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ZUG UM ZUG 2015: COLLECTIVE BARGAINING AS A TWO-LEVEL GAME

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ABSTRACT

In this article we introduce a new feature to model collective bargaining processes: a two-level game setting with direct student-expert interaction. In the simulation Zug um Zug 2015 participants form union and management negotiation teams which negotiate with each other (first level) and with a management or union "tariff commission" which has to approve the proposed contracts (second level). Real-world negotiation experts constitute the tariff commissions to increase the degree of realism and the teaching effectiveness of the simulation. We introduce a negotiation process to facilitate an efficient knowledge transfer from experts to students.

INTRODUCTION

There is a long tradition of modeling collective bargaining negotiations. French (1961) was one of the first to create a labor-management negotiation environment in the laboratory. Following Walton and McKersie's (1965) seminal work on distributive and integrative approaches to collective bargaining, a series of studies modeling labor-management interactions were published. These can be divided roughly into three types: simulations and case-studies (see for example Bohret and Wordelmann, 1974; Gahan & Macdonald, 2001; Lavin, 1988; Sackman, 1974; Sandver and Blaine, 1979; Stevens and Bohlander, 1982), studies about teaching effectiveness and/or attitudinal change in collective bargaining settings (see for example Axe, 1988; Brennenstuhl and Blalack, 1978; Roderick, Wilterding and Eldredge, 1979; Sandver, 1983; Tracy and Peterson, 1975) and participant-computer negotiations (see for example Heintz and Schreier, 1981; Murphy, Hines and Debenham,1982; Stanton and Greer, 1977). As simulation authors are often forced to make trade-offs between fidelity – the level of realism presented to the learner – and training effectiveness, these approaches model many of the features of collective bargaining, while simplifying others.

Often these substantial simplifications of real-world processes lead to a higher degree of learning effectiveness as high complexity can overstimulate novices (for a summary of relevant studies see Feinstein and Cannon, 2002). Collective bargaining simulation developers, for example, often ignore principal-agent relationships. Typically, a single union representative and a single management representative or two negotiation teams discuss a set of predefined issues. Yet, in many negotiations – especially in Germany – the union and management representatives must get any agreement ratified at a "higher" level. In the *Zug um Zug 2015* simulation described here, we added this two-level game feature. Students or young executives discuss possible contracts with real-world negotiation experts during the simulation. This direct student-expert interaction on two-levels aims to enhance the fidelity *and* the training effectiveness of the simulation.

In the following sections, we introduce the *Zug um Zug 2015* simulation's learning objectives, the scenario, the nature of the integrative setting, the two-level game feature, and a description of the process of negotiation.

ZUG UM ZUG 2015 – LEARNING OBJECTIVES

- *Create insights into some of the unique issues of collective bargaining*
  Participants of *Zug um Zug 2015* gain insights into negotiation strategies and communication styles of the management and labor side. For union teams this means gaining experience in the use (and abuse) of issuing threats to strike. The democratic, discussion-oriented style of many unions is simulated as well.

Management teams gain experience on when and how to make offers to the unions and get a better insight into the more hierarchical structure of the management side. Finally, each side gains experience in attempts to use the simulated media to its advantage.

- *Increase negotiators' abilities to construct efficient and advantageous contracts*
  Zug um Zug 2015 negotiation teams learn how to increase the efficiency of the collective bargaining contracts. Increased efficiency in this context refers to negotiated changes which lead to an increase in value for at least one of the teams, without a decrease in value to the other team. In addition to jointly seeking increases in agreement efficiency, participants need to either minimize costs (management) or maximize benefits (unions). As increases in benefits usually lead to some increases in costs participants follow conflicting objectives. In other words, participants have to address the characteristic mixed-motive environment of an integrative negotiation (Thompson, 2005). More details of the nature of integrative settings (Walton and McKersie, 1965) are discussed below.

- *Build trust between future management and union representatives*
  Zug um Zug 2015 has location/industry specific objectives. The simulation will be used to build inter-personal trust between young management and union representatives in Germany. With *Zug um Zug 2015* we aim to foster a more co-operative atmosphere in future collective bargaining situations. We ask students from a unions' foundation and a management-oriented foundation to form joint negotiation teams. Thus, potential real-life "opponents" will be team partners in a laboratory situation and share the experience of working towards a common goal. According to participants' feedback from the first pilot study, mixed-team structures proved to be one of the major sources of mutual trust building.

