Learning to negotiate – The Tactical Negotiation Trainer

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Abstract

Practitioners aim to learn how to negotiate, while researchers want to teach negotiations. In order to service both we analysed common problems occurring in negotiations. Based on research on negotiations training, an explanatory and practical design approach is presented. As a result we developed an automated negotiation partner for the negotiation support system Negoisst called the Tactical Negotiation Trainer. It is able to negotiate autonomously, write text messages and present guidance information to the human negotiator.

1 Introduction

Negotiations are important and essential in every organization: Important because of highly individualised goods or services that are exchanged between organizations and complex utility structures that need to be satisfied. Organizations reach from individuals to small and medium-sized companies to stock-oriented enterprises. They try to optimise their negotiation skills in order to minimise transaction costs [7], [26], [27]. While looking specifically at negotiations it is important to define what we understand as a negotiation.

A negotiation is an iterative communication and decision making process between two or more agents (parties and their representatives) who:

- (1.) Cannot achieve their objectives through unilateral actions;
- (2.) Exchange communicative acts comprising offers, counter-offers and arguments;
- (3.) Deal with interdependent tasks;
- (4.) Search for a consensus which is a compromise decision [5].

Electronic markets often are very big, virtual, transparent and cheap; large distances between negotiators or often changing business partners are common [36]. In a highly interconnected and competitive world it is nowadays often useful to conduct negotiations electronically. These electronic negotiations can offer significant benefits such as the possibility to think about and evaluate an offer, to consult colleagues, to enable more rational exchange and to provide facilities of support for the negotiator [5].

There are limitations of electronic negotiations according to the medium used including missing cues such as mimics, gestures and non-verbal behaviour [10]. Negotiations are non-routine and complex tasks they require rich media that information systems often cannot provide [8]. Additionally, the mode of communication may lead to problems. If messages are exchanged in a synchronous or very fast manner, research shows that negotiators tend to be more competitive [25]. Another problem is the lack of trust between negotiators in electronic settings [31].

Negotiations are often trained in electronic [16] and non-electronic settings [6], [20], [38]. However electronic settings require different skills, thus specific training is essential. This necessity is recognised by the economy. According to a 2006 study on user assessment of internet based negotiation support systems (NSS) 80% of the responding companies want to use NSS to prepare and practice negotiations, but only 61% want to use it directly in a negotiation [41]. Training of electronic negotiations is hardly done until now and therefore we developed an automated negotiation trainer.

The goal of this work is to enhance the NSS Negoisst ([32], [33]) with a component that enables systematic learning for the user by strengthening the support functionality of Negoisst in a design-oriented approach. The newly implemented Tactical Negotiation Trainer (TNT) addresses the psychological, sociological and technological biases that we will describe in the following. The TNT is able to negotiate with a human user of Negoisst in an automated fashion (i.e., it can construct offers according to a predefined negotiation strategy) and write messages by using templates. Within its constraints, it should be able to act like a human negotiator to allow a real training experience. Additionally, a guidance component is developed that is able to give the user feedback and offer theoretical information about the negotiation process.

2 Design-oriented development of the Tactical Negotiation Trainer

According to the framework of Baskerville [2] and Walls [43], presented in figure 1, design science consists of practical design science and explanatory design science. Whereas explanatory design science focuses on meta-requirements and meta-design of a class of artefacts and therefore can be generalised to a universal theory, practical design science characterises the particular design method and design process of an artefact instance. Both components use kernel theories as a foundation for meta-requirements or design methods. These kernel theories should be existing and well-explored theories surrounding relevant aspects of the problem. The link between these meta-requirements and design methods represents the mapping of generalised requirements that solve a given problem to specific components that could be developed as artefacts using a specific design method. The concrete process of design science research varies but most of them have one thing in common: They use artefacts to evaluate the design theory and eventually falsify it, if it does not conform to the previously defined meta-requirements [11].

