Reviving Language/Action Perspective in the Era of Social Software: Research in Progress

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Abstract. Language/Action perspective (LAP) was introduced by Flores and Winograd and their associates in the 1980th. This perspective, which is based on the speech act theory, has been originally suggested as guidelines for designing information systems. Though LAP had some success in designing commercial systems, it had never become widespread as a basis for systems design. This paper suggests reviving LAP, however, not as a tool for system design, but as a tool for analysis of communication models of systems designed on some other principles than LAP. The paper is focused on modern systems of social software type in which communication is based on the usage of shared spaces. The paper is a research in progress report that presents the main ideas, a research plan, and preliminary results achieved in its first two steps: (1) testing LAP for analysis of one system with shared spaces architecture, and (2) classification of atomic communication acts typical for business processes. The long term goal of the research is to create practical recommendations for choosing an appropriate communication model for particular business needs.

Keywords: Language/Action, LAP, speech act, business process, social software, groupware, communication, shared space

1 Introduction

The Internet boom brought into being a new generation of systems, usually called Social Software, that are aimed at facilitating communication between humans. Such systems, though built in more or less ad-hoc manner, widely use (explicitly or implicitly) the concept of shared spaces, which is well known in CSCW and groupware research, see, e.g. [1]. The ideas built in the social software started to affect the design of business-oriented systems, including Business Process Support (BPS) systems [2]. As a result, the use of shared spaces for communication and information exchange becomes a kind of a standard for contemporary information systems development. This trend requires research efforts to understand and evaluate different communication models that employ shared spaces. In the end, this kind of research should lead to creating practical recommendations for choosing an appropriate model for particular business needs.

Research discussed in this paper is aimed at analyzing communication models that can be implemented in business information systems that employ shared spaces. The

practical result we are aiming at is a methodology for evaluating communication models provided by such systems. This methodology would help in finding gaps in communication functionality of a particular system and give directions on how they could be bridged. We limit our investigation in two aspects. Firstly, we focus on evaluating systems aimed at supporting business processes – BPS systems. Secondly, we limit our investigation to communication between people through the system, leaving all issues of man-machine interaction outside the scope of our research. The latter issues include, for example, user-interface design, usability, actability.

As a theoretical foundation for our work, we have chosen Language/Action perspective (LAP). LAP was introduced by the works of Flores and Winograd and their associates in the 1980th [3,4]. This perspective, which is based on the speech act theory [5], has been originally suggested as guidelines for designing communication parts of business information systems [4]. Though this perspective had some success in designing commercial systems, it never became widespread as a basis for systems design beyond the organization that introduced it (i.e., Action Technologies). This perspective has been also suggested for business modeling (see, for example, [6]), and evaluation of information systems (see, for example, [7]).

Having a practical aim, our research falls into the category of Design Science (DS) [8,9]. The goal of DS research is finding and testing a generic solution (in terms of [9]), or artifact (in terms of [8]) for a class of practical problems. In this respect, our research differs from the main (and extensive) body of LAP literature. We are not trying to enhance LAP as a theory, but test whether it could be useful in practice in a specific area, namely, evaluation of communication models of information systems independently of whether they are built based on LAP, in an ad-hoc manner, or on a theoretical foundation different from LAP.

Though our primary aim is not connected to making a contribution to LAP theory, our research could be advantageous for the LAP movement. As it is justly concluded in [10], LAP being quite popular in academic circles, have not made its breakthrough in practice. [10] makes the following four suggestions for improving practical relevance of LAP:

"(1) observe real challenges in practice where LAP related ideas can be effectively applied so that they can show significant economic benefits, (2) build a focus on a few and prominent areas in which LAP related solutions can be developed that demonstrate user value, (3) strive towards areas where ideas can be softwired into platforms that enable continued learning and codification of knowledge. A good example would be e-commerce platforms that are reflective and capable of reasoning around ongoing transactions, (4) build alliances with critical members of the knowledge transformation networks including platform providers, solution integrators and different communities of practice."

