SCENARIOS OF CHOICE: USING SOFTWARE TO TEACH NARRATIVE DECISION MAKING

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Abstract

One of the key elements of business practice is decision making. In the domain of commerce, persons who have been managing business organizations are called upon to make both tactical and strategic decisions that determine the course of their enterprises through the maze of modern economic life. Given the importance of decision making, the teaching of these practices and their implementation is of paramount importance for the training of future professionals in business schools. As with all pedagogical endeavors (in this case that of business education) salient theories and methods that should be conveyed to students need to be identified. One of the principal theoretical approaches to decision making are decision trees. These are sequential graphs that display alternate paths through a particular “space” in which selected courses of action are made. Decision trees, according to Lee Roy Beach and others, also can embody a narrative structure defined by the temporal series of choices made by a decision maker. Decision making therefore embraces the use of scenarios that a decision maker should follow.

As a first step towards incorporating the use of narrative decision making into business education, “practical minded” students must be motivated to consider the importance of storytelling. As researchers in the tradition of contextual cognition have observed, an effective way for students to be motivated is to place them in a situation where they need to construct an environment or virtual world. Fortunately for instructors who wish to teach narratives by having students produce them, there exists a software tool known as "Twine". Twine allows a storyteller to develop a scenario by creating a linked series of HTML pages that can, in the case of business, represent a decision tree based process.

To test whether the use of Twine enhances a business student's appreciation and understanding of the role of narrative in decision making, a study was performed using a control and an experimental group of graduate level business students. In the control group, students were taught decision making methods without exposure to the Twine program, while the experimental group did an assignment using Twine. After completing questionnaires, it was found that the experimental group significantly appreciated incorporating narrative into the decision making process more than the control group.

These initial empirical results suggest that software tools that allow students to develop their own decision making scenarios can be fruitfully incorporated into business education. These tools can also allow students, as well as faculty, to empirically investigate of the use of narrative structures in business decision making.

Keywords: Business Education, Decision Making, Software, Simulation.

1 INTRODUCTION

A central role played by individuals in business organizations is that of a decision maker. Sound and effective decisions can determine whether an enterprise flourishes or fades. Since the widespread introduction of electronic computers into these organizations over sixty years ago, decision makers in business organizations have sought to use the storage capacity and analytical potential of these systems to help make decisions. These computer systems were relatively simple at first - they recorded and processed transactions. Over time, they first evolved into management information systems that can survey and control resources, and later into forms of decision support and knowledge management systems that can not only serve as adjuncts to managers, but in some cases can replace the role of human decision maker. [1]

The training of future business leaders who need to understand the importance of decision making often takes place in an educational setting, such as a school of business. In these settings students should not only be taught about the elements and processes of making decisions, but given the importance of computing in business, they should also understand how these processes can be represented in an information system. It then becomes incumbent upon instructors teaching courses in information
management to give students practical insights about the procedures of decision making as they are modeled in a computational environment. [2]

A primary way to approach decision making in a systematic way that can be computationally modeled is through the use of decision trees. Decision trees, as the name connotes, are essentially mathematical graphs that represent a hierarchy of nodes that each express a point where a series of options is given. Each option represents a branch from the node that constrains the flow of actions (or decisions) that may be taken. For example:

![Decision Tree Example](image)

Figure 1. A Decision Tree Example [3]

As sequential diagrams, these decision trees may be regarded as forms of narrative. Theorists of literature, such as Marie-Laure Ryan, have argued that such diagrams can represent the structure of narratives found in plots. [4] As a general point, literary narratives can be considered as collections of decisions, in which the characters make choices that determine the final outcome of the novel, play or short story.

From the standpoint of human cognition, regarding decision trees as having some of the features of narrative can have important consequences for meaning-making and learning. Jerome Bruner, one of the central figures in the early development of cognitive science, noted that "[Narrative] deals in human and human-like intentions and actions and the vicissitudes and consequences that mark their course. It strives to put its timeless miracles into the particulars of experience, and locate the experience in time and space." [5]

Bruner's observations have importance for both the conceptual foundations and for the teaching of decision making. With respect to conceptual foundations, the appreciation of the role of the intentions of a decision making agent that unfold through time must be considered when modeling (and understanding) the decision making process with the potential aim of computationally modeling it. But, given the enormous amount of scholarly writing on narrative, there are relatively few people interested in the use of narrative in business decision making. One of the foremost proponents of this point of view, Lee Roy Beach [6] [7] [8], along with his collaborator Terry Connolly, wrote that:

Narratives hold the key to progress in decision making. They encompass the past, the present, and the future. They provide a platform for expression of the decision maker's principles. They are colored by assumptions about social norms and interpersonal expectations. They may well be the primary vehicle for understanding and decision making - where decisions grow 'naturally' from the progressive development of the narrative. In short, the stories that decision makers tell themselves may be central to how they pursue their futures, which, after all, is what decision making is all about. [9]

