A Theoretical Framework of Co-purposing in Systems Design

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Abstract. The paper outlines a theoretical framework for the conceptualisation and design of collaborative systems for design organisations. The intent is to examine and support the idea of 'co-purposing' as an influential design metaphor for the analysis of design teams and the development of design support collaborative systems in contexts where systems' designers collaborate with their clients. By offering associations to the work activities and the social interaction of designers in actual design workspaces, we propose that the metaphor of 'co-purposing' can stand as an alternative perspective in the analysis and design of potentially new realisations of computer supported cooperative work systems for supporting teamwork.

Keywords: co-purposing, collaborative systems, e-collaboration, postmodern systems design.

1 Introduction

In the light of postmodern organisation theory, discourses that have historically shaped the status of organisation analysis, namely romanticism and modernism, is believed that they have lost their cogency [10]. According to the philosophical shift of the late 20th century (late modernists and postmodernists positions), the essence of theoretical frameworks is not based on their foundational concepts but on their intelligibility which provides the grounds for their usefulness. In this sense, postmodern organisations, are seen as flat hierarchies, based on decentralised decision making processes with greater capacity and tolerance for ambiguity, permeable boundaries, capable of renewal, self-organising constitutions with self-integrating coordination mechanisms [6]. The viability of these often geographically, culturally and organisationally dispersed teams is well depended on the use of information and communication technologies, but not simply driven by them in an instrumental sense [14]. The reliance on perspectivistic viewpoints of analysis based on insulated ontological observations by external (systems) designers frequently resulted on the fragmental support of collaboration processes and usually assisted to the development of systems that weaken communication couplings among teams members. A richer, human to human interaction within a socio-cultural environment, mediated by

technology is needed and it must be approached with the partnership of organisation members and information and collaboration systems designers in mind.

This paper analyses the current situation in systems design tradition for collaboration, from a theoretical perspective of discursive practice[1] related to the interfacing of both modern and postmodern practices and theoretical viewpoints. It focuses to pose forward the importance of an integrated systems design methodology where systems designers and their clients (possibly other designers in different contexts) collaborate.

It attempts to contribute an understanding in the following key issues:

a) In the second section we provide the theoretical basis of our arguments. We analyse earlier definitions of 'communication', 'coordination', 'cooperation' and we consider their strengths and weaknesses through the prism of our research investigation.

b) Section three outlines the design framework that provides research directions to system designers for the future development of information technologies for the support of design organisations. Based on the metaphor of 'co-purposing' this framework provides the aspects of design considerations that system designers can possibly elaborate for the conceptualization, design and evaluation of collaborative technologies.

e) Finally, we conclude by discussing the findings of this work. These indicate that the proposed framework of 'co-purposing' offers an alternative perspective for supporting the conceptual design of collaborative systems.

2   Communication, Coordination, Cooperation and Collaboration

Communication, coordination, cooperation and collaboration are notions widely used in literature of information systems development and communication studies with a variety of meanings often contradicting or unjustified. This section provides a short review of current literature and outlines the concepts in an appropriate way for the needs of this work.

2.1   Communication

Communication in information systems development is believed to provide the basis for interaction. Collaboration and social interaction is considered to occur through communication between human agents while technological advances in telecommunications, the internet and information systems development appear to have profound effects in mediating communication and collaboration. Previous approaches in defining communication are considered as "the command and control paradigm" or "simple linear models", where communication is thought possible when there is exchange of information and or data between a sender and a receiver via a communication medium [15]. Formally, this happens when the sender is informed that the receiver has received the message. According to Mumby [16] "such a

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[1] The term ***discourse*** is used here in Foucault's sense of a system of possibilities for the creation of knowledge [9].

representational model is unable to conceive of the possibility that communication is anything other than an empty conduit for effectively communication an already existing set of conditions…The act of communication and the world about which one is communication remain firmly separated" [16].

On the other hand the interpetivist approach to communication (or pragmatic approach) place subject and object in a productive dialectical tension. Communication in this collaboration paradigm entails the mutual understanding of the meaning of messages that have been exchanged among participants during the course of a communicative event. These models recognize the importance of context and social negotiation of meaning, and have been established in explaining the complexities of communication. This point of view is related to the early Habermasian [11] argument that any attempt at communication or action presupposes a horizon of meanings shared with others.

