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Individual End-User Training For Information Systems Using Learning Styles

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Individual End-User Training for Information Systems using Learning Styles

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Abstract
End-user trainings account for an important part of teaching how to use information systems effectively in practice. This paper examines which individual characteristics and differences between end-users can be leveraged to improve end-user trainings further. Therefore, relevant literature on end-user trainings is used to define relationships between individual characteristics (i.e. learning styles) of trainees and matching training methods. Following a design-based research methodology, two different end-user trainings are developed in the domain of electronic negotiation support systems to define and evaluate design principles and theories for individual end-user trainings. The trainings follow either an exploration-based approach or an instruction-based approach. For the evaluation of these trainings a general concept implementing a negotiation experiment assessing learning outcomes and acceptance of the target information system is developed and first descriptive results are presented.

Keywords: end-user training, negotiation support systems, negotiation training, learning style

1. Individual End-User Training to foster Adoption of Information Systems
The number of computer applications used in companies is steadily rising. Computer literacy, therefore, is more and more important for information workers (Gupta et al., 2010). Consequently, trainings are implemented which have been found to increase knowledge, performance, attitude towards and utility of such computer applications in the domain of information systems (IS) (Arthur et al., 2003). End-user trainings (EUT) teach future users to use a target information system effectively. It was shown that such end-user trainings increase the adoption of a given information system in a company (Igbaria et al., 1995).

Following Adaptive Structuration Theory (DeSanctis & Poole, 1994), information systems are defined as a combination of technology as an artefact and as a social component including the organisation in which the technical subsystem is embedded.
(Bostrom & Heinen, 1977; Lamb & Kling, 2003). However, the congregation of technical and social factors and the often large number of functionalities of IS dramatically increase their complexity. Therefore, end-users have to be trained to use information systems effectively and to adhere to technological as well as organisational guidelines.

The required degree of automation of such a system, however, is very difficult to determine. On the one hand, inextricably human tasks that afford, for example, communication or creativity cannot be automated by a software. Thus, end-users have to work closely together with the system. On the other hand, too much automation decreases system adoption, because end-users simply do not understand nor trust the quality of the outputs of the system (Gettinger et al., 2010).

To close the gap between complexity, automation, and inextricably human tasks, the social aspects of working with information systems have to be strengthened. End-users need to be personally satisfied using the system (DeLone & McLean, 2003) they have to identify themselves with it in order to participate in system usage (Yap et al., 1992). Therefore, the acceptance and attitude towards the system needs to be increased to foster system adoption. It is argued that this can be achieved by providing individually tailored end-user training. Therefore, different trainings have to be developed that address specific individual characteristics. The focus of this study is to clarify which individual differences can be leveraged and how they can be assessed. Furthermore, a connection between these individual characteristics and specific types of training has to be made in order to find out which type of training is particularly useful for which type of individual.

These questions are applied to the domain of electronic negotiation support systems (NSS) which are archetypes of information systems focusing on inter-organisational communication and decision making. The extensive literature on end-user training as well as the literature on negotiation training is used to develop two instantiations of end-user trainings for a negotiation support system matching the specific needs of its end-users. Also a concept for evaluation of these trainings is developed and first descriptive results are presented.

The present paper is structured as follows. After a brief description of the research methodology used in section 2, relevant findings from the literature of end-user
training are explained according to a comprehensive research framework in section 3. Section 4 introduces electronic negotiations as well as the negotiation support system used in this study and presents specific needs of negotiation training. Section 5 describes the development and main characteristics of the end-user trainings integrating the findings of the previous sections while section 6 describes the chosen approach to evaluate such trainings summarizing first descriptive results. Section 7 discusses these results and provides a brief outlook on further research tasks.

2. Research Methodology
This paper follows the methodology of design-based research (Barab, 2006; Anderson & Shattuck, 2012) which has been introduced into the learning sciences by Brown (1992) and Collins (1992). Design-based research aims to integrate educational research and practical teaching and contributes design principles as well as theories to the body of research. Design-based research, similar to design science in information systems (Hevner et al., 2004) is rooted in the paradigm of pragmatism. It focuses on the design and evaluation of a learning intervention situated in a real-life educational context involving researchers and practitioners (i.e.: trainers and trainees). Design-based research is an iterative design and evaluation process of the learning intervention under focus including the all-embracing complexity of the real-life setting. During this process, a large amount of qualitative and quantitative data is collected which can be used to improve the learning intervention and to enhance design principles.

