

# Understanding Pragmatic Aspects with Social Values in Web-Mediated Collaborative Systems

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**Abstract.** Various aspects underlying collaborative discussions in web-mediated systems influence the interpretation of exchanged messages, which may prevent participants to better manage, retrieve and explore available content. In this article, we argue that pragmatics and social values play a key role in this scenario, influencing each other. We propose to articulate aspects of pragmatics and values, and conduct four empirical analyses in a real-world case study. We ground our analyses on concepts and methods of Organizational Semiotics. The paper presents an analysis of participants' interaction, a communication analysis based on a framework of illocutions, and a discussion on the shared social values. Our results indicate possible interdependencies between social values and categories of illocutions.

**Keywords:** Values, Intentions, Social Web, Pragmatic, Collaboration, Organizational Semiotics.

## 1 Introduction

Pragmatics plays a central role in problem solving processes and information sharing. According to Morris, Pragmatics is concerned with “the origin, uses and effects of signs within the behavior in which they occur” [1, p.13], considering aspects such as intentions, communication, conversations, negotiations, *etc.* Several areas study Pragmatics, including Human-Computer Interaction (HCI), Linguistics, Semiotics, Philosophy, and Sociology.

In a Web-based system, the participants' intentions influence the interpretation of content constructed in a collaborative problem solving process (*e.g.*, messages, discussions, documents) during information production and consumption. An interpretation might, among others, have an impact on the further problem solving process, as well as on information retrieval and the reuse of solutions in future problems. The design and construction of systems that take into account pragmatic aspects require a socio-technical and multidisciplinary view, and rely on research that

still has many open issues. Although some existing design solutions enable users to express their intentions (*e.g.*, by marking messages with images that express intentions), few works explicitly investigate the impact of pragmatics in the Interaction Design (IxD) of Web applications — in particular for supporting collaborative problem solving.

We have studied the dynamic aspects of pragmatics in messages exchanged during collaborative problem solving processes within the special education domain [2, 3]. The conducted studies explored two scenarios: one in the “*Vila na Rede*”<sup>1</sup> Social Network System, which adopts a forum/“blog with comments” structure for questions and discussions, and the other within “*Yahoo! Answers*”<sup>2</sup>, which adopts the structure of multiple answers to a single question. These studies served to identify “pragmatic patterns” of design [3], which represent recurring situations of use that might require a design of solutions to facilitate, promote, or avoid the manifestation of the pattern.

This article aims to extend and deepen the understanding of these aspects related to pragmatics and communication by incorporating the value concept in other empirical scenarios. According to Schwartz’s Values Theory [7], values are desirable, abstract goals that vary in importance and serve as principles that guide peoples’ lives. This theory understands values as beliefs tinged with emotions, as motivational constructs that transcend specific situations and actions, serving as standards or criteria to guide the selection of actions, policies, people, and events. As such, social values and pragmatics seem to be interdependent: the way how people express intentions and negotiate meanings depend on individual and group values and vice-versa. Although the literature has explicitly focused on values in technology design [4, 5, 9] as well as on Pragmatics in IxD [3, 10], the relation between values and pragmatics and their impact on the design of web-mediated social systems require further research.

In this article, we articulate the value perspective with pragmatic aspects using methods from Organizational Semiotics (OS) [1], Speech Act Theory, and Values Theory. To this end, we explore the framework of illocutions to analyze intentions [1] and the ten basic areas of culture. These ten areas are named Primary Message Systems (PMS) [6], and support the understanding of “culture as a form of communication”. We furthermore investigate 28 key elements related to the PMS that represent critical aspects seen as values in systems aiming to promote social interaction [8].

Our case study investigates 27 topic discussions collaboratively conducted by inclusive education professionals in the TNR<sup>3</sup> system. We perform four distinct analyses: (1) a quanto-qualitative analysis of the social interactions; (2) a pragmatic and communication analysis inspired by [1]; (3) an analysis of values using the PMS; and (4) an analysis of the interdependency between social values and pragmatics.

We structure the remainder of this article as follows: Section 2 presents the background with the employed theories and methods; Section 3 presents a preliminary proposal to articulate pragmatics with social values; Section 4 describes our case study; Section 5 presents and discusses our findings; Section 6 concludes.

