70.

Trade to the top

Teaching economics and complex systems through the Lead Caravan multi-player game

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Abstract

Lead Caravan is an interactive, multiplayer mobile game that leverages the physical co-presence of participants. In *Lead Caravan*, you are an interstellar miner collecting resources at the far reaches of the galaxy. With nothing but a keen sense of business, you must outwit the other "space miners" to fulfill your order requests from back home. Use your keen negotiation skills to barter with other miners, and trade resources to gain advantage. But be careful… or another miner might out negotiate you and leave in their space dust!

Introduction

There is an increasing recognition among learning scientists and economists that youth financial literacy is extremely low (Lusardi et al., 2010) the youth has little knowledge on how to make wise consumption decisions (Johnson & Sherraden, 2007), and are less likely to accumulate wealth and manage wealth effectively (Stango & Zinman, 2007). Many games, from *Lemonade Stand* to *SimCity,* have attempted to engage players in economic thinking and practices, but few (if any) engage players in real-time with their peers. Negotiation is also an important mechanic within the broad scope of economics-focused games. However, most of these games focus on "game theory" elements (outwitting your opponent, or focusing on zero-sum outcomes in one-off events) rather than situating the players within a complex economic ecosystem (Bachrach, Kohli, & Graepel, 2011; Hinton, Hamner & Pohlen, 1974). In response, we are introducing *Lead Caravan* – an interactive, multiplayer mobile economic complex systems game that engages multiple players in face-to-face and real-time resource trading. Herein, they need to physically move throughout the environment, and negotiate deals to trade resources with their peers, while planning to maximize their economy.

Game Working

In *Lead Caravan*, players are distributed in teams (the team members are initially clustered together) and are given a "home market" in one spot in the room. Their home market has a resource stock which is initially populated with different amounts of various resources (e.g., wood, steel, metal) that is shared across all members of each team. While some of the resources are shared across all the markets in the

game, each team has their own unique resources that other teams need to barter and trade for in order to obtain.

Figure 1. An example of the initial resources in a market.

Players are tasked with recognizing which goods are in demand in their market, and must move around the room finding other teams (or players) that have and are willing to trade that resource. Using their mobile devices, players make trade requests to other players, which they can either accept or reject. Throughout this process players are encouraged to engage in negotiation and bargaining tactics.
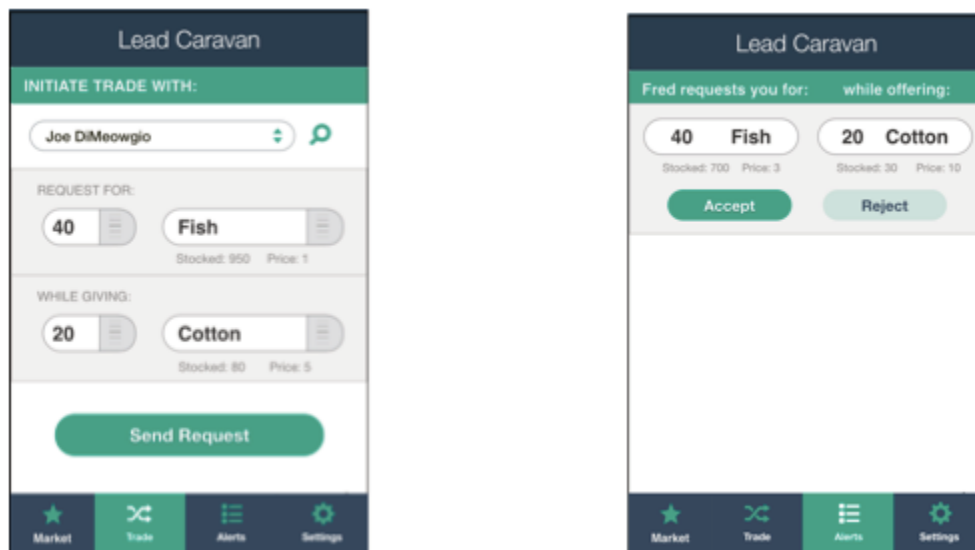

Figure 2. An example of two groups trading.

Throughout the game, changing of resource amounts and "pivotal events" (technological developments changing the value of resources, or demands of different items), can cause the prices of resources in the market to change; requiring players to make decisions on the fly and adapt to changing market conditions. Additionally, some items in the game can only be made by combining multiple resources together – requiring further cooperation and negotiation among players and teams.

When the game ends (generally by time), all teams sell all their remaining resources to their home market, at the current price of each item. The team that ends with the most money, wins.

An important aspect of *Lead Caravan* is that it uses players' mobile devices and requires them to actually move throughout a physical space to engage in negotiation and trades (versus only through computers screens). Using a Bluetooth tracking system, we can track players' movements through the space as they interact with one another and make trades. Coupled with a rich array of telemetry data (e.g., the trades proposed, trades accepted, fluctuating market prices, and total profits earned by players), we hope to gain insight into the flow of capital, ideas, and participation throughout the room. In this way, we hope to understand how players built the relevant skills and identify patterns in: how different players play; what behaviors lead to success; and highlighting different play and negotiation styles.

By playing *Lead Caravan,* we anticipate that learners will begin to understand the fundamental concepts around complex systems, equilibria, economics, negotiation, resource management, and market dynamics, operations, and processes. They learn this both through gameplay, embodiment, and social interaction in a real space.

A link of the game's early prototype, intended to run on all players' devices simultaneously, is available at http://caravan.complexplay.org.

References

Bachrach, Y., Kohli, P., & Graepel, T. (2011, May). Rip-off: playing the cooperative negotiation game. In *The 10th International Conference on Autonomous Agents and Multiagent Systems- Volume 3* (pp. 1179-1180). International Foundation for Autonomous Agents and Multiagent Systems.

Hinton, B. L., Hamner, W. C., & Pohlen, M. F. (1974). The influence of reward magnitude, opening bid and concession rate on profit earned in a managerial negotiation game. *Behavioral Science, 19*(3), 197-203.

Johnson, E., & Sherraden, M. S. (2007). From Financial Literacy to Financial Capability among Youth. *J. Soc. & Soc. Welfare, 34,* 119.

Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial literacy among the young. *Journal of Consumer Affairs, 44*(2), 358-380.