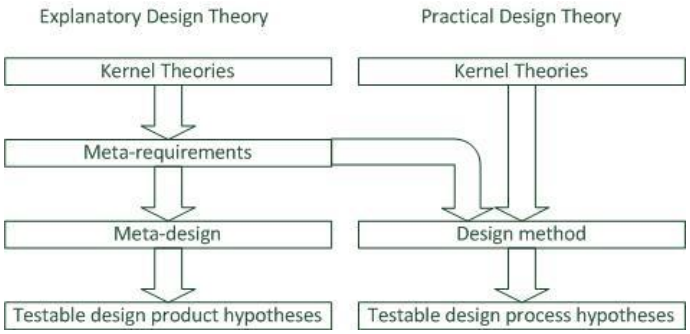


Figure 1: Design science framework adopted from Walls [43]

2.1 Tactical Negotiation Trainer: Explanatory design science

Initially, all practitioners' problems of the new design theory should be listed and well founded in neighbouring theories in order to formulate generic meta-requirements. Out of these foundations, a proper design for these general requirements should be developed and an instantiation can be implemented. In the following the most important problems will be explained.

2.1.1 Psychological biases

Psychological decision making problems are, for example, the cognitive complexity of negotiation processes, ad hoc calculation of probabilities or others.

Before the start of a multi-attribute negotiation, negotiators usually have to be aware of their preferences. This affords full knowledge of the utility function concerning all attributes and their possible characteristics. Because an integrative negotiation may turn into an unforeseen direction and new alternatives may appear, full knowledge is impossible at this point in time. As a result, a rational decision in this context is impossible [17]. Simon [34] introduced the notion of bounded rationality to explain that these above mentioned values can only be imperfectly anticipated by imagination because their consequences lie in the future. Today there are different methods to explicate preferences in order to reduce cognitive complexity and ill-structured nature of problems before decisions are made, e.g. the Self Explicated Approach [14], Conjoint Analysis [1] or Analytical Hierarchy Process [29].

Another psychological problem is the ad hoc evaluation of received offers that strongly influences the following answers. According to Kahneman and Tversky [15], people evaluate decisions not in total assets but in gains and losses, where equal losses are perceived larger than their respective gains. Therefore, people tend to maintain the status quo in negotiations and avoid concessions. This problem is also known as the Status Quo Trap [28]. Additionally, the framing of offers (i.e., how they are verbalised in messages) may obfuscate the negotiators and influence the negotiations outcome according to the Framing Effect ([15], [24]).

2.1.2 Sociological biases

Sociological problems in decision making may occur within non-monolithic parties or between parties in negotiations. They may exist in cultural or economic differences or social impact on decision evaluation. Above mentioned differences between negotiators or demographic factors, such as gender or age, influence their style of negotiation e.g. their persuasion or aggressiveness. Therefore, it is important to know the negotiation partner and adapt one's style of negotiation [37] accordingly to reach mutual understanding ([40], [42]).

Another social bias is substantiated by social utility. Individual negotiators evaluate their outcomes, offers etc. relative to outcomes of their partners. They might reject offers that present gains because they are not as good as the previous one. This effect can also be observed the other way round. Negotiators sometimes worry about the outcome of their partner and thus try to be extra fair [28]. This can be rooted in the Theory of Social Impact [18], that explains an effect of arousal of individuals the more other persons are around respectively interacting with them.

2.1.3 Technological problems

The previously mentioned types of biases are partly absorbed by the communication, decision and documentation support of NSS, but may still occur in supported negotiations. According to Benbasat [4] and Delaney [9], negotiators using decision support (DSS) solely can outperform face-to-face negotiators because of improved processing of information and reduced cognitive complexity. NSS users on the other hand can outperform DSS users and face-to-face negotiators in terms of negotiation outcomes caused by structured communication and a wide range of supporting functionalities. A big problem with NSS is user acceptance. The key for user acceptance of NSS composes around user experience, user characteristics and mainly on the achievement of good results [40]. But user acceptance should still be increased concerning usability, standardization and understanding of the system. Lim [19] for example states that users of NSS often need support by IT professionals or lots of experience with the system to use it effectively. Sometimes even the organizations using NSS as complex information systems have to adapt their structure and behaviour to the processes of the system [26].

Additional technological problems however are created by the NSS itself. These are mainly rooted in changes of communication compared to face-to-face negotiations. This type of negotiation can outperform other types of negotiations in terms of conflict handling style and coordinated group processes. The drawback of indirect communication influences the style of negotiation in electronic negotiation as well as the open question which mode of communication is more suitable for negotiations, i.e. synchronous or asynchronous message exchange [25].