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<sup>1</sup> <http://www.vilanarede.org.br>

<sup>2</sup> <http://answers.yahoo.com>

<sup>3</sup> TNR is a collaborative online system for promoting continuous learning and professional autonomy of education professionals: <http://tnr.nied.unicamp.br>

## 2 Concepts and Methodological Foundations

### 2.1 Organizational Semiotics and Pragmatics

We understand the pragmatics concept according to its definition in OS. Semiotics refers to the theory of signs. In particular, in Peircean Semiotics, “a sign is something [...] which denotes some fact or object [...] to some interpretant thought” (Peirce 1931-1935, vol. 1, par. 346), and which involves a signifier (or representamen), a signified (or object), and an interpretant. Liu [1] asserts that an organization refers to a social system in which people behave in an organized manner, and in which norms as well as people’s individual or joint communication and interpretation of signs shape the organizational behavior. Hence, we understand the context of a Web-based collaborative system as an organization in which certain norms apply that define, for example, communication among participants or expected behaviors.

OS interprets the concept of Pragmatics as the relations between the intentional use of a sign and its effects on people in a social context, which is grounded on Morris’ [1, p.13] understanding of pragmatics. In addition to Morris’ syntactic, semantic, and pragmatic Semiotic layers (*i.e.*, structures, meanings and usage of signs), Stamper [11] has added additional three layers: physical, empiric, and social world. The *pragmatic layer* includes aspects such as: intentions, communications, conversations, negotiations, *etc.*; while the *social layer* includes aspects such as: beliefs, expectations, functions, commitments, contracts, law, culture, values *etc.* [1].

According to Liu [1], on the pragmatic level, human communication successfully happens when using a meaningful sign with an appropriate intention between the speaker and the listener. In pragmatic analysis, a communication act refers to the minimal unit of analysis. A communication act consists in a structure with three components: the speaker, the listeners (including the addressee), and the message. A message has two parts: the content and the function. The content manifests the meaning, while the function specifies the illocution, which reflects the intention of the speaker.

Liu [1] groups illocutions into three dimensions: *time* (*i.e.*, whether the effect is on the future or the present/past), *invention* (*i.e.*, if the illocution used in a communication act is inventive or instructive, it is called prescriptive, otherwise descriptive), and *mode* (*i.e.*, if it is related to expressing the personal modal state mood, such as feeling and judgment, then it is called affective, otherwise denotative). By using these dimensions, the illocutions are classified as: 1. *Proposal* (future, prescription and denotative), 2. *Inducement* (future, prescription and affective), 3. *Forecast* (future, description and denotative), 4. *Wish* (future, description and affective), 5. *Palinode* (present/past, prescription and denotative), 6. *Contrition* (present/past, prescription and affective), 7. *Assertion* (present/past, description and denotative), and 8. *Valuation* (present/past, description and affective). In this study, we employ the pragmatic analysis proposed by Liu to analyze pragmatic aspects in messages in a structured way.

## 2.2 Values and Culture

Friedman *et al.* [4] understand values as something that is important to an individual person or to a group of people. For Schwartz [7], values vary in meaning, importance and priority according to the culture under analysis and across time and space. Indeed, a value cannot be understood outside its cultural context since while a value indicates *what* is important for people, the culture explains *why*.

According to Hall (1959), culture relates to the very different ways of organizing life, thinking, and understanding basic assumptions about the family, the economic system, and even mankind; it refers to people's attitudes, material things, learned behavioral patterns, and values. The author understands culture as a form of communication and proposes ten basic areas ("Primary Message Systems") that represent the building blocks for mapping and analyzing culture. Hall suggests that cultures develop values according to these areas, explaining them as follows:

- *Interaction*: everything people do involves interaction with something/someone else: people, systems, objects, animals, *etc.* Interaction is at the centre of the universe of culture and everything grows from it;
- *Association*: all living things organize their life in some pattern of association. This area refers to the different ways that society and its components are organized and structured. Governmental and social structures may strongly vary according to the culture, not only in nature, form and function, but also in importance;
- *Learning*: refers to the one of the basic activities present since the beginning of life. Education and educational systems are strongly tied to emotion;
- *Play*: fun, emotion and pleasure relate to this area, which is linked to other areas: in learning it is considered a catalyst; in relationships a desirable characteristic, *etc.* If one controls the humor of a person, one is able to control almost everything else;
- *Defense/Protection*: cultures have different mechanisms of protection (*e.g.*, medicine, military strategy, religion) and defense is an activity of vital importance;
- *Exploitation*: relates to the use of materials to explore the world. Humans have made tools and artifacts for cooking, protecting, playing, learning, *etc.*
- *Temporality*: time relates to life in several ways: from cycles, periods and rhythms (*e.g.*, breath rate, heartbeat) to measures (*e.g.*, hours, days) and other aspects in society (*e.g.*, division according to age groups, mealtime). The ways people deal with time and the roles of time in society vary across cultures;
- *Territoriality*: refers to the possession, use and defense of space. There are physical (*e.g.*, country, house) as well as social (*e.g.*, social position, hierarchy) and personal spaces (*e.g.*, personal data, office desk). The understanding of space also may strongly vary according to the culture;
- *Classification*: refers to the differences in terms of form and function related to gender, also considering differences in socio-economic conditions, age, *etc.*;
- *Subsistence*: ranges from people's food habits to the economy of a country. Professions, supply chains, deals, natural resources, are all aspects developed in this area; not only other areas but also geographical and climatic conditions may influence this area.

