary

William Penn, the founder of Pennsylvania and an early advocate of democracy once said that, "Time is what we want most, but what we use worst." Penn echoed an unforgettable verity, which draws our attention today to the amount of time that students ages 12 to 16, waste time transmitting millions of text messages and talking endlessly on their cellular phones.

Simon Bond, Leslie Ferguson, Anthony Shelley, and Geoff Thilo formed Team Cell-mates to propose a solution to curb teen cell phone abuse and educate them on responsible practices. Team Cell-mates created a service called EMU (Educational Monetary Utility) that teaches teens how to manage their minutes.

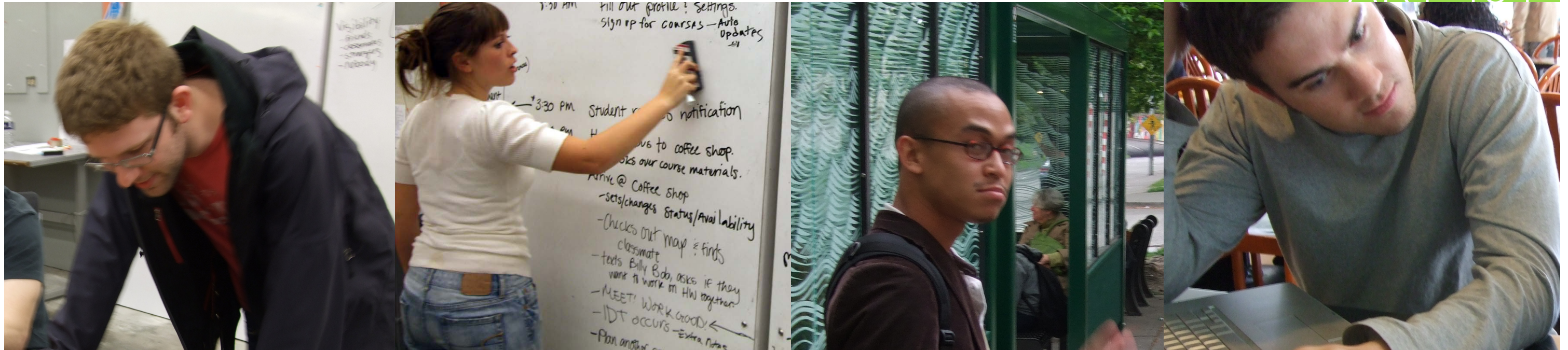
EMU offers a user-friendly web and mobile device interface both parents and students will appreciate through a system of color-coded warnings, easy to read graphs, a rewards system, and an interactive emu that responds to all inquiries.

## Problem Definition

Recent reports show that Americans have trouble living within their financial limits; Americans on average spend \$1.22 for every dollar they earn and the average household consumer debt is around \$8,000.

According to U.S. Cellular statistics, roughly 60 percent of American teenagers own a cell phone and spend an average of an hour a day talking on them. Too many teens are wasting minutes and worst of all, their lives on cell phones.

This particular population is not learning financial and social responsibility by incurring massive service bills and flustering their parents.



## Team

### Simon Bond, Junior – Visual Communication Design

"I took this class because it is important to have interaction with people from a wide range of fields, as this parallels the real world. The design program operates without its own bubble and it is easy to forget how other programs operate and what they care about. The topic of education showed vast potential for innovation."

#### Interests:

Photography  
Interface design  
Technology in general

### Leslie Ferguson, Junior – Computer Science Major

"I took this class because I thought it would be a good way to experience the design process from the ground up. I also thought it would be an opportunity to work with people from all different disciplines on a project that integrates two of my interests, education and technology."

#### Interests:

Human computer interaction (HCI)  
Graphic design  
Photography  
Software design  
Education

### Anthony Shelley, Senior – Technical Communication

"Working with students from various backgrounds really intrigued me. Although we all have different passions and opinions about design and technology, we managed to come together to create a product that I honestly believe will be useful and highly effective in the near future. Pondering innovative solutions is what ultimately drew me into signing up for this course."

