Final Game Design Paper

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This paper must be turned in hard-copy and electronically. Final format is pdf form, filename FinalGameDesign.pdf. It must be in your design folder.

Abstract Describe the learning goals of your game, the premise, and the overall game design in just a few paragraphs.

We have designed a role-playing game with the goal of teaching personal finance to children who are just becoming old enough to legally work. Because these children are likely to have never had a source of income before, they are likely to be inexperienced with the concept of managing the money they make. Ultimately, we want to teach students to be financially responsible, and to be able to make calculated decisions when considering different ways of using the money they earn.

We aim to introduce the users to Financia. This is essentially a world where users can click on different cities in a sequence, with each city teaching a subset of personal finance skills in increasing complexity. In each city, the user will be guided by a tour guide who introduces the user to various concepts in each topic (e.g. how to manage debt when in the *Borrowing Money* module), and gives the user a mini-game that utilizes using the concepts learned in the module. Once the users successfully complete a module, they'll be given missions and tasks in Finance World such as "save enough money to buy your friend a birthday present", or "you received an email that looks suspicious, how will you reply?" to encourage them to keep practicing the skills they've learned, and to move on to complete the next modules. We will include competitiveness through leaderboards, engage creativity through avatar and task customization, and utilize a badge system to increase motivation.

User Profile Summarize your user profile in 1-2 paragraphs, making sure to point out aspects that influence your game design.

We aim to target children who are just beginning to be able to work (e.g. in America, around the age of 16). We assume that users will have zero experience with personal finance because the majority of our target users will not yet have ever had a job. We also assume that the user comes from low-income families who live paycheck to paycheck. This assumption implies that the user is unlikely to be aware of concepts like investing and money management, as their families most likely do not have any disposable income.

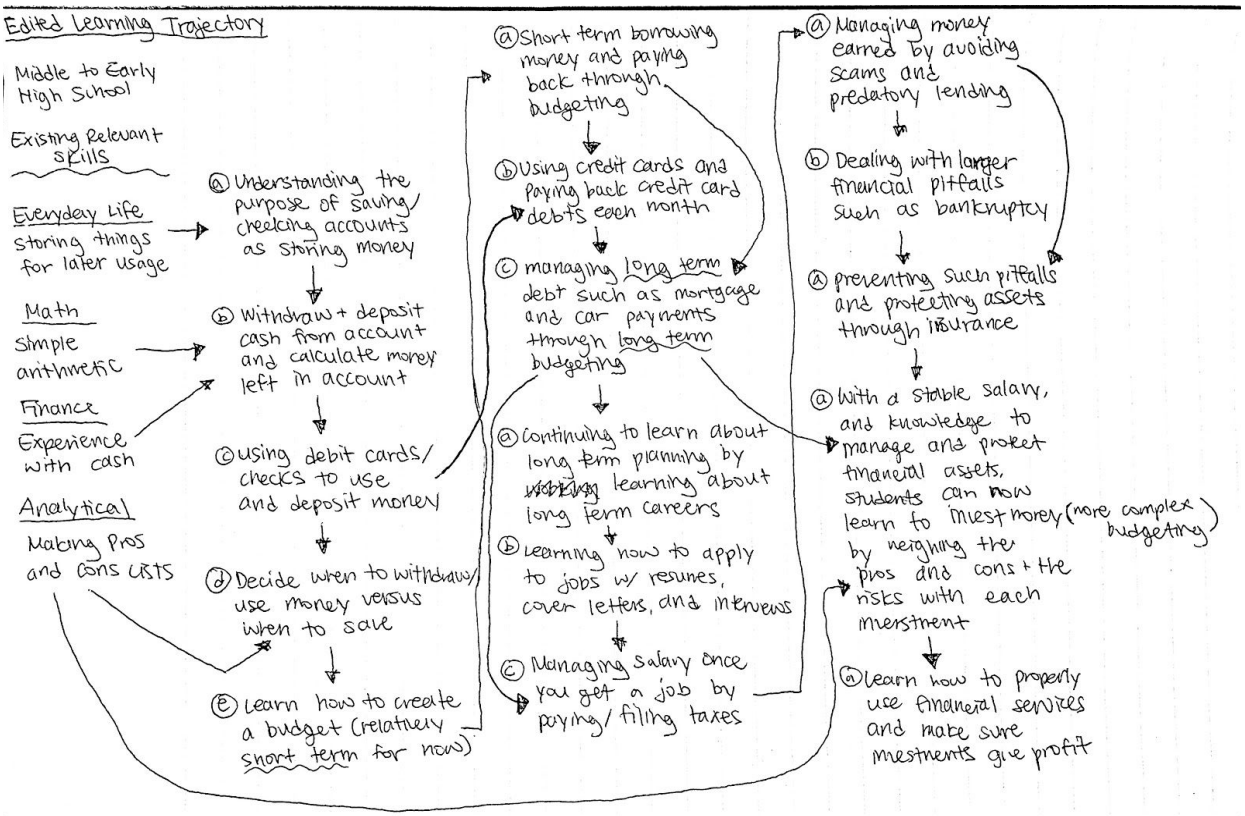
Our target user will also be from an immigrant family, with limited English skills and differing skill levels in other subjects important in personal finance, such as math. We will make sure to use pictures rather than words when necessary, use less advanced vocabulary, and assume only the most basic math skills for the grade level, such as addition. We will also take care to add cultural elements that will feel inclusive for our player.