2.1.4 Learning to negotiate

Learning to negotiate, however, is not that difficult. Nadler and others ([20], [22], [23]) analysed different techniques of learning concerning joint negotiation outcomes, trade-offs and perception of the learning process by the respondent in face-to-face negotiations. They found that analogical learning (i.e., learning by reading a negotiation case study and comparing it to others) and observational learning lead to a significant improvement. Although the respondents, that had learnt by observation of a model negotiation, could not explain what they were doing. Didactic learning, which means learning theory of negotiations or revelation of the preference information of the negotiation partner, did not lead to a significant improvement, though. In real negotiations or negotiation tutorials these methods are usually mixed but the results may provide hints on how to compose a suitable learning environment for negotiations.

Since people cannot negotiate in a normative way, the target in learning how to negotiate is to support people prescriptively to overcome the problems discovered in descriptive analysis of decision making [28]. These problems can be generalized to psychological, sociological and technological biases [3]. Figure 2 gives an overview of the general meta-requirements and their corresponding meta-design.

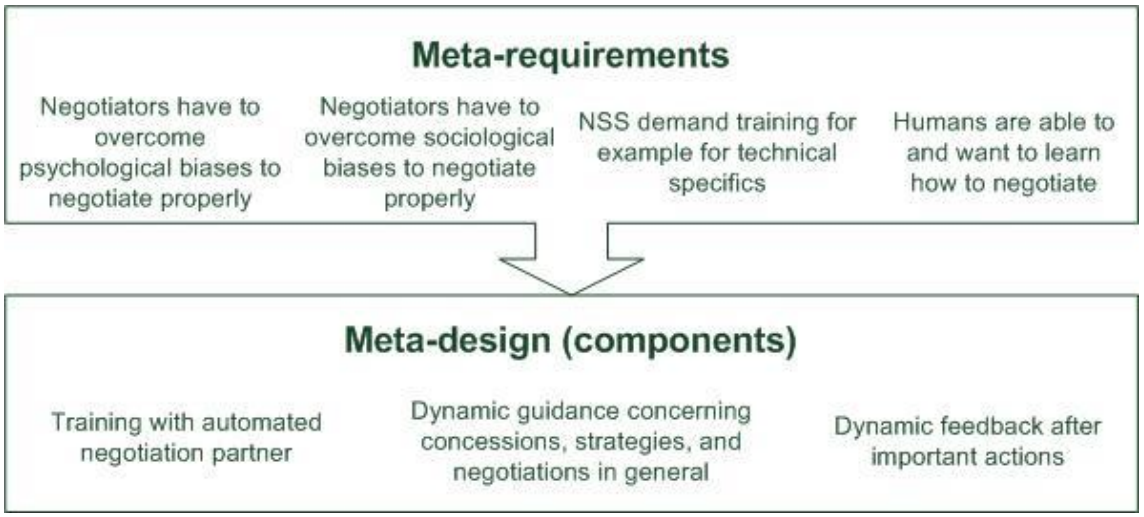


Figure 2: Meta-requirements and meta-design of a Tactical Negotiation Trainer

2.1.5 Meta design

Automated training requires a negotiation agent capable of using a realistic negotiation strategy and generating text messages to utter its preferences and to evaluate its partners' offers. An agent, following Hewitt [12], is able to cooperate and learn, execute orders autonomously and form reactive or proactive decisions to achieve its goals. The need for a concession strategy and communication is implied by the above mentioned definition of negotiations. In order to reach mutual understanding, the agent should be capable of uttering different speech acts [30]. The automated training component mainly tries to relieve the technical biases by generating user experience. The users are able to adjust their behaviour to the specific functions of the NSS and achieve better outcomes. These two factors are positively correlated with user acceptance of the system [40]. Additionally, observational learning is enabled since the users might go through the case study step-by-step, imitate the TNT's behaviour or might re-evaluate their own behaviour.

Dynamic guidance means providing the negotiators with recommendations for their next offers. This can be done following a concession strategy or simply providing possible concessions. This component addresses the psychological and sociological biases because negotiators may compare their own offers with the rationally calculated recommendations, which are bias free. It follows the information revelation learning paradigm [23] by providing information. The users may try it or not.