#### Interests:

Filmmaking  
Journalism  
Web development  
Human rights  
Information design

### Geoff Thilo, Grad Student – Computational Linguistics

"I took this class because I was curious how the sharing of knowledge and language was considered and molded when designing human computer interaction studies."

#### Interests:

Semantic networks  
Ontology development  
Knowledge representation  
Information retrieval

## Research

### Numbers

Cell phone usage in the US has increased from 34 million users to 203 million users in the last 10 years:

About 35% of tweens (kids ages 8-12) own a cell phone today. Over 1/3 of kids today!

About 54% of tweens will have cell phones within the next 3 years

Nearly 40% respondents use text message as their primary form of communication.

About 26% check for a text message or send one in less than ten minutes after waking up in the morning.

### Simon's Research

Bond spoke to four college students to take a retrospective look at the issues college students encountered with their first cell phones. These individuals had received their first phones between the ages of 15 and 16. Users A and B produced large phone bills that forced their parents to punish them by either phone removal or bill payments.

The most significant charges involved text messages. User A used the America Online Instant Messenger service without knowing that a charge came with each message written in response to the messages he relayed from his phone. The bills for Users A and B amounted to over \$100 each.

Users C and D incurred small bills. Their phone plans were more robust. User C explained that his family plan at first did not initially have enough minutes; when his family realized how many minutes they would need, they simply switched plans and experienced no more problems. User D said that her family plan was so good that it was nearly impossible to go over her minutes – she never had to worry about using too many minutes.

### Leslie's Research

- Interviewed two girls, age 14, who attend Finn Hill Junior High
- Both girls exceeded their minutes on their cell phone plans
- Both got in trouble with their parents
- One learned her lesson; the other went over her minutes multiple times

When asked if they tended to spend or save their money, they both admitted that they had trouble saving their money. Ferguson concluded from her research that it is difficult to know how many minutes you have used and keep track of text messages.

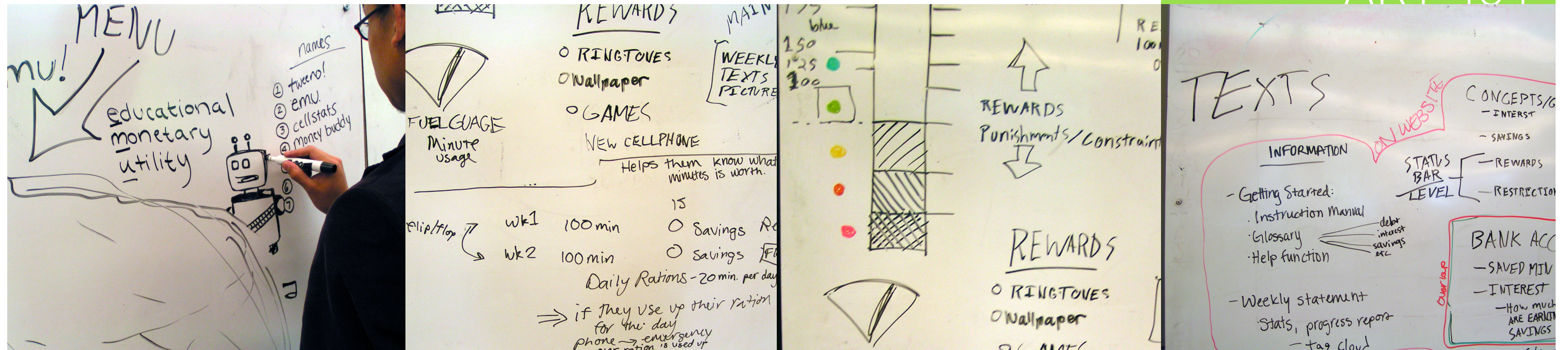
Ferguson also interviewed the mother of a nine-year-old who uses a cell phone. The mother admitted to having no plan for teaching her son how to manage his minutes. She simply hoped that unlimited cell phone minute plans would cost less in the near future. She would not have to deal with any surprise cell phone bills.

Ferguson interviewed one peer who had a cell phone throughout junior high and high school. The peer never knew if she went over her cell phone minutes because her parents never mentioned it to her.

