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An Experimental Study of the Reputation Mechanism in a Business Game

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Abstract

Reputation enables different parties to establish a trusting and cooperative relationship, a key factor in integrative negotiations referred to as "win-win" negotiations. Thus, a good reputation mechanism can bring simulations closer to reality. In this study, the authors review the reputation mechanisms applied to the online business game WIN WIN MANAGER, where the players' reputations are decided by their counterparts at the end of each negotiation. Then, the authors compare two reputation mechanisms and hypothesize that the best mechanism will be more positively correlated with the negotiation outcome, which is measured by a scoring algorithm. Using nonparametric statistics, it is highlighted that the reputation mechanism in earlier versions of the game seems to produce values unrelated to the score, whereas the new mechanism produces values significantly positively correlated with the score. Such results can be useful to scholars who conduct experiments on negotiation, as well as online markets in which users are allowed to negotiate with one another.

Keywords

business game, game-based learning, negotiation outcome, online negotiation, reputation mechanism, serious game, WIN WIN MANAGER

Only a small niche of serious games focuses on negotiations and only a few of these are software based. To the best of our knowledge, WIN WIN MANAGER (WWM; 2007) is the first online business game to allow players to negotiate with one another. During

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its development, we decided to introduce two score levels: one focused on each negotiation outcome and one focused on the negotiators' behavior, which we define as "reputation score." Regarding this last point, we experimentally examine the behavior of the reputation mechanisms implemented in WWM to assign a reputation score to players. Finally, we suggest a few upgrades that will be implemented in the next edition of the game.

Basic Data for WWM

Instructional (learning) objectives. To improve and evaluate negotiation skills.
Simulation/game objectives. To achieve the maximum score and the maximum reputation level.
Debriefing format(s). Feedback is generated by the software according to each negotiation outcome. Players can send subjective feedback to their counterparts at the end of each negotiation session. Instructors can provide additional feedback identifying the negotiation techniques adopted by the players and the correct methods of undertaking the negotiation.
Target audience. MBA, engineering, and economics students; businessmen; dealers; and lobbyists. Although not essential, a basic knowledge of negotiation techniques is useful. The game focuses on business-related scenarios and has been used for training purposes in business courses and suggested to engineering and economics students in order to improve their negotiation skills.
Playing time. The game is played through an asynchronous bulletin board. Players can start a negotiation whenever they want; however, once a negotiation is started, the negotiators are asked to post at least one message every 36 hours until the bargaining process has come to a close. A typical negotiation takes 3 to 4 days.
Number of players required. Minimum two players.
Computer/Internet. Web-only participation.

Concepts

The Online Cambridge Dictionary defines reputation as "the opinion that people in general have about someone or something, or how much respect or admiration someone or something receives, based on past behaviour or character." Anderson and Shirako (2007) refer to reputation as "the set of perceptions a community forms about the personal qualities of one of its members." Therefore, reputation is understood to be a collective concept that relies on past interactions, as well as expectations regarding positive future interactions (Wasko & Faraj, 2005). Opinions and perceptions about others are built and developed through repeated interactions (Yee & Korba, 2003). Thus, individuals willing to keep good and enduring reputations over time should engage in consistent behaviors (Torgersen & Rivers, 2005). This leads to a process known as the *social construction of reality,* introduced by Berger and Luckmann (1966) and later examined by Weick (1979, 1995). According to their studies, individuals build mental representations of others by observing their actions while interacting in a social network. If such actions are frequently

repeated, they lead to *habitualization* and become *embedded routines*, habits and norms within the institutional structure of society. In other words, individuals share their perceptions with others building a perceived image of reality based on social interactions. Reality, therefore, might be considered a social construction produced through human activity that depends on how people interact within a particular context (Walsh & Wigens, 2004).