In the application domain of end-user trainings, design-based research constitutes a reasonable methodology since it enables researchers to address the problem of developing an end-user training by encompassing social as well as technical aspects at the same time. Furthermore, an iterative methodology is more adaptable at this early stage of research and constantly produces new insights on all relevant variables.

3. A Research Framework for End-User Trainings
The research framework for reviewing EUT literature (Gupta & Bostrom, 2006, p. 173; Gupta et al., 2010, p. 12) depicted in figure 1 describes the process of developing and conducting end-user trainings for research purposes. It contains all important variables a designer has to decide on and therefore will be explained in the following.
First of all, the target system to be learned provides the foundations of a specific end-user training where all other components have to be adapted to. Prior research focused on productivity applications and collaboration software. However, Gupta & Bostrom (2006) question the generalizability of previous findings to different types of applications.

In the Pre-Training phase the end-user training is developed. Therefore, the training goals have to be defined. These will be used to measure the learning outcomes in the Post-Training phase. Consequently, both training goals and learning outcomes consist of the same underlying dimensions. According to the taxonomy of Bloom (1956), they can be divided into cognitive, affective, and psychomotor learning outcomes, the latter of which is of minor importance in the domain of end-user training. Since the cognitive domain is the particular focused here, the dimension of meta-cognitive outcomes, also defined by Bloom (1956) as part of cognitive learning outcomes, is also observed. To achieve a holistic perspective the ability to use the target system correctly (i.e. skills) is also included as the fourth dimension of learning outcomes.

The epistemological perspective of the designer may also influence the characteristics of training goals as well as the end-user training itself. Favoured learning paradigms or theories such as behaviourism, cognitivist approach or constructivism (cf. Melzer & Schoop, 2014) may guide the designers’ decisions.

Figure 1. Research framework for end-user training (adapted from Gupta & Bostrom, 2006, p.173 and Gupta et al., 2010, p.12)
3.1. Characteristics of the Training Method

The main end-user training consists of the duality between training method and learning process influencing each other. The training method needs to define to which degree information technology is involved. The goal of EUTs is to teach users how to use a software. Therefore, technology is indispensable. However, it should be specified whether to use computers as medium of learning with computers supporting the communication between the trainees (learning with computers) or to use computers as trainers that provide knowledge to the trainees (learning from computers). The training method also needs to arrange the learning techniques used. Gupta et al. recommend observational learning techniques in the domain of end-user training. These consist of the observation and imitation of domain experts (vicarious learning) as well as the observation of one’s own learning process (enactive learning).

In EUT research, there are several dimensions which guide the selection of learning techniques following an exploration-based or instruction-based approach (Davis & Bostrom, 1993).

- Level of collaboration: defines to which degree students learn in groups or individually.
- Reasoning process: guide students to learn inductively or deductively.
- Level of programming: open trial and error learning or following a predefined program.
- Control of learning: assigns control over learning contents to trainees or trainer.
- Level of completeness: leave contents of learning materials open to exploration or completely describe a domain.
- Learning orientation: focus on tasks to do with the target system or features of the target system.

These dimensions of exploration-based and instruction-based training correspond to the previously described types of observational learning with exploration as a form of constructive knowledge generation in groups focusing on the observation of ones’ self or other group members. The instruction-based training focusing on the trainer as expert who guides the trainees to acquire knowledge.

3.2. Characteristics of the Learning Process

The defined training method is instantiated in an end-user training and exposed to the trainees. They possess individual differences such as persistent character traits and more volatile emotional states that affect their learning process. Every trainee also has an individual level of competence which requires matching scaffolding and supports
concerning learning process as well as learning contents to achieve the desired learning outcomes.