### Findings

Team Cellmates is not trying to prevent users from making mistakes; simply preventing teens from going over their minutes is not enough. When a teen racks up a large phone bill, punishments usually ensue. This gives parents the opportunity to teach their children about the connection between money and responsibility.

The worst-case scenario is not learning from the situation. Even when a parent does a good job handling the situation, the knowledge gained about money management is rudimentary.



## Concept and Design Development

This EMU program centers on the idea of saving unused minutes (similar to rollover minutes). The phone plan starts out with 100 weekly minutes. Team Cellmates chose weekly minutes because it matches the fast-paced lives and shorter attention span of teens. The user can begin collecting their unused minutes in a savings account. The Interest that they earn from their savings account increases their total weekly minutes. In this way, they can work their way up to a 200-minute week plan.

For example, if a teen saved up 200 minutes in their savings account and earned 10% interest each week, this will add 20 minutes to their 100 weekly minute base for a total of 120 minutes.

It is very likely that some teens will try to "beat the system", but overall, they will learn a valuable practice. If they find the fastest way to reach 200 weekly minutes easily, this is acceptable because these skills apply to real world money management.

Aspects that are more complex are also included in the program such as variable interest rates and conversion rates. However, even without understanding these concepts, teens will know that the EMU program encourages them to save minutes in order to earn minutes.

### Zones

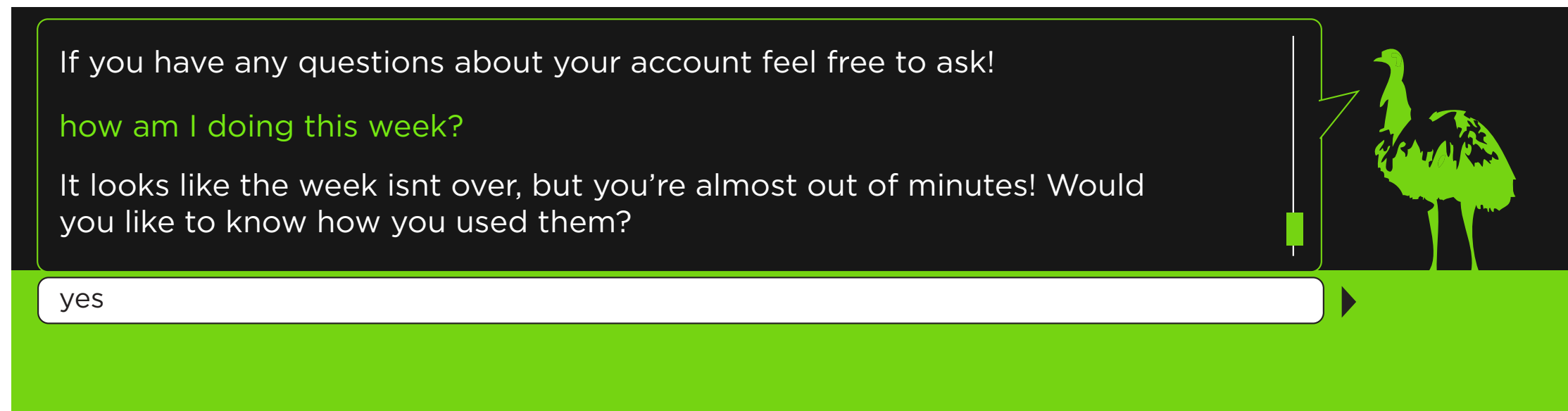
The EMU interface deploys a series of color-coded zones to that affect how the phone is working.

The green zone illustrates the "safe zone" and indicates that the user is actively saving their minutes per week.

If a user spends all of their allotted weekly minutes, it will cut into their savings account and demote them into the yellow zone.

If the user depletes their saved minutes, they fall into the red zone. In this zone, the user can only use a bare minimum of 100 weekly minutes and they can only be used to call his or her parents and emergency numbers for the rest of the week.

