IST 5011, Fall 2008 Dr. McGee

Game Design

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NAME: The Lunch Money Game

TOPIC: Money management and budgeting basics

OBJECTIVE: Learners will …

(1) apply addition and subtraction principles to a real-world situation.

(2) make choices that allow them to successfully budget lunch money for a week.

(1) Target Population

The target for The Lunch Money Game is 4th grade elementary school students who are likely 9 or 10 years old and are either familiar with the experience of using cash to buy lunch in a school cafeteria or can imagine the experience. The latter situation may be a larger percentage of the audience since many elementary schools today use cafeteria accounts that allow students to pay for lunch by debiting from a prepaid account (Holt, 2008). As such, students are missing out on practical, real-life application of addition and subtraction through simple, hands-on spending exercises.

In terms of developmental characteristics, the 4th-grade target age range for this game is extremely curious and enjoys problem-solving games and puzzles. A typical 4th grader usually does best when work is broken into chunks and when achievement is recognized with feedback (Wagoner, 2004; Developmental characteristics). Hands-on and learn-by-doing activities like this epistemic game should facilitate a tangential learning opportunity for players.

(2) Type of Game

Educational > role-playing simulation

The Lunch Money game allows elementary-age learners, many of whom have a natural interest in money, to practice addition and subtraction skills in connection with a real-life experience. This epistemic game allows a learner to be an "active agent" (Gee, 2005) and allows the empowering learning opportunity to make mistakes and fix them before facing similar situations in the real world (Shaffer, 2006, p. 9).

(3) Characteristics of Successful Games

Environment

The opening screen of this game is the door to a school cafeteria with buttons labeled "enter" and "how to play." Clicking on those buttons reveals the game's situational scenario and goals.

"How to play": This button is an illustration of a cafeteria worker with the words "how to play" incorporated. Clicking on this image from the opening screen or any time through the game (the character would always appear somewhere on the screen to provide tech support Van Eck, 2006) reveals no more than a single page of instructions (Looney, 2003; Kramer, 2000), with illustrations taken from the game to explain rules. A "play" button at the top and bottom of the page allows the player easy entry to game play. The rules also use age-appropriate language to clearly define the game's goal (Crawford, 1997) — to practice and master budgeting skills. Imbedded help is in the form of clickable non-playing characters, or NPCs (Prensky, 2006, p. 155) that offer spoken and on-screen typed game hints and budgeting tips. Example: "Divide $15 by the number of days in a school week. The answer is the average amount you should try to spend each day."
"Enter": Clicking on this button reveals an animated illustration of a school cafeteria in a uniform style and theme (Kramer, 2000) that appeals to a 10-year-old. It resembles a Nickelodeon and Disney Channel cartoon, with bright colors, lively animations, sound, comical characters, etc. Game play happens in the environment of a cafeteria — a meaningful and relevant context to the target learner. That context helps establish situated cognition, which is considered more effective than formal instruction (Van Eck, 2006).

The middle of the screen contains a large cafeteria tray and a clickable menu of food items with prices. To make the experience feel real and the learning experience more fun (Kirriemuir, et al, 2004), the menu and tray color change each day, as does such typical cafeteria surroundings as …

a daily calendar.
the placement of NPCs in the cafeteria environment.
signs on the cafeteria wall touting different club meetings occurring that day.
audible daily announcements from the principal in the background.

Playability

To keep the interactivity requirements consistent, most actions in this game require mouse clicking — on food choices, to confirm choices, to get hints from and respond to NPCs, etc. The game moves forward only when the player allows it to through his or her own decision-making and confirming mouse clicks. Exploration of the cafeteria reveals that rolling over the menu items provides additional information to consider before making choices.

A driven player can move through the environment quickly, while a curious learner can move slower and explore. While the player is most successful doing the addition and subtraction mentally before committing to menu choices, an ongoing tally reveals the results regardless. The only other navigation is clicking the "take a short break" button to pause the game or the "how to play" icon which opens an easy-to-close screen with instructions and hints for game play.

To add humor and authenticity to the game, NPCs such a schoolmates, teachers, a principal, the school dietician, and cafeteria workers appear in the environment to either help move the game forward or allow the learner to play and explore. When clicked, the NPCs offer spoken and/or onscreen speech bubbles that offer game hints, menu choice recommendations, or such "Easter eggs" as jokes and fictional school gossip to entertain, surprise (Kramer, 2000), and motivate the player while he or she learns.

The variables of figuring out how to play and the actual duration of play (five rounds of spending decisions) are just long enough to stimulate a reasonable amount of interaction, but don't require so much time that the player loses interest due to low tension (Kramer, 2000). The player's decisions balanced by the calculations made possible by the ongoing money tally or score also provide peaks and valleys to keep the game interesting and let the player feel some control without all the work of calculating the results of the spending decisions.

Quantity and quality of interactions

Interactions drive the game forward and take two forms: the player's menu choices and information gathering from the NPCs. The instructions make clear how to utilize and master these interactions to reach the game goal. The effect of mastery becomes obvious as the player progresses with more information to better solve the challenges and applies principle and factual knowledge (Bloom's Taxonomy) to begin to understand the concept of budgeting.