Weick (1979) argues that "reality is selectively perceived, rearranged cognitively, and negotiated interpersonally (pp. 164)." To put it simply, people interpret reality through their own backgrounds, attitudes, values, beliefs, biases, heuristics, and stereotypes (Morgan & Dennehy, 2002). Sociologists argue that reputation only exists in the minds of individuals. For instance, Wartick (2002) states that "reputation, be it corporate or otherwise, cannot be argued to be anything but purely perceptual (pp.374)." Eberl and Schwaiger (2005) argue that reputation is "an attitude-like construct that exists and operates in the general public's mind (pp. 844)," and Emler (1990) refers to it as a "collective phenomenon and a product of social processes, and not as an impression in the head of any single individual (pp. 171)." Therefore, reputation can only be acquired through complex social interactions, and it is the product of social construction and validation (Rao, 1994). Such interactions develop word-of-mouth networks—also known as "reputation networks"—that represent an ancient solution to the problem of trust building. In fact, reputation was the primary enabler of economic and social activity for most medieval communities (Dellarocas, 2006).

Reputation's role in the exchange of goods and services is still very important in today's markets: Thus, reputation is an intangible resource that may increase a firm's performance and leads to a sustained competitive advantage (Barney, 1991; Deephouse, 2000). Compared with face-to-face communication, reputation is even more critical in computer-mediated marketplaces such as eBay or Amazon, where buyers and sellers are frequently anonymous and asynchronous communication makes it more difficult to signal trustworthiness and encourage cooperation (Bolton, Katok, & Ockenfels, 2004; Brosig, Ockenfels, & Weimann, 2003). To reach an agreement, the buyer must "trust" that the seller is being truthful in the item description. Moreover, the buyer often pays in advance and needs to trust that the seller will send the purchased items by the agreed deadlines. Thus, effective reputation mechanisms are necessary to ensure cooperation and efficiency in a world of *e-strangers*.

Online reputation mechanisms (Dellarocas, 2003), or reputation systems (Resnick, Zeckhauser, Friedman, & Kuwabara, 2000), are Internet-based systems used to collect, aggregate, and distribute feedback on participants' past behavior regarding previous transactions. Online reputation mechanisms help build solid partnerships among participants. In fact, possessing information about others helps people decide who to trust, encourages trustworthy behavior, and deters participation by those who are dishonest (Anderson & Shirako, 2007).

When individuals interact with one another over time, the history of past interactions with other users provides them with the information about the other party's skills. In other words, people learn whether they can count on their counterpart or not. As Axelrod (1984) suggests, the expectation of reciprocity or retaliation in future

interactions encourages trustworthy behavior. Axelrod (1984) refers to this as the "shadow of the future".

Resnick and Zeckhauser (2002), however, demonstrated that it is very difficult to build trust among strangers. When reputation mechanisms are not implemented, strangers have no evidence of past interactions and are not influenced by the prospect of future interactions. Furthermore, the absence of any negative feedback may generate an incentive for opportunistic behavior.

Reputation systems, therefore, "seek to restore the shadow of the future to each transaction by creating an expectation that other people will look back upon it" (Resnick et al., 2000; pp. 2). Regarding this perspective, Wilson (1985) argues that the predictive power of reputation depends on the supposition that individuals' past behaviors are indicative of their future behaviors.

The literature summarized here illustrates how reputation plays a dramatic role in negotiation. For that reason, several scholars have undertaken experimental research aimed at quantifying the impact of reputation in the outcome of a negotiation. This article is inspired by research performed by Chen, Hogg, and Wozny (2004) in which a series of bargaining experiments were executed to examine the behavior of reputation mechanisms. By revealing differing amounts of information about the participants' transaction history, the researchers were able to focus on the effects of past transaction information and defined the information policy as a treatment variable. The information policies were classified as follows:

1. *Low information:* Participants were given historical information about their own transactions only.
2. *High information:* Participants were given historical information about all transactions.
3. *Self-reported ratings*: After each contract was completed, participants had to rate their opponents and no historical information about past transactions was made available.