Skills Describe what skills you are going to teach your user. Make sure that these are skills, not just content. These need to be specific - not just "math" or "memorization" - exactly which math skills are expected or exactly what level of memorization is expected to be built? You also need the skills to show some range from easier to harder.

We want to equip children with skills that allow them to be financially independent and to be able to make smart financial decisions with their future earnings. We have divided the skills into 7 categories, in increasing range of difficulty:

1. *The basics of managing money*: this includes making/using checking and saving accounts, learning how to budget and save up for bigger goals, and weighing the costs and benefits of saving versus spending.
2. *Borrowing money*: we aim to teach students about credit, how to use credit cards, and how to manage debt. We want to teach students to be responsible about borrowing money and staying accountable.
3. *Learning how to earn money*: we will guide students through the process of finding a job to obtain a stable income. These skills will include resume/cover letter writing, and interview etiquette and practice. We will also teach students how to deal with taxes and paperwork that come with working.
4. *Avoiding and dealing with financial pitfalls*: we will teach students about scamming, identity theft, predatory lending, bankruptcy, and other financial pitfalls that can occur. Students will learn how to avoid these pitfalls and how to deal with them if they do occur.
5. *Insurance*: here, we will teach students how to protect their property and financial assets. This will include health, auto, and other types of insurance.
6. *Investing*: once the students have learned the basics of saving, spending, managing, and protecting their finances, we will teach them how to invest in stocks, bonds, retirement accounts, and more, and identify the different types of risks that come with such investments.
7. *Using financial services*: finally, we will teach students how to utilize services such as investment managers by understanding the risks and benefits that come with diverse services.

Learning Trajectory Create a hypothetical learning trajectory for how student skills / knowledge will be built. The left edge should be the skills you assume students start with (lower anchor points). The right edge are the most advanced skills you will teach (upper anchor points). If there are concrete skills in the middle, you can highlight those with a different color. If you think it is more appropriate to split this into multiple trajectories, you can do so. Where available, cite sources for either the learning goals themselves or the relationships between learning goals. Much of what you are teaching has research behind it, so you should not be making all of it up.



We drew our learning trajectory mainly from these two personal finance curriculums we found online: the *High School Financial Planning Program(HSFPP)* and *NextGen Personal Finance(NGPF)*. The main backbone of our trajectory builds upon the existing curriculum of HSFPP, which had six modules ordered in the following trajectory: 1. Managing money, 2. Borrowing, 3. Earning Power, 4. Investing, 5. Financial Services, 6. Insurance. We both agreed with this curriculum that learning how to manage existing finances should be the first step in personal finance - followed by borrowing money which builds upon the skills learned in the previous module and learning how to best present oneself to increase earning power. However, we discussed the next trajectory and thought that investing is not necessarily the best next step.

We wanted to structure our game to follow a natural order so that scaffolding could be utilized - by providing a framework for novices and slowly remove the scaffolds as skills are learned. During the first part of the game, the students can focus on learning how to manage the basics without worrying about real-life financial problems of actually earning money. Once they learn how to earn money, they now incorporate managing that into the game, and we can now remove another scaffold. Teaching investing at this point does not do this - we thought of investing as a more advanced topic that can be learned after the student learns to be financially responsible and independent, and free to explore other ways of earning money.