We believe that our research, if successful, could contribute to a progress in the areas (1) and (2) above.

This paper presents research in progress, not results of completed research. Therefore, some parts important for a completed research, e.g., a section on related research are missing here. Our current plan to conduct this research is as follows:

1. Quickly investigate whether LAP could be useful in our undertaking. We use the case study approach for this end. More exactly, we investigate a working system that facilitates human communication via shared spaces as a platform to try LAP as a tool for evaluating the expressive power of communication models. To start with, we go through Searle's illocutionary points [5] to see whether all of them can be expressed in the communication model built into the system.
2. Identify and classify typical atomic communication acts completed in the frame of business process cases/instances, like reporting, or task assignment.
3. Identify patterns of combining atomic communication acts into "messages" that circulate between participants of a process instance. For example, task assignment might need to be combined with a status report so that a person who is supposed to execute the task could get all information he/she needs to complete the task.
4. Identify patterns of conversation consisting of several messages passed between process participants.
5. Test the presence of identified atomic acts, messages and conversations in practice of using contemporary systems that support business processes.
6. Combine 2, 3, 4 based on experience from 5 into a practical methodology of evaluation of communication capabilities of BPS Systems.

This paper reports our progress on the first two steps of the above plan. We consider the first step as fully completed, and the second step as almost completed.

The rest of the paper has the following structure. Section 2 presents our investigation of applicability of LAP for the chosen purpose. Section 3 presents preliminary classification of atomic communication acts in the frame of business process instances. In Section 4, we discuss the results achieved so far, and short terms plans for advancing the research farther.

2   Testing LAP for Analysis of Communication Models

The system we use in our initial test of LAP is a BPS system with shared spaces and collaborative planning (planning for each other) called ProBis. It was developed based on the state-oriented view on business processes [11] for a Swedish interest organization in 2003-2006, as described in [12,13]. Though the system is becoming outdated, it is still in use in this organization.

The reason we have chosen to investigate this particular system is purely practical. The authors have participated in the development and introduction of ProBis into organizational practice, and have been using it themselves for some period of time. Having intrinsic knowledge of the system speeded up completion of the first step of our plan.

2.1   ProBis Description

ProBis has no explicit data/information flow; all information exchange and communication is realized through shared spaces. A shared space in ProBis is presented to the end-user as a window separated in several areas by using the tab

dialogues technique, see Fig. 1. Some areas of the window are standard, i.e. independent from the type of the business processes, others are specific for each process type supported by the system. Standard areas comprise such attributes and links as:

1. Name and informal description of a process instance
2. Links to the owner, and, possibly, the process team
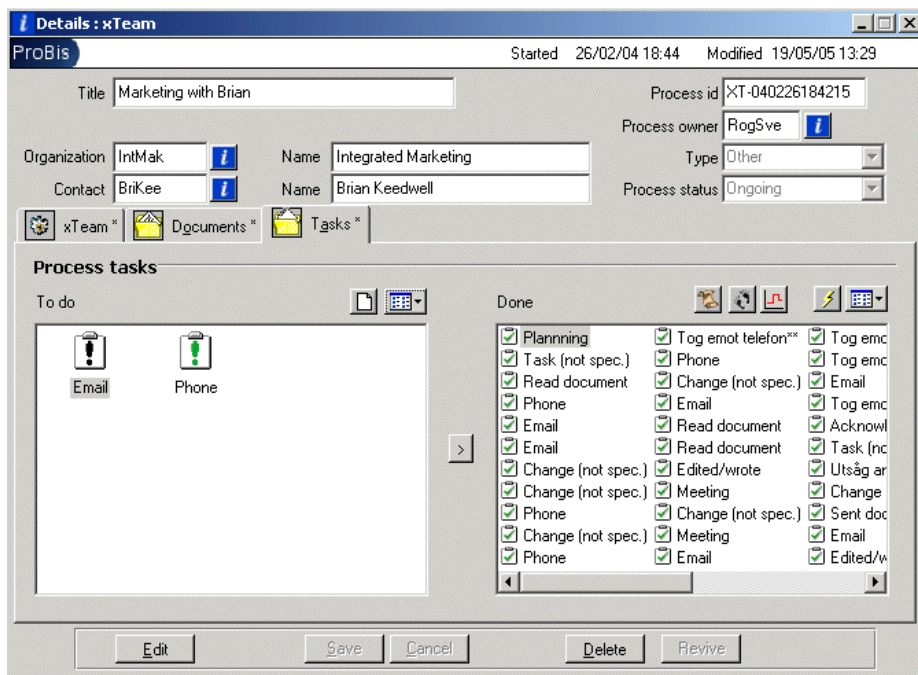3. Links to the relevant documents, created inside the organization, and received from the outside