Interface design

The game's buttons are obvious and clearly labeled to facilitate easy entry. To alert the player to take action, the game's clickable choices glow and/or make a sound upon rollover, prompting the player to click. By default, the game's audio is on, but throughout the game there is a visible volume control and mute button that can be activated by clicking if the "irrelevant audio" (Clark & Mayer, 2007, pp. 318-319) distracts the player from achieving the learning goal. If sound is de-activated, speech bubbles serve as the sole communication vehicle. NPCs that "talk" to the player can be responded to with pre-formatted, clickable chat responses. Interactions do not exceed a single comment from the NPC and a pre-formatted response from the player.

Levels of play

Completion of the game's budgeting goal in one setting reveals additional levels of the game that allow the user to practice budgeting in different and perhaps more complex scenarios. For example,

Having less money and more expensive choices.
Having to buy lunch for him/herself and a friend who lost his lunch money.
Being tempted to spend lunch money on other non-food items for sale in the cafeteria, like fundraiser items.

Replayability

The game also includes modding opportunities (Prensky, 2006) to allow the motivated user to change the setting, characters, rules, and other variables to make the game relevant for learners with different experiences or interests. The modding capability allows the learner to construct a new, more invested level of participation, which may motivate them to play again and reinforce learning (Squire, 2006) about budgeting in other realistic settings.

(4) Game Elements

Element	Function
Goals	The Lunch Money Game begins by outlining the goal (Crawford, 1997): Make lunch menu choices for a week that do not exceed a total budget of $15. An alternate beginning point for the game is a tutorial, which allows the learner to reference the rules at any time during the game by clicking an ever-present "how to play" button. Throughout the course of the game, a running score in the form of a tally of expenses and money left to spend appears on the screen for the player to consult on his or her progress. This tally allows the player to see the consequences of his or her decisions and actions, a reminder of the goal, and progress toward that goal. The game ends when lunch choice expenses for the week reach or exceed the $15 budget and the final tally appears. If the player has spent less than or equal to $15, a congratulations screen appears. If the player has exceeded the budget, tips for how to achieve the goal next time appear on the screen with a button to "play again." While successfully budgeting the $15 over 5 days is considered a "win," the real end-state for the player is when he or she realizes the learning objective: mastery of the concept of budgeting. That may happen a few days into the game's fictional week or only after several full play-throughs.
Rules	In the first level of this game, the player, who is competing against himself or his last performance if he's played before, must make five days of menu

	choices, one day at a time, without exceeding a budget of $15. The player … cannot increase the budget to more than the designated amount indicated in the level of play. (This rule changes if modding is in effect.) must choose to purchase only from the items offered. must click to confirm choices before the score is tallied for a day and the next day's choices are revealed. can click on NPCs at any time during the game to get hints and tips. can explore the setting as much as desired. is not constrained by time. can pose pre-formatted chat questions to the NPCs to gain more information. can play the game with a partner if desired and share responsibilities. cannot save a score from a level played in a previous session. (Scores will only be "saved" during a continuous session.)
Game Tokens	The tokens in The Lunch Money Game include: a game start button ("enter"). a clickable button to see the rules of the game ("how to play") clickable food items that the player chooses. a clickable confirm button that becomes active once menu choices are made. This token moves the game forward. a running tally of money spent, money left to spend, and a reminder of the spending goal. This is not directly controlled by the player but is there for reference in decision-making. clickable NPCs to get game hints that could help the player make more informed menu choices. pre-formatted chat responses to click and "send" to NPCs who pose questions or challenges. a clickable button to pause the game ("take a short break"). a clickable button to mute audio.
Incomplete Information	The player sees menu item prices but the tally does not activate until choices are confirmed. This incomplete information forces the player to mentally calculate totals and commit to choices based on mastery of addition and subtraction. The fact that several NPCs can be clicked for hints and tips is not revealed on the "how to play" page. Rather it is a surprise element for the curious player who is tempted to click upon seeing the glow or hearing the sound upon rollover.
Challenge and	Once game play has begun, the learner is faced with a myriad of choices that might realistically appear on a school lunch menu. The learner chooses randomly-presented entrees and side dishes by clicking on illustrated images of the foods and is challenged to mentally add the costs before committing to

Opposition	choices. Once choices are confirmed through a button click, the player sees the financial results of those choices. Conflict is presented if/when… the player adds or subtracts incorrectly. the player makes a poor choice in the short-term that forces a less desirable choice the next day in order to budget long-term for the week. the player is not able to choose a desired menu item due to higher price, a lack of money, or availability. NPCs in the lunch line with the player choose expensive items and try to persuade the learner to do the same. The player can pose pre-formatted chat questions to the NPCs about the choices and learn reasoning behind them to better inform their own decision-making.
Resource Management	The player's choices move the game forward and are directly related to the application of addition and subtraction skills.
Fantasy	A humorous illustration and animation style allows the player to weigh their own real experience against the comical antics of the game's fantasy cafeteria.
Entertainment	The animated illustrations, sound, and NPCs provide the most entertainment for the player and should motivate him or her to play again to reveal all the "Easter eggs" in the game.