ZUG UM ZUG 2015 – SCENARIO

The simulation is set in an imagined economic and political scenario in Germany in the year 2015. We use this situation to be able to credibly model three German railway companies of comparable size. In Germany today, the railway market is still dominated by the ex-monopolist "Die Bahn". In addition to a description of the current (2015) situation, the participants receive a projection of the railway sector's likely developments in 2016, including information about probable future growth in GNP, inflation and predicted productivity increases in the railway industry. In addition, participants obtain details of the collective bargaining agreements concluded earlier in the year 2015 in related industries (metal and electronics industries).

To make the issues and options as realistic as possible, we carried out extensive qualitative interviews with German railway experts from management and labor. Based on those interviews, eight issues were chosen for the simulation. Each issue consists of discreet or "quasi-continuous" options. For each option the management team obtains information about the costs in Euro, and the union team obtains information about the relevant benefits, measured in points.

- *Salary*
  Employees of the railway companies are paid according to different salary categories. The percentage level of increase for all categories must be negotiated. This option is the only "quasi-continuous" one: no discreet categories (*i.e.* 2%, 2.5%, 3% . . ., etc.) are defined. Rather, the parties can agree on any value. The costs for the management and the benefits for the union are computed with a formula. Indicative values are provided in a table for illustrative purposes.

- *One-off payment*
  As it is common in Germany, parties can negotiate a one-time payment at the beginning of the new contract. In the scenario, the negotiation is occurring near to Christmas time and thus the one-off payment gains in importance for the employees. Payments range from 0 to 400 Euros and increase by increments of 50 Euros.

- *"Zero-months"*
  It is negotiated, when the new contract comes into force. Parties can jointly decide to delay the inception of the new collective bargaining contract. These delays usually reduce costs for the employer. There are five discreet options: no delay, one month of delay, two months of delay, . . ., four months delay.

- *Job security*
  In 2015 Germany, employees are particularly interested in job security. The parties can agree to institute a job security program in which management guarantees not to fire any staff (for non-disciplinary issues) for a discrete period of time. The parties can agree on no guarantee, a "political" statement, one year of guarantee, two years or three years of guarantee.

- *Working break acknowledgement*
  Due to the nature of the railway industry, operational breaks in working days are common. Timetabling means that staff often have breaks in their work. For example, a driver may have to wait 20 minutes for an incoming train. These breaks are particularly common during off-peak times and/or in areas with relatively low levels of service. Negotiation teams have to agree on how this break time will be integrated into total paid working time. Six options are available: operational breaks are not paid at all (best for employer side), 20%

of the break time is paid, 40% of the break time is paid, ..., operational breaks are fully paid (best for union side).

- *Additional Training*
  The negotiation teams can agree on additional training for the staff. Five discreet options are available: no additional training, one hour additional training per week, two hours additional training per week, three hours per week or four hours per week.

- *Ticket discounts for employees*
  Railway companies can offer employees and their relatives a variety of price reductions on network travel. In this scenario, the negotiation teams must decide on the number of free tickets per year. They can settle on five discreet options: 5 free national tickets per year per employee, 10 free national tickets per year per employee, 15 free national tickets per year per employee, unlimited travel on the net, unlimited travel on the net plus 10 free national tickets for relatives.

- *Contract length*
  Collective bargaining contracts in Germany usually cover 12-month periods. However, often employers are interested in prolonging contract duration to increase planning reliability. The parties can settle on seven options: 12 months, 14 months, 16 months, ..., 24 months.

To reach a final settlement the parties must agree on one option for each of the eight issues. The overall benefits to the union are calculated by summing up the benefit points of each option agreed. The overall costs for the management are calculated by summing up the costs of each option agreed. To simulate the pressure of the rank and file on the union and the pressure of the companies' boards, both teams have to reach certain thresholds – reservation points - before they can agree to a deal (Raiffa, 1982; Raiffa, Richardson and Metcalfe, 2002, Thompson, 2005). At their reservation point, the parties are indifferent between the agreement and breaking off the negotiation. If a settlement is reached which results in more costs or less benefits than their reservation points, the team members are assumed to lose their job.

