

Improving Negotiation Skills Through an Online Business Game

Marco Greco, Gianluca Murgia

Tor Vergata University - Business Engineering Department, Rome, Italy

greco@disp.uniroma2.it

murgia@disp.uniroma2.it

Abstract: Game-based Learning enables students to undertake tasks and situations which would otherwise be impossible or undesirable for cost, time, logistical and safety reasons. As a matter of fact, this training technique allows learners to earn skills which wouldn't be developed through a traditional didactic approach.

It is important to consider negotiation capabilities among the skills that may not be developed just by reading a book or by learning through a teacher. Only a small niche in the wide panorama of "Serious Games" focuses on negotiation and just a couple of them are designed in a software version. More importantly, the majority of them are "single-player" games, in which learners are able to choose only among a few predetermined choices. This paper will introduce Win Win Manager, an online multiplayer business game that focuses on negotiation.

Multiplayer technology allows a deeper learning, favours a greater commitment of the students and allows a continuous comparison between users boosting competition, fun and commitment through a more realistic approach. It will be demonstrated how Win Win Manager achieves its formative goal, providing quantitative evidence of an increase in the users' negotiation skills, and showing the outcome of a survey on perceived improvement in users. In Win Win Manager players negotiate online in randomly selected couples, using a private discussion board, on each of the ten scenarios provided by the game. Players obtain a score accordingly with the results of their negotiation. In the first edition of Win Win Manager we noticed that both linear and polynomial tendency curves of players' mean scores increased in a monotonic way as the difficulty of the scenarios increases. The second edition of Win Win Manager seems to comply with this trend. Even if such score is very useful for evaluating each player's performance, it often doesn't provide an adequate feedback for him. Thus, in the second edition of Win Win Manager, we introduced a feedback algorithm complementary to the score, which we will briefly introduce in this paper.

Keywords: Win Win Manager, negotiation, business game, games-based learning, feedback, anonymous negotiation

1. Introduction

According to a large number of authors, games provide rich learning contexts for players; thus, they can be used in order to achieve educational goals (Gee 2003a; Gee 2003b; Kafai 2001; Kirriemuir 2002; MacFarlane 2002; Norman 2001a; Norman 2001b; Prensky 2001; Sawyer 2002; Stapleton and Taylor 2002; Stapleton 2003). In fact, several animal species play games to learn the knowledge and skills necessary to live in their environment (Stapleton 2004). In order to maximize learning in students, teachers must find innovative techniques of knowledge transferring, considering that "The real learning happens best when one is deeply engaged in hard and challenging activities" (Papert 1998). The constructivist view of learning (Vygotski 1962) assesses that the learner plays an active role in building his own knowledge, and that's exactly what happens while playing a game.

When a discipline is supported by a small amount of theory concepts, but needs a lot of field work in order to excel, training "on the job" seems to be the best way of teaching. Anyway, getting some practice is often expensive and sometimes very risky (think about flight simulators for aircraft novice pilots: what would be the cost and risk of letting them fly on a real airplane?).

Even if a lot of books have been written on negotiation, core concepts may be resumed in a dozen of pages. Most manuals filled with examples in order to show how concepts have been applied in the real world (often, in negotiation, theories are built on the base of practice's results). Anyway, such examples don't necessarily provide students with a deeper learning, because each negotiation is different and only practice may help in successful bargaining. According to Corti (2006), even if games can be very powerful for letting learners to put theory in practice, they are generally bad in delivering content. He assesses that information should be delivered by a game only in small doses.

Thus, it is not surprising that many negotiation courses are integrated with in-class role games in which students try to apply concepts in very simple bargaining situations. Unfortunately, these games

are often excessively simplified to be effective as a learning tool and, as a matter of fact, provide a mere exemplification of few specific theory concepts.