As measure of the individual differences between trainees, the Learning Style Questionnaire (LSQ) by Honey & Mumford (1992) is used. Despite the fact that Honey & Mumford indicate that there is no dominant learning style and learning styles might change depending on the learning task, it is assumed that specific learning styles match specific training methods and such harmonising combinations have positive effects on trainees and learning outcomes (Li et al., 2008). The LSQ is based on the theory of experiential learning (Kolb, 1984) which is often used in negotiation training (Lewicki, 1997). Experiential learning views learning as an explorative process of acquiring knowledge by (1) being exposed to a new experience, (2) reflecting on this observation, (3) forming general theories which are (4) tested in active experimentation. The LSQ is selected for the present work because it exhibits slightly better values for reliability and validity in the domain of management training than Kolb’s Learning Style Instrument (Kolb, 1985; Duff & Duffy, 2002; Cassidy, 2004; Penger & Tekavcic, 2009). Honey and Mumford define four learning styles matching each of the steps of experiential learning, namely pragmatists, reflectors, theorists, and activists. The LSQ provides an independent preference value for each of the four learning styles. In the present study, these values are used to identify the most preferred learning style.

4. Electronic Negotiations & Negotiation Training

Negotiations are defined as interdependent communication and decision making process where at least two negotiators iteratively exchange offers trying to find a compromise decision (Bichler et al, 2003). Such negotiations are called electronic negotiations if an electronic medium is imposed which supports at least the decision making or communication process (Ströbel & Weinhardt, 2003). Negotiation support systems have been developed on the basis of decision support systems (Jelassi & Foroughi, 1989) integrating more and more support functionalities over time to provide a holistic support (Schoop, 2010). To this end e-negotiations are very complex tasks due to their inherent group conflicts and mixed motives of the negotiators and, therefore, require specific and also complex negotiation trainings (McGrath & Hollingshead, 1994).
4.1. The Negotiation Support System Negoisst

In this study the negotiation support system Negoisst (Schoop et al., 2003; Schoop, 2010) is used as an exemplary target information system to be learned. Negoisst follows a holistic support paradigm implementing decision support, communication support and document management support. Figure 2 shows the main negotiation screen of Negoisst. Decision support in Negoisst means that negotiators are able to elicit their preferences for the negotiation supported by the system. Negoisst uses this information to calculate utility values (electronic negotiation score in figure 2) for every message sent and received based on one’s own preferences. A compositional approach using a weighted linear additive preference model (Keeney & Raiffa, 1976) is implemented. A history of offers provides a graphic representation of the negotiation. Communication support is realised via semantic and pragmatic enrichment. The negotiation agenda with its issues, values, units and their relationships is defined using an ontology. Negotiators can directly reference issues within their text messages using semantic enrichment. Therefore, misunderstandings and ambiguities are reduced. The aim of pragmatic enrichment is to explicate the intention that the sender wants to transfer with a negotiation message. Consequently, negotiators are able to specify a message type such as offer, counteroffer, question, clarification, final accept, or final reject for every message sent. The communication support is based on elements of communication theories such as validity claims of Habermas’ Theory of Communicative Action (Habermas, 1981) and the distinction between illocutionary force and propositional content in Searle’s Speech Act Theory (Searle, 1969). Document management is implemented to increase clarity of the message exchange and build up trust. Negoisst automatically documents all messages exchanged between negotiators and uses them to generate a contract template of the current state of the negotiation.
4.2. Characteristics of Negotiation Training

Whilst there is extensive literature on training of face-to-face negotiations, literature on training of electronic negotiations is scarce. Consequently, technology only plays a minor role in negotiation training. However, learning with negotiation support systems as well as learning from negotiation support systems would be beneficial to users, only very few electronic negotiation trainings have been developed until now (e.g. Eliashberg et al., 1992).

Negotiation training emphasises observational learning, especially encouraging trainers to include negotiation experts and using observational as well as experiential training methods (Lewicki, 1997). Loewenstein & Thompson (2006) propose a taxonomy of face-to-face negotiation training methods based on a literature review including “principle learning”, “analogy learning”, “observational learning”, “learning via feedback”, and “trial and error learning”. This taxonomy also distinguishes between the underlying dimensions of instruction-based (i.e.: principle learning) and exploration-based trainings mentioned above (i.e.: trial and error learning).
5. An individual End-User Training for Negoisst

5.1. General Characteristics of the Negoisst End-User Trainings

Following the distinction between exploration-based learning and instruction-based learning presented above, two end-user trainings for Negoisst are created to represent these most distinct methods of training. The exploration-based training should match activists and pragmatists while the instruction-based training ought to match reflectors and theorists. Focusing on the learning techniques, technological aspects have been reduced to a minimum. Therefore, learning with or from computers has been consciously omitted. Computers are only used to serve as means to access and use Negoisst. Whilst the content of the training as well as content-related scaffolding and support of the trainees is kept constant in both trainings, process-related scaffolding is managed according to the dimensions explained above. In detail, the trainer is encouraged to walk around in the class room, ask the students questions to activate them and foster group work in the exploration-based training. In contrast, the trainer should stay in front of the class and focus on the presentation of abstract theories in the instruction-based training.