(5) Type of Learning

1. **Discrimination Learning**

After choosing several expensive items from the menu and seeing the spending tally plummet based on that action, the engaged player should figure out that choosing less expensive items is a better path to achieving the spending/budgeting goal, and change strategy to match that learning. The positive reinforcement of choosing less expensive items and seeing the spending tally fluctuate less should influence learning. Reinforcement in the spending tally will help the player change or adopt certain behaviors.

On a different topic, comparing the prices of different items allows the player to make distinctions about value (e.g. the price of nutritious items vs. junk food). This may require

some prior knowledge but could also serve as a bonus opportunity to teach about healthy vs. unhealthy eating habits.

2. **Generalization Learning**

The game's relatable context should allow the player to make connections to real-world experiences, identifying which details are alike and different. For example, the cafeteria at the player's school may be as equally chaotic as the Lunch Money Game's cafeteria, but the real-life cafeteria is not nearly as fun to explore. The player learns this from exploration and observation.

Similarly, the addition and subtraction skills practiced in the Lunch Money Game are transferable (Oblinger, 2006) to a real cafeteria, or store, or other setting where money is spent. Feedback on choices, which comes in the form of a daily spending tally, provides direction. Hints from NPCs may also redirect and help a player remediate if he or she is not budgeting efficiently. The player learns by applying addition and subtraction skills and making choices based on those skills. The player's choices that lead to successful completion of the game should reinforce the desired spending behavior in virtual life and transfer of those skills to real life.

Feedback is provided after each day's choices are confirmed in the form of a spending tally. This score supports the intention of experiential learning (Oblinger, 2006), or learning by doing and through firsthand experimentation and discovery.

3. **Sequence Learning**

The Lunch Money Game player learns that in order to move forward in the game, he or she must first make three food choices each day, then confirm those choices with a button click before the tally will record the money spent and leftover. Game play cannot continue without following at least those three steps. This order of operations is required for each day of play, reinforcing the concept of sequenced actions to achieve a goal.

4. **Psychomotor Learning**

The Lunch Money Game player practices aligning what he or she sees on the screen with the movement of the mouse in order to make choices and move through the game. This action should promote practice of hand-eye coordination.

(6) Interactive components

A site map is not necessary for this game as all game play takes place in one "room" and the tutorial or "how to play" is the only other choice.

Learner-content

The Lunch Money Game is designed in Flash, a highly penetrated **media** platform (Adobe.com Flash Player Version Penetration) that allows robust animation and audio creation by the designer and control by the user. The game is distributed through a DVD and is available on the Web.

Support and feedback devices takes the form of a spending tally, hints from NPCs, a congratulations message when goal is achieved, and hints when the goal is not achieved to provide responsiveness to user needs. The use of pre-formatted chat responses may seem limiting but should cover the range of responses that a player would make to an NPC in the game. **Look-ups** are available through rollovers on the food items that reveal more information about each item to aid player decision-making. Progress of the game is tracked within a given session, but those **records** are not be maintained beyond that session. The curious player may discover "Easter eggs" within the game through exploration, but no additional **side games** are included since the game itself would be multi-leveled and includes add-on modding opportunities.

In terms of **cognitive tools**, a player uses his or her memory of a previous decision to guide future choices, encoding the experience and hopefully moving it to long-term memory. The experience of playing the game empowers a learner to generate and test hypotheses about budgeting to reach the game goal and develop meaningful learning with the computer as a partner as opposed to being simply a drill and practice tutor.

Learner-interface

Navigation: The player's choices serve as the main navigation through The Lunch Money Game. Clicking on clearly labeled food choice and confirmation buttons move the player through each day.

Start and stop: The game is started by clicking the "enter" button and can be paused by the "take a short break" button. The game stops automatically when the $15 dollar budget has been spent. Depending on whether the player has finished the five-day challenge successfully or unsuccessfully, the game ends with a corresponding message of congratulations or an "oops" message with encouragement to try again and hints to succeed the next time. Because the game is designed to be played in a short session (as opposed to an adventure game where the goal may require several levels of play), there is no need for a player to save the game and come back to it later to pick up where he or she left off. In fact, the game is not designed to have a memory of the player beyond a single session. Inclusion of a pause button should be sufficient for temporary stops.

Drag and drops: While it would be feasible and perhaps more realistic to have the player drag and drop the food choices from the menu to the cafeteria tray, for interface consistency, the game relies on clicking to progress. The clicking consistency is important for lower-knowledge learners (Clark & Mayer, 2007, p. 320).

Image Map, buttons, and rollovers: The illustrated cafeteria scene in The Lunch Money Game is image-mapped in Flash with imbedded swap image rollovers (regular state and glow state) on the buttons to highlight what's clickable (example: food choices, confirm button, NPCs).

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