2. Business games about negotiation

Only a small niche in the wide panorama of “Serious Games” focuses on negotiation and just a couple of them are designed in a software version. Most of them are made up of a more or less complex storyboard that includes a definition of roles, objectives, purposes and some general background information. For example, “The Win Win Game” is an interesting example of business game on negotiation that may be played in a classroom, without a software support. “It illustrates both the difficulties involved when multiple groups have to work together to achieve a common goal, and the skill necessary for those groups to achieve a successful, win-win outcome. Ideally four teams take part though you can play it with fewer. The teams represent four primitive countries who are all neighbours and who have in their centre a piece of rocky, mountainous land – ideal for the telecommunications tower that they all want for their people” (from http://www.elitetraining.co.uk/business_game/Win_Win.htm). Teams don’t agree on several issues, and have to negotiate with each other to find the best solution. We think that such a game may boost in players the learning of negotiation skills, but that it is also affected by several limits. First, it provides only one scenario, probably not enough for a deep learning. Second, it doesn’t provide any incentive for players apart from the challenging effect which is proper of a game. Lastly, it is affected by logistic and temporal constraints, since players must be in the same classroom, at the same time. Such constraints are typical of games that are not supported by a software interface.

Most of negotiation games are built in a “single-player” software structure, in which learners are able to choose only among a few predetermined choices.

“Zap Dramatic” (<http://www.zap.ca/course.htm#tour>) is an online negotiation game certified by the University of Windsor, Faculty of Law (Ontario, Canada). The course is made up of 8 modules, 7 of which are simulated negotiations that the player conducts with animated computer characters. The player “talks” with the character, choosing between few sentences provided by the interface. The outcome of each choice is deterministic, foreseen by the developers of the game, in order to stress some concepts that are relevant in negotiation. Such a game may be very useful for stressing the importance of relevant concepts, but poor for practicing players. Indeed, a more realistic game should give the possibility to the players of saying an infinite number of sentences and software should generate a random reaction. That is why we chose to create a negotiation business game in which players could bargain in couples, simulating negotiations in a more realistic way. Games where players play each other are called “multiplayer”. Positive effects of such structured games on players’ learning have been observed by several authors (Steinkuehler 2004, Herz 2001, Magnussen 2004) especially with regard to Massively Multiplayer Online Role Games (MMORPG).

Moreover, practicing negotiation online is even more critical if we consider how many negotiation are daily pursued on the Web (via e-mail, forums, chats, instant messaging software or portals, like e-bay).

3. Win Win Manager

Win Win Manager (WWM) is an online negotiation game in which players negotiate with each other, in couples, on ten different scenarios focused on business. Negotiations are pursued in a private thread on the general board of the game. Players are given both qualitative and quantitative information about their role, their objectives and the general background of the scenario. Such data should be used by the player to extrapolate his own Best Alternative to a Negotiated Agreement (BATNA) (Fisher et al 1991). Wikipedia provides this brief definition for BATNA: “it is the course of action that will be taken by a party if the current negotiations fail and an agreement cannot be reached” (en.wikipedia.org). Quantitative information is generated by the software, complying with some constraints aimed to guarantee the existence of a Zone Of Possible Agreement (ZOPA). ZOPA describes the positive zone between two parties’ BATNAs. Within this zone, an agreement is possible (Lewicki et al 1999). For example, in a bargaining situation, if the seller wants to sell an item which he values at least five pounds and the buyer appraises it not more than eight pounds, the ZOPA is the set of possible agreements from five to eight inclusive. In a win-win negotiation, the agreement grants to all parties a fair mark-up on each individual BATNA. Such a result may be achieved by following the tips provided by Fisher (1991) about the “principled negotiation”. Win Win Manager is meant to help learners in increasing the skills and attitudes that allow a negotiation to be carried on in a principled way.

