ENHANCING WEB-BASED SIMULATIONS WITH GAME ELEMENTS FOR INCREASED ENGAGEMENT

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ABSTRACT

A key challenge in online teaching is generating high levels of student engagement. Computer-based simulations, especially team-oriented competitive simulations, hold promise for accomplishing this objective. A web-based forms-based simulation engine designed to increase student engagement will be presented. A case study for a fictitious company is presented to student teams. Student teams then assume the role of consultants to management at the company. The general case is elaborated on in two areas for which student teams make decisions. The first is in the area of investments in business practices. The business practice decisions are typical of those found in the functional area of the knowledge domain. Participants read about the various practices and discuss them with team members. They also consider their team's budget and after considering all relevant factors arrive at a suitable amount to invest in each particular practice. The second area where the case is further elaborated is in the area of decisions related to consulting incidents. The consulting incidents are designed to provoke discussion and debate among team members. After discussion is complete and all decisions are made, the simulation engine takes the decisions input by student teams and maps them to adjustments in key performance indicators (KPIs.) The KPIs have been selected for their applicability to a selected knowledge domain. As such they are typical of those a manager would use in guiding ongoing operations. Student teams then use the KPI results to guide subsequent decisions on investments in practices, as well as decisions on consulting incidents. A typical game concludes after eight sets of decisions. Engagement in this current model is accomplished via competition, team play, and discussion and debate surrounding incident scenarios and business practice decisions. This can be improved on by incorporating game elements. Game elements are identified by evaluating recreational computer games to identify features which are engaging to users. A collection of game elements will be discussed and a mapping of game elements to features in the form-based simulation will be proposed. A literature review IS cited and presented demonstrating support for the direction of this project.

INTRODUCTION

The prevalence of computer and video games across a broad range of ages (Yee, 2006) demonstrates that games are not a novel form of entertainment for the young, but are instead a form of interactive entertainment that engages players of all ages (Dickey, 2005). Games have the ability to sustain long-term player engagement with challenging tasks (Gee, 2003). They have also been shown to meet various psychological and humanistic needs (Colwell, 2007) and Dickey (2007) further describes how games can foster intrinsic motivation in players. Perhaps the ultimate in engagement is experiencing Csikszentmihalyi's flow state (1997), and Chin-Sheng Wan and Chiou Wen-Bin (2006) demonstrated that games can, in fact, induce a flow state in players. Add to this the tendency of some games to create spontaneous and involved player communities (Rheingold 1994), and significantly increase time on task (Yee, 2007) and the potential for games to become potent learning tools (Begg, Dewhurst, and Macleaod 2005) is easily seen.

Answering the question of whether the anticipated learning outcomes are found using games in the classroom, Dondlinger (2007) cites the Aguilera and Mendiz (2003) historical research study on video game design which maintains that a number of studies indicate these games are conducive to the development of specific skills important to working in a global, knowledge based economy. Further evidence is provided demonstrating that games are conducive to learning gains in the areas of deduction and hypothesis testing, complex conceptualizing and abstract thinking, and visual and spatial processing.

The engagement and learning gains achieved via games has stimulated a significant body of research to emerge covering numerous approaches for impacting traditional classroom teaching and learning. Included among the many approaches suggested are incorporating existing commercial games in various ways, designing learning environments informed by games and blending elements of engaged learning with engaging game-design elements for an even greater leverage of engagement strategies. The popular World of Warcraft (WOW) game has been used numerous times to investigate angles for enhancing learning environments. WOW was studied by Reeves, Malone and O'Driscoll (2008) with the conclusion that we should consider adjusting our learning environments to create environments which enable leadership to emerge, as they demonstrated leadership emerges in WOW. Colby and Colby (2008) also used WOW but they found it valuable for driving engaged writing in a composition class. Begg, Dewhurst, and Macleaod (2005) suggest game-informed rather than game-based approaches, using game approaches rather than actual games. Dickey (2005) takes this further by suggesting that games should inform the design of traditional instructional materials by asking questions that blend Jones' (1994) and Schlechty's (1997) elements of engaged learning with Howland (2002) and Rolling & Adams (2003) engaging game-design elements to support learning activities.