Fig. 1. Task area in the ProBis shared space

The standard part of a ProBis shared space includes also the task area (tab) that contains of two lists, as in Fig. 1. The *to-do* list (to the left on Fig. 1) includes tasks planned for the given process instance; the *done* list (to the right on Fig.1) includes tasks completed in the frame of it. A planned task defines what and when something should be done in the frame of the process instance, as well as who should do it. In ProBis, the process plan serves as a mechanism for issuing "invitations" to attend a particular shared space. All invitations from all process instances are shown in the end-user's personal calendar. From the calendar, the user can go to any shared space to which he was invited in order to inspect, change this space, or execute a task planned for him/her in it.

Process participants work with the shared spaces in ProBis in the following manner. A participant visits a shared space because a task has been planned for him/her in this space, or in the ad-hoc manner while browsing through the list of

existing shared spaces (i.e., opened process instances/cases). When in the space, he/she can decide to make changes in it by changing the values of various fields, attaching new documents or persons to the shared space, etc. Any change in the shared space results in adding an event to the *done* list of the tasks tab (see Fig. 1). If the change is due to the execution of some planned task, the event represents a report on its completion, otherwise the event represents some ad-hoc activity.

When changing a shared space, a participant can make changes in its plan (to-do list) by adding new tasks, or augmenting or deleting the existing ones. When inserting a new task he/she can plan it for him-/herself or to any other person. The latter serves as an invitation for this person to visit this shared space.

As follows from the description above, the only way of communicating via ProBis is by assigning a task to the communication partner. This is done by filling a form as on Fig. 2. One chooses the task from the list, assigns it to another user of the system, and adds a textual description and some parameters, for example, by attaching a document that is already registered in the process. The task list is configurable and can be adjusted for each installation and process type.
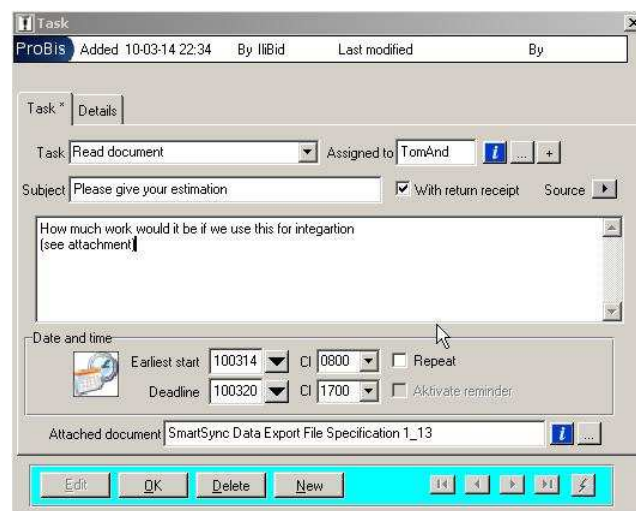

Fig. 2. Assigning a task to another user in ProBis

To document the completion of a task assigned to a particular user, the latter moves this task from the *to-do* list to the done list via drag and drop, or via pressing a button placed between the lists (see Fig. 1). A report form, shown in Fig. 3, appears. This form is automatically filled with parameters and the task description from the original task assignment. The user just needs to add a textual report on completion of the task, and possibly make changes in other parts of the shared space.