In addition to these eight joint decisions, the union teams can threaten and/or call a one-day 'warning' strike. If the union team calls for a strike, they must get a majority of rank and file members to support the action. The probability of success of a call to strike depends on the quality of the management team's last rejected offer. The more favorable this last rejected offer to the employees, the less willing the rank and file of the union will be to agree to a strike. After calculating the probability of a successful strike, the instructor uses a random number generator to determine whether the strike call was supported by the union's members. Independent of this one-day strike, a longer strike is possible only when one party announces the negotiation to be over without a settlement. This would result in a major strike, which would end the simulation.

ZUG UM ZUG 2015 – AN INTEGRATIVE SETTING

In distributive negotiations the issue involved is valued such that one person's gain is necessarily another's loss. For example, a negotiation over the price of a car (assuming the negotiation involves only the price, and not other issues like delivery date, warranty package, . . .etc.) is a distributive negotiation. Increasing the price by x, necessarily results in a gain of x for the seller and a loss of x for the buyer. Collective bargaining negotiations are seldom purely distributive in nature. Rather, they involve negotiations over multiple issues where negotiators' preferences across and within issues differ. These differences allow for trade-offs across issues that can increase payoffs to all parties. For descriptions of distributive vs. integrative models, see for example Bazerman (2002), Bazerman & Neal (1992), Lewicki, Saunders & Minton (2001), Raiffa (1982), Raiffa et. al. (2002), Thompson (2005) and Walton & McKersie (1965). In the example of the car sale, assume the buyer is more concerned with a lower price than the seller, and the seller is more concerned with a longer delivery time than the buyer. In this case a concession to lower the price by the seller in exchange for a concession to increase delivery time by the buyer could increase the value of an agreement for both. Efficiency gains occur in collective bargaining where such trade-offs across issues are possible.

Zug zum Zug 2015 is a simulation of an integrative negotiation. Depending on the choices of options on each issue, the joint value of the final contract to both parties varies. Some contracts result in fewer costs to the management and more benefits to the unions than other agreements. For example in our scenario Christmas is approaching and the unions accordingly value the one-off payment more highly – the rank and file members need some extra money for the forthcoming holidays. For example, to receive an immediate one-off payment of 150 Euros in a one-off payment at the start of December may be more valuable to the union than to receive an additional 15 Euros per month in salary over the following 12 months. From the management's point of view, paying 150 Euro up front is also preferable to the payment of of 180 Euro over a period of one year. These kinds of mutually beneficial trade-offs lead to increased contract efficiency. The general idea is graphically displayed in Figure 1.

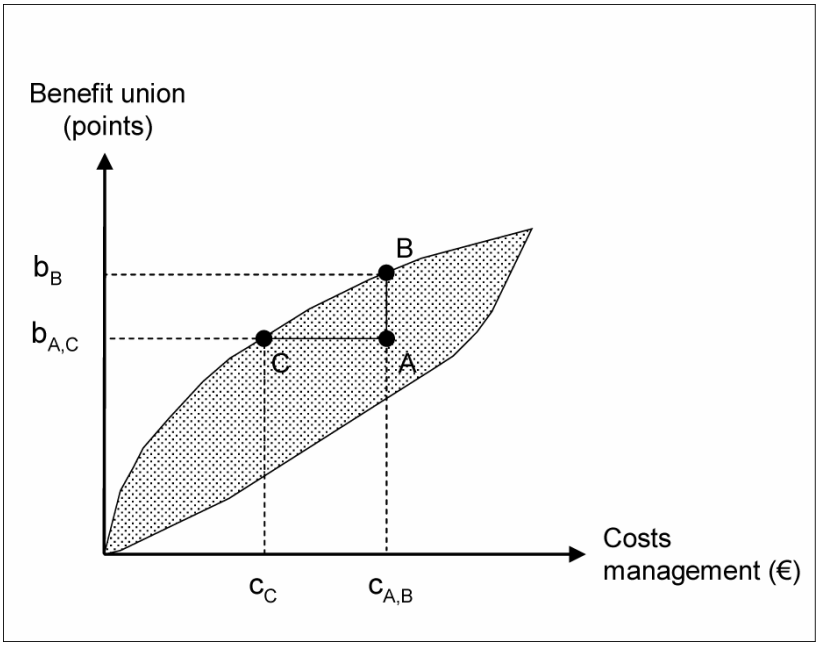

Figure 1: Contract space for Zug um Zug 2015

In this graph contract A results in c_A Euro costs for the management and in b_A benefit points for the unions. By agreeing to some mutual beneficial trades, as discussed above, the negotiators can move the contract position towards the efficiency border in the area northwest described by C, A and B. However, this does not mean that the negotiation is without conflict. Point B represents a contract, where only the union profits from these trades from the initial point A. Contract B is – compared to contract A – equally costly for the management side ($c_A = c_B$) but increases the benefit to the unions substantially ($b_B > b_A$). Point C represents the other extreme: the benefit to the unions is the same as for contract A ($b_A = b_C$). It is, however, substantially less costly for the management side ($c_C < c_A$).