This paper provides an additional and unique perspective by putting a collection of these ideas into practice. The author presents a game model which is described in terms of a blend of elements of engaged learning combined with game elements for engagement. This is not a video game, but instead is a web-based forms-based game, drawing upon elements for engagement from computer and video games. Additionally, the author describes a possible future mapping of

game model features by culling together additional elements of effective game design observed and noted by various authors. The primary attraction here is the unique positioning between game-informed learning activities and full blown video games in the classroom and the mapping to a specific knowledge domain. This work is also unique in that there is significant support for learning by managing performance metrics, a key aspect of real-life management.

The author first briefly lists out the components of engaged learning and game elements for engaged learning. Then the current game using a subset of these components, demonstrating a mapping to many of the principles of engagement, is presented. Finally, the author lists a proposed set of additional game characteristics or elements that may provide increased engagement in a subsequent version of the game described.

ENGAGED LEARNING

These are listed here to provide a general framework. For a detailed reading on these attributes see the original work. According to Jones et al. (1994) and Schlechty (1997), elements of engaged learning include:

- Focused goals
- Challenging tasks
- Clear and compelling standards
- Protection from adverse consequences for initial failures
- Affirmation of performance
- Affiliation with others
- Novelty and variety
- Choice
- Authenticity

GAME ELEMENTS FOR ENGAGEMENT

These are listed here to provide a general framework. For a detailed reading on these attributes see the original work. According to Howland (2002) and Rollings & Adams (2003), game design elements for engaged learning include:

- Focused goals
  - Narrative
    - Character roles
      - Interaction with NPC and other players
      - Perspectives
- Challenging tasks
  - Settings
  - Action hooks (choice)
  - Resource hooks (choice)
  - Tactical and strategic hooks (choice)
  - Time hooks
- Clear & compelling standards
- Protection from adverse consequences for initial failures
  - Role playing
- Affirmation of performance
  - Hooks
- Affiliation with others
  - Role-playing
  - Nonplayer character
- Novelty and choice
  - Narrative arcs
- Choice

SIMULATION BACKGROUND: INTRODUCTION

The simulation under discussion was developed for a course on human resources management (HRM). This simulation may be used effectively in a university course that surveys HRM, a capstone integration of an HRM major or minor, a graduate course that surveys HRM, or an organizational training program on human capital decision-making.

The simulation engine itself was designed to accommodate multiple knowledge domains. A narrative coupled with scenarios with options, characters and metric impact data can be plugged into the simulation to produce a new simulation in an applicable knowledge domain.

Participants are encouraged to think of this simulation as a set of connected case studies, or scenarios, occurring over time. This approach corresponds to the learner-centered model referred to as "Problem-Based Learning" or PBL. Participants, faced with one of the scenarios, assess the situation, search out information that assists them in analyzing the scenario, apply what they've learned during the search and in the course, make the decisions and then assess the results. This means that while making decisions and analyzing outcomes, participants and teams are "discovering" the cause and effect relationships that are true for Human Resources Management (HRM) in this company.

Beyond growing critical thinking, problem solving, and decision making skills, a simulation is an engaging way to learn. The process is engaging because participants become involved with the people in the company and in helping the employees succeed by recommending good decisions. Participants report that having realistic business situations for which they are responsible creates a greater sense of ownership.

Part of what makes simulations realistic and engaging is that participants have an opportunity to act as a real manager would. There are likely to be to be differences in opinion among team members on strategies and decisions. Each team will be working with incomplete information similar to any manager in an existing company. There are trade-offs among most alternatives, and there is not enough money to do everything. Not every action taken has the result anticipated, and sometimes the unexpected occurs.

In this Problem-Based Learning (PBL) context, the simulation models the complexity of organizational life so that participants can experience "discovering" sets of relationships among decisions and results that occur. The degree to which the learning problem mimics actual decision-making complexity strongly influences the likelihood for "discovery" that prepares participants for future challenges. This complexity derives not only from the multiple decision options and outcomes, but also from the sense of working with incomplete information, trade-offs, limited funds, and unanticipated consequences.