### 3 Articulating Values and Pragmatics in Communication

We must successfully cross all six semiotic layers to achieve successful communication [1, p. 35-36]. On the level of pragmatics, the communication partners need to understand the intentions of the speaker and listener, while on the social layer they need to consider the commitments and obligations created or discharged as the result of a conversation.

According to Stamper [12], norms stand for fields of force that govern how members think, behave, make judgments and perceive the world. Culture and values directly influence norms. People have different cultural systems that govern how they understand, value and react to material or speech acts. Considering Pragmatics, as understood by OS, values may act as norms that influence peoples' intentions, both when using signs and when interpreting them with respect to their effects on society. This means that when dealing with pragmatic aspects in collaborative problem solving we must consider the complex cultural context of people and their values. Considering OS and Values Theory, we rely on two assumptions:

1. *We can improve our understanding of the socio-pragmatics aspects of the communication when we consider the underlying value aspects related.*
  - (a) Values may have influence on people's intentions (and other pragmatic aspects) and commitments (and other social aspects);
  - (b) We can understand communication better if we understand "how this influence happens", *e.g.*, by correlating the values to illocutions and norms.
2. *We can improve our understanding of the values in a social system when we consider socio-pragmatic aspects of the interaction.*
  - (a) The socio-pragmatics of the communication may influence on how users share and understand the social network's values;
  - (b) We can understand the values better, if we understand "how this influence happens", *e.g.*, by correlating the illocutions and norms to values;

### 4 The Case Study and Methodology

This section presents how we conducted the study of the interdependencies of illocutions and values providing local evidences of these interdependencies regarding the studied scenarios.

We situate this case study in the context of computer-mediated continuous learning of Brazilian special education teachers, under the research project "Social Networks and Professional Autonomy". One of the project's main goals consists in creating a system for supporting collaborative case discussions. The project team adopts participatory methods and consists of researchers from the areas of Education and Computer Science, as well as of 28 Special Education Service (SES) teachers from all five geographic regions of Brazil.

Currently, the designed system has more than 500 registered SES teachers. We conducted our analyses on more than 1800 messages created by teachers between April and December of 2013, relative to the discussion of 27 topics in the system.

Each topic was introduced by an affirmation and a poll that prompted the teacher to decide whether the affirmation was true or false. Each poll had a separate comment section where teachers freely discussed the affirmation and related matters in a forum-like structure during a week. The affirmations were related to inclusive education and the different ways public schools in Brazil deal with children with special needs.

We conducted four distinct analyses.

1. *Analysis of interactions and messages.* We performed a quanto-qualitative analysis where we analyzed different aspects related to the social interaction. A set of key variables were collected directly from the database. Four analysts discussed the results to identify relevant aspects of communication. The key variables identified in the group discussion include: average size of messages and number of messages by topics and by participants, number of messages exchanged by participants. This analysis allowed us to observe general aspects regarding the messages and the participants under collaboration.
2. *Communication analysis.* We performed this analysis of communication inspired from the framework of illocutions [1]. Firstly, the theory and the analysis method were presented to a group of 14 analysts (3 professors, 2 postdoctoral researchers, 9 PhD/MSc students). The analysts' profiles included specialists in HCI, natural language processing, education, Semantic Web, e-Science and statistics. Since not all of the analysts were experienced in performing a pragmatic function analysis, ten topic discussions were analyzed by seven pairs of analysts in a face-to-face session after one of the authors presented an introduction to the pragmatic function analysis. The remaining 17 discussions were individually analyzed. We performed the analysis by using the following procedure: (1) the collaborative discussions were randomly distributed to the analysts; (2) the analysts read the texts systematically (word by word) aiming to identify the speech act units (*i.e.*, breaking messages in acts); (3) they annotated the text assigning continuous values from 0.0 to 1.0 for each dimension of Liu's [1] communication analysis; (4) we (the authors) performed an analysis of the frequency of the values assigned for each dimension and classified illocutions; (5) finally, we discussed the results and graphs, while aspects regarding the problem solving and discussion processes were observed by cross-referencing the cube/function analysis with the content.
3. *Analysis of values.* From the collaborative discussions, we analyzed the values shared by the participants. Four analysts read the exchanged messages after the communication analysis. They performed the value analysis to firstly identify common values of the social network present in various scenarios. One analyst produced general comments that were posteriorly discussed with the four analysts. Afterwards, the analysis focused on the most expressive aspects present on the scenarios. To this end, we selected two scenarios for a thorough study after a first analysis of the whole set of collaborative discussions. The used criteria for the selection relied on the aspects of the interesting elements with respect to values based on the used background, predominance of the value and influence on the discussion process.