Dynamic feedback seeks to provide the users with feedback about their actions. This could be in the form of joint utility values or explanation of utility changes. The dynamic feedback also addresses psychological and sociological biases because it helps user to evaluate their actions rationally. It follows the paradigm of didactic learning [23] because it explains negotiation theory to the user.

Our requirements can be fulfilled by the above mentioned three components defined in the meta-design: training with an automated negotiation partner, dynamic guidance and dynamic feedback to the negotiator. These components are subsumed in the Tactical Negotiation Trainer.

2.2 Tactical Negotiation Trainer: Practical design science

The practical design process started with a detailed requirements analysis. The goal at this stage was to find out the general requirements abstracted from the Negoisst system. Additionally the actual state of the system was analysed regarding the target state and how to use the already implemented functionalities for the new components to change as little as possible. During the specification and design stage the specific requirements were collected in a requirements specification. Three core software components were identified for implementation: The automated negotiator, an expert system to build dynamic text messages and a guidance component. Additionally a use case diagram, class diagram and specific sequence diagrams were developed and a manual for administration and negotiation purposes was written. The core components were implemented and tested after all.

2.2.1 Automated negotiator

The automated negotiator needs to simulate a human negotiator; therefore it should use a negotiation strategy that leads to an asymptotic negotiation process. The implementation uses a Tit-for-Tat strategy [39], which mirrors the concessions of the human negotiator to achieve an asymptotic concession path without being exploited. Still it is possible to implement further strategies. The automated negotiator, as the core component of the TNT, can be activated, deactivated and set up by an administrator, whereas the human negotiator just uses the Negoisst system as usual.

2.2.2 Sentence recommender

The sentence recommender component uses certain facts from the current negotiation, transfers them according to specific rules and formats them into human readable text messages. This process is briefly shown in figure 3.

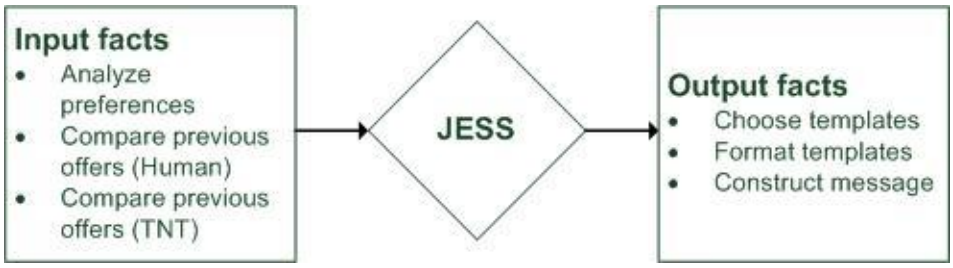
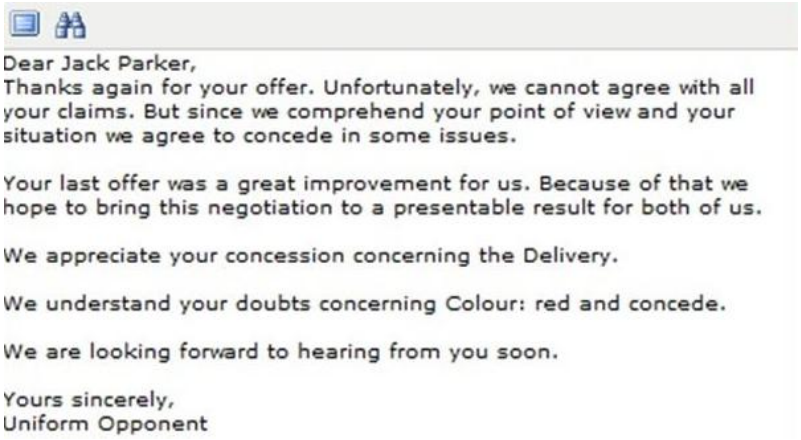