The scheme as described above seems to be a one-way communication. This is not true, however. Consider a situation where the user who has just completed a task wants to notify the user who planned it. Information about who planned the task is shown in the original task form (see Fig. 2.). Notification can be manually issued by planning a special *Attention* task to the "planner" as the last act of completing the

assignment. The planner gets this *Attention* task in his/her calendar and can view it in a window similar to Fig. 2.
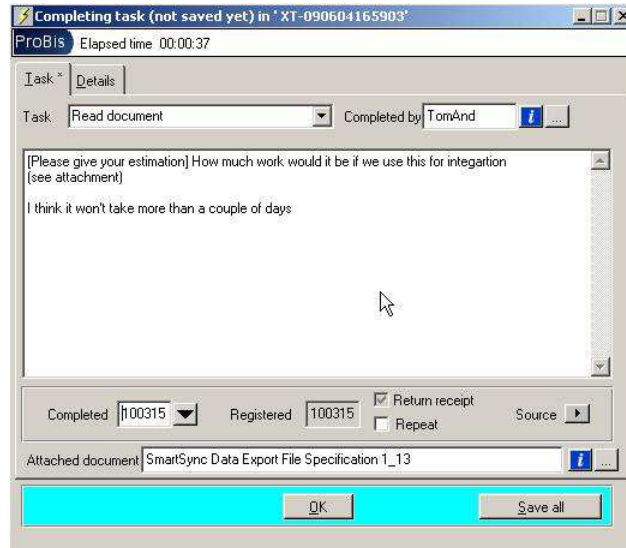

Fig. 3. Completing a task in ProBis

To provide the user with information about the context of planning, there is a special button *Source* in the window in Fig. 2. Pressing the button leads to the item of the *done* list that describes the event in which the planned task appeared in the *to-do* list. This item is presented in a window similar to Fig.3. The typical example of use for this button is when a user who has planned some task gets an *Attention* about its completion. Then, he/she can go directly to the completion report by pressing *Source*. There is no need to explain what *Attention* refers to when planning it, as the recipient of the *Attention* can go directly to the event that has caused this *Attention* to appear. In this way, many events in the done list can be causally chained to represent various "conversations" in the frame of the process case/instance.

The idea to introduce the *Source* button came from the following observation. From the time a person has got an *Attention* to the time he/she actually checks it many new event items can appear in the *done* list. The button gives a possibility to directly fetch the one that is relevant for the given *Attention*.

To simplify the attention scheme, a special check box is introduced in the task window (see Fig. 2) called *With return receipt*. When checked, a special attention-like task called *Receipt* is automatically planned as soon as the task is completed. This task is assigned to the user who originally planned the completed task.

To further facilitate communication, several more advanced features were added to ProBis. For example, there is a possibility to plan the same task to many users. Additional users can be added from the list with the "+" button (see Fig. 2), or can be fetched from a predefined group. Each user gets its own task in the calendar and will

need to go and complete it independently from other users. Multi-user planning gives a possibility to easily raise attention of several people to some event that has happened in the frame of a particular process case/instance. Other advance features include automated planning (see [10]).

2.2 LAP Analysis of the Communication Model Built into ProBis

We use the notion of illocutionary points introduced by Searle [5] - objectives one can achieve with simple speech acts - to make rough analysis of communication capabilities built-in in ProBis. Below, we list Searl's illocutionary points and investigate how they can be expressed in ProBis:

- Assertive: Commit the speaker to something being the case - to the truth of the expressed proposition.
- Directive: Attempt to get the hearer to do something. These include both questions (which can direct the hearer to make an assertive speech act in response) and commands.
- Commissive: Commit the speaker to some future course of action.
- Declaration: Bring about the correspondence between the propositional content of the speech act and reality (e.g., pronouncing a couple married).
- Expressive: Express a psychological state about a state of affairs (e.g., apologizing and praising).