Although the interpretivist approach to communication is focusing in the analysis of the participatory construction of a meaningful world through communicative practices, the critical project and the theorists of Frankfurt school [13] are characterised by an articulation of hermeneutical suspicion. In his late writings Habermas argues that the acknowledgement of the possibility of success lies within communicative failures through the implicit recognition of shared criteria constitutive of our communicative practices. By following a pragmatic tradition, he speaks of "universal and unconstrained consensus"; the possibility of an ideal speech situation of collective comprehension [12]. This is a kind of mutual pre-understanding of the criteria for successful understanding, shared by human beings even in contexts of misunderstanding, describe a social constructionist view of the world but criticise the interpretivist inability "to explore issues of power and ideology and the processes through which certain realities are privileged over others" [12].

By contrast, postmodern thinkers disagree with those who adopt ideals of community based on an ideal form of communication, and support the idea that any successful communication contains the alternative possibility of its own failure. This possibility of failure is the condition of any communicative event – makes communication possible. This failure of communication embedded in communication calls for the recognition that we might not fully share criteria for success, or might make a mistake about what is shared. Contrary to Habermas who supports the idea that mutual understanding is implied in day to day language and actions, Derrida argues that this ideal is impossible [7]. The misunderstanding is integral in communication and action; participants in a communicative event are in a state of continuous *aporia* between successful and not successful communications. This idea of a continuous flux in meaning creation is based on "speech acts" that take place in relation to what does not 'belong' to 'speech acts". Every context of communication is enfolded by another context, so that the context is never stable, without a definitive fixing of its meaning.

In the case of communication in design teams the characteristics of the context are in a continuous negotiation and are thought to be provided by the actors themselves (beings), the situation governing the status of the actors' behaviour (social) including the medium/vehicle of communication (technology), the cultural environment, language etc. For the purposes of this paper we will follow a discussion among the four paradigms mentioned above and begin the analysis by the employment of the

three ontologically observed characteristics of a system of interaction [Fig. 1.] within the communication discourse that are more frequently used in information and collaboration systems' design: being (participants, actors or agents), social environment (community, organisation or team) and communication medium (technology: communication and collaboration systems, language).
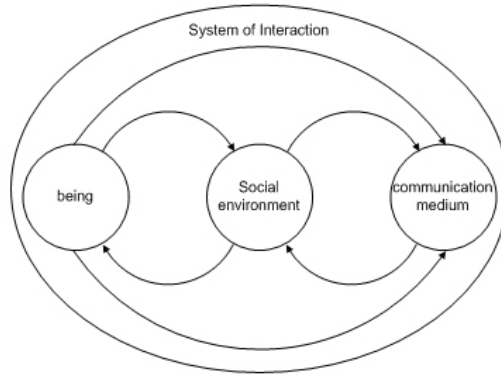

Fig. 1. System of interaction in the communication discourse

2.2 Coordination

Coordination in group work*,* is considered as a regulation process; the normal and routine flow of interaction where individuals are following their scripted roles. These scripts are thought as parts of product or process design documents and are coded in written rules, plans and schedules or in tacitly assumed traditions and norms [4]. The differentiation processes in organisation contexts, i.e. division of the work between specialists, groups, departments, are coupled by coordination processes to adjust the activities of individuals and groups to common goals. Andriessen's [2] deconstructive approach in defining coordination involves the possibility that participants, who work together under the framework of a common goal, do not necessarily share the same ideas and personal goals. He argues that *"…this common goal does not exclude that the individuals involved may also have different goals and/or conflicts. If however there is no commonality whatsoever, coordination is not needed."*

Often, the commonality of goals imply interdependency of activities; a notion that is considered central to coordination. This degree of task interdependence refers to the degree to which participants in a design context, rely on each other to carry out their individual responsibilities successfully. This degree of interdependence regulates the degree of coordination; the higher the task interdependence the higher the need for coordination [2].