4. *Analysis of interdependencies between values and pragmatics.* The analysts read the collaborative discussions again aiming to identify examples of communication acts with explicit references to the areas of culture. For each extracted example, we conducted a local and a contextual analysis of pragmatics. We aimed to observe interdependencies between the social values in the culture areas and the illocutions. The local analysis (denoted as  $ill_{loc}$ ) presents the assigned values for the three dimensions of the framework of illocutions, considering only the communication act extracted. The contextual analysis shows the most frequent illocution category, considering all communication acts from the commentary (denoted as  $ill_{com}$ ), where the extracted communication acts appear, and from the entire discussion (denoted as  $ill_{dis}$ ).

## 5 Results and Discussion

The 27 topic discussions amounted to a total of 552 comments, 529 (95.8%) of which were analyzed (23 comments were duplicates). A discussion received an average of 20.44 (minimum: 7, maximum 36) comments and 33.3 votes (minimum: 15, maximum: 59). There was no correlation between the difficulty of answering a discussion's initial affirmation (measured in percentage of wrong answers) and the number of comments. Only a weak linear correlation existed between the comment number and the average discussion thread depth, but no correlation between difficulty and thread depth. During the last month of the analysis, the system had 539 registered users, 287 of whom accessed the topic discussions. On average, more than half of the registered users accessed the topic discussions at least once a month.

The average comment size was 79 words or 622 characters. Counting only the 85 users who effectively commented on topic discussions, each commenting user posted 6.5 comments on average. However, the distribution of comments per user followed a typical long-tailed distribution. The top-three users amount for approximately 25% of all comments, the top-ten for almost 50%, while more than half of the users who commented (45 out of 85 users) posted up to 3 comments. 54 of 85 commenting users posted or received at least one comment. The number of responses posted and received also followed a long-tailed distribution. Looking at single pairs of users, the relation between posted and received responses was relatively symmetric, with the exception of one user pair, where one user posted eight responses and the other zero. The analyses resulted in 1813 messages corresponding to 529 analyzed comments, *i.e.*, an average of 3.43 messages per comment, and an average message size of 156 characters or 24 words.

The dominating illocution types over all discussions and messages were assertion (51.7%) and valuation (29.8%), followed by proposal (8.2%), inducement (4.2%), and forecast (2.5%). Palinode, wish and contrition accounted for 3.5% of the analyzed messages. Some of the topic discussions showed a different distribution of illocution types, *e.g.*, discussion #1 with a high number of forecasts, wishes and inducements, or discussion #17 with a high number of forecasts and inducements.

## 5.1 Results of the Analysis of Social Values

At the home page of the TNR system, a "*Charter of Principles*" highlights and makes explicit the most important values shared by the network. The guiding principles of the TNR system include the "National Policy of Special Education in the Perspective of Inclusive Education" and the UN Convention on the Rights of Persons with Disabilities, as well as ethical principles concerning: accessibility, autonomy, collaboration, conversation, sharing and focus on the group. These values are shared by many participants and influence the network's activities, for example:

- In various discussions the participants emphasize these principles. Some conversations repeat a pattern, frequently when one participant posts/externalizes a "strong value" in the discussion, other participants answer with agreements;
- Some key participants took the responsibility to verify whether others follow the values. The discussions present some questions and inducements aiming to preserve the values and maintain some "homogeneity";
- Participants indirectly and subtly inquire on sensitive problems.

In the following, we present a brief characterization of two discussions.