Each signed contract outlined two separate actions–the payment sent by the buyer and the goods sent by the seller—each of which may be either fulfilled or not. The study results showed that the use of reputation mechanisms revealing "high information" produced a meaningful increase in the number of fulfilled contracts.

Given the results from past research, we have been challenged to choose a good reputation mechanism for an online business game focused on negotiation. It is hypothesized that if an effective reputation system is provided, the conduct of the negotiation is improved, thus encouraging integrative (win-win) outcomes. Also, Anderson and Shirako (2007) hypothesized that "negotiators who have achieved high integrative outcomes would develop a reputation as being more cooperative (pp. 10)."

Win-win negotiations, also known as integrative negotiations, are characterized by an integrative outcome. In win-win negotiations, counterparts are able to increase value by cooperating and, by focusing on their interests, are able to create new options

(Fisher, Ury, & Patton, 1991). In *win-lose* negotiations, also known as distributive negotiations, resources are merely redistributed among the counterparts with one emerging advantageously over the other.

Integrative outcomes are typically measured in terms of joint profit, by summing each negotiator's individual outcome (Bazerman, Magliozzi, & Neale, 1985; Mannix & Neale, 1993). Thus, we measure the correlation coefficients between players' scores and reputation values obtained at the end of each negotiation to evaluate the reputation mechanism. We argue that such a mechanism is quite reliable, if the score is properly calculated.

In the next section, we will introduce the online business game WWM and describe its main features. We will provide some details about the scoring algorithm and the reputation mechanism implemented in the game. Then, negotiation outcomes will be analyzed, and particular attention will be paid to how strategies chosen by the players produce mistakes or generate good choices. Subsequently, we will present some statistical evidence for the online reputation mechanisms we have implemented in WWM, and we will highlight some limitations of this study.

WIN WIN MANAGER

WIN WIN MANAGER (http://www.wwmanager.it) is an online negotiation game in which players conduct up to 10 bilateral negotiations. The negotiations are pursued through private threads on the general board of the game. The players are given both qualitative and quantitative information regarding their role, their objectives, and the general background of each scenario. For example, two players may take on the role of representatives of two companies contemplating a merger. One company is much larger than the other, and the players have to decide how to divide the shares of the merged company. The players also have to elect a new company CEO, decide on a company main office location, and determine a new company name. Each player's Best Alternative to a Negotiated Agreement (BATNA; Fisher et al., 1991) can be extrapolated on the basis of the data provided. The BATNA generally represents the player's reservation price, or rather the higher (lower) price that the buyer (seller) is willing to pay (earn) for a specific bundle of products or services. The software generates quantitative information, which complies with some constraints to guarantee the existence of a Zone of Possible Agreement (ZOPA). The ZOPA describes the positive zone between two parties' BATNAs. Within this zone, an agreement is possible (Lewicki, Minton, & Saunders, 1999). For example, in a bargaining situation, if the seller's reservation price is €5 and the buyer's reservation price is €8, the ZOPA is the set of possible agreements from 5 to 8 inclusive. In a win-win negotiation, the agreement grants all parties a fair mark up on each individual BATNA. Such results may be achieved by following the tips on "principled negotiation" provided by Fisher et al. (1991). WWM is meant to help participants improve their skills and attitudes, thus allowing a negotiation to be carried on in a principled or, at least, a collaborative way.