The week following the red zone, the user moves to the orange zone where their daily minutes are rationed for them. This gives the user an excellent illustration of a day proportioned by minutes. After spending a week in the orange zone, users return to the green zone if they saved any minutes during this probation time. Hopefully they will have learned from their mistakes.



### Interactive EMU-Multimodal Interface

Talk about how this is on the website and not the cell phone itself

The program incorporates an innovative system for users to access information by using an interactive character that instructs and answers any question. EMU is an interactive dialogue driven environment. The EMU character fulfills the teaching role and is a streamlined guide in the learning experience and similar to a chatbot. At any time, users may query the EMU about any topic within the domain of banking, cell phones, and related fields. This character takes the chatbot characteristic a step further by using text to speech capabilities.

HCI studies involving children have shown to be most efficient when the program makes use of multimodal interfaces, that is keyboard, mouse, and voice all working together seamlessly. Team Cellmates opted not to utilize speech from the user as studies have shown a great deal of variability in pitch and frequency in the voices of projected users.

The EMU is a more powerful tool than simply an interactive help menu. This tool can gather information, point to information on graphs, and elaborate on that information to the user.

Here is a situation in which the user has queried their recent activity. The EMU processes the statistics and displays them in an easy to read graph.

The user can make further queries on previous questions. Here you can see the EMU elaborating on the topic of savings.

Other teaching aids and tutorials rely on the user to read large bodies of text and navigate through keywords embedded with in the text. Our system is more dynamic by stimulating the user to ask questions. It is also friendly by not overloading the user with straight facts and fundamentals.

There is often a negative stigma with traditional education.

The EMU bypasses this stigma by communicating with the user through an informal vernacular and a personality, which the user can explore. The EMU bounces back witty answers to unrelated and personal questions such as:

- "What's an emu?"
- "How's it going?"
- "What is your favorite color?"

### Benefits of the System

Parents benefit because teens cannot go over their allotted minutes and raise phone bill charges. Parents do not have to be the "bad guy" and enforce punishments for cell phone abuse. Likewise, parents should not spoil their kids and kids are not limited to their parents' knowledge about managing finances.

#### Key Concepts

1. Ability to manage money
2. Savings
3. Interest
4. Debt
5. Responsibility
6. Time management
7. Keep it challenging

Cell phone service providers would benefit from a system that charges users for a 200-minute weekly plan when most users will make mistakes and will take quite a bit of time to work their way up to 200 minutes.

Teens end up learning about money management and skills that may one day help prevent them from amassing credit card debt and other money management problems. Teens learn in the most effective way with the program- by trial and error- by making mistakes and then learning from them (with an innovative multimodal interface).

The phone plan might seem overly restrictive, but it is not much different from a regular phone plan except that you cannot rack up ridiculous charges. The user can shoot themselves in the foot and drop down to the minimum of 100 minutes per week, which is a rather small plan, but the system focuses on rewards, not restrictions. The use starts at 100 minutes and grows from there, earning more minutes and text messages by being responsible.

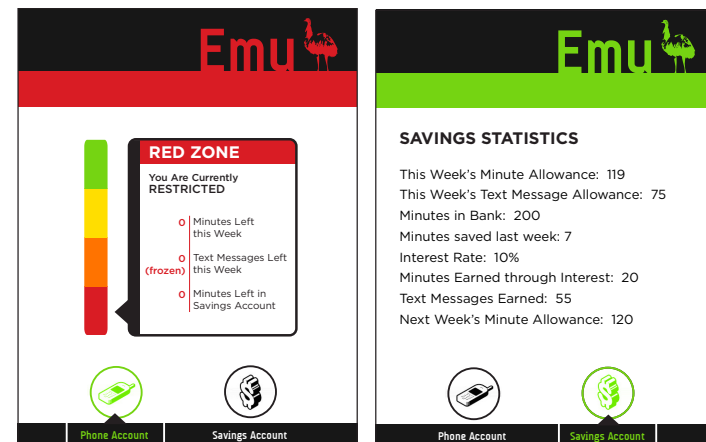
## Final Design

The interface consists of two parts- the cell phone and the website.

