Learning Techniques

Learning “Techniques” I’ve Used in the Past

As a child:

- Gaming
  - A quick multiplication game involving attacking robots
  - A tower defense math game
  - Brain Pop
- Science Experiments

In high school:

- Gaming
  - Blooket
  - Gimkit
- Studying (so boring)
- Worked examples

Studying

- Can be best for short-term achievement
  - Ex. standardized tests
- Learn exactly what’s required

Overall, boring and not necessarily cognitively efficient (but works)

Worked Examples

- Step by step illustrations of the process required to solve a problem
- Help students engage in self explanation for the core concepts behind a problem
- “More efficient and effective for initial skill acquisition”
- No worked examples can lead students down unproductive paths of learning
- Incorrect and correct worked examples are both helpful
- Can practice with worked examples with some steps removed

Games!

- Play is an effective way of learning for all ages
- Flow of gaming is essential for enjoyment and learning
  - **Challenge is optimized**
  - Attention is clearly absorbed in the activity
  - The activity has clear goals
  - The activity provides clear and consistent feedback as to whether one is reaching the goals
  - The activity is so absorbing that it frees the individual, at least temporarily, from other worries and frustrations
  - The individual feels completely in control of the activity
  - All feelings of self consciousness disappear
  - Time is transformed during the activity
- Can’t enter flow by being passive (it’s a choice to be engaged)

Types of Educational Games

Exogenous games:

- There is a disconnect between the learning goal and the game goal
- Educational “sugar coating”
- “The content is superimposed on top of the fantasy”
    - Ex. Blooket, Gimkit, hangman (by a different name)

Endogenous games:

- The learning goal and the game goal are the same (or closely linked)
- The content is weaved into the game
    - Ex. A game for finding treasure by plotting x and y coordinates

Pitfalls

- If a task is too easy or too hard players won’t participate
  - Study found children had more fun randomly guessing answer to question than trying to find the answer to a hard question
- Exogenous games can seem like making games more boring
- Learning the concept in game can ruin the flow, but not knowing the concept leads to too difficult questions

Thoughts for My Game

- My game is currently exogenous and has poor flow (requires learning all the concepts for a year of math outside of the game, but starting the game at the very beginning of the content)
- Finding an engaging endogenous game for each math concept seems very difficult
- Most information is tailored to how children learn rather than adults (adults don’t need to learn math to learn basic cognitive skills)
- I wanted one game format that could easily be scaled for the more time intensive and complicated math problems, which does not seem realistic
- Including worked examples with clear explanations would help introduce teaching into a game without disrupting the flow too much