Coordination is considered a central concept in cooperation/collaboration studies and often is used to define them. In this sense Thompson [17] supports the idea that task interdependence is one variable that affects team performance in terms of

coordination. Type of interdependence is another. According to his work three types of interdependence can be identified:

1. *Pooled* interdependence (discrete roles, no interdependence of tasks, no common goal, externally coordinated): in this type, each participant provides a discrete contribution to the design team by collating or pooling its obtained experience (information and knowledge). No need for direct individual interaction is needed. A typical example of this is a group of individual labourers who produce work and are coordinated by a supervisor responsible for adjusting the contribution of each members output to the task of the group.
2. *Sequential* interdependence (discrete roles, interdepended, no common goal, externally coordinated): in this type, the product or labour work of a participant is highly dependent upon the output of another. A classic example of this type is the work on an assembly line.
3. *Mutual or reciprocal* interdependence (discrete and specific roles, interdependence, common goal, internal or external coordination): in this type, participants set critical contingencies for each other that have to be determined before taking action. Participants have different but specific roles and interact in a meaningful way for a common goal, e.g. a surgical team. This is often described as a *collaborative* type of interaction [3].

Team or group interdependence (roles are unspecified-emergent, interdependence, common goal, self-coordinated) defined as a fourth type of interdependence by Van de Ven [18] in order to include the possibility where participants with similar or not discrete roles, jointly cooperate in order to accomplish tasks. In this case the organisation or team self-organises and autonomously defines its course of action. This is a typical example of a design team trying to complete a design goal or project and often is described as a *cooperative* type of interaction [3].

2.3   Cooperation and Collaboration

The 'collaboration' versus 'cooperation' debate is more complex compared to the distinction that Bair [3] provided in terms of coordination. Many researchers use these terms interchangeably and one can without doubt identify that there is an obvious disagreement amongst the authors themselves [8][2]. For the purposes of this work and in acknowledgement of the distinctions that others in the field have made, we provide definitions for the terms *cooperation* and *collaboration* that take into account previous approaches and also expand the meaning of both terms in an attempt to involve the paradigm of postmodern thinking that has been analysed in the previous section of communication analysis.

Therefore, we describe both terms within the limits of the three ontologically observed characteristics of the system of interaction in communication discourse outlined earlier. These can include:

1. Type of participants' roles: specific, discrete, emergent
2. Type of symbiosis: synergy, interaction, relations, interdependence, association
3. Group characteristics: size, proximity of members, virtuality
4. Division of labour
5. Type of teleological purpose (goal, aim, end)

6. Type of management/organisation (coordinated, autonomous, self-organised, indeterminate)
7. Type of environment (passive, competitive)

Cooperation is considered as a means to an end that involves gains and losses on the part of each participant (being a designer or an organization). This type of symbiosis is defined in terms of a continuous interaction and interdependence, within a contingent environment. This behaviour can sometimes encourage a competitive environment, and parties need not necessarily to carry a relationship beyond the accomplishment of the task at hand. The goal is considered static and is imposed by a manager/coordinator. In cooperation there is not a strong sense of team integrity beyond the goal but participants are aware of the interdependence that emerges because of the common goal that is imposed externally.

Collaboration is considered in terms of autonomy and self-organisation. Similarly to cooperation this type of symbiosis is described in terms of continuous interaction and interdependence, within a contingent environment. It is important that encouragement of competitive environment is considered necessary but its competitiveness is continually redefined in terms of the team coherence. There is not an external goal to be accomplished but all participants are focusing in carrying on interacting with other participants in order to secure their own participation in the network and as a result the autonomy of the team. Moreover the structural couplings that are produced during the course of the interaction provide the ground for the emergence of temporal goals that need to be accomplished. In this context a strong sense of team integrity and situation awareness is produced.

3   Analysis of Theoretical Framework

Our theoretical standpoint originates from the four characterisations (conservative, pragmatic, critical and radical) that Coyne [5] introduced for thinking about information technology in the postmodern era. Similar discourses have also been identified by Mumby [16] and Anderson et al. [1] in communication studies. These discourses [Fig. 2.] are described in terms of the aforementioned system of interaction (being, social environment, medium of communication) within the communication discourse [Fig. 1.].