### Cell Phone

The cell phone is simple. There is the intro screen and then two sections, the phone account and the savings account. The phone account displays the color-coded zones (see earlier description) that tell your status. This screen also displays the most important statistics to know at any time.

The savings account lists key savings statistics that are comprehensive and useful to the user.



### Website

The website opens with a splash screen and description of the site. Meta navigation has three sections: Phone Account, Saving Account, and Statistics.

#### Phone Account

- o Current status

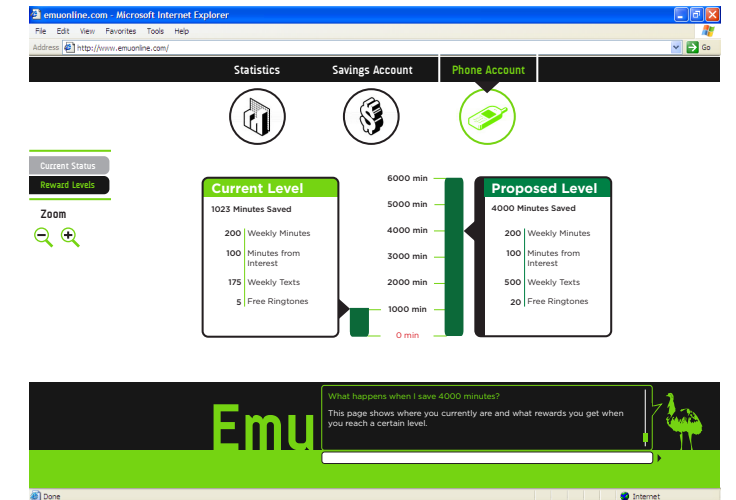
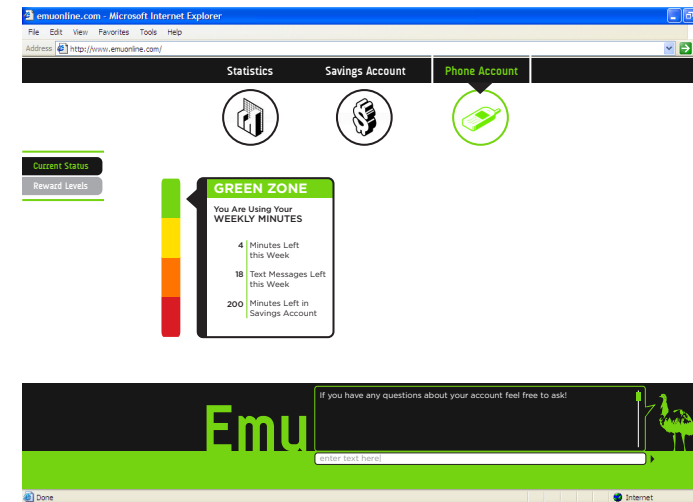
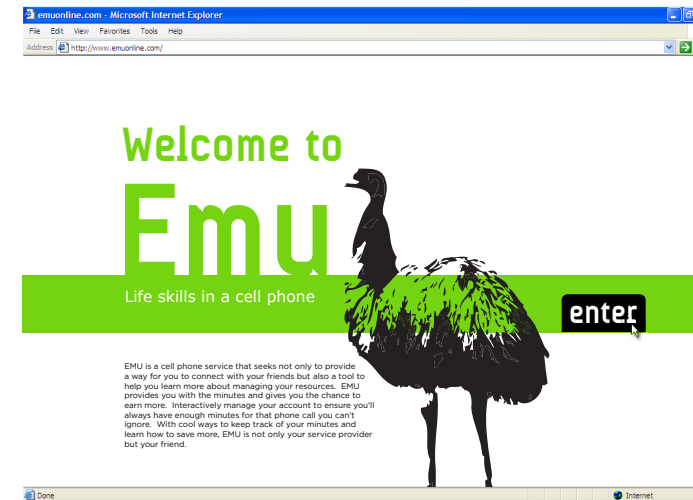
The user sees this screen after the splash screen.