Figure 3: Sentence recommender

To build text messages the TNT uses a Java Expert System Shell (JESS) knowledge base, which contains lots of sentence templates to express specific intentions. Additionally it analyses the previous two offers written by the human negotiator and determines the changes between them. The offers of the TNT are handled the same way. Consequently all agenda changes of the human negotiator are evaluated using the preferences of the TNT. The JESS knowledge base is now filled with facts that state if these changes are beneficial or detrimental for the TNT. The expert system is started and transforms these facts into new facts representing specific sentence templates. These new facts contain several concrete sentences for one specific intention. Therefore one sentence is randomly chosen to vary the text messages. After all facts are transformed, they are formatted and variables that represent the names of the negotiators or attribute values are set. Then the messages are constructed and sent. As presented in figure 4,

text messages consist of a welcome sentence, an overall evaluation of the utility of the previous message sent by the human negotiator, a specific evaluation of the previously changed attributes and a farewell statement.


Dear Jack Parker,
Thanks again for your offer. Unfortunately, we cannot agree with all your claims. But since we comprehend your point of view and your situation we agree to concede in some issues.

Your last offer was a great improvement for us. Because of that we hope to bring this negotiation to a presentable result for both of us.

We appreciate your concession concerning the Delivery.

We understand your doubts concerning Colour: red and concede.

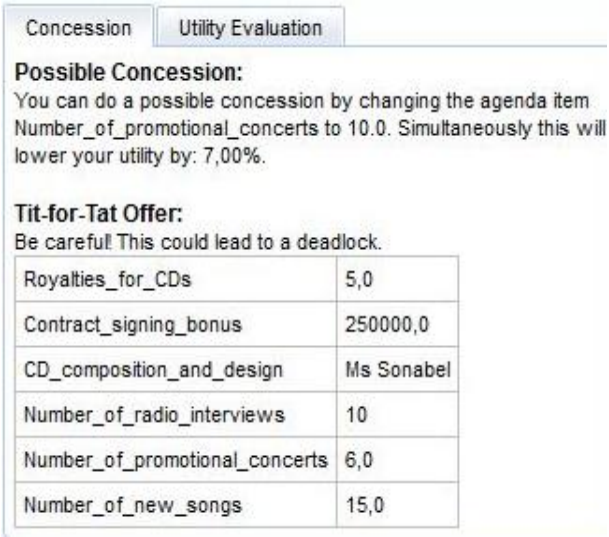
We are looking forward to hearing from you soon.

Yours sincerely,
Uniform Opponent

Figure 4: Automatically generated text message

2.2.3 Guidance

The guidance component is displayed during and after negotiations. As shown in figure 5, a possible concession is displayed to encourage the human negotiator to make concessions. Additionally a possible Tit-for-Tat offer is recommended to the human negotiator, which would result in better outcomes than just making concessions no matter what the negotiation partner does. But if both negotiators would strictly use a Tit-for-Tat strategy the negotiation would end in a deadlock and no agreement could be reached.



Royalties_for_CDs	5,0
Contract_signing_bonus	250000,0
CD_composition_and_design	Ms Sonabel
Number_of_radio_interviews	10
Number_of_promotional_concerts	6,0
Number_of_new_songs	15,0

Figure 5: Possible concession and recommended Tit-for-Tat offer

Alternatively, as shown in figure 6, the total utility of both negotiators is evaluated after each message. This should reveal additional information to the human negotiator to keep up the attention and de-emotionalise the negotiation. The human negotiator is also warned if certain constraints are violated. For example if the previous message did not represent a concession or the concession was too large.

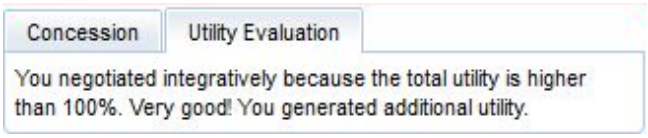


Figure 6: Utility evaluation after messages

After a completed negotiation an extended utility evaluation, as shown in figure 7, is presented to the user to give feedback concerning information about some properties of the just finished negotiation (e.g. whether it was integrative or distributive) and how the individual outcome can be evaluated regarding the total utility.

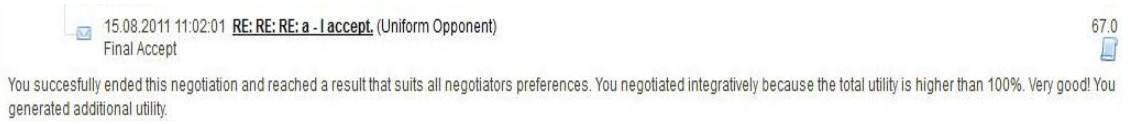


Figure 7: Utility evaluation after completed negotiation

3 Discussion

Currently the state of research concerning the TNT is very early. In figure 8 we adopted the research framework by March [21] and integrated the current state of TNT research.