5.2. Specific Characteristics of the Negoisst End-User Trainings

Table 1 shows the script developed to structure the trainings with each row representing about 15 minutes of training time. The exploration-based training follows an inductive approach encouraging the trainees to explore a concrete problem at first and then generalise their findings. The training consists of four tasks that the trainees have to tackle in groups of two to three students and discuss their results in class afterwards. This includes trial and error learning to a certain degree, although it is difficult to develop comparable trainings without completely programmed activities. During these practical tasks, trainees have high control over how to explore the given problem. Learning materials, in this case slides as well as the Negoisst system itself, are exhaustive to ensure comparability between the trainings, however, if trainees come up with new directions the trainer has to deal with it individually. The exploration-based training has a task focus introducing a negotiation case study with embedded tasks for the trainees. This task focus leads to a form of enactive training with the trainees observing themselves and reflecting on their knowledge acquisition.
The instruction-based training follows a deductive approach. The trainer presents abstract information which the trainees have to apply to Negoisst. Since there is less interaction between trainer and trainees, the training can be almost completely predefined with low trainee control and standardised learning materials. In contrast to the exploration-based training, the focus of the instruction-based training is on the features of the Negoisst system. These are shown and explained in detail before the trainees have the possibility to try them out. This leads to a focus on vicarious training with the trainer as negotiation expert guiding the trainees through the system explaining best practices.

<table>
<thead>
<tr>
<th>Exploration-Based/ Enactive Training</th>
<th>Instruction-Based/ Vicarious Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction of negotiation case study;</td>
<td>Introduction;</td>
</tr>
<tr>
<td>Task 1: Explore negotiation basics; Review negotiation basics;</td>
<td>Present negotiation basics;</td>
</tr>
<tr>
<td>Discuss negotiation strategies;</td>
<td>Present negotiation strategies;</td>
</tr>
<tr>
<td>Task 2: Prepare your negotiation according to case study and develop negotiation strategy;</td>
<td>Present integrative and distributive negotiation strategies;</td>
</tr>
<tr>
<td>Task 3: Browse the Negoisst system and get familiar; Discuss support components;</td>
<td>Present Negoisst system;</td>
</tr>
<tr>
<td>Present Negoisst review;</td>
<td>Present Negoisst support components;</td>
</tr>
<tr>
<td>Task 4: Negotiate using Negoisst and implement your developed strategy;</td>
<td>Guided tour through Negoisst system;</td>
</tr>
<tr>
<td>Discuss negotiation results;</td>
<td>Guided negotiation with Negoisst;</td>
</tr>
</tbody>
</table>

Table 1. Comparison of exploration-based/ enactive and instruction-based/ vicarious Negoisst end-user trainings

6. Training Evaluation and First Results

6.1. A holistic concept for the evaluation of end-user trainings

The evaluation of the end-user trainings needs to assess the learning outcomes of the trainees described in section 3 as well as their acceptance of the Negoisst system. In order to achieve a holistic perspective following the design-based research methodology, an experimental evaluation needs to be performed putting the trainings in operation and measuring their results in a subsequent negotiation. This concept follows the guidelines by Gupta et al. (2010) how to measure the specific learning outcomes. The overall design of such an experimental evaluation can be divided into four phases, ranging from pre-training to training, negotiation, and post-negotiation phase. These phases along with their respective measures of learning outcomes are shown in table 2.
### Table 2. Measures used during the process of experimental evaluation according to learning outcomes