Participants of *Zug um Zug 2015* are therefore confronted with a mixed-motive situation (Thompson, 2005). On the one hand they have an interest in creating additional value in the agreement by agreeing on mutual beneficial trade-offs. On the other hand each wants to claim most of this value. Each party should, role-depending, either aim to maximize benefits or to minimize costs. To find efficiency increasing trade-offs, confidential information has to be shared. If, however, one party reveals too much information, the other side usually can exploit this and claim more of the created surplus (Thompson, 1991).

ZUG UM ZUG 2015 – A TWO-LEVEL GAME

The structure of the negotiation significantly changes when negotiators must deal with both their direct opposites *and* with a person or body that has the power to approve or reject agreements (see Putnam (1988) for a theoretical discussion of two-level games). Participants in *Zug um Zug 2015* simulate a management or a union negotiation team of three fictional railway companies in Germany in the year 2015. Participants therefore form one management and one union team for each of the three companies. The teams negotiate with each other to attempt to reach an agreement on company-specific contracts (first level). These teams, however, cannot autonomously determine the characteristics of the final contracts. Rather, each team must consult regularly during the negotiation with a management or a union "tariff commission" (second level). These commissions are played by "real" management and union experts. To get contract proposals approved the negotiation teams must have the consent of their respective commissions. This structure is common in collective bargaining negotiations in Germany.

In the first run of *Zug um Zug 2015* negotiation experts from two German railway unions as well as negotiation experts from German blue-chip companies simulated the tariff commissions. With this two-level game setting the experts can interact directly with the students. This presents a rich, applied learning environment. In reality three companies require three management and three union tariff commissions. As it is difficult to recruit experts for six commissions, we only formed one management and one union tariff commission. The negotiation teams of the three companies therefore negotiated with each other and consulted regularly with the management or the union tariff commission. This two-level game setting of *Zug um Zug 2015* is displayed in Figure 2.