In Win Win Manager, players negotiate in an asynchronous way, posting in turn their offer or counter-offer. Even if technology would have offered other opportunities for arranging negotiation dynamics (like Voice Over IP or Instant Messaging), an asynchronous communication tool allows each player to make his offer whenever he wants, even if his opponent is not online simultaneously. Moreover, using an online board makes possible that every information could be tracked and easily used for scientific purposes. Finally, as experienced by Annetta et al (2006), students are often reluctant to move from text-based communication to audio, both for technical difficulties and for affective impact of VoIP.

3.1 Anonymous negotiation

When players sign up the first time in the home page, they choose a nickname and a password. Most times, the nickname is pretty different from real user's name and surname. Moreover, according to the randomised assignation of the counter-part, it's very rare to bargain with somebody you already know, or that you are able to recognize just on the base of his username. Since the game is completely carried out on the Web, without meeting each other, we can assume that players negotiate under anonymity. According to Kagel and Roth (1995, p. 295) "the hypothesis that has motivated many experimenters to conduct experiments under anonymous conditions is that face-to-face interactions call into play all of the social training we are endowed with, and may make it unusually difficult to control preferences". Siegel and Fouraker (1960) wrote on their anonymous way of conducting experiments: "This procedure eliminates certain variables which may well be important in bargaining [...] It cannot be assumed, as has often been done, that such variables may simply be neglected". Moreover, the use of nicknames is widespread on the Internet. Thus, real online negotiations happen under anonymity, and this reinforces the usefulness of Win Win Manager.

Where, on the Web, negotiation are regularly made under anonymity, many efforts are made to reduce the risk of frauds. For example, Ebay supplies the "eBay Feedback". "Feedback is each user's reputation on eBay. Through positive, negative, and neutral ratings and comments, each eBay member has a Feedback score. All sellers display this score in the Seller Information box of the item listing page" (www.ebay.com).

In order to emulate such mechanisms, we introduced a "reputation value" in Win Win Manager. When the negotiation ends, each player chooses a value from 0 to 10, which should represent his level of satisfaction with the agreement and with the behaviour of his counter-part. Anyway, since players can't choose their counter-parts before the beginning of a new level, it is actually not clear how this value affect the conduction of the negotiation. According to the survey that we are conducting about this topic in the second edition of Win Win Manager, reputation seems to be rarely consciously considered in any way by the players. Interviews point out that players' score acts as a stronger indicator of the counter-part's negotiation capabilities.

For our purpose, reputation is a good way to understand the effectiveness of a negotiator: if players with high reputation are top scorers too, we could assume that an empathetic style of bargaining may have excellent results instead of a positional one. As a matter of fact, the winner of the first edition of Win Win Manager totalized both the maximum score, and the best reputation.

3.2 Score assignation

In accordance with the outcome of the negotiation, each player is given a score (Figure 1). Scores in the first edition of WWM were included in a (-100; +100) range. 0 was assigned when the negotiation result coincided with player's BATNA. Thus, when a player accepts an agreement worse than its BATNA, his behaviour may be considered unsuccessful, and the score assumes negative values. On the other hand, 100 was assigned when the player was able to make its opponent accept an agreement which identified precisely his own BATNA. For example, consider a negotiation about buying something: seller's BATNA would be S, Buyer's BATNA would be B. In every WWM negotiation $B > S$. If a buyer successfully paid the object exactly S, his score would be 100, and the seller's score would be 0. Penalties were provided for breaking other's BATNA (i.e., for example, paying less than S) in order to disincentive excessive hard bargaining styles and to simulate the effect of a loss in reputation for the hard bargainer.