We looked at the NGPF curriculum, which was divided into units, and saw that financial pitfalls was taught after the basics of budgeting. We agreed that this was another scaffold we could remove at this next level of our learning trajectory, and added it in. Then, we moved onto the

next trajectory of protecting the assets earned through insurance, a natural extension after learning how to protect finances from pitfalls, and finally followed through with investing and financial services. This way, our learning trajectory naturally progresses as follows: spending, managing, borrowing, earning, protecting, and investing finances.

We used constructionism in building the learning trajectory as well. For example, students learn the basics of investing first, and are then equipped to move onto the next step in the trajectory, which is utilizing this knowledge to use financial services carefully. Because they know the risks and benefits of investing, the can use these skills into deciding which financial services are best for them.

Game Design Describe your game, taking care to describe the different elements such as premise, rules, etc. This needs to be a complete description that will allow the reader to understand the game play.

The premise of the game revolves around the exploration of a fictional country, Financia, with individual cities that start off locked, and become unlocked as the player progresses through the game. The story begins with the player taking on the role of a fictional character, who is a personal finance coach backpacking through Financia, with an initial bank account value of $500. The goal of the game is to see every city in Financia without running out of money.

As the player goes through different cities, they are greeted by the city mayor, who gives the player a quick learning module on a specific area in personal finance (e.g. saving money, investing money, or insuring personal property). After completing the initial learning module with the mayor, the players are free to explore the city by interacting with different NPCs. Players can also receive different “quests” from NPCs that involve taking from or putting money into their bank account (e.g. the player needs to save up money for a birthday gift, decide what to do with their paycheck, or budget money to pay bills).

In order to earn more money, the player can take on additional quests in which the player “tutors” NPCs in personal finance. Upon accepting the quest, the player will be given a financial scenario that the NPC is in, and the player must analyze the situation using previously learned skills and give a recommendation to the NPC. Depending on difficulty, the NPCs may always reward the player with money, or only when the player makes the correct recommendation. We hope this will be an effective mechanism to engage the player in spiral learning, all the while contributing to the player’s progression through the storyline.

If the player ends up with no money in their bank account, and all of their available quests require taking money out of their bank account, they can either receive some “gift” money or lose the game and start over (depending on the difficulty level). There are no rules regarding where a player spends their money, as long as they have a balance in their bank account (just like in the real world).

Players will be able to gauge their performance in various ways. Each task completed will give a badge, such as a “bank account created” badge that they can collect. Furthermore, users in-game levels will rise with each task completed. The levels increase with experience (higher levels of expertise reached) and play (number of tasks completed, even if it’s repetitive). There will be a live leaderboard where the levels of all the players in the game and the number of badges they have will be displayed. This will allow players to see where they are in respect to the rest of the players, and add a competitive element for those who wish to compete against other players.

Skill Building Describe how the game gets more challenging as users learn skills, using vocabulary from game design.

Our game makes the user progress through the different elements in the trajectory by locking the more advanced topic “cities” until certain tasks are completed that demonstrate the mastery of skills needed to continue. We teach the different elements in a story-like manner since our game is a role-playing game. When each city is entered (in the learning trajectory, the beginning of each city is marked by the bullet point starting off at “a” again), the mayor will teach the basics of the topic such as withdrawing or depositing money. This is intended to be a brief, tutorial-like experience.

More intensive learning takes place when the player continues to explore the city, and meets various characters who require tasks from the player in order of the learning trajectory. For example, in the first city, the player will encounter an NPC who asks the player to set up a checking/savings account to be able to use money within the Financia world. Once the player successfully completes this task, they will be able to meet another NPC who teaches the next task in the learning trajectory, which is to withdraw and deposit cash. For example, the player could travel through a shopping plaza where they can choose to buy different items, and in order to do so they need to withdraw cash. With each successful completion of the learning trajectory items, players are now able to tutor in this topic, which allows for spiral learning.