In ProBis, an *assertive* act takes place each time a user changes the shared space that is accessible for other users, for example, when he/she reports about a phone conversation with a customer in the frame of a business process case/instance by filling the form in Fig. 3. In addition to making changes, the user can raise attention of one of several of his/her colleagues to these changes by planning an *Attention* task to them. In the latter case, the *Source* button of *Attention* will lead directly to the report.

In ProBis, a *directive* act takes place each time a user plans some actual task for some other user. For questioning, there is a special task *Question* that works in the following way. When the user who gets a question moves this task from the *to-do* list to *done* list a form as on Fig. 3 appears. However, in this form the task name is changed from *Question* to *Answer*. The user writes his/her answer directly under the question and commits his changes by pressing *Save* button. An automatically planned task *Read answer* is then planned for the first user, who has planned the original *Question*. The latter can easily rich the answer by pressing the *Source* button on the *Read answer* task form.

Any actual task, like *Write a document, Attend a meeting, Phone call*, planned to a subordinate by his/her manager represent as kind of an order. If planned by a colleague, the interpretation of the act can dependent on the task in question, which we are not discussing here due to the lack of space.

In ProBis, a *commissive* act takes place each time a user plans some task for him-/herself in a shared space of a particular business process instance. When colleagues that participate in the same process see that something is already planned, they assume that the task is being taking care of, and would not do it themselves

In ProBis, the possibility to express certain *declarative* acts is incorporated in the structure of shared spaces. For example, a shared space can include a list of users that participate in a given process case/instance alongside with their roles. Adding a new user to this list constitutes a declaration that creates a new "reality" in which the user becomes part of the process team. To inform the user about the change of reality that concerns him/her particularly, ProBis automatically plans a new *Attention* task for this user (that he/she became a member of the process team).

As far as *expressive* acts are concerned, there is no special provision in ProBis for these acts. However, such provision can be made, by allowing to register expressive events like *opinion, apology*, etc, in the *done* list of Fig. 1.

2.3   Discussion

Based on the analysis in the previous section, we can make the following two interconnected conclusions:

- Even in its very general form - Searl's illocutionary points - LAP can be used for evaluation of communication capabilities of systems built on the principles different from LAP
- The communication model built into ProBis has enough expressive power to handle all five types of communication acts identified in the speech act theory

We consider these results as promising enough to continue our research according to the plan in section 1.

3   Classification of Atomic Communication Acts

In this section, we present our preliminary classification of atomic communication acts typical in the frame of process instances, which is the goal of the second step of the research plan drawn in Section 1. This classification has been built based on our own practical experience of process analysis, building business process support systems, and introducing them into organizational practice. At the next stage, this classification will be checked against other research works to obtain independent confirmation of its validity. During this check, this classification could be extended and modified.

Based on our experience, we identify the following areas of usage of communication in the frame of business process cases/instances:

- Reporting – knowledge transfer about the process instance state (assertive acts in the speech acts classification)
- Reflecting – exchanging opinions on the current state, and suggestions on how to proceed (expressive acts in the speech acts classification)
- Managing roles – assigning roles to participants of business process instances (declarative acts in the speech acts classification)

- Managing tasks – assigning tasks to participants of the business process instances, including self-assignment (a mixture of directive/commissive and declarative acts in the speech acts classification)
- Negotiating – requesting an authorization before assigning a role or a task for somebody or oneself, or asking for a change in already assigned roles and tasks. Negotiating also include agreeing to, or declining the requests. (A mixture of directive and commissive acts in the speech acts classification)

In each of these areas we identify a number of atomic communication acts that are described in more details in the subsections below.

3.1   Reporting

Report is a communication act that informs the recipient(s) about the development in the given business process instance. This act can be committed in various situations. For example, it can be committed as a reaction on the request for information from another process participant. It can also be committed after completing a task in the frame of the given process instance, or in connection to a task assignment act in order to provide a person who is to complete the task with the background information.

A report act, usually, has some dedicated recipients who need the information for their work, and the audience who might just be interested in this information (e.g., CC in case email is used as a media for communication). Reporting is always an assertive act in the speech acts classification.