If Beach and Connolly are correct about the relationship between narrative and decision making - particularly in business - then it is incumbent upon educators of business students to make this connection salient for this audience. Business students are often "practically minded", and discussions of narrative can be seen by them as not being particularly useful for their careers. As some educators have noted, merely lecturing and extolling the virtues of incorporating an understanding of narratives into decision
making will not improve the students’ appreciation and understanding of this approach. Instead, a "learning by doing" method that emphasizes some degree of contextual learning would be more effective than mere lecturing. Adopting some of the features of "games" that can enhance cognitive development and user satisfaction might be helpful in an orientation that emphasizes such learning. In fact, some research has maintained that aspects of "gamification" within an educational context can engage business students in a fruitful way. More generally, games can be considered as "micro world" simulations. In a micro world, the properties of agents acting in a given environment are defined in advance, and the actions that they can perform are limited and constrained. Given the defined properties and constraints of agents in a micro world simulation, these features can be considered analogous to the predispositions and restrictions (in terms of alternatives) of decision makers.

In studies involving student learning in games, or micro simulations, the learner is immersed in an environment in which participation occurs. However, from the standpoint of active student learning (that can be seen as an "ideal") students would not only be immersed in a micro world decision making environment, but they would also have the opportunity to construct a simulation in which decision making would occur as a narrative unfolding over time. For the most part, game and simulation development involves a considerable expertise in programming as well as visualization competence. In addition even if the student possessed such skills, the labor necessary to produce such simulations would require far more time than what is allowed in a typical semester. However, a relatively easy to use software tool that allows users to create simple hypertext narratives (or in some cases, games) is Twine. The benefits of using Twine in Digital Humanities courses has been noted but there has been no body of scholarship that has shown its pedagogical advantages for business. At the very least, as this study shows, students who use this software tool will have an appreciation for the role of narrative in business decision making.

2 METHODOLOGY

This study defined a control group and an experimental group. The latter used a software tool, known as Twine, in order to complete tasks involving the modeling of decisions. Both groups were administered a pre and post test to assess their understanding of various factors that characterize decision making in business.

2.1 Description of Twine

The software tool that was used by students to model decision making as a narrative framework was Twine (found at http://twinery.org). Its website generically states that

"Twine is an open-source tool for telling interactive, nonlinear stories. You don't need to write any code to create a simple story with Twine, but you can extend your stories with variables, conditional logic, images, CSS, and JavaScript when you're ready. Twine publishes directly to HTML, so you can post your work nearly anywhere. Anything you create with it is completely free to use any way you like, including for commercial purposes. Twine was originally created by Chris Klimas in 2009".

Although the conventional use for Twine is to create settings and actions for storytelling, Twine also has aspects that make it appealing for modeling judgments as decision trees. Each HTML (Hypertext Markup Language) page that is produced by the Twine tool can be thought of as a node in a decision tree. The hyperlinks found on that particular page can be considered as decision branches, each leading to a new node (as a HTML page), as depicted in a decision tree model.

2.2 Description of instrument

The instrument for measuring student attitudes consisted of a series of questions with a controlled range of ranked responses, which were: 1: Extremely important, 2: Important, 3: Somewhat important, 4: Not important. If the respondent indicated that they did not know, then the response was given the value "5". There was also a space for the respondent to provide written, qualitative information. The questions were:

a) How important is visualizing a decision making process for decision making?

b) How important is imagining different pathways (or alternatives) for decision making?

c) To what degree does a narrative process contribute to decision making?

d) To what degree does a simulation of decision making processes contribute to better decision making?
2.3 Description of population
The population for this study consisted of two groups of graduate students, one control and the other experimental, who were enrolled in a management information systems class. As part of this course, decision making and decision support systems were discussed. The control group consisted of ten students, while the experimental group numbered twenty.

2.4 Description of experimental procedure
Both groups of subjects were administered a baseline questionnaire, in which they were asked to provide responses to the questions in the instrument described above. Both groups then were given lectures on decision making and decision support systems. At the conclusion of these lectures the control group completed an assignment that applied the content of the lectures to a case study in decision making and decision support systems. In addition, the lecture material for this group mentioned the role of narrative in decision making. The experimental group was given the same lecture material as the control group, but the assignment that they completed at the conclusion of the set of lectures was different. This group was given a set of verbal scenarios in which decisions needed to be made. The students then had to convert the scenario into a set of decision trees. The students were then required to represent the trees in a Twine narrative. At the end of the course, both the control and experimental group were given the same instrument that was used in the baseline assessment. The use of the same instrument was intended to measure whether there was any change in attitude towards aspects of the decision making process. It should be stressed that changes in individual student attitudes were not not tracked and measured longitudinally; rather the collective attitudes of the control and experimental groups were measured over time.