We will increase the difficulty and complexity of the game as users progress by making the encounter with each NPC more complex. For example, once the user has learned to budget and save, they could come across the same shopping plaza mentioned before. At a lower level, the items in the shopping plaza would all have been sold at low prices so that the user didn’t have to worry about saving versus using most of their money. However, at higher levels the items can have high prices, even ones that exceed the amount in the user’s bank account. Now, the user not only has to withdraw money to purchase items, they have to continue weighing the pros and cons of buying an expensive item, and even budget to save up and buy an item that they cannot right now. The users will be able to come back to cities they explored before. In this case, the difficulty in encounters with different NPCs will still increase with the player’s expertise level. For example, if the player has completed exploration of the city that taught about borrowing money and credit cards, they will have the option to use a credit card at the same shopping plaza and deal with instances when they go over their credit limit and so on.

Motivation Describe what elements you included to engage the reader, again using vocabulary from game design. Describe how different "player types" will find something that engages them.

We will list the main “player types” described in the Game Design Workshop book below and discuss how each will find the game engaging in a different way, as well as the elements that increase engagement.

The Competitor - This type of player wants to best the other players, regardless of the game. This player can be engaged by looking at the live leaderboard in the game, and try to have the highest level in comparison to everyone else playing the game.

The Explorer - Our game is very well tailored to this type of player. Because our game revolves around the exploration of a fictional country, and each city presents a different arena that can be explored, and the player will be able to continuously explore. Each of our cities will have slightly different aesthetics and new components, and since each city represents a different area of content, the exploration pushes physical and mental boundaries constantly.

The Collector - This player will be able to “collect” different sets of knowledge as they continue to explore the cities. As the realm of exploration increases, the player can collect badges of achievement as well.

The Achiever - This player will be engaged by the rising level system as more quests and tasks are completed.

The Joker - This player can be engaged by the free-play aspects of our world. They can make their character buy random things that don’t take the game seriously (such as buying a toothpick for a birthday present), or go through bankruptcy multiple times just to play around.

The Artist/ The Craftsman - These types of players are engaged by creating, building, and designing. This player will be engaged because tasks will involve solving problems by constructing a plan, and designing little aspects of the game - for example, to save up for a present, what things will the player have to give up? What will the present be and how much will it be worth? Will it be okay to go without another need such as new clothing? The craftsman and artist will be able to engage in creatively constructing plans and designing how their character will act in the fantasy world. We also will have avatar customization tools available which can be bought with Financia’s currency. For the more creative players who want to customize their looks and buy various hairstyles or clothing, this would motivate them to continue earning money through the missions in the game.

The Director - The director will be engaged because they will be able to direct and take control of the choices of the character they are role-playing.

The Storyteller - This player will be engaged because our world is one of fantasy and imagination. While the financial aspects of the game are definitely based around the real world so the skills translate directly, the graphics and storyline of different cities will be imaginative and different from everyday life.

The Performer - This type of player will be engaged because our game essentially allows the player to take the role of another character and put on a show to develop their new character through different actions. Their performance is also shared with other players through live time updates and leaderboards, putting on a show.

Designing for the User Explain how you took into account the limitations in skills of the user to influence your game design.

Our target player when designing the game was a student from a low socioeconomic background. We assumed no prior experience with saving and money management in this environment, and decided to start off everything with the usage of cash since many of these students might not have dealt with cards.

Our target player is also an immigrant (who is possibly less proficient in English), which made us think about not using as much text in our game, but rather relying on images to convey information. For example, for our tutorial of learning concepts by the mayor, we decided to use an animation that would present content with images and movement (mayor physically showing which buttons to press at an ATM, how to use a card, and so on). In addition, any dialogue with an NPC would use lower grade-level vocabulary (late elementary), and we would print the words on the screen as well as have an audio so there are multiple ways to understand the content given. We also wanted to make sure students who have a hard time focusing (cognitive limitations) could come back to learning content and dialogue. Our game takes this into account by allowing players to replay all material presented by the mayor and the interactions with the NPCs.

We also took into account common disabilities such as visual limitations (color-blindness or lower eyesight). While our game focuses a lot on making each city of the world creative and unique design-wise, we will also make sure that the aesthetic elements are not only dynamic colorwise, but use contrasts to emphasize images for these players.

Finally, we noted that the topic of personal finance on its own may be dry and challenging to students of young ages from 13-16. Because of this, we wanted to tie in as much of our learning lessons as possible into real life scenarios that they could experience. Our design of interaction with NPC’s and the missions and tasks they are given revolves around this idea. For example, when we begin the introductory levels of money management, we will engage the player by asking them to do things they may encounter in real life: for example, one task would be to buy a birthday present for someone (as opposed to grocery shopping, which is a good example of money management but may fail to connect with teenagers who don’t necessarily spend time

cooking). By starting off with these easy connections to everyday life, we wanted to build confidence in personal finance before approaching concepts that are not encountered very easily at these ages, such as investing and insurance which are among the very last levels of our game.