<table>
<thead>
<tr>
<th>Evaluation Phase/ Learning Outcomes</th>
<th>Pre-Training</th>
<th>Training</th>
<th>Negotiation</th>
<th>Post-Negotiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills</td>
<td>Negotiation skills &amp; Computer skills</td>
<td>Negotiation &amp; NSS skills</td>
<td>Task performance</td>
<td>Negotiation &amp; NSS skills</td>
</tr>
<tr>
<td>Cognitive outcomes</td>
<td>Quiz</td>
<td>Task performance</td>
<td>Journal</td>
<td></td>
</tr>
<tr>
<td>Affective outcomes</td>
<td>Motivation</td>
<td>Task performance</td>
<td>Satisfaction, Journal</td>
<td></td>
</tr>
<tr>
<td>Meta-cognitive outcomes</td>
<td>Computer Self Efficacy, Computer Anxiety</td>
<td>Task performance</td>
<td>Journal</td>
<td></td>
</tr>
</tbody>
</table>

Before the trainings, test persons have to fill in a survey assessing demographics, perceived skills in negotiations, and electronic negotiations as well as the LSQ to determine their individual learning style (Honey & Mumford, 1992). Negotiation skills and electronic negotiation skills respectively computer skills are assessed following the distinction between experience (i.e. adaption of behaviour through repeated exposure without deep understanding) and expertise (i.e. transfer knowledge into different situation using deep understanding) (Dawes & Corrigan, 1974; Smith et al., 2007). Each test person is then assigned one of the trainings to create two groups equal in size, previous skills, and distribution of preferred learning styles. Both trainings thus contain an equal number of test persons of all learning styles. It is assumed that one half of these persons has a matching, the other half a non-matching learning style. They receive the trainings and fill in another survey afterwards. This survey includes manipulation checks, assessing whether the trainings were perceived to be different according to the dimensions explained above, a quiz consisting of ten questions assessing the cognitive learning outcome of the trainings, the Motivated Strategies for Learning Questionnaire (Duncan & McKeachie, 2010) to determine intrinsic and extrinsic motivation of trainees in terms of affective outcomes, items from TAM (Venkatesh & Bala, 2008) concerning computer-self-efficacy and computer anxiety to assess meta-cognitive learning outcomes, and a skill assessment again. After the trainings, a ten day negotiation simulation using a predefined case
study with the Negoisst system is conducted to measure task performance, namely negotiation effectiveness (i.e. agreement rate) as well as negotiation efficiency (e.g. individual utility, joint utility and fairness) of the agreements automatically tracked by the Negoisst system (Delaney et al., 1997). After the negotiation, another survey has to be filled in assessing skills again to complete their longitudinal measurement, satisfaction of the negotiators using the Subjective Value Inventory (Curhan et al., 2006) and again TAM focusing on perceived usefulness, ease of use of the Negoisst system as well as meta-cognitive learning outcomes. In addition a journal of five pages has to be written by the negotiators, explaining and analysing the individual approach to the negotiation as well as the reaction of the negotiation partner. This journal can be used for qualitative content analysis to complete the picture of cognitive, affective, and meta-cognitive learning outcomes following tested guidelines (Thompson & DeHarpport, 1994; Ritov & Moran, 2004).

Following the experimental design described above enables researchers to acquire a holistic picture of the learning outcomes of end-user trainings and system acceptance. By measuring skills before and after the trainings as well as after the application of the transferred knowledge, a longitudinal perspective is acquired. Given the overall research goal to increase acceptance and adoption of NSS in companies, test persons ideally need to be practitioners. However, this experimental design requires a huge effort by the test persons. Therefore, students can be a valid proxy if the researchers are aware of their advantages and disadvantages (Herbst & Schwartz 2011). Especially useful are students, who have received extensive negotiation trainings of at least several weeks to increase negotiation experience and that have a course of study which is closely related to the negotiation case study (e.g. business students) to increase negotiation expertise (Neale & Bazerman, 1991). However, validity of such student samples has only been showed for negotiation outcomes rather than for negotiation behaviour. It is assumed that such training mainly increases experience not expertise (Neale & Northcraft, 1990).

### 6.2. Experimental Evaluation and Descriptive Statistics

Following the iterative methodology of design-based research a first explorative evaluation with 42 undergraduate management students has been conducted to assess the experimental evaluation setting and its operationalization. The manipulation
checks showed that the learning techniques in both trainings were perceived to be similar.

According to the results of this first iteration both trainings have been improved to even more pursue the extremes of their training methods as described above. Then a larger evaluation, following the process described above, was conducted involving 178 graduate students from two European universities. 91 students enrolled in communication sciences, 23 in information systems, 22 in Management, 16 in International Business and Economics, 1 in Economics, 1 in Agribusiness, 20 exchange students, and 4 students not disclosing their course of studies. All participants attended a one semester course on negotiations at their respective universities and were rewarded for participation in the experiment by receiving credits.