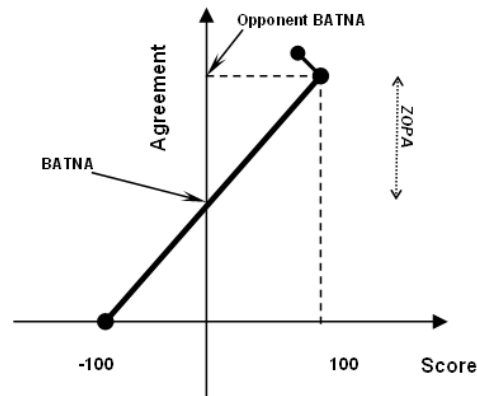


Figure 1: A graphic representation of a generic score assignment function

The biggest innovation we introduced in WWM, if we compare it with other negotiation experiments where a score was provided, is that each player's score is meant to be compared with the others' ones (Greco, 2006). For example, in experiments conducted by Raiffa (1982), a seller's score couldn't be compared with a buyer's one, while two sellers' or two buyers' ones could be compared with each other. Even if we agree that, when negotiation is difficult and informative asymmetries are present, a role is always more difficult than the other in an intangible way, we think that on a ten-scenario long game, differences should be counterbalanced by randomised role assignment.

Score is very important in Win Win Manager, since it allows player to gain valuable prizes offered by some private sponsors. As a matter of fact, this kind of incentive reinforces the natural challenging characteristics of a game which provides a public hall of fame. Moreover, by playing Win Win Manager, some students received a bonus on their final mark in a Management Engineering examination.

Together with the automatically assigned score, a reputation score exists too. At the end of every negotiation, each player provides an evaluation of his own satisfaction with it, in a range from 0 to 10. We assume that the more a player is satisfied, the better his opposite bargained, not giving in too much. Thus, this value becomes the reputation mark of the counterpart. A hall of fame of reputation is also provided by the game, and a prize is awarded to the best reputation player. This choice should incentive a less positional negotiation style, a wider open-mindedness and, on the whole, a more collaborative negotiation approach.

3.3 Feedback in Win Win Manager

When receiving a feedback, learners are provided with information about their performance, which may tell them how well they have done a task and how to improve (Vollmeyer & Rheinberg 2005).

When we designed the first edition of Win Win Manager, we thought that score could work as feedback for players. Unfortunately, such assumption turned out to be inaccurate. As a matter of fact, when a player achieves a score of nearly 100, he is given a good feedback which allows him to understand that his way is the right one. Instead, when the player achieves any other score, he just understands, more or less, how he negotiated, but he can't understand where he was wrong nor where he was right. Consequently, during the first edition of WWM, we received a large amount of messages from players asking for the reasons of their score assignment. When the score assumed negative values, players used to feel that as a sort of punishment. Many players abandoned the game after gaining the first negative score, some others changed their negotiation approach becoming less open to make any concession. Moreover, according to Kahneman and Tversky's prospect theory (1979), people's value function is "normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains". For example, if achieving a score of -50 points causes a disutility of α , and achieving one of 50 yields an utility of β , prospect theory assesses that $|\alpha| > |\beta|$. So, when the first edition ended, we looked for a new way for providing a feedback to our users.

The role of feedback in learning is not univocally accepted in the scientific community. As stated in Kagel and Roth (1995): "Psychologists often suspect that the immediate, frequent, clear, exogenous feedback subjects receive in economic experiments overstates how well people learn in natural economic settings. Economists, in contrast, think that experiments understate the rate of natural learning because context, access to advice, higher incentives, and added time to reflect or calculate are absent from experiments, and probably improve performance in natural settings". It has been

shown that frequent and immediate feedback benefits practice performance, but can undermine learning as assessed on transfer tasks (Goodman, 1998; Schmidt, 1991). On the other hand, feedback interventions that provide less frequent and delayed feedback lead to poorer practice performance, but better learning (Archer, Kent, & Mote, 1956; Christina & Bjork, 1991; Schooler & Anderson, 1990; Winstein & Schmidt, 1990).