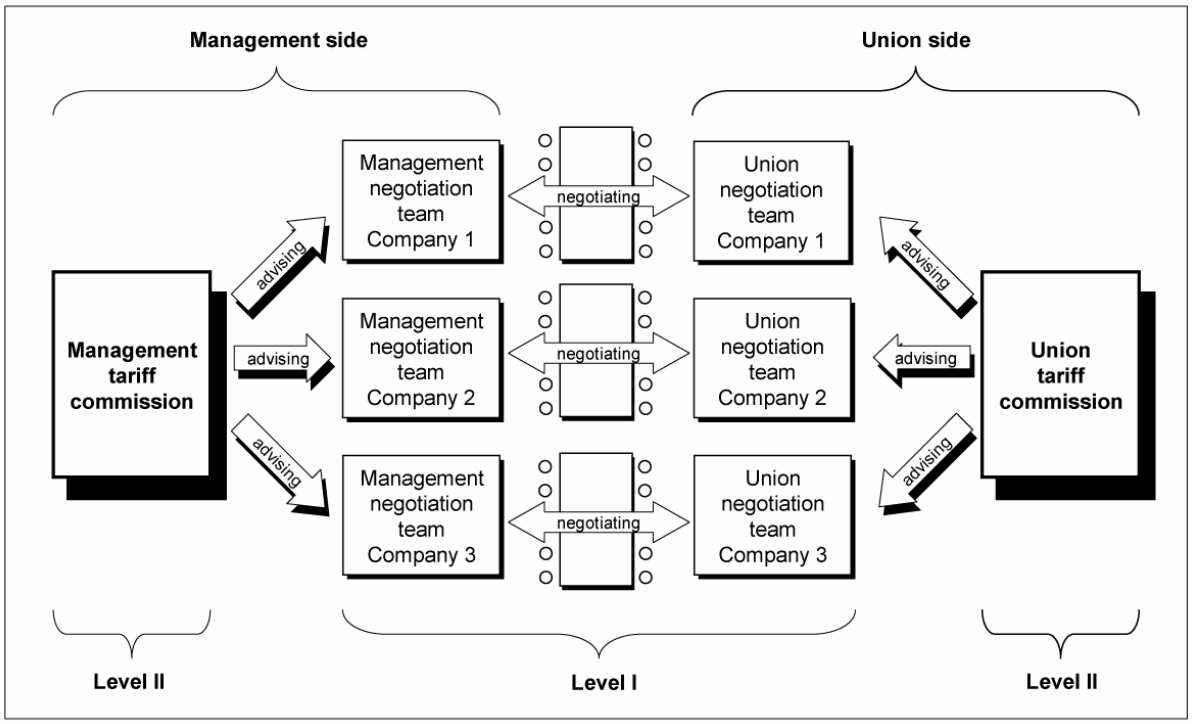

Figure 2: *Zug um Zug 2015* as two-level game

At the end of 2003 and the beginning of 2004 we ran five alpha tests with co-developers to calibrate the point-scores of the to-be-negotiated issues and two beta tests with students to design the two-level game structure. In April 2004 we organized the first simulation run with scholarship holders from the Foundation of the German Economy and of the union-led Hans-Böckler Foundation as members of the first-level negotiation teams. Negotiation experts from the railway company Die Bahn, Deutsche Bank, Deutsche Post World Net, HOCHTIEF and experts from the railway unions transnet and GDBA supported the first run of *Zug um Zug 2015* as members of the second-level management or union tariff commissions.

ZUG UM ZUG 2015 - PROCESS

To facilitate this two-level game setting in a one-day simulation, we developed a system which enabled all participants to negotiate with a minimum of pauses. After a half-hour introduction to the processes and issues of *Zug um Zug 2015* each negotiation team and the tariff commission consult in private to develop a negotiation strategy. This is followed by four, one-hour negotiation rounds. In each of these rounds the teams consult for 20 minutes with the tariff commission and negotiate for 40 minutes with their company's other negotiation team. Each company has, in each round, a fixed time slot in which they consult with their respective tariff commission. The teams negotiating the contract for Company 1, for example, consult with their commissions in the first 20 minutes of the round and negotiate with each other in the last 40 minutes. The negotiation parties of Company 2 negotiate for the first 20 minutes of the round with each other, consult subsequently for 20 minutes with their tariff commissions, and negotiate on the first level in the last 20 minutes of the round. The representatives of Company 3 negotiate for the first 40 minutes with each other to consult in the last 20 minutes with the tariff commissions. With this system the experts on the second level are able to transfer knowledge to the students during the whole round. In the last negotiation round one representative of the tariff commission accompanies the negotiation teams to the first-level negotiations to enable the teams to sign a contract directly.

After each round a press representative (the instructor or other classroom aid) sums up the results and rumors in a press session. During this session each party can issue statements to all participants. Like the addition of a second level of negotiations, the inclusion of the media is an important modification. Press reports, interviews and public statements are all important parts of many collective bargaining negotiations. By adding this feature, we increase the degree of realism of the simulation. A variety of strategies and trust building (and destroying) measures can be employed.

After the parties signed the contracts, the tariff commissions give feedback to the negotiation teams about their bargaining strategies. In addition, the results are analyzed with a computer-based model as shown generally in Figure 1. The entire negotiation process is displayed in Figure 3.