Culturally-relevant Instruction Explain how you designed the game to appeal to students whose cultures do not fall into dominant American culture. What specific game elements did this affect, and in what way does that follow strategies we learned about culturally-relevant instruction?

We wanted our missions in the game to have personal connections with the players. For example, instead of just buying an object for no reason, the player could have their parent's birthday coming up and have to buy a present for them. However, we noted that it is often assumed that students have a traditional family structure and those that do not might find these additions to be alienating. Because of this,we decided to remove these types of wordings, and instead allow the connections to be customizable. For example, we mentioned in our design document how players will be able to choose and enter who they are buying a present for, as well as the present itself.

An element we decided to add recently was the ability to customize the player's avatars. Not only would the players be able to customize skin and hair colors of their avatar, we will also add different types of clothing and accessories that can be bought with the world's currency. We aim to make these accessories culturally diverse - for example, different items can be added on different cultural holidays (i.e. during Holi season, multicolor powder can be bought to be "sprayed" on the avatar). We will have to make sure to be inclusive in adding these elements and also have descriptions of their significance so that cultural elements can be shared and appreciated rather than blindly used. These elements will also be constantly updated to reflect students' backgrounds and feedback.We aim for this to add another aspect of personalization to the game and allow students with different backgrounds to connect with their character. The NPC's in our game will also represent different cultural backgrounds and ethnicities. Because our game revolves around meeting different mayors and characters who give out missions, having a diverse pool of characters allows for diverse representations.

Badge System Describe a badge system that could be integrated into your game. Take care to describe three categories of badges.

We can design a badge system that incorporates all three categories: participation, achievement, and for behaviors that lead to academic success.

First, participation badges can be awarded for completing tasks that do not require learning, but rather things that the user must do in order to play the game. For example, we can reward "Visited the Mayor in City 1" badges when players enter a new city and goes to the mayor's office to get started. Participation badges can also be rewarded for free-play elements. Badges can be awarded for "Buy a new outfit for avatar", or "Customize look of avatar", or "buy 5 items

from store” - play elements that aren’t necessarily related to learning, but can be earned by engaging with the game.

Achievement badges can be awarded for performance on tasks which require learning and skill to complete. For example, achievement badges can be handed out based on performance: “Complete task 1 with 10 dollars left out in bank account”, and so on that rewards good budgeting. Later on in the modules, badges could include “Profit from investment by 10%”, which similarly awards badges for performance.

Finally, badges can also be awarded for behaviors that lead to success. Since there are many NPCs in each city, and not all of them provide a task necessary to get to the next level, there could be badges for “Completed tasks for all citizens in City 1” - players are engaging in practicing skills over and over again to solidify learning, which is a behavior that can be rewarded but not necessarily performance or achievement based. Other badges could include “Completed all tutoring center questions”, which is another behavior that enforces good academic success behaviors.

These badges would be available to for the player to see without earning them, so that they can tweak their goals based on which badges they would like to earn.

Intelligent Systems How could an intelligent system be used in your system to adjust game play based on user play? Hypothesize a design that would dynamically provide personalized feedback and choose the next level / task / etc.

In a hypothetical ITS for our game, the system would constantly keep track of user movement throughout the city and actions they perform. Since the player has one mission at a time, the intelligent system would process the number of times and different ways that the player attempts to complete the mission. Once the player attempts the mission more than 2 times in the same way, the intelligent system could provide feedback, which gives out “hints” that direct the player towards the correct way to complete the mission. Then, the system would choose the next mission to be similar, just to make sure that the player fully understands how the concept works before moving onto a new topic.

In our game design, the tutoring center questions could also utilize a feedback system. If the player gets a certain question wrong at the tutoring center, the system could tweak the next mission to be related to the content of that question so the player could actively engage with the material more and learn. Once the player can successfully complete all missions related to the learning content on their own, the intelligent system would then boost the player to the next level or next learning content task.

