COS750
User Experience: Motivation

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Story of the soccer boys

Story of the football players (Prof. Siedentop, Ohio State University, from The Sport Psych Handbook by Shane Murphy, 2005):

“An eccentric old man came home one day to discover that his flower garden had been trampled. He was exceptionally fond of gardening and distraught that someone or something would ruin his masterpiece and show such complete disregard for his dedication. ... He was surprised the next afternoon when a group of 4 adolescents showed up toting a football and began playing two-on-two in his backyard. His flower garden was the end zone! As the old man watched, he noticed that the boys took immense joy in diving into the end zone to make spectacular catches. The flowers were not something to be vandalized; rather, they were the goal of great play, respected almost. The old man was now more curious than irate. Though he still wanted to halt the destruction of his flowers, he decided he would conduct an experiment...”
“... He went outside and called the youngsters over. He explained that he too loved the flower garden and wished to reward the boys for their play. He would provide them each with a dollar every day that they came to his lawn. At first, it was a marvellous treat – the kids felt like professional athletes being paid to play sports. But, interestingly, as the old man reduced his remuneration in the following weeks, the boys showed up with less frequency. In fact, they became agitated that they were no longer being paid what they were worth.”
The soccer boys: what happened?

• What motivated the boys to play soccer in the beginning?
• Did the money motivate the boys to continue playing?
• Why did they stop coming to play?
• Do you think they would have continued playing regularly if he had not decreased the money?
• Do you think they would have continued playing for longer if the man had not become involved?
• The activity stayed the same, so what changed?
• The elder gentleman had altered the young people’s motivation from the love of diving into the end zone and catching touchdown passes to the chore of making money.
• The reward changed from being intrinsically motivated (doing it for the love of it – internal reward) to extrinsically motivated (doing it for money – external reward).
Reflecting on motivation and learning

• Think back to a time when you were highly motivated to study a computer science topic / do programming?
• What was motivating you?
• Did you lose motivation? Why?
Extrinsic vs Intrinsic Motivation

• Extrinsic motivation:
  – Motivated by some external reward to performing an activity, e.g. money, food, social reinforcement.
  – Awarded by some external agent.

• Intrinsic motivation:
  – No obvious external reward for performing an activity.
  – Reward is naturally part of performing the activity (e.g. enjoyment, like the feeling of achievement).

• Are both external and internal rewards motivating?
  – Both can be motivating, but the effect of intrinsic rewards usually lasts longer (e.g. research shows bonuses at work motivate but only last for 3 months)
  – Main issue is the “locus of control”: perception of whether your actions are under your own control or determined by external forces (somebody else is pulling the strings).
Extrinsic & Intrinsic motivation

• People who are motivated intrinsically can even lose motivation when extrinsic incentives/rewards are added.
  • Soccer players in the garden.
  • Academics given bonuses based on a performance management system.
  • Can be motivating for some, but demotivating for others (depends on perception of the individual – who is pulling the strings?).

• What does this tell us about educational software?
  – Not too much focus on external reward.
  – Better to focus on increasing intrinsic motivation.
Psychology: Motivation

- Many theories on motivation.
- One theory called *Flow* (Mihály Csíkszentmihályi)
  - Being fully immersed in an activity, focussed motivation.

versus
Basic model of flow

Level of challenge

Flow Channel

Level of skill

Anxiety

Boredom

?
Achieving a flow state

Flow theory describes three conditions necessary to achieve a flow state:

1. The person must be involved in an activity with clear goals and progress. This adds direction and structure to the task.

2. The task must have clear and immediate feedback. This helps the person negotiate any changing demands and allows them to adjust performance to maintain the flow state.

3. The person must have a good balance between the perceived challenges of the task at hand and his or her own perceived skills. The person must have confidence that he or she is capable to do the task at hand.

(http://en.wikipedia.org/wiki/Flow_(psychology))
What makes educational software captivating?

