



## Using the Venture Capital Game to Teach Topics in Finance

### Overview and History

The Venture Capital (VC) Game is a web-based, discrete-event simulator of a market for a single product. Students are divided into teams. In some assignments all the teams are entrepreneurs. In other assignments, some teams will be entrepreneurs and the rest will be venture capitalists. The objective of the game is to finish with the highest equity valuation. The entrepreneur teams compete against each other in either a single market or in separate markets and raise money by selling equity to Friends and Family and, if there are any, to venture capital teams. An entrepreneur's market share is determined using a formula that is known to the teams. The formula is a function of the team's cumulative R&D expenditures, previous day's marketing expenditures, fraction of equity owned by employees (excluding founders), the "reputation" score of the most reputable venture capitalist that owns equity in the entrepreneur, and the previous day's market share. Entrepreneurs spend money on R&D, marketing, and operations. Each venture capitalist starts with a pre-determined amount of cash that they can invest in their reputation directly or invest in entrepreneur teams. The VC Game includes an industry journal and an e-mail function that allows teams to communicate with each other. E-mail would be used, for example, to solicit offers for investment and to set the terms of an investment. The game administrator (typically the professor or a TA) can monitor all the teams and e-mails. The VC Game also generates balance sheets, income statements, and cash flow statements for each entrepreneur. VCs can also view the financial statements of the entrepreneurs in which they have invested. The game from the students' perspective is described further in the "VC Game: Overview" note.

The VC Game has three general learning objectives.

- **competitive dynamics:** Build students' understanding and intuition for the dynamics of a rapidly growing, competitive industry, particularly as a function of the amount of investment capital available;
- **valuation of firms:** Build students' understanding and intuition for using financial statements and market projections to determine a firm's value and financial health;
- **financing strategies:** Allow students to exercise tools and knowledge from the classroom to negotiate the "how much, when, and who" of term sheets, including equity price, contingencies, and options.

The VC Game is designed to overcome many of the difficulties associated with computer-based assignments. An instructor or a student only needs a web browser that can run Java and Javascript. Netscape Navigator version 2 or later, or Microsoft Internet Explorer ver-

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sion 3 or later meets these requirements. The computer must have access to the internet. The software resides on a central server provided by a private company, Responsive Learning Technologies (RLT). As a result, instructors do not need to be concerned with software installation and maintenance, or platform compatibility issues. Instructors may assign up to three assignments. Instructors may design their own assignments or use assignments provided by RLT (along with teaching notes). Instructors can get a temporary, free trial account to evaluate the software and, if desired, design new assignments. If the instructor decides to use the VC Game in a course, the price is \$15 per student per academic term.

The VC Game was first used in a course at Stanford's Graduate School of Business in the Spring of 2000. The course was an elective in financial entrepreneurship taught by Associate Professor Manju Puri. The game was sufficiently well received by the students that it has become a permanent part of the course.

## **Typical Procedure**

This section describes a typical sequence of events for using the VC Game in a course.

1. The instructor requests a free trial account from Responsive Learning Technologies (RLT) to evaluate the software. RLT sets up an account and provides access codes to the instructor.
2. The instructor decides whether to use the assignments provided by RLT, or to design a new assignment with new simulation parameters such as capacity cost or demand profile. Designing and testing new sets of parameters are described in the note "Venture Capital Game: Administration."
3. If the instructor decides to use the VC Game in a course, the instructor notifies RLT of the approximate number of students and the approximate dates when the assignment(s) will be given. The \$15 per student fee is typically included in the student's reader price or class fee. RLT provides the instructor with an access code that the students can use to register their teams.
4. The instructor distributes the note "Venture Capital Game: Overview" and the first assignment to the students. The instructor will generally pre-determine which students will be entrepreneurs and which will be venture capitalists for each assignment. The instructor also provides an access code to the students to register their teams and the time and date that the first assignment will begin.
5. Students register their teams on the web using the access code provided by the instructor. The instructor verifies that all the students have registered toward the end of the registration period.
6. At the designated time, the administrator presses the "run" button on the administrator's web page that starts the game, moving the simulator to "running" mode.
7. Over the one to two-week duration of the assignment, teams monitor the entrepreneurs' performance, periodically making changes to their companies. If the assignment includes venture capital teams, student teams will negotiate and execute investments. The students will use concepts from lectures, but lectures will typically not focus on the game.
8. Once the game ends the simulator enters the "done" mode. Each student team turns in a two to four page memo describing what they did, what they should have done (if different from what they did) and present an analysis using concepts from lectures to justify their conclusions.
9. A typical course will use one to three assignments.