For example, take a player who is learning how to withdraw money from the bank. If the player keeps selecting deposit, the system would realize that the player does not understand the words withdraw and deposit. It would then provide reminders on the vocabulary, and give hints on how to navigate through the bank. Once the user successfully completes the guided mission, the

next mission given would still involve withdrawing money, but in a different context. Once the user can successfully complete this type of mission on their own, the system would advance the play to the next level of learning content, using debit cards.

UDL How would you incorporate universal design for learning to accommodate students with sight impairments, hearing impairments, and/or cognitive impairments?

Our learning content design at the Mayor's Office has already taken into account some universal design for learning concepts. For the presentation of our learning content, we reduce text by using animations. Watching a video rather than reading off slides would engage easily distracted students. We use captions as well as audio to accommodate students with sight or hearing impairments. The videos are replayable, allowing students with attention deficits to go back to the material.

We will also incorporate these elements into the gameplay itself. We will avoid using color to differentiate between items, and keep the contrast of our images high for students with sight impairments. We will also avoid using large amounts of text, and make any text we have big and legible. We will also provide auditory input of text on screen. For students with hearing impairments, we will caption every auditory sound that the game makes, whether it be sound effects or dialogue. For students with cognitive impairments, we will provide a constant checklist of tasks they must complete, and hint buttons for every mission. We will also aim to organize our screen in a clear way so that finding different elements is less difficult.

Tangibles, Movement, Collaboration What elements could you introduce that would use tangibles, movement, or collaboration into your system to increase learning? You only need to propose a single unplugged activity to satisfy this portion (and explain the relationship to the game).

One unplugged activity with tangibles would be to explore the concept of investment with small food items such as pretzel sticks. Everyone in the class (or an individual) could start off with a set number of pretzel sticks, and "invest" them however they want on top of plates that represent different companies they can invest in. For each "round", the student could roll a dice for each plate. The dice would have a certain rise or decline in stock (ex. 1=-5 pretzel sticks, 2=-2 pretzel sticks, 3=-1 pretzel stick, 4=+1 pretzel stick, 5=+2 pretzel sticks, 6=+5 pretzel sticks), and the number of pretzel sticks on the plate would be adjusted for each dice roll for each plate. A "rise" in stock value brings in fresh pretzel sticks from a pile of sticks from the "bank", and a "decline" in stock value means the student must give up pretzel sticks. In order to adjust for the fact that stock values don't rise and fall randomly, each plate could have a dice that is weighted for a certain number.

This activity with pretzels with tangibles would allow students to see how their decision making earns or loses them assets, in this case, pretzel sticks. The activity would fit in well with the

game's goals of teaching investment in city 6, because students get to interact first hand with tangible losses and earnings.

Assessment/Transfer Choose three learning objectives from your learning trajectory. For each of those three learning objectives:

- Create one assessment question that would assess student knowledge of that objective.
- Define one "real-world" learning objective that it helps teach.

Then, for one of the learning objectives, define a single "bridge" activity that would help connect the in-game learning objective to the "real-world" learning objective.

Learning Objective 1: Understanding how to withdraw and deposit cash.

- Assessment question: Define the terms withdraw and deposit and give examples of when each can be used to purchase something that requires a certain method of payment (i.e. card, cash, check).
- Real world learning objective: Often, paychecks are set up to deposit directly into an employee's bank account. This learning objective helps teach how to transfer this money to tangible cash for things like bus fares and gifts.

Learning Objective 2: Managing long term debt.

- Assessment question: Suppose you want to purchase a car, which can be paid off in monthly installments with interest (numerical details would be given, and an existing budget of salary, food, etc). Complete the yearly budget plan and determine whether it is feasible to purchase this car.
- Real world learning objective: Big expenses like iPhones allow customers to pay in monthly installments. This learning objective helps teach how to deal with such real-world long term payment scenarios.

Learning Objective 3: Avoiding financial pitfalls and scams.

- Assessment question: How would you respond to a phone call that claims to be collecting donations for a charity, and asks for your name? What if they ask for your credit card info to process your donation?
- Real world learning objective: Phishing emails are often sent out and ask for sensitive information such as credit card info and social security numbers. This learning objective helps teach how to identify these scams and avoid leaking sensitive information.
- Bridge activity: Students can be provided with sample emails or voicemails that could either be "legit", or a scam. They can write notes on each one, determine how they would respond, record warning signs, and classify them as safe or not safe. This would allow them to see how real-world scams are carried out and help them avoid these real-world scenarios.