In WWM, the players negotiate in an asynchronous way, posting their offer or counteroffer in turn. The players cannot read other players' private negotiation threads and

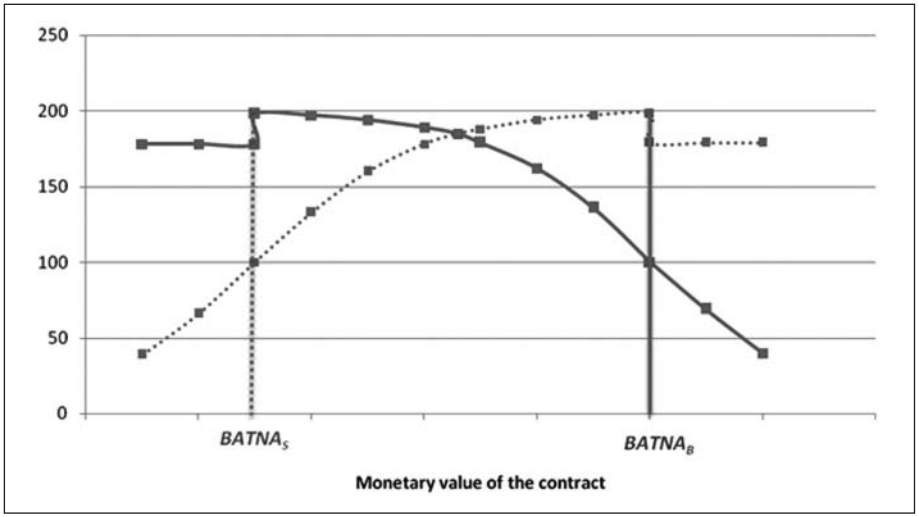

Figure 1. A graphic representation of the score trend of the "Buyer" (continuous line) and the "Seller" (dotted line) in a buy-and-sell negotiation, given the counterparts' BATNA

generally do not know the real identity of their counterparts as each player chooses a nickname (generally different from their real names) when signing up on the homepage for the first time. Thus, we argue that players are negotiating anonymously (Greco & Murgia, 2007).

Scoring Algorithm and Reputation System

At the conclusion of each negotiation, each player is given a score (Figure 1). Scores are in the range of 0 to 200. The algorithm assigns 100 points when the negotiation result coincides with the player's BATNA. When players accept an agreement worse than their BATNA, their behavior may be considered unsuccessful. The system assigns 200 points when the signed agreement coincides with the counterpart's BATNA.

For example, let us consider a negotiation about the purchase of an item: the seller's BATNA is S, and the buyer's BATNA is B. In every WWM negotiation, B > S. If the amount the buyer pays matches S, the resulting buyer's score will be 200, and the seller's score will be 0. The algorithm assigns penalties when the player exceeds the counterpart's BATNA (e.g., paying less than S will result in the assignment of a penalty to the buyer, see Figure 1) so as to disincentivize hard bargaining styles and simulate the effect of a loss of reputation for the hard bargainer. The players are also allowed to submit a "non-agreement" when they cannot reach an agreement with their counterparts. In this case, the algorithm generally assigns both players 100 points (meaning that both recurred to their own BATNA). In some cases, the text of the scenario can highlight that nonagreements would seriously damage one or both parties (e.g., configuring a loss of public image), and less than 100 points would be assigned.

Table 1. Relevant Changes Among the Three Versions of WIN WIN MANAGER

	Version 1.0	Version 2.0	Version 3.0
Scoring algorithm	Linear shape of the score function; score ranges from −100 to +100 (0 matches the BATNA)	Logistic shape of the score function; score ranges from 0 to 200 (100 matches the BATNA)	No changes
Scenarios	Ten business-related scenarios	Replacement of several scenarios, a comprehensive review of others	No changes
Reputation system	At the end of each scenario, each player evaluates his/her overall satisfaction. Such value represents his/her counterpart's reputation score in the scenario.	No changes	At the end of each scenario, each player evaluates separately his/her satisfaction with the negotiation outcome and with the behavior of his/her counterpart. The mean of the two values represents the counterpart's reputation score in the scenario.

