Integrating Communication Support and Decision Support for Effective Negotiation Support Systems

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## Agenda

1. Introduction
2. Two Worlds of Thought
3. Integrating Communication and Decision Support
4. Conclusion
1. Introduction

2. Two Worlds of Thought

3. Integrating Communication and Decision Support

4. Conclusion
1. Introduction

- An electronic negotiation is restricted by at least one rule that affects the decision-making or communication process, if this rule is enforced by the electronic medium supporting the negotiation, and if this support covers the execution of at least one decision-making or communication task.
  [Ströbel and Weinhardt, 2003]

- Introduction of an NSS is organisational act
  - reduce uncertainty and complexity of human decisions
  - achieve performance goals

- Different forms of negotiation support
Portfolio of Negotiation Support Technology

<table>
<thead>
<tr>
<th>Level</th>
<th>Optimization approaches</th>
<th>Argumentation Support</th>
<th>Negotiation Automation</th>
<th>Mediation &amp; Facilitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
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<tr>
<td>2</td>
<td>Decision Support</td>
<td>Consistency Checks</td>
<td></td>
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<tr>
<td>1</td>
<td>Comm.- Process Structuring</td>
<td>Contract Structuring</td>
<td>Document Management</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Communication Services</td>
<td>Security Services</td>
<td>Data Integration</td>
<td></td>
</tr>
</tbody>
</table>
1. Introduction

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4. Conclusion
Two Schools of Thought

Communication Perspective

Decision Support Perspective

Effective Negotiation Support
Communication Perspective on Electronic Negotiations

- Negotiations are communication processes
- Negotiation support = communication support

Examples
- Intentions
- Negotiation protocol
- Classification of communication acts
- Visualisation of communicative exchanges
- Argumentation support
Assessment

○ Advantages
  ○ Focus on negotiation process
  ○ Analyse procedural, social, communicative context
  ○ Take into account interpersonal/interorganisational aspects of negotiation

○ Disadvantages
  ○ Quantitative measure is missing
  ○ Performance is not measured
  ○ Only one part of negotiation process is considered
Decision Support Perspective on Electronic Negotiations

- Negotiations are processes of offer exchanges and decision making
- Negotiation support = decision support

Examples
- Preference elicitation
- Utility functions
- Performance measures
- Visualisation of rating of negotiation steps
- Post-negotiation assessment
- Strategy support
Assessment

- **Advantages**
  - Focus on performance
  - Quantitative measure
  - Tool support

- **Disadvantages**
  - Focus on rational aspects
  - Disregard social contracts
  - Only one part of negotiation process is considered
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>Introduction</td>
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<tr>
<td>2.</td>
<td>Two Worlds of Thought</td>
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<tr>
<td>3.</td>
<td><strong>Integrating Communication and Decision Support</strong></td>
</tr>
<tr>
<td>4.</td>
<td>Conclusion</td>
</tr>
</tbody>
</table>
- **Aim:** Support complex negotiations between human negotiators

- **Negoisst** integrates three types of support
  - Semi-structured message exchange
  - Document exchange
  - Decision support
Message Exchange

Integrating Communication Support and Decision Support for Effective Negotiation Support Systems

Intentions through message types

Semantic enrichment for message content

Negotiation: Labour Contract Negotiation, Nov 03

Sender: Manage (Training Case Management Team)
Recipient: Union (Training Case Union Team)

Type: Request
Subject: Initial offer

Topic: Labour_Contract_November_2003

Dear eSchool Union,

after extensive internal discussion the management board agreed to offer you an increase of Salary: 2.

I think this is fair compared to other schools.

Best regards: Representative A

contract negotiation points:

Agreement

- Salary
- Teacher_Evaluation
- Arbitration_Method

Your rating for the resulting contract is between 0.5 and 1.0.
Document Management

Agreement
This agreement is still in process. It is dated 3 Nov 2003 09:46:59 GMT.
This agreement is made By and Between Training Case Union Team and eschool.

§ 1: Visitation notice
The visitation notice has not been specified yet.

§ 2: Cost of living adjustment
Cost of living increase shall be 2. This is an obligation for eschool.

§ 3: Arbitration method
The arbitration method has not been specified yet.

§ 4: Contractpartner
§ 4.1: Contractpartner_1: Training Case Union Team.
§ 4.2: Contractpartner_2: eschool.
(Klick to show the message in which a contract point was specified.)
## Decision Support

### Negotiation workspace

#### Set Your Preferences

**Please state your preferences for possible outcomes of this negotiation below.**

Information will be used to evaluate offers and is visible to you only!

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Importance</th>
<th>Value</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>60%</td>
<td>4</td>
<td>Worst case / Minimum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Best case / Maximum</td>
</tr>
<tr>
<td>Teacher_Evaluation</td>
<td>15%</td>
<td>72</td>
<td>Worst case / Minimum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>Best case / Maximum</td>
</tr>
<tr>
<td>Arbitration_Method</td>
<td>25%</td>
<td>advisory</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>binding</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Total: 100%**

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**Preferences of attributes**

**Satisfaction level of values**
Below, you see a randomly created list of possible outcomes. These outcomes are rated using your preferences (0-100%). Please correct the rating, if the estimated values do not adequately represent your utility perception.

<table>
<thead>
<tr>
<th>Possible outcome</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary: 2.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Teacher Evaluation: 0.0</td>
<td></td>
</tr>
<tr>
<td>Arbitration Method: advisory</td>
<td></td>
</tr>
<tr>
<td>Salary: 2.0</td>
<td>85.0</td>
</tr>
<tr>
<td>Teacher Evaluation: 72.0</td>
<td></td>
</tr>
<tr>
<td>Arbitration Method: advisory</td>
<td></td>
</tr>
<tr>
<td>Salary: 9.0</td>
<td></td>
</tr>
</tbody>
</table>
Integrating Decision and Communication Support

Utility value of message (request)
Empirical Experiments

- Decision support functionality and communication structuring in NSSs positively contribute to the user expectancy of effort and performance.

- Setting
  - 87 students
  - 1 week of negotiation
  - Test of 2 features of Negoisst
## The Case

<table>
<thead>
<tr>
<th>Attribute group</th>
<th>Attributes mentioned in the case</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Payment</td>
<td>Price, time and possible splitting of payment, management of exemptions, a new recompensation rule</td>
</tr>
<tr>
<td>II. Ticket</td>
<td>Entrainment of bicycles in train and busses, possible extension of the validity area</td>
</tr>
<tr>
<td>III. General</td>
<td>Term of the new contract</td>
</tr>
</tbody>
</table>
Empirical Results

- Group with DSS used fewer messages (less effort) and performed better than group without DSS
- Communication structuring was perceived to be most useful
Comments

- “You can quickly see due to which reasons certain points where negotiated that way – in general I also like the presentation of the utility ratings.”

- “I most liked the integration of contract points and the message, you knew immediately which points where currently being negotiated and you didn’t have to search.”
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Conclusions and future work

- Communication perspective on e-negotiations
  - qualitative measure procedural, social, communicative context
- Decision support for e-negotiations
  - performance measure
- Need for integration
- Integrated approach implemented in Negoisst

- Future work
  - development of integrated efficiency measure