Thus, we chose to introduce an algorithm of feedback assignation which gives to the player an immediate overview of the agreement he signed a few minutes before. Such overview is not really specific, since it doesn't consider how the negotiation has been driven, but just what the final agreement has been. Sentences are generated in a deterministic way, and often give an indirect feedback such as "After one year you notice that your counterpart's store is closed for bankruptcy" or "the Union's members are really grateful for the raise of the wages that you negotiated with the management". We resorted to humorous sentences or drawings (Figure 2), especially when providing negative feedback, in order to reduce the upsetting impact of the mistake in the subject. Moreover, Goodman and Wood (2004) demonstrated that a high specificity of the feedback "benefits the learning of responses for good performance and is detrimental to the learning of responses for poor performance".



Figure 2: Sample of feedback drawing: "Whaaaat? – Your wife says – Did you really sell our house at this price?!?!"

Such feedbacks, being immediate but not specific, accordingly to Goodman and Wood (2004), should jointly allow a raise in both practice and learning performance.

Finally, while virtually signing up the agreement, players are given the opportunity of sending a message to their counter-parts, writing their own feedback: they may focus on some strengths or weaknesses in the bargaining style of their opposite, or simply congratulate with them, or even explain the reasons for the assigned level of reputation. Such feedback, even if not scientific nor often of good quality, shows to the player the perceptions that his behaviour generated in his counter-part, acting as a powerful instrument of personal growth.

3.4 Technical characteristics

Win Win Manager is a web-based game. Open source PHP scripting environment was used for creating the game's website and its rationale. PHP allows the creation of dynamic web pages, which are indispensable for a game where data are randomic and the results depend on them. Moreover, a good database is needed in order to hold information about every negotiation, to create a "high scores" list and to manage users' data. Again, we chose an open source product, MYSQL, which is very synergistic with PHP. Finally, in order to allow players to carry on the negotiations in writing, we adopted a popular open source internet forum script, PHPbb (PHP Bulletin Board), which requires PHP and MYSQL to work properly. In the second edition of Win Win Manager this script has been heavily modified in order to allow an easier administration and a deeper interaction with scripts in the home page.

4. Evidence

Even if the ten scenarios have been written in order to be each more challenging than the previous one, some of them appeared to be more difficult than expected. Misunderstanding of the text, cognitive distortions in players, and nuisance variables, difficult to isolate, have played a role in every scenario. Thus, for example, the sixth scenario turned out to be harder than the seventh, the eighth

and the ninth. Difficulty of this scenario may be easily seen in Figure 3, according to the unusually low level of mean score.