PLAYER POSITIONING

Each player is positioned as a member of a consulting team to management. The setting is one in which participant teams have been hired by the Chief Human Resources Officer (CHRO) at the game's fictitious company, to serve as HRM analysts to help with this strategic initiative. Each student in a

course is a member of one of the teams. All actions are team-based. Team members communicate either by chat, email, text-messaging, and phone or in-person meetings.

SAMPLE NARRATIVE

The simulated company is eGlobalServe (eGS), a knowledge-based service firm providing trend analyses for clients in the health care, education, and sustainability industries. Founded six years ago by two new college graduates, eGS has 237 employees with an average salary of $98, 699, including benefits. One of five departments, the HRM Department consists of a CHRO with four Coordinators, one each in Staffing, Training, Compensation, and Employee Relations.

Revenue for eGS is currently at break-even. The founders and the CEO realize that to bring eGS to triple-bottom-line profitability, eGS must enhance the use of human talent at eGS by improving the practices used with eGS's employees, the source of eGS's intellectual capital and distinctive advantage.

Additional important information is provided to participants such as an org chart, company–wide salary and benefit information, and budget data. Also, the role of each department in the company is elaborated on in order to provide a realistic company scenario and to assist participants in identifying important relationships, pressures and conflicts.

SAMPLE KEY CHARACTER DESCRIPTIONS

Bob Maxwell and Jen Walker, as the founders of the company, had a vision and it proved to be accurate and successful. Along the way, with the rapid growth they experienced, they each realized that while they understood the technical side of things, they were not experienced business managers. They decided to take on advisory and support roles, sitting on the board while allowing others with specific expertise to run the day-to-day operations. Key to their goal of using intellectual capital as a distinctive source of competitive advantage, they initially hired Paula Chilton as CEO.

Paula Chilton

> Jennifer met Paula Chilton at an industry conference. Paula had been a rising star data analyst and project manager for 10 years at QuestData, moved on to become a senior analyst at PearceWatermanHooper for five years, and had then been promoted and spent the last seven years as the VP of Client Relations at Hambrell and Quincy, a premiere trends analysis company against which eGS aspired to compete. Paula was aggressive and confident, with an excellent track record. She was looking for an opportunity to take a smaller company to the next level. She was well connected in the industry, and this was very attractive to Jennifer. Jen, Bob and Paula had dinner on several occasions following the conference, and eventually a deal was struck.

Marcia Jackson

> Paula immediately recommended creating a Chief Human Resources Officer (CHRO) position and wanted Marcia Jackson to fill the position. Marcia was experienced in all phases of HRM with about 13 years of cumulative expertise across all the major HRM functions. She was eager to bring this all together and significantly grow a company. She was known as an expert in human capital development, had a track record at several major organizations, and had worked with Paula in two separate companies during her career. They had a solid working relationship and Marcia accepted the offer immediately. Marcia met with Cheryl Robbins, the existing HRM employee, and liked what she saw. She mused that Cheryl reminded her of herself five or ten years ago.

Cheryl Robbins

> Cheryl radiated competence, energy, and ambition. She was also very straight with Marcia, indicating that in five years she wanted Marcia's job. Marcia recognized the talent in Cheryl and responded, "Well, let's get started grooming you for the position straight away. Go ahead and recommend to me how you would structure this function." Cheryl worked on this for a day and then proposed a total for four positions, including her own: Staffing Coordinator, Training Coordinator, Compensation Coordinator, and Employee Relations Coordinator. After reviewing Cheryl's proposal, Marcia agreed and told Cheryl to begin the recruitment and selection process for the other three positions.

After three weeks of advertising and networking to expand the applicant pools, interviews, and background checks, Marcia and Cheryl agreed on a top candidate for each position: Allen Selby, Leslie Stone and Dave March, all currently employed elsewhere. Marcia asked Cheryl what it would take to attract the three. Cheryl wrote down salaries on a piece of paper and handed them to Marcia. Cheryl stated, "This opportunity will sway them, and this is what they will need financially to make the move." Marcia pointed out that one of the salaries was higher than Cheryl's and the others were similar, and asked, "How would that work?" Cheryl indicated that this would create a tight team, and that the reason for Leslie getting a slightly higher salary was that she was the consummate specialist in a hard-to-hire area.