	Build	Evaluate	Theorise	Justify
Construct	Specification	Only explorative evaluation until now		
Model	Architecture models			
Method	Automated briefing			
Instantiation	TNT in Negoisst			

Figure 8: Research matrix adopted from March [21] with current state of TNT

We have written a generic specification of requirements for automated negotiation trainers and adapted it to the development of the TNTs instantiation for Negoisst. During its implementation, we constructed several technical models for the architecture of the instantiation e.g.: UML models. Additionally, the TNT is already used in negotiation experiments to train the participants, which clearly improves the method of briefing. Until now only an explorative evaluation has been carried out. Theorisation and Justification will have to follow after the evaluation is completed.

The explorative evaluation featured 20 participants negotiating with each other in bilateral negotiations. Everyone received the same case studies and tutorials, but additionally one half had to partake in a training negotiation with a TNT. After this seven day training period, one participant of the non-TNT-trained group had to negotiate with another one of the TNT-trained group and reach a binding result within 14 days. The goal of this experiment was to find out if there are any differences between TNT-trained negotiators and non-TNT-trained ones. The resulting values of the two groups show a non-significant rise of the individual utility comparing training and main negotiations as well as comparing non-TNT-trained and TNT-trained negotiators. The descriptive statistics retrieved out of pre- and post questionnaires although show some interesting findings.

- 40% of the TNT-trained group perceives their negotiation skills to be better than before whereas nobody in the non-TNT-trained group feels this way. In contrast 30% perceive their skills to be worse. (N=20)
- 80% of TNT-trained negotiators perceive their understanding of the Negoisst system to be very good or good whereas only 30% of the Non-TNT trained ones think the same. (N=20)
- The coherence of the TNTs text messages is assessed to be very good or good by 30% of the test persons. 70% assess it to be medium. (N=10)
- 70% assess the possible concession of the TNT to be very useful, useful or at least medium. For the Tit-for-Tat offer recommendation this value is up to 80%. (N=10)

Furthermore, they gained self-confidence concerning their negotiation skills. TNT-trained negotiators rated their skills and their perceived results far better than their respective negotiation partners. Finally they felt better-prepared for further negotiations.

Currently we use the TNT in our international negotiation experiments with several hundred negotiators. After the core components of the system are explained, the negotiators are provided with an example case study to practice. Before the TNT was introduced, they negotiated with themselves by controlling both negotiation parties. Now they can focus on their instructions while negotiating. As the number of test negotiations is the same the quality has improved. For example, the test persons can experience the reaction of a “real” negotiation partner that acts based on rational decision making. Since using the TNT we experience significantly fewer support requests during the main negotiations concerning technical issues. The main negotiations are more goal-oriented [44] as well because negotiators know better what outcomes are possible. They concentrate on reaching this kind of outcome again in the main negotiation.

These results have to be handled with caution, but they point out some general tendencies. Further research especially on the quantitative impacts on negotiation results is necessary, though. In the explorative analysis there were several confounding variables. For example one drawback could have been the correlation between language patterns in text messages and negotiation outcomes [35] that has to be explored in further studies.

4 Conclusion

This work points out the need of training in electronic negotiations, which results from different biases in negotiation support systems. It explains how future negotiators can learn how to negotiate and proposes a design-oriented approach to develop an automated training component.

As a design artefact the TNT is implemented as an additional component to the NSS Negoisst and a conceptual documentation is generated. We evaluated the concept using an explorative approach. Nevertheless more research is necessary to evaluate the influence of this concept on electronic negotiations properly. It is essential to find out, whether TNT usage leads to significant improvement of training results. Furthermore, it could be possible to find out what kind of specific training method according to Nadler [23] is most effective. In the end, the goal is to improve the outcomes of the trained negotiators in electronic negotiations. The effect of this training on face-to-face negotiations has to be assessed as well. Therefore, other experimental settings are also called for.

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