3 RESULTS
Mean results for the pre and post assessment were computed for the control and test groups. These results are as follows:

Table 1: How important is imagining different pathways (or alternatives) for decision making?

<table>
<thead>
<tr>
<th>Group/ Assessment Point</th>
<th>Mean Score (1 -5, with 1 = most important, 5 = Do not know)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/ Pretest</td>
<td>1.2</td>
</tr>
<tr>
<td>Control/Posttest</td>
<td>1.33</td>
</tr>
<tr>
<td>Experimental/Pretest</td>
<td>1.39</td>
</tr>
<tr>
<td>Experimental/Posttest</td>
<td>1.15</td>
</tr>
</tbody>
</table>

In the case of this question, subject responses were relatively uniform across groups and times in valuing the importance of imagining different alternatives for decision making. Since the role of alternatives is central to the decision process, the high appreciation of business students for this feature is not surprising. In fact, from the point of view of the instructor, these results can be heartening. But, it should be noted that there was near uniformity in the experimental group in the posttest. This can perhaps be attributed to one of the central cognitive features of Twine, which is to construct alternatives for a particular stage in the decision making process.

Table 2: To what degree does a simulation of decision making processes contribute to better decision making?

<table>
<thead>
<tr>
<th>Group/ Assessment Point</th>
<th>Mean Score (1 -5, with 1 = most important, 5 = Do not know)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/ Pretest</td>
<td>2.0</td>
</tr>
<tr>
<td>Control/Posttest</td>
<td>1.78</td>
</tr>
<tr>
<td>Experimental/Pretest</td>
<td>2.11</td>
</tr>
<tr>
<td>Experimental/Posttest</td>
<td>1.70</td>
</tr>
</tbody>
</table>
Both groups registered a greater appreciation in the posttest for the role of simulation in decision making, whether they did the Twine assignment or not. Clearly the lecture portion of the course was sufficient to help them gain a greater awareness of the role of simulation in decision making.

Table 3: How important is visualizing a decision making process for decision making?

<table>
<thead>
<tr>
<th>Group/Assessment Point</th>
<th>Mean Score (1-5, with 1 = most important, 5 = Do not know)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/Pretest</td>
<td>1.80</td>
</tr>
<tr>
<td>Control/Posttest</td>
<td>1.33</td>
</tr>
<tr>
<td>Experimental/Pretest</td>
<td>1.33</td>
</tr>
<tr>
<td>Experimental/Posttest</td>
<td>1.11</td>
</tr>
</tbody>
</table>

The most salient aspect of this table is that there was an overall appreciation in the importance of visualization in decision making, but more importantly, there was a near uniformity in the experimental group for the centrality of imagery for this process.

Table 4: To what degree does a narrative process contribute to decision making?

<table>
<thead>
<tr>
<th>Group/Assessment Point</th>
<th>Mean Score (1-5, with 1 = most important, 5 = Do not know)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/Pretest</td>
<td>2.11</td>
</tr>
<tr>
<td>Control/Posttest</td>
<td>2.22</td>
</tr>
<tr>
<td>Experimental/Pretest</td>
<td>3.33</td>
</tr>
<tr>
<td>Experimental/Posttest</td>
<td>1.80</td>
</tr>
</tbody>
</table>

The results of this question were most central to this study, since it was conjectured that completing the Twine exercise would increase the student's appreciation for the importance of narrative structure for effective decision making. There was very little difference between the pre and posttest in the control group, yet there was a dramatic change in the attitudes of the experimental subjects towards the role of narration at the end of the course. Upon examination, part of this change was due to fewer students in the experimental group registering "Do not know" in the posttest survey, but this change in attitude potentially demonstrates the importance of the use of an interactive software tool for increasing student awareness.

4 CONCLUSION

The most salient result of this preliminary study is that both the creation of a scenario, and presumably the subsequent immersion of a subject into a decision process that is represented by the scenario, increase a graduate student's awareness and appreciation of the role of narrative in decision making. Also, the use of a visual software tool such as Twine, can possibly strengthen the student's appreciation of the importance of visualization in decision making.

This short study is obviously more suggestive than conclusive. The primary goal here was not to measure whether the use of a software tool like Twine actually improved a business student's ability to make decisions or to effectively model them. Rather, what was tested was whether a tool like Twine could increase the student's appreciation for the incorporating narrative (as well as visualizing alternatives and simulations) into modeling the decision making process. In addition to this empirical work, further conceptual analysis needs to be done to more clearly understand the relationships between contextual learning through the use of software development tools, gamification, cognitive dimensions of the imagination, narrative structures and decision making. Finally, from the standpoint of teaching management information systems, educating students about modeling the decision making process can potentially give them insight into how these procedures can be represented in a computational environment.
REFERENCES