Marcia made the three offers and by the end of the week, the good news was in. All three would join the HRM function at eGS by the end of the month. Realizing that there was extensive work to be done in better aligning eGS's intellectual capital with its strategic goals, Marcia also recommended to Bob and Jen that they approve hiring a team of analysts.

Participants encounter other characters along the way. These other characters appear in the scenarios. Participants understand the org chart and the salaries and benefits chart, and so have a context in which to place these characters. They further understand those character's roles and relationships.

PLAYING THE SIMULATION: GAME MODEL

The underlying conceptual model of this simulation is congruent with that of many major HRM textbooks and studies. Essentially, the model is:

HRM Practices influence
Human Capital (knowledge, skills, abilities, and behavior) that affects

Key Performance Indicators that influence *Business Results*.

Participants familiarize themselves with the game, narrative, characters, practices and incidents. The game then engages participants in a series of strategic, tactical and resource hooks, providing affirmation for performance along the way. They work in teams to make decisions (strategic and tactical hooks) which they anticipate are going to be effective, while staying within the constraints (resource hooks) of the budget. After each set of quarterly decisions (time hook) is made, participants assess the results by viewing the changes found in the KPI report (affirmation for performance.) Participants generate a new plan for the subsequent quarter based on the results from the previous quarter.

SAMPLE HRM PRACTICES

The HRM practices included in this simulation consist of six sets of options for performance management, work/life balance, learning days, internal promotion, pay, and staffing. Participants are offered a series of decision choices in each practice.

- *Performance management* is the process through which an organization seeks to increase the degree to which employees' work contributes to accomplishing strategic goals. Discussions of performance management usually include training and developing employees so they have the knowledge, skills and abilities to perform their work effectively; performance appraisal so they can obtain clear feedback on the effectiveness of their work; and compensation that carefully rewards employee work that contributes strategically. At eGS, each of these three is addressed by a separate area of HRM practices: Learning Days (training and development), Performance Management (performance appraisal), and Pay (compensation).
- *Work/life balance* has become an increasingly urgent concern as many people seek to pay attention to their families, friends, health, hobbies, and communities in addition to working full time in a world that values speed, 24/7 accessibility, and pressure to compete globally. Research has indicated that employees respond highly favorably to organizations that provide opportunities to arrange a better balance between work and home.
- *Learning Days* used for developing employees contributes significantly to the success of any company. HRM research shows that ongoing learning fosters effective performance and decision making which typically translates in company success.
- *Internal promotions* serve to enhance employee satisfaction, motivation, and loyalty to an organization because employees perceive that hard work, good results, collaborative problem solving, and creativity are rewarded with advancement opportunities.
- *Pay* is not the only feature of a job that influences employees' motivation and loyalty, although it does make a significant difference. It typically requires significant attention over time by HRM members.
- *Staffing*, of which the core is effective recruitment and selection, is essential for accessing talented employees with strong intellectual capital.

SAMPLE KEY PERFORMANCE INDICATORS

Key performance indicators are measures of factors that are thought critical for a company's successful operation and goal achievement. Tracking KPIs fosters timely and effective decisions. From among eGS's KPIs, the five that participants track are absenteeism, diversity, engagement, productivity, and turnover.

- *Absenteeism* refers to employees missing work. Unavoidable absenteeism stems from factors largely outside an employee's control (e.g., illness, family responsibilities), while avoidable absenteeism involves a conscious decision to stay away from work.
- *Diversity* refers to employees' differences in demographic characteristics, culture, values, knowledge, skills and abilities (KSA). To optimize diversity means to create a balance of demographic, cultural and KSA differences so that the mixture can produce higher creativity and better client service.
- *Engagement* refers to the degree to which employees invest themselves fully in their work roles and perceive the autonomy to express their authentic selves at work.
- *Productivity* refers to employees' quantity and quality of work output.
- *Turnover* refers to employees leaving an organization. Involuntary turnover occurs when employees are terminated or laid off; voluntary turnover occurs when employees quit or retire.