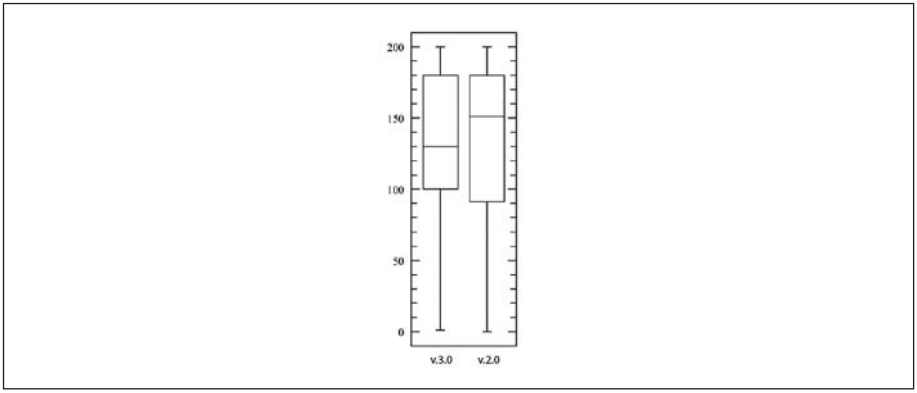

Figure 2. Box plots of scores achieved in WIN WIN MANAGER (Versions 3.0 and 2.0)

Three versions of WWM have been released so far. The most relevant changes are described in Table 1.

It is important to highlight that the shape of the scoring function and its rationale allow almost 75% of the players to gain scores higher than 100 in both Versions 2.0 and 3.0. Figure 2 shows box plots of the score distribution in Versions 3.0 ($n = 90$) and 2.0 ($n = 236$)—scores refer to the two scenarios provided in both versions. Minor

changes have been implemented in the informative texts of Version 3.0 scenarios, to clarify them and to allow players to easily understand the BATNA. Such changes probably caused the increase of the lower quartile to the 100 threshold. For brevity, we do not show the box plots of the score distribution in the two scenarios separately, as they show similar results. The results do not change even if we disaggregate the data according to the target audience (MBA students vs. undergraduates).

In WWM, each player's score is meant to be compared with the other players' score. This is one of the major innovations being implemented in WWM, when compared with other negotiation experiments where scores are provided. For example, Raiffa (1982) conducted several experiments in which a seller's score could not be compared with a buyer's score, whereas two sellers' or two buyers' scores could be compared with one another. The score is very important in WWM, because it allows the players to gain valuable prizes offered by any private sponsors. As a matter of fact, this kind of incentive reinforces the naturally challenging characteristics of a game, which provides a public hall of fame. Moreover, some students received a bonus on their final mark in a Management Engineering examination by playing WWM.

Along with an automatically assigned score, a reputation score is assigned at the end of every negotiation. Before a score is assigned by the software, each player grades the reputation score of his or her opponent. The reputation mechanism will be described in depth later. The game provides a reputation hall of fame, and the best reputation player is awarded a prize. This feature is meant to incentivize a less positional negotiation style and, therefore, to promote a more collaborative negotiation approach.

Debriefing

In the WWM's free version, the program software automatically generates feedback on each negotiation outcome, starting with the parameters of the agreement. The feedback is composed of sentences and comics. The algorithm displays one or more types of feedback according to very simple rules, such as

"**if** parameter x < 10 show *figure A* **else** *show sentence f*"

The feedback style is often humorous, especially when it points out a mistake. The humor reduces potential negative motivational impact. Moreover, the players are free to send their counterparts a personal message on their own behavior during the negotiation. The message is to be written in the same form as the parameters of the agreement are filled. The player's message is sent before receiving his/her score. In this way, the risk of messages being biased by the response of the software is avoided.

Customized feedback is provided to those players involved in a private tournament such as a customized MBA edition of the game. In this case, feedback can be provided on the strategies chosen by the player, the communication mistakes, and the good moves. Moreover, an "optimal" solution to the negotiation might be suggested to the players using a bulletin board or a traditional lesson.