We differentiate the following atomic reporting acts:

- Status report – report on what has being achieved in the process instance so far, how long are we from the goal set for the instance, what is planned for advancing the towards the goal, etc. Such reports could be prepared on the request from the management, or issued periodically to all process participants, or even to the external observers. A status report does not need to cover all details of the given process instance development, for example, it may contain information about a particular planned task.
- Task completion – report on the planned task completed in the frame of the process instance, for example goods sent to the customer (which ones and how much)
- Event report – report on the unplanned event, e.g. a customer calling back and complaining on the quality of goods received
- History report – report on the development in the process instance over some period of time, e.g. to update a participant on what has happened in the period of his/her absence

Besides the act of providing a report, this group includes *inquiry* – an act of requesting a report. *Inquiry* is a directive act in the speech acts classification. It presumes a response from the recipient(s) of the inquiry in the form of a report act.

3.2 Reflecting

Reflecting means expressing personal opinion on the situation, possibly, including suggestions on how to proceed with the given process instance. From the speech act point of view, a reflection represents an *expressive* act.

3.3 Managing Roles

Role assignment is a communicative act that gives the recipient some permanent role in the given process instance, or relives him/her from an already assigned role. A role can be assigned to somebody else, or to oneself. To assign a role (or relieve somebody from a role), one have to have a right to do so. Such right can be derived from the person's position in the organization and/or the already acquired role in the given process instance. Alternatively, one needs to negotiate an agreement of such assignment/relieve. An agreement may be needed from the person to whom the role is being (or has been) assigned (if it is not self-assignment) or/and from other process participants who might object or agree to the changes in the distribution of roles.

Role assignment is a declarative act according to the speech acts classification as it directly changes the state of the business process instance.

3.4 Managing Tasks

Task assignment can be of two sorts, an assignment to somebody else, and self-assignment. Task assignment to somebody else is a communication act of asking the recipient(s) to complete a task in the frame of a business process instance. To assign a task, a communicator needs to have a right to make an assignment. Such rights can be of three origins:

- The communicator has some management position over the recipient, in general or in the frame of the particular process instance, that gives him/her a right to "order" certain task execution, provided that the recipient has obligation to follow the orders according to his contract with the organization
- The communicator holds no management position over the recipient, but the task being assigned falls into the sphere of responsibility of the recipient according to his/her position within the organization, or his/her role in the particular process instance
- The communicator holds no management position over the recipient, but he/she has previously negotiated an agreement from the recipient, or/and from his/her manager

Task assignment to somebody else is a mixture of directive and declarative communication acts in the speech act classification. When it is an assignment of a relatively unimportant task to be completed more or less directly, the act is purely directive. No audience needs to be engaged in such communication act. However, if it is an assignment of an important task to be completed at some time in the future, the act besides being directive has also declarative nature. It changes the reality relevant

to the given business process instance – a new element is introduced in the process plan. Such an act, normally have an audience (like a CC if email is used for communication), i.e. participants who need to know that the task has been planned, for example, for avoiding double assignments.

Task assignment to oneself also requires some rights from the communicator, which can be of three origins:

- The communicator has a right to assign him/herself this type of tasks according to his/her position in the organization or/and role in the given process instance
- The communicator has an obligation to assign himself a task of this kind when a situation warrants it (again, according to his/her position in the organization or/and role in the given process instance)
- The communicator has previously negotiated permission for self-assignment from some other process participant(s), e.g. management.

Task assignment to oneself is a mixture of commissive and declarative communication acts in the speech acts classification. It is a commissive act as it constitutes a promise to do something, and it is a declarative act because it adds a new item to the process instance plan.

Beside assignments, this group includes task retraction, task change and reassignment. Negotiation may be required before such acts can be performed.