SAMPLE BUSINESS RESULTS

Business results are typically thought of as measures that provide a view of a business's health and performance from the perspective of a stakeholder. Recently organizations have realized that the "triple-bottom-line" of business results is important for serving stakeholders. In addition to financial performance, the triple-bottom-line includes social (integrity, community involvement) and environmental (sustainability) performance. From among eGS's BRs, the two that participants track are a measure of financial performance, revenue/FTE, and a measure of innovation, ideas/FTE (new/usable).

- *Revenue* refers to the amount of money earned from selling products or services in a specified time frame such as a quarter or year. *Revenue/FTE* indicates the amount of revenue a company has earned per Full Time Employee (FTE). A company will frequently research what the average revenue/FTE is for its specific industry, and then compare this to its own revenue/FTE. The company will then take action as appropriate. For example, if the company's revenue/FTE is lower than the industry average, then it may consider improving sales processes, improving quality, adjusting pricing up or down, or even reducing employee headcount.
- *Ideas/FTE (New/Usable)* refers to the number of new and usable ideas generated per Full Time Employee in a specified time frame. The ideas may range from radical innovations for new products and services to

small improvements in processes and client service to creative ways to solve clients' problems. For the ideas to foster strategic goals and profitability, though, they must not only be new but be practical to implement.

The basic organizational model for the simulation consists of an in-house HRM department staffed with a Chief Human Resource Officer (CHRO) and four Coordinators. HRM work is accomplished with an HRIS extensive enough to allow self-service for routine employee queries and managerial tasks, in conjunction with a proactive internal consulting practice that emphasizes significant service for internal customers. The priority is facilitating all units' best possible use of human talent for attaining strategic goals.

FOCUSED GOALS AND CHALLENGING TASKS

As mentioned earlier, in order to become more profitable, our two founding characters, Bob and Jen, realized they needed to improve the practices used with eGS's employees, the source of eGS's intellectual capital and distinctive advantage. To help them with this process over the next few fiscal years, Jen and Bob authorized the hired team (role-played by student teams) to work as HR analysts for CHRO Marcia Jackson. The goal for participants is apply what they've learned about human resource management practices to decisions about practices and ICPs, and then assess the results and discover important causal relationships in order to further enhance the use of human talent at eGS.

The first step is to examine the current status of human talent, HRM practices, key performance indicators (KPI), and business results (BR) at eGS. Participants are provided a manual describing the practices, KPIs, and BRs. Once participants are clear on eGS's goals for making the company profitable, they can prioritize options for HRM practices based on what will make the most difference in reaching those goals. The budget isn't unlimited, so they need to be selective. As each team keeps track of changes and makes decisions through the quarters of one to two fiscal years, they can better understand HRM's impact on eGS's human talent and overall effectiveness.

Participants are provided with a basic budget for HR expenditures on practices and internal consulting projects (ICP). The goal is to optimize KPIs and BRs while staying within budget. Since the decisions participants recommend are based on quarterly time periods, each team needs to keep track of how it is doing by projecting out the costs of decisions for the year. While it is possible to overspend a budget, this is not considered good business practice, and typically an instructor will likely not award bonuses or allow a team that overspends to be considered the top team in the simulation. Obviously if a team could spend unlimited amounts, it would have a decided advantage over the competing teams, and this would be unfair.

Table 1 lists eGS's current key performance indicators and business results. All numbers given are per quarter. The "critical success factor" is the level for each KPI and BR needed for eGS to improve its social and environmental performance, while the "stretch goal" is the level of each needed to improve its financial performance to the level of robust profitability. Improved performance on all three would allow eGS to achieve a strong triple-bottom-line. Absenteeism and turnover need to be reduced, while all the other KPIs and BRs need to be increased for eGS to reach its goals.

NOVELTY, VARIETY AND CHOICE

There are 16 internal consulting incidents (ICPs) which are evaluated by participants over the course of an eight quarter game, at the rate of two per quarter. ICPs are intended to advance the narrative, deepen participant association with characters, and provide interesting and novel scenarios within which the participants are positioned. Each scenario focuses on a different learning objective. Each scenario's learning objective takes place in a unique departmental and interpersonal setting. There are typically four to eight decisions or choices that could be made for any given ICP. A sample of one ICP follows below.

Ethics ICP

CEO Paula Chilton was irate. "$1,100? In one month? That's completely out of line in any case! You'd better tell me more."