- o Reward levels

Rewards are a significant part of the EMU program. This screen allows users to see what they have achieved and what milestones lay ahead. Even when a user has reached the cap of 200 weekly minutes, they still can hope to save enough to unlock unlimited text messages, which would take a significant amount of time.

#### Savings Account

This section only has one screen and is the same as the corresponding screen shown on the phone.



**Statistics**

o Social network

This display allows the user to see where a user is allocating his or her minutes. Friends and family that users talk to the most are in closer proximity to them and appear larger. Clicking on someone's bubble brings up additional statistics (hard numbers) on how often you communicate with that person. People with different relationships to the user appear in different colors. The display also can change time range.

o Daily breakdown

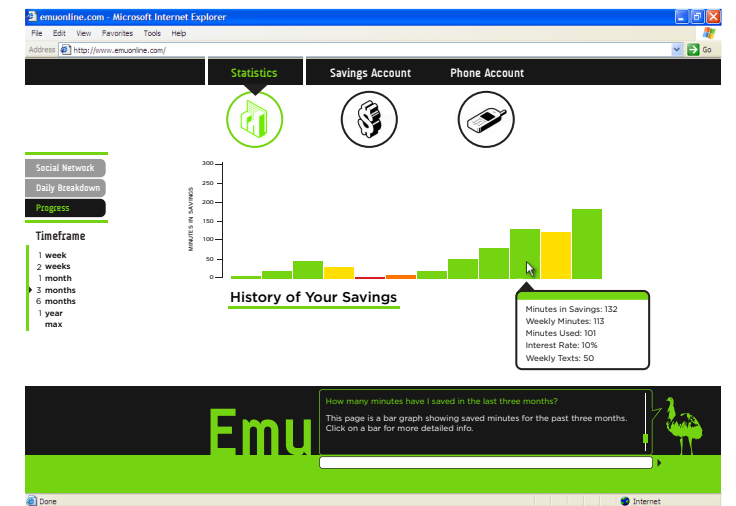
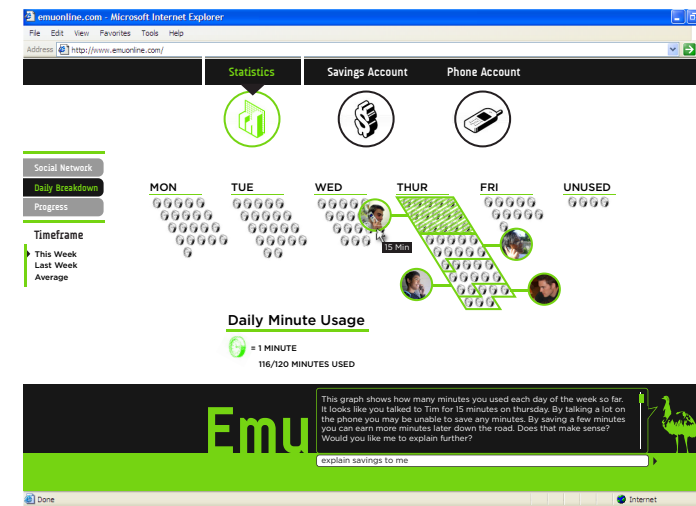
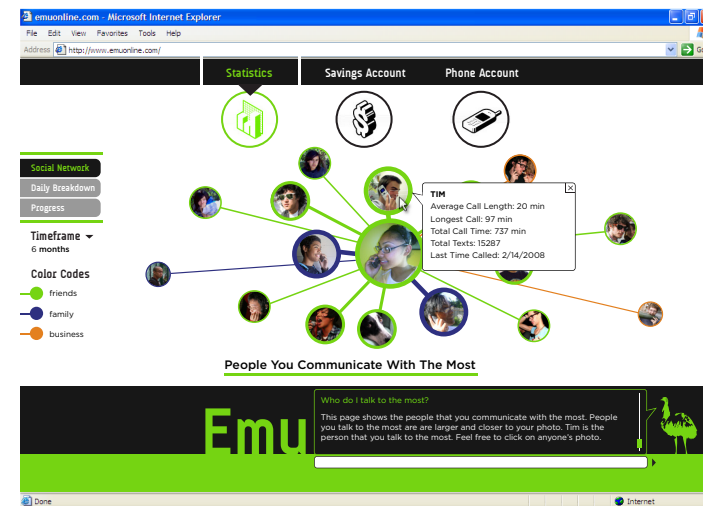
This screen shows the amount of minutes spent each day during that week. This screen also shows whom the user called. Users can view the days they spent the most time talking and the length of each conversation. This screen also lets you change the timeframe.