## **Lectures and grading**

It is recommended that only a little lecture time be spent specifically on the VC Game. In Stanford's entrepreneurial finance course, there was a brief demonstration of the software early in the course just to show the students what they should expect if they are using the software correctly. After each assignment was completed, there were also class discussions where the most successful teams described what they did and their rationale. Other than these times, the VC Game was only occasionally mentioned, for example, to set up the context for some concept being taught in class. References to the VC Game were limited in class to support the idea that students were "on their own" in managing the companies, as they might be in a real-life setting, and that it was up to them to figure out how to apply and extend concepts from the course to the more complex (and thus more realistic) VC Game setting.

After each of the assignments, each student team turns in a "memo" describing their actions during the game and either justifying their actions or arguing that some other set of actions would have done even better. The assignments are mainly graded on the use of concepts and tools presented in lectures, although a small portion of the grade may also depend on the team's final score in the simulation. The teaching notes for the specific assignments contain more information on what to expect from students.

Finally, after each assignment is graded, a one or two-page handout is distributed to students. The handouts do not generally present any claims to "optimal" behavior. Instead, the handout describes how the most successful teams approached the problem of managing their cash position, growth, and market share.

## **Pedagogy**

For an introductory financial accounting or finance course, the game would focus on using financial statements to determine when and how much cash should be raised to sustain operations. By repeatedly monitoring evolving balance sheets, earnings statements, and cash flow statements, students can develop the skills to use all three statements together to gauge the health and financial requirements of a growing company. For example, students will experience the common but often non-intuitive condition during rapid growth where earnings are positive and cash flow is negative. Key decisions would include whether to raise capital, and if so, when. In these assignments, all teams would be entrepreneurs competing in a common market. In the first game, enough "Friends and Family" capital would be available for entrepreneurs to capture the entire market. In the second game, there would be little availability of capital, so cash would become each team's constraint. Contact RLT for examples of assignments and teaching notes for such introductory courses.

"Financing Growth in a Competitive Market" is an assignment designed for an advanced finance course focusing on financing startups and venture capital. (See the assignment and teaching notes for details.) The assignment is designed to be run twice, allowing each student to be on both an entrepreneur team and a venture capital team. Each venture capital team would have twice as many students as an entrepreneur team so that there would be half as many venture capital teams as entrepreneur teams. An advanced finance course focusing on financing startups and venture

capital, assignments would also focus on the challenge of financing growth, but there would be an added emphasis on financing strategy. In addition to the challenges described in the previous paragraph, both types of teams would have to determine appropriate equity prices and financing terms, which they would negotiate in the process of selling equity.

The Venture Capital Game is an example of a *goal-based scenario*<sup>1</sup>. In their research, Schank et al have described goal-based scenarios as comprising a “clear, concrete goal to be achieved, a set of target skills to be learned and practiced in the service of this goal, and a task environment in which to work.” Goal-based scenarios are especially appropriate for generating an understanding of complex systems, which allows students to systematically refine their understanding and intuition of system behavior through exploration and iterative experimentation. In the context of the Venture Capital Game, the system is a competitive, growing market that may include various financing options. By iteratively making decisions, observing the effects of their decisions, and refining those decisions, students develop an intuition for evaluating and diagnosing a company’s financial health and needs, for negotiating financing, and/or competitive dynamics depending on which aspects of the VC Game are emphasized. At least as important, students develop the set of skills that apply lecture concepts. For example, a lecture may describe the elements of an earnings statement and cash flow statement, and the Venture Capital Game would then allow students to see how the statements must be used together to determine the prospects for high future earnings given the current cash position. As another example, a lecture may describe the different elements of a term sheet for private financing, and the Venture Capital Game would then allow students to think more carefully about how the financing terms fit together and experiment with different terms. By providing a scenario that is somewhat representative of a real situation and where course material can be applied, goal-based scenarios build student enthusiasm for course material. Finally, the constant availability of team standings in the Venture Capital Game has also built enthusiasm and allowed students to continually assess their performance relative to peers.

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1. Schank, Fano, and Jona. “The design of goal-based scenarios.” *The J. of Learning Sci.* 3(4) 1994.