

NEW PRODUCT DEVELOPMENT SIMULATION

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ABSTRACT

This paper describes the New Product Development (NPD) Simulation developed for our Marketing and Entrepreneurship courses. The simulation teaches NPD best practice, focusing on determining needs of potential customers, definition of customer segments, and building & launching a product.

INTRODUCTION

We conducted a review of simulations that addressed entrepreneurial situations (e.g., The Retail Entrepreneur Simulation, from Interpretive Software). These can be placed in one of two categories: 1) the entrepreneur is managing a small existing business with pre-defined products, or 2) the new business is some form of retail sales. In both of these, the simulation participant does NOT face the task of designing a product. If there is any simulation component related to gathering customer data, it is represented as purchasing a report, i.e., the simulation participant has no exposure to actually gathering any customer data. Our engineering students who think of becoming entrepreneurs see the design of products as their primary contribution to a new enterprise. Therefore we decided to develop a simulation that focused on product development and included details of gathering customer data. Initial testing demonstrated attitude change among MBA students. Students report they enjoy the simulation and recommend it to other students.

THEORETICAL FRAMEWORK AND RELEVANT CONSTRUCTS

Previous simulation research has produced measurable attitude change using a 'Paired-Game' design (Schumacher 1992). This design has participants play a complete game, in this case taking an idea through development & launch of a product, after which they receive feedback in the form of scores on about a dozen parameters (e.g., time to launch, amount of marketing data collected). The participant then plays a second game with the goal of improving their score.

The Paired-Game design is a generic design, what some have called a 'Frame Game' and other content can be organized into a paired game design. This paper addresses only the NPD simulation, one example of a simulation that incorporates the paired game design. The original use of the paired game design was a simulation focused on the impact of rapid growth in a high-tech company on its entrepreneurial culture (Schumacher 1992).

There are random draws that set some simulation parameters during initialization, therefore the second game is

different than the first in details. For example the customer segments are different in the second game, and thus what features participants should include in their product to be successful changes. Participants remain in a mode of discovery & information seeking in trying to launch their product in both games. The more general task of evolving a product idea through development to launch remains the same in both games and the paired-game design allows discovery of contrasting approaches to this task.

The 'Paired-Game' design is more elaborate than two games played in sequence, the software has several features that provide additional support for learning. For example, the simulation records participant progress in the initial game and participants can view this record and track their relative progress in the second game. Also, an advisor offers suggestions and interpretations of simulation events to participants during the games. There is a different advisor offering a different perspective in the second game. In addition to the computer software, the simulation includes roles that participants adopt. The roles are intended to enhance learning by providing interpretations, and causing participants' to rethink their mental models such as is often sought in activities for debriefing simulations. The learning mechanism here is participant identification (empathy) with the simulation roles, a topic several authors have addressed (Williams 1980, 1986, 1987, Bennett 1977).

Any simulation experience raises context questions for participants regarding how well the simulation maps to reality. How does what I learned apply outside the simulation? The paired game offers participants what we call 'calibrating experience'. They compare their experiences in the two games and become aware of how their different actions influenced the results. The comparison of two simulated experiences enhances the participants' ability to answer context questions. This design creates a learning environment that supports 'deep' learning, the rethinking of beliefs & attitudes participants have about how and why a certain approach is effective.

One issue that is mentioned in discussions of simulation use is that of 'students gaming the system'. The idea seems to be that students can 'cheat' or somehow get a high score without doing what the simulation designers intended. The NPD simulation, and other simulations adopting the paired-game design, follows the suggestion of Fletcher (1971) that the simulation message is encapsulated in a successful strategy. Therefore, in the Start-Up simulation, if participants obtain a high score, they are adopting the strategy they were intended to learn. Participants are given instructions and advice that guide them toward achieving a good score, but there is sufficient uncertainty in the tasks they face that they must discover success.

The NPD simulation was created using this design to make apparent to participants how some of the attitudes observed in technical entrepreneurs reduces the likelihood of NPD success. It

exposes them to an alternate perspective that embraces the best practices suggested in the literature, primarily a greater use of marketing early in the NPD cycle. (Morris 2003; Cooper, 2001; Urban & Hauser, 1996). The simulation message is broadly consistent with published best practice. Adopting a greater marketing orientation (Gebhardt 2006) yields a better simulation score. The Start-Up simulation provides an understanding of the importance of, and methods used in, collecting and analyzing data about potential customers in NPD.

PEDAGOGICAL IMPLICATIONS AND OUTCOMES

Participants begin with a brief product description - a product vision (below), as well as some information about potential customers and possible product attributes, money, and a goal of building and launching a new product. The primary issue they face is selection of features to include in the product. The secondary issues they must address in defining their product include, How much time to spend contacting customers, Which potential customers to contact, When to use trade shows or focus groups to gather information, The definition of customer segments, and Setting the price of their product. After the product is launched, participants receive feedback on market success. Success is largely determined by the match between the features included in their product and those the various market segments want. Because customer needs and segments are unknown, (randomly drawn at the start of each game) participants must discover these through their actions: customer interviews, trade shows, focus groups, and library search.