Test persons had to negotiate a case implementing a bilateral buyer-seller dispute resolution scenario, where one party represented a medium-sized electronics retailer and the other party a student consumer. The case includes several distributive as well as integrative issues to be negotiated focusing on warranty issues of a recently bought laptop. Negotiators were provided with public background information as well as private information revealing preferences, reservation levels and aspiration levels per issue. There were no alternatives to negotiation assumed by the case.

During data cleaning, negotiation dyads that did not negotiate seriously or did not fill in the surveys were excluded from the data set. Also dyads that had a prior working relationship as developers of the Negoisst system were excluded because they were already familiar with the system. This led to a final data set of 110 negotiators in 55 negotiations each consisting of one student from each participating university. 67 participants were female, 42 participants male with one test person not disclosing gender. Participants had an average age of 24.8 years (SD=1.92). All negotiations were conducted in English. English proficiency was measured on a 5-point Likert scale with an average of 3.8 (SD=0.9).

Previous skills of the test persons were assessed in terms of general computer skills (Igbaria et al., 1995) as well as negotiation experience and expertise. Actual daily use of computers was reported to be very high with a median at “2 - 3 hours per day”, frequency of use at the maximum of the scale meaning “several times a day”.

Concerning previous negotiation skills, subjects reported average skills of 4.69 (SD=1.13) on a 7-point Likert scale, revealing well above average previous skills.

The assessment of learning styles lead to the treatment groups shown in Table 3 including 20 activists, 28 pragmatists, 40 reflectors and 22 theorists being equally assigned to one of the trainings.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Exploration-based/Enactive Training</th>
<th>Instruction-based/Vicarious Training</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activists</td>
<td>11</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>Pragmatists</td>
<td>15</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td>Reflectors</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Theorists</td>
<td>11</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>53</td>
<td>110</td>
</tr>
</tbody>
</table>

Table 3. Treatment groups

After the trainings, another survey had to be filled in with manipulation checks consisting of eight 7-point Likert scale items assessing how constructive or instructive, collaborative or individual and situated or theoretical the trainings were perceived. The first characteristic led to a high value whereas the second characteristic led to a low value. Results were in line with the created trainings reporting a very constructive and collaborative exploration-based training (M=4.46, SE=0.09) and a very instructive and individual instruction-based training (M=3.64, SE=0.1) with only minor differences concerning situated learning techniques, in sum revealing significant differences (t(108)=0.639, p<0.001).

Although the learning techniques in the trainings were perceived to be different, there were no differences concerning cognitive learning outcomes directly after the trainings. Subjects achieved an average score of 10.25 (SD=2.05) of 13 points in the quiz. There were no significant differences between treatments.

Motivation of the participants was reported to be above average with an intrinsic motivation of 5.02 (SD=0.88) and extrinsic motivation of 4.66 (SD=1.11) on a 7 point Likert scale.

Examining task performance of the negotiations, 45 of 55 negotiations led to an agreement. Negotiators reaching an agreement achieved individual utilities from 41% to 69% with an average of 54.52% (SD=6.32). Joint utilities reached from 100% to the pareto-optimal outcome of 115% with an average of 109.04% (SD=3.8). Fairness
of the agreements ranged from perfectly fair agreements with 0% to 28% contract imbalance with an average of 8.96% (SD=8.1).

<table>
<thead>
<tr>
<th>Task Performance/ Treatments</th>
<th>Agreement Rate</th>
<th>Individual Utility*</th>
<th>Joint Utility*</th>
<th>Contract Imbalance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>81.8%</td>
<td>54.52%</td>
<td>109.04%</td>
<td>8.96%</td>
</tr>
<tr>
<td>Matching</td>
<td>80.7%</td>
<td>54.37%</td>
<td>109.54%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Non-Matching</td>
<td>83%</td>
<td>54.68%</td>
<td>108.52%</td>
<td>10.4%</td>
</tr>
<tr>
<td>Exploration-based Training</td>
<td>86%</td>
<td>54.27%</td>
<td>109.1%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Instruction-based Training</td>
<td>77.4%</td>
<td>54.83%</td>
<td>108.98%</td>
<td>9.02%</td>
</tr>
<tr>
<td>Activists</td>
<td>95%</td>
<td>52.79%</td>
<td>107.68%</td>
<td>9.89%</td>
</tr>
<tr>
<td>Pragmatists</td>
<td>85.7%</td>
<td>54.92%</td>
<td>110.21%</td>
<td>8.63%</td>
</tr>
<tr>
<td>Reflectors</td>
<td>72.5%</td>
<td>54.72%</td>
<td>108.69%</td>
<td>8.62%</td>
</tr>
<tr>
<td>Theorists</td>
<td>81.8%</td>
<td>55.5%</td>
<td>109.5%</td>
<td>8.94%</td>
</tr>
</tbody>
</table>