Conservative is based on ontological representations and suggests the uncovering of original meanings that are placed in a real world. It is found on the Cartesian legacy of the separation of subject (researcher) from object (inquiry/knowledge). In this sense, there are 1) technological characteristics (data, information, knowledge, communication etc) that are quantifiable entities and can be measured and manipulated by technological means, 2) human activities, behaviour and needs that are determinable qualities while 3) social engagement remains a matter of causal explanations. For the purposes of this framework, the conservative discourse is useful for re-establishing the objects of our concern (e.g being, social environment, communication medium). The usefulness of conservative discourse is seen only within an iterative/recursive process of exploitation of the framework (see pragmatic).

Pragmatic discourse is not exclusive to the first but sees this separation of object and subject emerging from a continuous productive dialectical tension. It focuses in describing how the ontological concepts that are found in the conservative mode, interactively work together and tries to identify their characteristics within the system of interaction of communication. The observation of these characteristics (participants' roles, type of symbiosis, group characteristics, division of labour, purpose, etc.) provides feedback to both the conservative mode and the subsequent critical mode of analysis.

Critical is interested primarily in analysing the ways that observers in the pragmatic mode, co-construct meaningful contexts of communicative practices and focuses in exercising scepticism about the outcome. This is a reflexive mode of "suspicion" for the arguments of the previous modes of analysis. This position adopts a critical posture towards the explanation of issues of power, ideology, and marginalisation of ideas found in the conservative and pragmatic discourses by the observers. This mode of analysis focuses in identifying the way that the metaphor which is under conceptualisation in this framework, is to be treated with caution by the information systems designers who formalise it in design scenarios.

Radical discourse unsettles any claims to the importance of the proposed metaphor by showing that any ideas developed about the centrality of the metaphor might turn out to demonstrate the opposite. This "discourse of vulnerability" [16] represents the crisis of the validity of the framework itself by questioning all of its previous presuppositions. It provides systems designers with the idea that the "emancipation" that is offered by this very framework is elusive. It treats it as a text in the Derridian sense, where an endless play of signs takes place [7]. This framework is revealed and concealed through the incessant play of difference and contradiction.
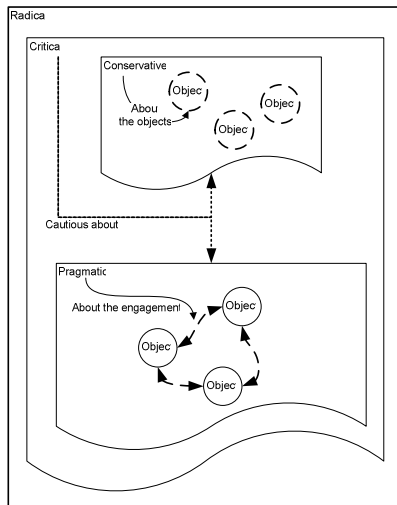

Fig. 2. The interaction of the four theoretical characterisations that Coyne [5] introduced in information technology theory

3.1 Co-purposing

At this point we define this interplay of ontological observations for knowledge acquisition, practice, critical apprehension and representational deconstruction, with the notion of "co-purposing" and we locate it among the communal practices, of communication, coordination, cooperation and collaboration that have been outlined previously and take place in all levels of systems design. According to the argument that this paper develops, 'co-purposing', as a metaphorical system of reference, is thought to offer mobility of the design context, by supporting the exchange of contextual awareness of work activities among the design participants and the information and collaboration systems designers, and thus provide the possibility of the design of a flexible setting for collaborative work. 'Co-purposing' itself is often mediated by information and communication technology tools and can be related to an organisational context of human activity within a socio-cultural environment.

The notion of 'co-purposing' is not considered as a static belief of instrumental communication or data manipulation or even a rigid systemic construct, but is seen as a continuous, social interaction and reflexive production of meanings among designers of various levels, including systems designers and their clients. These design participants continually strive to purposefully collaborate by constructing and deconstructing (differentiate and defer) meaningful structures of systems designs and design methodologies that they produce throughout their interaction.

4 Conclusion

This paper presented an empirical approach of analysing design organisations and it is though to operate by its continuous redefinition. The language which is produced by the use of its empirical process does not equate with an increasingly accurate correspondence of reality. Instead, it represents a process of professional self-justification. According to this postmodern view, research and design analysis proceeds on the basis of discourses which are already shared within particular systems design community. The evidence that is produced by the use of the aforementioned framework is interpreted and justified only within a restricted domain of linguistic constancy and it is possible to provide an inspiring methodological supplement for the design of information systems.

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