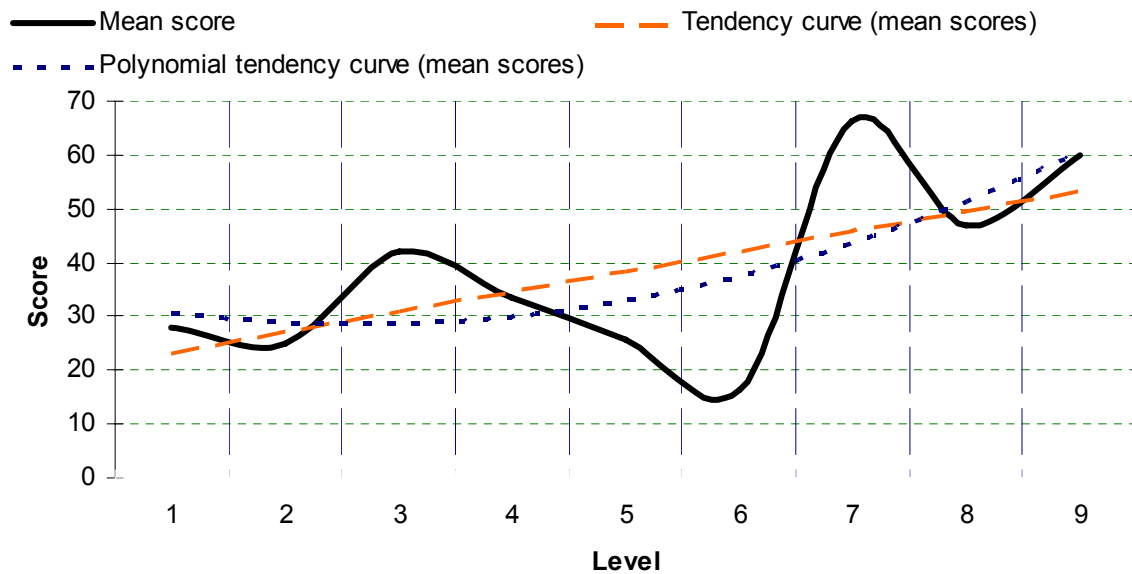


Figure 3: Mean score of players through the first nine scenarios - Tendency curve equation: $y = 3,74x + 19,523$, with $R^2 = 0,37$; Polynomial tendency curve equation: $y = 0,7966x^2 - 4,2256x + 34,127$

Figure 3 provides a good evidence of the raising of users' skills. Both linear (red dashed curve) and polynomial (blue dashed curve) tendency curves of players' mean scores increased in a monotonic way as the difficulty of the scenarios increases. We think that such a result is due to an increased players' ability in bargaining as well as in recognizing the proper BATNA, as they advance in the game. Moreover, like many other MMORPG, Win Win Manager is affected by a high abandonment in early stages. Thus, many players don't begin a new level after the end of the previous one. This allows a self-selection of the best players that makes negotiations of a higher level more interesting, challenging and formative than those of the previous one. Such hypotheses are reinforced by the poll we conducted on players who successfully completed at least six scenarios (more than 50% of the game). Even if only a dozen of them answered the questions, results have been really satisfactory (Figure 4). At the question "Do you feel that Win Win Manager has been useful to you?" 64% of players answered "A lot" or "Enough", none of them answered "Not at all".

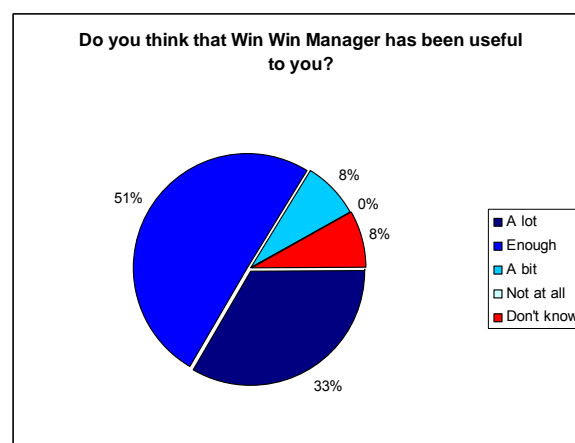


Figure 4: One of the questions of the poll we conducted on a selection of players

5. Conclusive remarks and future developments

In this paper we pointed out how Win Win Manager has shown to be useful in raising players' negotiation skills. The second edition of Win Win Manager is going to be finished in September 2007. A larger amount of data than in the first edition has been registered and we hope that it will reinforce

our conclusions. Moreover, the second edition of WWM has been characterized by a large introduction of innovations, such as an automatic – generated feedback which briefly explains to the user the reasons behind the score that has been provided. Furthermore, score assignment algorithms have been changed and better uniformed. New score lies in a range between 0 and 200. As shown in Figure 5, the form of the curve allows a quick increase of the score with small effort in terms of agreement near the flex point (BATNA, 100). As the negotiator tries to get a better agreement, maybe pushing his adversary against the ropes, incremental increase in score reduces.