CHRO Marcia Jackson indicated that Judy Hawkins, an Industry Analyst, had accumulated $1,100 in phone charges this month, and that they were unable to allocate those to clients.

"Have you spoken to her?" asked Paula.

"Yes, briefly," Marcia replied, "and she at first denied the calls, but then after I called the number and found it was her mother, she recanted and indicated that she did not know that she had run up that amount of personal calls. She indicated that her mother is sick and after recently completing three successful projects for different clients, and putting in lots of overtime, she felt she needed to turn more attention to her mother."

"I am very sorry about her mother, but we have to hold the line on this somewhere! She needs to be fired, plain and simple. Did she have any other excuse for lying?" Paula wondered.

Marcia responded "She did indicate that she did not know there was any policy against using the phone for personal use."

"That's absurd," retorted Paula, "She can use her common sense, can't she? We have a clear policy that all calls must be accurately assigned to clients, plain and simple."

"Yes," Marcia agreed, "but technically speaking we could perhaps spell personal calls out more clearly."

"Unbelievable," Paula frowned. "Next are we going to issue a policy that says don't take pens home from the office? I tell you this is basic ethics and common sense! "

"There's more," Marcia continued. "Her Internet usage is also outside the boundaries of our typical research databases. It appears to be a lot of shopping for her upcoming trip to her mother's and vacation item purchases as well. So we decided to take a look at this across the company and to evaluate our internet records as well, and we found that there are issues in other departments with both personal calls and internet usage."

"So what are we talking here? Give me an aggregated number then," Paula exclaimed.

Marcia wrote down a number on a piece of paper and slid it across the table to Paula. Paula shook her head as she read the number and slid the paper into her pocket. She picked up the phone and called Donna Gomez, head of accounting. "Donna, are you free for the next hour? Good, get your gear and meet me in the parking lot in ten minutes. I want to play racquetball, and I'll reserve a court. See you in ten."

"Marcia, thanks for alerting me to this. Frankly, if I were making this decision alone this minute, I'd simply fire anyone who has abused phone or internet usage for personal use, but I realize there may be other ways to handle this. Please have

Table 1. eGS's Current KPIs and BRs

	Current Quarter	Critical Success Factor	Stretch Goals	Year 1				Year 2			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Key Performance Indicators											
Absenteeism	**360 days**	**200 Days**	**120 days**								
Diversity	**24% of FTE**	**40% of FTE**	**51% of FTE**								
Engagement	**60% score on survey**	**70% score on survey**	**90% score on survey**								
Productivity	**24/40 billable hours/week**	**38/40 billable hours/week**	**44/40 billable hours/week**								
Turnover	**6%**	**4%**	**2%**								
Business Results											
Revenue/FTE	**$34,000**	**$51,000**	**$78,000**								
Ideas/FTE	**.5 ideas**	**.8 ideas**	**1.5 ideas**								

your team review the situation and develop some alternative recommendations."

Marcia asked your team to review possible approaches for clarifying the issues in this area. Since the HR budget has constraints, however, your team will need to consider each suggestion's likely impact on KPIs and BRs.

Options:

1. Fire Judy for lying. This incident must send a message to employees. Cost: $15,000

2. Inform Judy and other employees who have been abusing phone privileges that they will have to pay back the costs, and then withhold these amounts from their next paychecks. Cost: $1,500

3. Support Judy in time of need. Overlook the lying and abuse, assuming it was due to stress and family issues and taking into consideration her excellent work of late. Separately issue a blanket policy that clearly prohibits personal phone and Internet use. Cost: $5,000

4. Create a task force of various managers and employees to investigate and inform the company of the situation. Explain clearly the large aggregate costs. Get feedback from employees and managers on their reaction. Develop a clear policy regarding phone and Internet use. Add this information to the company's ethics statement and employee handbook. Cost: $25,000

AUTHENTICITY

A key feature of this game is the mapping of student decisions to KPI adjustments. In order to build this in such a way that it has a constructive and satisfying effect, a good deal of research was conducted on the impact of various business practices on KPIs. A very thorough literature review was conducted and numerous articles relating to business practices, metrics and human capital were reviewed. Further, it is imperative in a game model like this to have professional evaluation and guidance. We have reviews ongoing from individuals who have academic, professional or both academic and professional experience, and are currently updating parts of the simulation to more accurately reflect a company of this nature within a typical environment. A professional game developer described the process for achieving a satisfying game as 20% building the basic game and 80% playing and adjusting. Any person who is interested in the simulation is invited to review and provide feedback on the simulation.