To debrief properly, the faculty member needs to be an expert in negotiation techniques and must have full access to all confidential information being provided to the players. Up to now, instructors who have used WWM in their classes have always asked WWM staff to debrief and grade the players' performances. Debriefings have been structured as follows: When all the members of a class end a scenario, the WWM expert shares a standard debriefing text, which describes the scenario's technical specifics, that is, characters' BATNAs, reservation prices, alternatives, and so on, and both characters' potential strategies to accomplish their own goals. Then, the expert speaks (or writes, in cases of interaction through the bulletin board) to the class, pointing out the techniques being tried by the players and highlighting their proper or wrong application.

Students often ask for clarification on their scores. Perfect knowledge of the scenario's quantitative information is needed to provide a proper and thorough answer. Moreover, a simulator of the scoring algorithm (e.g., an Excel worksheet) helps the instructor show the score trend as the variables in the scenario change.

Reputation Mechanism

This section of the article will present and analyze the structure of the reputation mechanisms used in WWM to evaluate them as tools for rendering the negotiation process in this simulation as close to reality as possible. One of WWM's goals is to allow players to obtain integrative outcomes. The reputation concept is a key factor in this context. Versions 1.0 and 2.0 of the game implemented a reputation mechanism similar to the "Self- reported ratings" policy described by Chen et al. (2004). That is, at the end of each negotiation the players were asked to evaluate, on a scale from 1 to 10, their satisfaction with the just concluded negotiation.

The following value was used to evaluate the reputation of the opponent:

$$R_i = \frac{1}{n}\sum_{k=1}^{n} S_i^k, \quad 1 \le S_i^k \le 10, \tag{1}$$

where R_i is the reputation of the ith player, S_i^k is a generic satisfaction value expressed by the opponent of the ith player at the end of the kth scenario, and n is the number of scenarios completed by the ith player.

Consequently, the opponent's reputation was evaluated indirectly on the basis of the player's satisfaction with the negotiation.

Because such a mechanism does not allow the parties to directly evaluate their opponents, its effectiveness as a valid tool for building a real reputation of the players might be questioned. Nevertheless, the satisfaction of a player might be influenced by two factors: the counterpart's behavior and the negotiation's outcome. The more the counterpart acts cooperatively and is able to persuade the player on the profitability of the agreement, the higher the R value will be. WWM players are assigned their counterpart according to a constrained random function that prevents the same pair from

bargaining in two consecutive scenarios. This solution avoids the memory effect linked to any opportunistic behavior. Moreover, players having a strong tendency to negotiate with a positional approach, which can have detrimental effects on the negotiation outcome, are prevented from penalizing the same counterparts. In addition, the larger the number of different people faced at the negotiating table, the larger the number of alternative negotiation strategies being learned.

To improve the reliability of the reputation algorithm, we have modified it in Version 3.0 of the game as follows:

$$R_i' = \frac{1}{n}\sum_{k=1}^{n}\frac{S_i^k + G_i^k}{2}, \quad 1 \le S_i^k \le 10, \text{ and } 1 \le G_i^k \le 10, \tag{2}$$

where R_i' is the reputation of the ith player, S_i^k is the satisfaction value with the signed agreement expressed by the opponent of the ith player at the end of the kth scenario, G_i^k is a rating of the ith player's negotiating behavior expressed by the opponent, and n is the number of scenarios completed by the ith player.

Sometimes R has been extremely understated, particularly by those players wanting to penalize the unfair behavior of their opponents, even if the negotiation outcome has been satisfactory. R' allows the players to evaluate their counterparts in both direct and indirect ways, narrowing the effects of a potential "penalizing aim," which might derive from the direct evaluation of the counterpart. Such effects are highlighted by the reputation scores box plots in Figure 3. For the sake of brevity, we do not show the box plots of the reputation scores distribution in the two scenarios separately, as they highlight similar results. Once again, the results do not change even if we disaggregate the data according to the target audience.