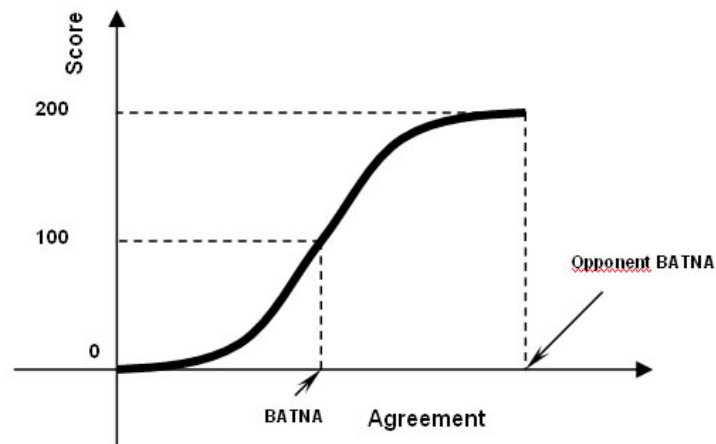


Figure 5: New graphic representation of a generic score assignment function in WWM 2nd edition

Finally, as mentioned before, we expect the new feedback mechanism to boost learning effects in players. As a matter of fact, questions about the result of negotiations dramatically reduced in the first six months of competition.

Our aim, for the next edition, is to translate the game into foreign languages in order to observe different approaches to online negotiation among players from different countries. This project should be backed by other experimentalists that may provide logistical support for their own countries, in order to better broadcast this initiative locally.

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7. References

Annetta, L.A., Murray, M.R., Laird, S.G., Bohr, S.C. and Park, J.C. (2006) "Serious Games: Incorporating Video Games in the Classroom", [online], *Educase Quarterly*, Vol 29, No. 3, pp 16-22, <http://www.educause.edu/apps/eq/eqm06/eqm0633.asp> .

Archer, J.E., Kent, G.W., and Mote, F.A. (1956) "Effect of Long-term Practice and Time on Target Information Feedback on a Complex Tracking Task", *Journal of Experimental Psychology*, Vol 51, pp 103–112.

Camerer, C. Kagel, J.H., Roth, A.E. (1995) *The Handbook of Experimental Economics*, Princeton University Press, Princeton.

Christina, R.W., and Bjork, R.A. (1991) "Optimizing Long-term Retention and Transfer", in Druckman, D., and Bjork, R.A. (eds.), *In the Mind's Eye: Enhancing Human Performance*, pp 23–55, National Academy Press, Washington.

Corti, K. (2006) "Games - based Learning: A Serious Business Application", [online], PIXELearning Limited, <http://www.pixelearning.com/docs/seriousgamesbusinessapplications.pdf> .

Fisher R., Ury W., and Patton B. (1991) *Getting to Yes: Negotiating Agreement Without Giving in*, Penguin, New York.

Foreman, J. (2003) "Next-generation: Educational Technology Versus the Lecture", *Educase Review*, July/August, pp 12-22.

Gee, J.P. (2003a) High Score Education: Games, not School, are Teaching Kids to Think, [online], <http://www.wired.com/wired/archive/11.05/view.html?pg=1> .

Gee, J.P. (2003b) *What Video Games Have To Teach Us About Learning And Literacy*, Palgrave Macmillan, New York.

Goodman, J.S. (1998) "The Interactive Effects of Task and External Feedback on Practice Performance and Learning", *Organizational Behavior and Human Decision Processes*, No. 76, pp 232–252.

Goodman, J.S., and Wood, R.E. (2005) "Feedback Specificity, Learning Opportunities, and Learning", *Journal of Applied Psychology*, Vol 89, pp 809–821.

Greco, M. (2006) *Applicazione dei principi dell'economia sperimentale ad un gioco di negoziazione online: il caso Win Win Manager*, Degree Thesis.

Herz, J.C. (2002) "Gaming the system-what higher education can learn from multiplayer online worlds", in Devlin, M., Larson, R., and Meyerson, J. (eds.), *Internet and the University: 2001 Forum*, pp 169-191, Educase MIT, Cambridge.

Kafai, Y.B. (2001) "The Educational Potential of Electronic Games: From Games-to-Teach to Games-to-Learn", [online], Cultural Policy Center, University of Chicago, <http://culturalpolicy.uchicago.edu/conf2001/papers/kafai.html> .