PROPOSED FUTURE MAPPING TO GAME-ELEMENTS FOR ENGAGEMENT

Armory, Naicker, Vincent & Adams (1999) found in their study that strategy and adventure games ranked the highest in desirability, indicating a preference by the participants to play games with objectives requiring higher order thinking skills that nurture creative problem solving and decision-making. This bodes well for management simulations since they lend themselves to being strategy games due to the inherent strategic nature of business.

Many management simulations have the teams form, or the instructor forms them, and then they begin the game. There is little in the way of building a team by selecting from a community of individuals. One of the important notions about games is the opportunity to build social identity within a larger community. In many popular games, individuals choose a character and then set about to learn the game. Initially they know very little but the game guides them to learn the game and its rules, acquire knowledge and skills, and hone talents. This knowledge, as well as skills and talents, are represented to the community at large. When a player is viewed by others in the game, there are symbols that represent the knowledge, skills and talents, among other things, that the player has acquired. These are of interest to the community when it comes time to form associations to carry out group missions, or quests as they are commonly called.

One way to map this to the business simulation is to split the game into two major segments, the first being individual play and the second being team play. At the outset there are known goals for participants:

1. As an individual: play the game to gain knowledge that prepares one for competing on a team during the group play.

2. As a member of a group: apply the previous individual learning in the new collaborative group setting. Engage in a realistic simulation that entails developing the skills, knowledge and talents required in the real world from both a content and process perspective. Participate in group-level strategizing and problem solving with higher order thinking.

Note that the design of the game with individual play followed by group play is in itself a scaffolding technique, with individual play providing the needed knowledge for group play. Scaffolding combined with regular feedback is noted as important by Fisch (2005) when designing engaging game-play.

<u>Individual Play</u>

1. Provide an initial choice of character's or character types so participants may adopt a role to play. Dickey (2006) noted that, among other elements, role playing may lead to intrinsic motivation. Despite selecting any specific character, the participant's character will be individuated by the result of interaction with the game.

2. Have participants build their initial corporate yellow page entry (enter major, minor, experience, etc.), thereby establishing a baseline social identity.

3. Participants then read an initial set of emails and memos. This is where players get their initial goals. These give participants guidance within the game to facilitate learning about how to play the game itself initially, followed by how to acquire domain knowledge. According to Swartout and van Lent (2003), for goals to be most effective they should be a combination of short term, intermediate and long term. A mapping to the business world might be as follows:
    a. short term, such as reading memos or emails, or talking to other characters (or non-player characters),
    b. intermediate, such as reading more extensive material like manuals or business plans, and then passing quizzes on the subjects, and
    c. long term, such as getting hired by a company (participant team) and competing in the group competition portion of the game.

4. Participants pursue goals and accomplish objectives. The game updates the yellow pages over the course of the learning, adding appropriate symbols for accomplished levels, skills, knowledge and talents. Proficiency is gained by exercising process skills appropriate for the knowledge domain. It is critical that these goals and objectives are relevant to the knowledge domain. For example, in HR the participant might have to make numerous attempts at recruiting by using an information system to identify candidates. So, while in many games for entertainment, a goal might be to find an object like a key, or to find and open a chest, etc., the goal in a business simulation should be met by participating in appropriate business activities such as using email, reading a memo, conducting a survey, running a process, etc. When these activities are embedded into the game we achieve Fisch's (2005) notion that the targeted academic skills and knowledge be an integral part of the game.

5. Participants attain a level of proficiency during the set amount of calendar time allotted to this segment of individual play. There should be a chance for individuals to advance at some minimal expected rate, and enough space for motivated individuals to excel beyond that.