Is the reputation mechanism adopted by WWM realistic and effective in allowing the players to make an accurate evaluation of the opponent's reputation? Figure 3 shows that R' produces reputation scores, on average, higher than those produced by R. However, such a result does not indicate whether R' is more effective than R in evaluating the "correct" reputation of the players. Thus, our challenge is to quantitatively determine the effectiveness of a qualitative and subjective indicator.

We assume that the reputation score should be strongly positively correlated with the cooperativeness of the player's behavior during the negotiation. Most scholars suggest that a cooperative approach can lead to an improvement in negotiation outcomes, as opposed to positional approaches, which are known to destroy value for both parties (Fisher et al., 1991). As mentioned before, WWM provides a fair algorithm for the outcome evaluation. Thus, we formulate the hypothesis that the score and the reputation values provided at the end of each scenario should be positively correlated, if the reputation mechanism is effective. Because both scores and reputation values are unlikely to be normally distributed, we use nonparametric correlation statistics such as Spearman's (ρ) and Kendall's (τ) rank correlation coefficients to verify the hypothesis.

We cannot reject the null hypothesis for Version 2.0 of the game, if we consider all the data that we are analyzing in both the scenarios ($\rho = -.02$, $p < .4$; $\tau = .01$, $p < .4$;

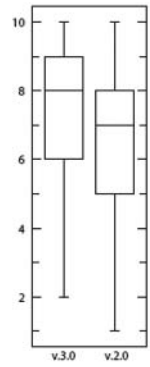

Figure 3. Box plots of reputation scores achieved in WIN WIN MANAGER. Version 3.0 implemented the *R′* mechanism, whereas Version 2.0 implemented the *R* mechanism

$n = 236$). Thus, on one hand, R seems to be unrelated to the score. On the other hand, if we consider $\alpha = .1$ as a statistical significance threshold, R' is significantly positively correlated with the score, considering both Spearman's and Kendall's coefficients ($\rho = .14$, $p < .1$; $\tau = .1$, $p < .1$; $n = 90$). Similar results can be achieved if we consider the two scenarios separately.

If we take into account the differences in the target audience, it is interesting to point out that both correlations increase when we restrict the sample to MBA students. We still cannot reject the null hypothesis for Version 2.0 ($\rho = .06$, $p < .35$; $\tau = .05$, $p < .35$; $n = 39$), but we can reject it with more confidence for Version 3.0 ($\rho = .23$, $p < .05$; $\tau = .18$, $p < .05$; $n = 56$). Such results can be considered as consequences of the "Negotiation Techniques" lessons, which MBA students attended while playing WWM. Such lessons probably provided the students with a more holistic comprehension of the negotiation dynamics and the opponents' behavior.

Even if, from theoretical and technical perspectives, both players have the same chances to gain 200 points in all scenarios, in practice one role is frequently more difficult than the other because of the scenarios text elements that might seem noninfluential to the story boarder but happen to influence the negotiation outcome. Therefore, we propose to debias the score as follows:

$$P_i'^k = 200 * \frac{P_i^k(r)}{\max_i P_i^k(r)}, \quad \forall k, \quad r \in (a, b), \tag{3}$$

where $P_i^k(r)$ is the score assigned to the ith player, at the end of the kth scenario; r is the role the player "takes on" during the kth scenario, $\max_i P_i^k(r)$ is the top score being achieved among all players taking on the role r in the kth scenario, and $P_i'^k$ is a corrected

Table 2. Summary of the Correlation Coefficients Between Score and Reputation

Version	*P*	*T*	*N*
2.0 (*R*, *P*)	–.02	.01	236
2.0 (*R*, *P*′)	–.05	–.03	236
2.0 (*R*, *P*) MBA	.06	.05	39
3.0 (*R*′, *P*)	.14*	.10*	90
3.0 (*R*′, *P*′)	.17**	.13**	90
3.0 (*R*′, *P*) MBA	.23**	.18**	56

**$p < .05$. *$p < .10$.

measure of the score that might be considered a more reliable measure of the player's negotiation efficacy.