Kahneman, D., and Tversky, A. (1979) "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, Vol 47, No. 2, pp 263-292.

Kirriemuir, J. (2002) "Video Gaming, Education and Digital Learning Technologies", Vol 8, No. 2, *D-Lib Magazine*, February, [online], <http://www.dlib.org/dlib/february02/kirriemuir/02kirriemuir.html> .

Lewicki, R.J., Minton, J., and Saunders, D. (1999) *"Zone of Potential Agreement" in Negotiation*, 3rd Edition, Irwin-McGraw Hill, Burr Ridge.

MacFarlane, A. (2002) "Video Games 'Stimulate Learning'", TEEM, BBC News, [online] http://news.bbc.co.uk/2/hi/uk_news/education/1879019.stm

Norman, D.A. (2001a) "The future of education: Lessons learned from video games and museum exhibits", [online], <http://www.jnd.org/dn.mss/NorthwesternCommencement.html> .

Norman, D.A. (2001b), "Learning from the success of computer games", [online], <http://www.jnd.org/dn.mss/ComputerGames.html> .

Papert, S. (1998) "Does Easy Do It? Children, Games, and Learning", *Game Developer Magazine*, pp 87-88.

Prensky, M. (2001), *Digital Game-Based Learning*, McGraw-Hill, New York.

Magnussen, R. and Misfeldt, M. (2004) "Player transformation of educational multiplayer games", in Smith, J.H., and Sicart, M. (eds.), *Proceedings of the Other Players Conference, Copenhagen, Denmark, 2004*, IT University of Copenhagen, Copenhagen.

Raiffa, H. (1982) *The Art and Science of Negotiation*, Harvard University Press, Cambridge.

Sawyer, B. (2002) "Serious Games: Improving Public Policy through Game-based Learning and Simulation", [online], Woodrow Wilson International Center for Scholars, <http://wwics.si.edu/subsites/game/Serious2.pdf> .

Schmidt, R.A. (1991) "Frequent Augmented Feedback Can Degrade Learning: Evidence and Interpretations", in Requin, J., and Steimach, G.E. (eds.), *Tutorials in motor neuroscience*, pp 59–75, Kluwer Academic, London.

Schooler, L.J., and Anderson, J.R. (1990) "The disruptive potential of immediate feedback", in *Program of the Twelfth Annual Conference of the Cognitive Science Society*, pp 702–708, Erlbaum, Mahwah.

Siegel, S. Fouraker, L.E. (1960) *Bargaining and Group Decision Making: Experiments in Bilateral Monopoly*, McGraw-Hill, New York.

Stapleton, A.J. (2004) "Beyond Entertainment: Games as Learning Technologies", paper presented at the AIMIA Game-based Learning Seminar, Melbourne, Australia.

Stapleton, A.J. (2003) "Why Videogames are Cool & School Sucks!", [online], Curtin University of Technology, http://www.agdc.com.au/03presentations/phpslideshow.php?directory=andrew_stapleton

Stapleton, A.J., and Taylor, P.C. (2002) "Physics and Playstation Too: Learning Physics with Computer Games", paper presented at the Australian Institute of Physics 15th Biennial Congress, Darling Harbour, NSW, July.

Steinkuehler, C. (2004) "Learning in massively multi-player online games", *Proceedings of the Sixth International Conference on Learning Sciences*, pp 521-528, Lawrence Erlbaum, Mahwah.

Vollmeyer, R., and Rheinberg, F. (2005) "A surprising effect of feedback on learning", *Learning and Instruction*, Vol 15, pp 589-602.

Vygotski, L.S. (1962) *Thought and Language*, MIT Press, Cambridge.

Winstein, C.J., and Schmidt, R.A. (1990) "Reduced Frequency of Knowledge of Results Enhances Motor Skill Learning", *Journal of Experimental Psychology: Learning, Memory, and Cognition*, Vol 16, pp 677–691.