6. The final level of individual play would be one or two practice quarters in which the individual played the game as an individual, but made the same types of decisions that the group will make once formed. Feedback is given to the participant in the form of designations showing accomplished learning objectives as compared to other class members. Importantly as well, there is feedback via adjusted performance metrics after the practice round(s). These provide information on how well the choices the participant made for the practice rounds affected the company's important and sought after outcomes. However, these are reset prior to moving into group play, so in that sense the participant is protected from possible undesirable outcomes from initial attempts.

Group Play

1. The initial segment of group play is team formation. Assuming a class size of 40 and a team size of five, there would be eight teams. The top eight participants ranked by score at the end of individual play could become the initial members of each team. Or it could be that the first eight to reach a certain level, designation or collection of points could be the initial members. They would recruit the next team member using the yellow pages recruitment search process (a skill learned during individual play). An offer would be made, with full consideration given to budget constraints, knowledge of team building complimentary skills and talents, etc. (The game should probably allow some flexibility here so that teams could be formed also by the instructor, or ad hoc by participants themselves.) The team continues to build itself up to a membership of five. During this period the teams grow in size up to five, with potential team members accepting some offers and rejecting others. At a point, all participants are on teams.

2. The initial quarter or two (determined by instructor) would again be practice decisions, thereby scaffolding from individual to team play, and again protecting participants from negative results from initial trials.

3. The game now moves into a phase which is marked by collaboration of team members to assess and evaluate the current situation, strategize, make decisions, and assess outcomes which follow after all teams have entered decisions and the game has been run (impacts of decisions applied to performance metrics) for that quarter. The unfolding of the narrative is critical here; several authors have pointed out the importance of immersive narrative and Dickey (2006) concludes in part that narrative context offers learners, "a cognitive framework for problem-solving because the narrative storyline in games provides and environment in which players can identify and construct causal patterns which integrate what is known (backstory, environment, rules, etc.) with that which is conjectural yet plausible within the context of the story."

4. During the group play period, skills learned during the individual play period come to bear. Each quarter a set of decisions would be made which require the same type of decision processes, this time using group collaboration. In order to make the decisions, the same set of tools would also be used. So, for example, each quarter would require the assessment of personnel needs, development of a recruiting strategy and subsequent attempts to recruit and hire matching individuals. At this point since all class members are allocated to teams, the choice of new members is likely to be done by consulting the recruiting database to identify what we term non-player characters, or NPCs. NPCs are simply fictitious characters with varying talents and skills, which are available from the internal and external talent pools. The addition of these players helps simulate the natural movement of personnel in a business (expansion, new hires, voluntary separation, promotion, lateral move, reduction in force, etc.)

5. This period is also marked by the quarterly reflection of the impact of decisions and choices on performance metrics and a competitive ranking of teams. Game play concludes at the end of the last quarter (determined by instructor).

6. At the conclusion of the game it is very helpful to ask students to reflect on the causal relationships discovered during the game. A report or a round table discussion can solidify the knowledge participants gained through playing the game.

PRACTICAL CONSIDERATIONS

Instructors can review the current Human Resources simulation in more detail, or sign up HR classes by logging onto the system at www.humressim.com. There you can specify the number of teams and you are provided with team codes. These codes are given to participants by the instructor and they are then able to self-register and get onto the proper team. Instructors inform participants when to complete various quarter activities and upon completion the instructor can run the simulation for that quarter. Reports are generated so that instructors and participants can quickly see results.

In order to support participants and instructors using this simulation engine, several support documents have been created, and these are updated with new information as needed. Participants are able to take quizzes online as well as fill out and submit peer evaluations online. Additionally, a certain amount of additional instructor support was important. This support includes a grade book which presents, for each class member, the student team rankings, student quiz scores, and student peer evaluations. Instructors indicate that this enables them to focus more on running the game and less on the typical associated duties of collecting and recording grades, etc. Additional support and game features are planned as well.

SUMMARY

There is growing evidence that games can positively impact learning and a portion of that research is mentioned in this paper. Concepts for engaged learning and game elements for engagement have been identified by several authors and were presented here. A game was described that maps many current game features to those on the list of concepts for engaged learning and game elements for engagement. By actually building this initial round of game, the author is able to construct a proposal for a subsequent version based on adding additional game elements to the current version, with the intention of increasing engagement and gains in learning.

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