3.5   Negotiating

This group includes a request for engagement, and response to it:

- *Request for engagement* is a question posed to the recipient inquiring whether he/she can think of committing him/herself to take a role or a task assignment (alternatively be relieved of a role or task assignment). A request can also be about permission to assign a role or a task to oneself (or relieve oneself from a role/task assignment). *Request for engagement* is a directive act in the speech acts classification. It presumes some action, e.g., a response from the recipient(s) of the request.
- *Response* is an act of *accepting*, *conditionally accepting,* or *declining* a proposal that comes in a request. This is a commissive act in the speech acts classification.

4   Conclusion and Plans for the Nearest Future

As follows from Section 1, the goal of our research in progress is development of a methodology for evaluating communication capabilities provided by modern information systems. As we pointed out in Section 2.3, our preliminary test of applicability of LAP for reaching the goal was quite positive. Therefore, we consider that it is worthwhile to continue our research according to the seven points plan drawn in Section 1.

Having drafted a preliminary classification of atomic communication acts typical in the frame of business process instances (step 2 of the plan), we intend to proceed to

steps 3 and 4 of our plan. A single communication in the frame of a process instance can consist of several atomic communication acts, for example a report on a completed task, and a request to complete the next task. Step 3 of our research plan concerns identifying typical patterns of combining atomic acts into "messages" that are passed between process participants. A sequence of messages between the same participants can constitute a conversation (thread) inside a process instance. A typical example of a thread consists of a request to complete a task which is followed by a confirmation that it will be completed, and then by a report that it has been completed. Identifying patterns of conversations constitute step 4 of our research plan.

In addition to working on steps 3 and 4, we plan a literary study to get confirmation to our findings, which so far are based exclusively on our experience. We also expect to get ideas of what is lacking in and needs to be added to our model of communication in the frame of business processes.

References

[1] H. Takemura und F. Kishino, Cooperative work environment using virtual workspace. *Proceedings of the 1992 ACM conference on Computer-supported cooperative work*: 226-232, ACM New York, NY, USA, 1992.

[2] Nurcan S., Schmidt R.. Introduction to the First International Workshop on Business Process Management and Social Software (BPMS2 2008). *LNBIP* (17): 647-648, Springer, 2009

[3] Winograd, T. and F. Flores. *Understand Computer and Cognition.* Ablex Publishing Corporation, Norwood, NJ, USA, 1986

[4] Winograd, T. A Language/Action Perspective on the Design of Cooperative Work. *Human-Computer Interaction* (3:1): 3-30, 1987

[5] Searle, John R. Speech acts, Cambridge University Press, London, UK, 1969

[6] Dietz, J.L.G Understanding and Modelling Business Processes with DEMO. *Proc. 18th International Conference on Conceptual Modelling (ER'99)*: 188-202, Springer, 1999.

[7] Agerfalk, P.J. Investigating actability dimensions: a language/action perspective on criteria for information systems evaluation. *Interacting with Computers* (16:5): 957-988.

[8] Peffers, K., Tuunanen, T., Rothenberger, M.A., and, Chatterjee, S. Design Science Research Methodology for Information Systems Research, *Journal of Management Information Systems* (24:3): 45-78, 2007

[9] Bider, I., Johannesson, P., Perjons, E. Design science research as movement between individual and generic situation-problem-solution spaces. In Baskerville, R., De Marco, M., and Spagnoletti, P. Eds. *Designing Organizational Systems: An Interdisciplinary Discourse*, Springer, 2012

[10] Lyytinen, K. The Struggle with the Language in the IT – Why is LAP not in the Mainstream? *International Working Conference on the Language-Action Perspective on Communication Modelling (LAP)*, New Brunswick, NJ, 2004.

[11] Khomyakov M., and Bider, I. Achieving Workflow Flexibility through Taming the Chaos. *OOIS 2000* : 85-92. Springer, 2000.

[12] Andersson T., Bider I., Svensson R. Alignig people to business processes. Experience report. *SPIP* (10:4): 403 – 413, 2005

[13] Bider I., Striy A. Controlling business process instance flexibility via rules of planning. *IJBPIM* (3:1): 15-25, 2008.