Table 4. Task performance in negotiations across treatment groups. *Only agreements

Focusing on the task performance shows that the aforementioned assumption that test persons with matching learning style and training are superior to other test persons does not hold for all dependent variables. Test persons with matching learning style and training have a tendency to achieve fairer agreements than test persons without matching training. The agreement rate, for example, shows a different picture. The relationship between learning styles and training methods, therefore, has to be examined further. Descriptive statistics show interesting tendencies especially concerning the rate of agreements. Test persons with practical learning styles (Activists and Pragmatists) seem to reach an agreement more often than test persons with theoretical learning styles (Reflectors and Theorists). Furthermore, an exploration-based training seems to foster agreements. Examining individual utilities, test persons preferring an activist learning style achieve the lowest individual utilities while at the same time producing the least fair agreements. Such behaviour is prevalent in negotiation dyads with both negotiators having attended the non-matching (i.e. instruction-based) training. Therefore, this results in the lowest joint utility for this treatment group. Test persons preferring theorist learning styles reached the best individual utilities outperforming their negotiation partners. Concerning joint utility test persons with pragmatist learning style achieved the best results. In combination with their very fair outcomes this shows tendencies for very integrative results.
7. Discussion & Outlook

This paper integrates findings from end-user training and educational research to develop an individual end-user training for an exemplary information system in the domain of electronic negotiation support systems. Therefore, individual differences of the trainees are assessed to choose a matching training method, thus providing an individual training. Two pure variants of such a training are developed along with a concept for evaluation in a higher education scenario following a design-based research methodology. Experiences and first descriptive results on task performance gathered during trainings and evaluation are presented and used to further improve the trainings and construct a broader picture of individual end-user training. To answer the research question posed in the beginning, it can be stated that an individual End-User Training with a matching learning style and training method improves specific characteristics but there is no single matching that improves all dependent variables. The relationship between learning styles, training methods and learning outcomes, therefore, has to be examined further.

However, it is difficult to generalise these findings due to the specific distribution of learning styles. A student sample limits the generalizability because learning styles are not distributed equally. The sample used in this experiment includes 36.4% test persons that prefer a reflector learning style and only 18.2% test persons that prefer an activist learning style. Students with different learning styles influence each other during the trainings, especially when jointly performing group work. Therefore, findings may be blurred. Another limitation of this study is the information loss accepted using only the most preferred learning style of each test person disregarding the rich, but controversially discussed (Duff & Duffy, 2002; Cassidy, 2004), interval-scaled preference values for all four types of learning styles produced by the LSQ. Including these informations may lead to more elaborate results concerning the differences between learning styles.

Data gathered within this study has to be examined further. Task performance as well as psychometric properties of the test persons assessed within the questionnaires have to be integrated and evaluated for main and interaction effects between treatment
groups. Also a dyadic evaluation of the negotiations focusing on combinations of learning styles and trainings has to be performed. Findings from qualitative content analysis of the journals can provide further insights into the domain of individual end-user trainings.

In future, such studies need to be generalised to other target information systems in different domains of organisations. Eventually such findings could contribute to the ongoing discussion on the advantages of Massive Open Online Courses with thousands of trainees over small private online courses that focus more on individual differences between trainees (Fox, 2013). The assessment of individual differences also needs to be broadened to evaluate more domain specific differences (e.g. the Subjective Value Orientation in negotiations (DeDreu & Boles, 1998)) as well as the necessary level of scaffolding and support for the trainees. If these assessments can be automated the step to dynamically selected individual computer-based trainings in the first step and individual e-learning or blended learning offerings in a further step is near.

References