o Progress

This is a standard bar graph applied to the history of the user's savings account. It also utilizes the color-coded zone system. For example, yellow bars are decreases in the user's savings. Each bar is one week. Clicking on each individual bar brings up the hard statistics of their saving for that week. This screen also lets you change the timeframe.

**Talking EMU**

Users can issue questions through an ever-present text bar at the base of the interface. An interactive emu answers the questions. This feature helps users learn about content and engages them with a multi-modal interface. It replaces the need for a glossary or more traditional help system.



## Implications

“ Learning how to manage resources, money specifically is a life skill not often taught. Team Cellmates believe that EMU is a tool that will eliminate the surprise cell phone bill and teach teens a valuable skill that they can carry with them throughout life. ”

## Evaluation and Discussion

*"Some of my greatest concerns with teen cell phone use are largely on the cultural effects. As time progresses, I believe we will see a dramatic rise in the negative implications of widespread cell phone reliance. This is definitely one major concern I see with offering a help-based system on mobile devices.*

*Professor Nabuo Masataka, a primatologist from Kyoto University Primate Research Institute, is convinced that the proliferation of mobile devices among our youth is devolving them into chimps. Masataka goes on to say that he believes young people will attack with an animalistic and ape-like mentality because they are not able to express their emotions appropriately with words.*

*'Apes will suddenly strike out at people for looking at them. Naturally, apes can't talk and they're expressing their emotions in the only way they can. People prone to rage are doing exactly the same thing,' Masataka continued. 'Mobile phones are now performing tasks that minds once did, such as think and talk. If this continues, people will continue losing their ability to think.'*

*I strongly think that it is imperative for researchers, scientists, parents, students, and officials to look into this looming threat, address it, and prevent such a reality from swallowing society before it's too late. We must define the lines between technological advancement and technological detriment."*

**- Anthony Shelley**

*"If we had more time I would love to take our design out and talk to many users, parents, teens, and cell phone service providers. Furthermore, I would explore more concepts (other than interest) that could be incorporated into the cell phone plan that would help teach teens about how real world credit and banking systems work. I would also like to further refine the design of the website and cell phone interface to be most user-friendly and appealing to the user group."*

**- Leslie Ferguson**

*"If we had more time, we could help flush out and integrate more complex ideas into the system. Now, the interface displays the interest rate- but doesn't have any graphical representation. We didn't talk about it in the presentation either. Another concept, conversion rates, would be nice to integrate. Conversion rates make sense if you think about how the program is supposed to work. If users save up 3000 minutes in their savings account they could theoretically blow them all in one week by using up all of their weekly minutes and then cutting into their savings, but 3000 minutes is far too many to ever go through.*

*Even if the user is going over their minutes for many consecutive weeks, it will be a while before they actually feel a difference. Conversion rates could allow savings to start out at 1 to 1 and progressively get worse the more minutes they save up. Therefore, if you have 3000 minutes in the bank, if they go over their weekly minutes by 10 minutes, instead of taking 10 minutes out of their savings it might take 100.*

*Other aspects of money management could also be included such a borrowing, lending, and even the stock market.*

*We could also do more research if we had more time, showing our project to more teens for example. Another interesting avenue would be to pursue a line of inquiry with phone companies. One nagging question is why phone bills so confusing and phone plans are so easy to get charged outrageous fees. Do phone companies do this on purpose? These moral angles could strengthen the concept behind our design."*

**- Simon Bond**

*"The field research I did suggested that kids like more colorful and stimulating interfaces. I would want to go back and creating a theme that was more cartoony and cool. The emu is a great character, but it needs to be revamped with more style."*

**- Geoff Thilo**