- Tried to figure out why computer games are so captivating.
- Idea: to use principles to design captivating educational software.
- Survey of 65 school learners
  - From pre-school to grade 8.
  - 25 games
  - Features considered:
    Audio effects, Competition, Cooperation, Computer keeps a score, Fantasy, Goal, Randomness involved in game, Speed of answers counts, Variable difficulty level, Visual effects.
  - What was the most important feature (from above list) that determined which games students liked to play?
Malone & Lepper’s framework

• Individual intrinsic motivations for learning:
  – Challenge
  – Curiosity
  – Control
  – Fantasy

• Interpersonal motivations for learning:
  – Competition
  – Cooperation
  – Recognition
Challenge

• What makes something a challenge?
• There must be goals whose attainment is uncertain.
• Goals should ideally be:
  – Obvious (must know what the goal is), or allow user to generate goals for themselves.
  – Visible (are they getting closer?)
  – Goals should be practical, rather than a general skill (e.g. doing arithmetic).
  – Short-term and long-term.
• Ways of making goals uncertain:
  – Varying difficulty level.
  – Multiple level goals (e.g. score-keeping with speed measure).
  – Hidden information (also called imperfect information).
  – Randomness (chance plays a role).
• Performance feedback:
  – Need to provide clear performance feedback to enhance the challenge and learning, ...
  – Without reducing self-esteem to the point where the challenge is discouraging.
  – Frequent, clear, constructive and encouraging.
The activity should provide a moderate level of informational complexity and discrepancy from the learner’s current state of knowledge & information.

Sensory curiosity:
- May be enhanced by variability in audio and visual effects.
- Also technical events (e.g. zooming, dissolving, changes in camera angle, etc.).
- Should promote interactive exchange with the learner.

Cognitive curiosity
- Prospect of modifying higher-level cognitive structures.
- Can be stimulated by showing that users knowledge is incomplete in inconsistent.
Control

• The activity should promote feelings of self-determination and control on the part of the learner.

• Contingency:
  – The activity should provide a responsive learning environment (the outcomes are dependent on the person’s responses).

• Choice:
  – The activity should provide an emphasize moderately high levels of choice over various aspects of the learning environment.
  – Personalisation of the activity may enhance perceptions of choice.

• Power:
  – The activity should permit the learner to produce powerful effects.
• What is fantasy?
  – Imagining objects or social situations not in current reality.
  – Can range from completely possible to completely impossible.

• Fantasy can make an activity more interesting and so promote intrinsic motivation.
  – Should be designed to appeal to the emotional needs of learners.
  – Can differ significantly for different people/groups.
  – Reward of fantasy: escapism and wish fulfillment.
  – In educational games, the accuracy of the fantasy is usually important (simulation rather than imitation). E.g. driving game for a driving school, science game.
Example 1: Typeracer

- Main focus: teach people how to type faster.
- http://play.typeracer.com/
- Discuss in terms of Malone and Lepper’s four individual intrinsic motivations for learning, namely:
  - challenge,
  - curiosity,
  - control, and
  - fantasy.
Example 2: Alien Language

• Focus: Supports the teaching of body parts in 4 languages.
• [http://alienlanguage.co.uk](http://alienlanguage.co.uk)
• “The aliens are on a mission to collect creatures from around the galaxy. Blast off and learn the parts of the body with them.”
• Discuss in terms of Malone and Lepper’s four individual intrinsic motivations for learning, namely:
  – challenge,
  – curiosity,
  – control, and
  – fantasy.
Example 3: Nero

• Main focus: to teach students basic artificial intelligence concepts.
• [http://nerogame.org/](http://nerogame.org/)
• The NERO game takes place in the future as the player tries to outsmart an ancient AI in order to colonize a distant Earth-like planet.
• Machine learning game:
  – Agents are embedded in a 3D physics simulated world.
  – Agents are trainable (each is controlled by a neural network)
  – Game phases: (1) sandbox for training, (2) trained agents battle against other agents.
• Discuss in terms of Malone and Lepper’s four individual intrinsic motivations for learning, namely
  – challenge,
  – curiosity,
  – control, and
  – fantasy.