In fact, if we consider the correlation coefficients between reputation and P' in the two overviewed versions of the game, we obtain better results. However, we still cannot reject the null hypothesis for Version 2.0 ($\rho = -.05$, $p < .3$; $\tau = -.03$, $p < .3$; $n = 236$), but we can reject it with more confidence for Version 3.0 ($\rho = .17$, $p < .05$; $\tau = .13$, $p < .05$; $n = 90$). Results do not change in any significant way if we use P' in place of P when calculating the correlation coefficients of MBA students.

On the whole (see Table 2), the correlation coefficients point out that R' seems to provide a better interpretation of players' performances than R. The low correlation coefficients suggest that improvements should be implemented to give the players a better comprehension of their opponents.

Building solid relationships among parties is a long and complex process, which is fundamental to promote integrative negotiations. In this context, it might appear simplistic to determine a person's reputation just through a number. According to the results of the experiments conducted by Chen et al. (2004), and observations made by Dellarocas (2006), it might be interesting to give the players the opportunity to read all opponents' previous negotiations in addition to the current reputation mechanism implemented in WWM. The application of such an evaluation tool should lead to a decrease in the number of conflict situations (Falk, Fehr, & Fischbacher, 2003). We will measure the efficacy of such an approach in the game's next editions by comparing our current data with future results. Of course, this method would be time consuming for the players, and we argue that only a small group of them would actively adopt it.

Limitation of the research

Even if R' appears to be significantly positively correlated with the score, both ρ and τ are quite low values. Such results might be distorted by negotiation situations between "hard bargainers" and "soft bargainers." In this kind of negotiation, hard bargainers often force their counterparts to sign unfair agreements that allow them to gain high

scores, whereas their opponents assign them very low reputation values; this—coupled with their high scores—reduces correlation coefficients. Perhaps the score algorithm should be modified to reduce any incentive to "hard" negotiation styles.

The data available on WWM's Version 3.0 is less than that of Version 2.0 (90 vs. 236): An extension of the sample could increase the reliability of the results and influence the correlation coefficients.

Conclusion and Future Developments

Most scholars agree on the importance of reputation in negotiation, ultimately influencing the negotiation approach, conduct, and outcome. Thus, it is not surprising that most bidirectional negotiation websites use reputation mechanisms (Dellarocas, 2006). Most of the time, such mechanisms are very direct and ask users to evaluate their counterparts using a five-star-based system and/or a brief comment. Such mechanisms can be very effective after many evaluations are made. In WWM, players receive at most 10 evaluations (one for each scenario); therefore, the reputation value must be as reliable as possible from the beginning, in order to relay relevant information to the counterpart in the following scenarios. We tried to solve this problem by providing an indirect reputation mechanism, as to narrow the distortions in the evaluation. We tested this innovation by considering the nonparametric correlation of score and reputation, assuming that a good reputation score should be correlated with the negotiations outcome. Results showed that the new reputation mechanism (R') is significantly correlated with the score, whereas the previous mechanism (R) did not show any significant correlation with it. Both correlation and confidence increase, if we take into account the specific target audience of MBA students. We suggest that these results ensue from the specific training of the players.

As a future development, we plan to give players the opportunity to read their opponents' past negotiations, to understand their negotiation style. We expect this to reduce any conflict situations, which can be measured by the number of nonagreements between the players.

In the meantime, we will explore the possibilities of including more reputation mechanisms by involving the scoring algorithm and resorting to an independent evaluator: a moderator who reads the negotiations without intervening and who manually assigns reputation scores. We will measure the outputs of our future efforts referring to correlation coefficients among the scores and the new R'' reputation values. We believe that our research in a simulated environment will help the evolution of reputation mechanisms in real online markets, where users are able to negotiate among one another.

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