Our observations of entrepreneurs in our incubator are consistent with literature reports (e.g., Cooper, 2001). They often over-emphasize technical development and under-emphasize, or postpone, marketing in their execution of NPD projects. That same bias is also seen in our students. We conclude that the insufficient use of marketing is driven by attitudes and beliefs, not simply a lack of information about marketing. Thus training to improve their approach must target attitude change. The paired-game design was developed to direct attitude change.

An initial task in defining the simulation message was to summarize observations of the entrepreneurs with whom we had worked at our incubator. The patterns of behavior were consistent with published work, but we had seen more detailed, more specific examples that suggested why these behavioral patterns persisted.

For example, one set of beliefs concerned entrepreneurs' understanding of the time required by marketing activities. Some believe that a good product will sell itself, that customers will find them. These beliefs support the practice of putting little effort into marketing, and postponing that effort until after product development is substantially complete. Entrepreneurs who build technical products often expect that the marketing activities will require substantially less time than the technical tasks associated with building the product. The simulation provides a record of the amount of time spent on technical and marketing tasks making it obvious to participants that marketing does indeed require a substantial investment. Further, moving that effort forward to early development has benefit in the simulation, as the literature claims it should.

IMPLEMENTATION GUIDELINES

In testing this simulation, the instructor provided students with a written introduction (below) and then ran the software using a projection screen and asked students to make decisions (Shall we attend a trade show? Work on the prototype? Visit a potential customer?). This generates a lively discussion as the process unfolds. It has also allowed us to capture student feedback on possible improvements to the simulation. We have had students spontaneously go to the blackboard, draw a diagram, then attempt to persuade their classmates to make certain decisions. The entire simulation takes 2 to 3 hours depending on the group size and amount of discussion. This is how conference presentation will be delivered.

After each simulation demonstration a few students invariably ask if they could have access to the simulation. They feel the choices during the group demonstration were a compromise and they wish to try again to improve their score. We believe this approach allows students to work at their own pace and to make their own decisions. We believe the best use of the simulation is to make it an out-of-class assignment. Students are instructed to download the simulation software and complete it. There can then be a discussion of the various student experiences in a subsequent class meeting. A 5-minute, QuickTime video is available that demonstrates the simulation. This and the instructions below are sufficient for students to begin the simulation.

The simulation has been used in classroom exercises 12 times in 5 universities, with both graduate and undergraduate students. One recent trial with 115 MBA students showed significant participant attitude change. The simulation was developed for use with engineering students, but a number of trials have shown it to also be effective with business students. The full simulation takes two to three hours. We believe that a single, intense simulation experience of a few hours has greater impact than simulations whose design intends them to be used over a period of days or weeks. This is consistent with the design goal of creating participant identification with simulation roles.

INSTRUCTIONS TO PARTICIPANTS

GOAL:

Your goal is to take an initial idea, develop it into a product, then launch that product. Your initial idea - your product 'vision' - is described below.

SCORING:

The simulation calculates a score after you launch your product. The score is primarily based on how well your product features meet customer needs, and the number of those customers. The score is also influenced by when you launch your product. Launching before the competition gives you access to more customers.

PLAY OF THE SIMULATION:

The simulation progresses in rounds as in many games. Each round is a simulated month. You receive Time resources at

the start of each month and 'spend' this time conducting activities. When you have spent all your time, you start the next month which gives the next month's Time resources and updates the simulation parameters. (Note: To improve game play, you may attend a conference even if it requires more time than you have remaining in the current month. The simulation allows this 'deficit spending'; the deficit is subtracted from your Time in the following month.)

THE BASIC TENSION OF THE SIMULATION:

How many features to build? And which features? Your product can be developed faster by selecting fewer product features, because this requires completing fewer tasks. However, the match between product features and customer needs is the key factor determining your score at launch. If the match is poor, there will be few sales and your project will be a failure. Therefore adding product features increases the fit of your product, but it also tends to delay the launch.

YOUR PRODUCT VISION:

Your product idea is a PDA-based software tool for medical professionals. Initially your vision is little more than a short list of possible features. You have selected a programming language and decided that you will not make hardware. You expect to sell your software from a web server or on CD-ROMs with customers installing it themselves on their PDAs. At some point you will need a customer support function but it must be a low priority until there is some installed base. You believe your product will increase the productivity of physicians, helping to reduce health care costs. Therefore you expect that doctors, hospitals and insurance companies will find your product very valuable.

CUSTOMERS:

You have the opportunity to meet potential customers in the "NPD-Challenge". In reality these would be a combination of phone calls, emails, interviews etc., and a significant amount of time would be spent in arranging such meetings and in travel for any face-to-face meetings. This process is simplified in the simulation by assuming all meetings are face-to-face and eliminating time to arrange or travel to meetings. Each customer visit 'costs' one time unit.

YOUR ADVISOR:

Part of your college experience was taking a series of engineering courses from Professor Gibbon. You always thought of him as a helpful teacher and you have maintained contact with him over the years. He will be available to offer advice during the simulation.

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