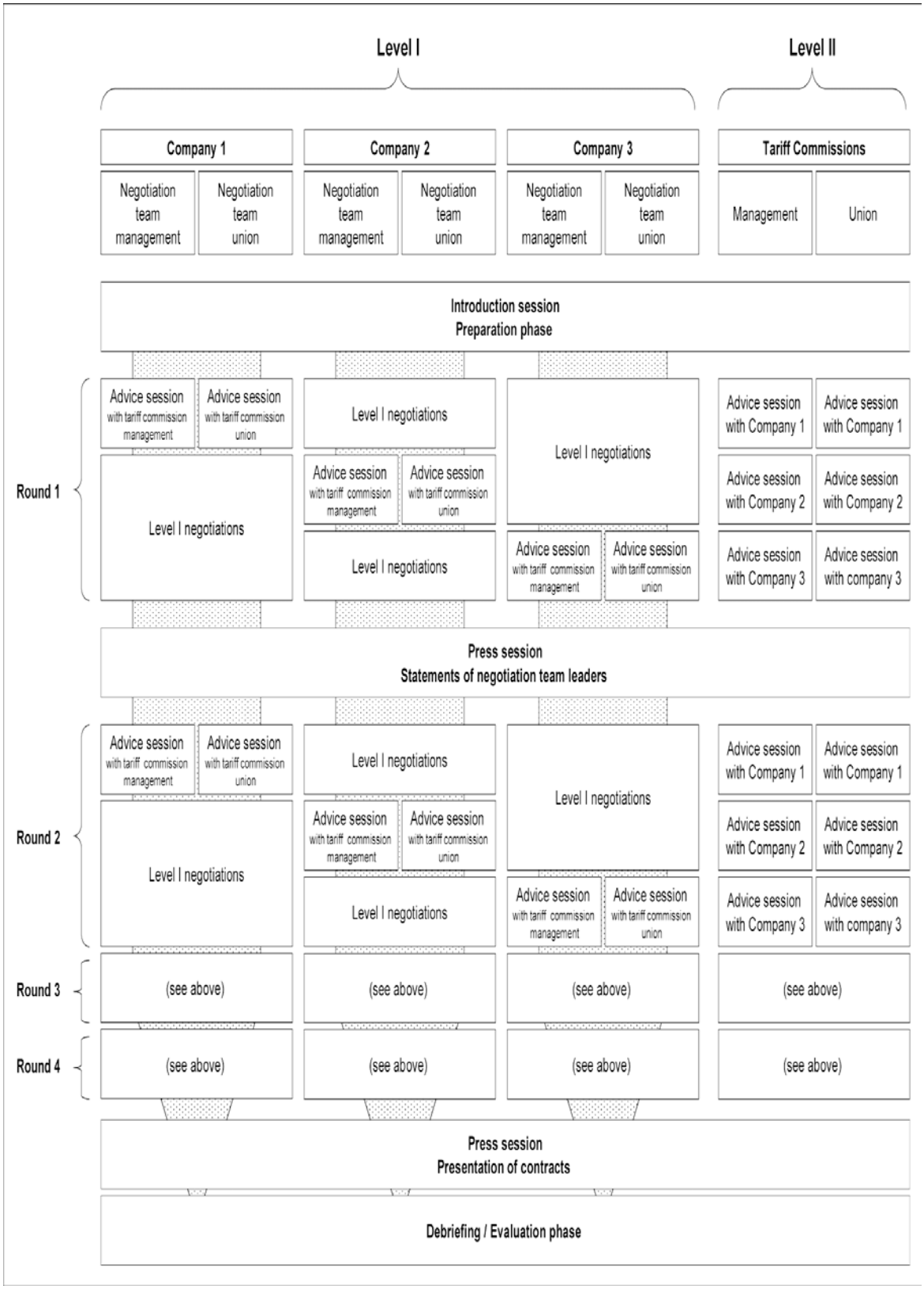

Figure 3 – Negotiation process of *Zug um Zug 2015*

CONCLUSION

Zug um Zug 2015 is a collective bargaining simulation with a two-level game feature with direct student-expert interaction. These features have been added to a more traditional integrative negotiation simulation to increase its representational validity. To make a simulation like this feasible the negotiation situation has to be radically simplified. The numbers of issues are limited, options in each issue are clearly defined and preferences are quantified. As the setting was complicated to develop, we have focused - up until now – more on verification than on validation (as discussed in Feinstein & Cannon, 2002).

The simulation continues to undergo improvements and refinements. Firstly, the quantitative preferences of the union and management sides will be re-assessed based on comments on the simulation from negotiation experts in the German railway industry. In the current version of the simulation, only the structure of the issues and options were developed based on experts' feedback. Secondly, the strike possibility will need to be altered. A strike was called in only one of the twelve pilot simulations. Yet, short walk-outs during collective bargaining are common in Germany and it seems appropriate to include more incentives for the unions to call for warning strikes.

We view two-level game structures with direct student-expert interactions as one way to efficiently facilitate knowledge transfers from experts to students. This system might be useful in other simulation contexts as well. Total enterprise simulations, for example, could possibly be organized with real-world experts on a second level. The experts could consult with different groups of students, on how to develop company strategies. The applicability of this idea – however – is still to be proven.

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