*Comments on two selected topic discussions.*

**Discussion #14:** "The so called "inverse inclusion" (*i.e.*, including students without special needs in predominantly special classes) is a trick adopted by special schools to be characterized as inclusive schools."

- Initially, some participants shared a sequence of messages with agreements that the affirmation (#14) was true. This was influenced by shared values stating that "an inclusive education occurs in regular schools", instead of "special schools";
- After the initial sequence of agreements, users pondered on this in a further set of messages, arguing that the initial statement (#14) could not be generalized for all the "special schools". This sequence expose a chain of values about the "special schools", "what they want to achieve", "the schools intentions" and others. This sequence strongly deliberates that many participants admitted the possibility of the initial statement to be false according to the situation, as the following example of message: "[...] *By the time the institution had been able to break out of this process [inverse inclusion] and go for the full inclusion of students. For those who analyzed this [the adoption of inverse inclusion] from the outside it seemed to be a completely bad idea. For that institution, nevertheless, it worked as a transitory phase. However, this is not the reality of all the institutions [...]*";
- In the same discussion, the entrance of a new participant strongly influenced the discussion. She made a global appreciation of the problem, and after doing this, she questioned some aspects in the discussion and shared an article about the History of Special Education in Brazil. Another participant appeared "vigilant", explicitly pointing out and demonstrating values present in the network, while at the same time explicitly presenting her intentions. Some examples of messages include:

(1) “[...] Guys, please find attached an article that I found quite interesting on the History of Special Education. I hope that you read it and share your impressions here [...]”; (2) “[...] This text is directed specifically to a very specific audience, and we work with education in general, with specialized education support, we believe that we crossed this line [...]”; (3) “[...] I did not intended to align the ideas with the Special Education Polices, my intention was to disseminate a historical process that had not started in Brazil [...]”; and (4) “[...] In fact, the text you brought embraces concepts contrary to the Special Education Policy ...”

**Discussion #17:** “Adapted school curricula are recommended for including students with disabilities in regular classes of a primary school.”

- Various messages indicated that participants had not a shared understanding of the curriculum concept. Some participants perceived this aspects and explicitly mentioned this in some messages, e.g.: “I agree with you that there are confused ideas [in the discussion] about: resources and curriculum adaptation. I think that it’s better to stop now and think about these terms. Isn’t it?”, and “... How about you post something about curriculum adaptation and creating/acquiring/producing AT [Assistive Technologies] for a specific audience?”
- The lack of a common definition of the concept of curriculum reflected in messages about the key network values, i.e., depending on how one understands this concept, one might interpret that some users were not respecting some of the key values on the “Charter of Principles”. Conversely, if one assumes that participants shared the same values, one might assume that they do not share the same theoretical referential on school curricula, e.g., “... I observed that there are votes/opinions that agree with the affirmation [#17], however it is false! In an inclusive school, to adapt activities, separating them or assigning them only to students with disabilities is a discriminatory action [...]”, and “[...] But shouldn’t the curriculum be open? If we do not adapt it, aren’t we restricting the learning possibilities?”
- The lack of definitions of the words “adapt” and “modify” (there is a linguistic subtlety regarding two verbs that were used by the participants: the Portuguese verbs “*adaptar*” (to adapt) and “*adequar*”; “*adequar*” can be translated to “to adapt”, “to adjust”, or “to modify”) also resulted in misunderstanding and questions about the network values, e.g., “Should the activities be adapted or modified? And now?”, and “When we talk about curriculum we quickly think about adaptation, I (particularity) never liked the word adapt ...”

## 5.2 Results of the Analysis of Interdependencies

Table 1 presents the areas of culture along with the values and examples. Note that some examples may fit into more than one area. Table 2 shows the detected interdependencies analyzed for each example presented in Table 1. Table 2 presents the illocution type of each example ( $ill_{loc}$ ), as well as the predominant illocution types for the comment in the context of which the example occurred ( $ill_{com}$ ) and for the discussion in the context of which the comment was posted ( $ill_{dis}$ ).

**Table 1.** Areas of culture and extracted examples from the case study

Area		Values	Extracted example/evidence
1	Interaction	Identity and Norms	"...If I am wrong, please correct me, but we are here to show our ideas, beliefs and to enrich our curriculum..." (Norms)
2	Association	Conversation, Groups, Relationship and Trust	"...Let's think, talk and clarify our thoughts about these questions..." (Conversation and Groups)
3	Learning	Meta-communication	"...will have soon [...] a specific tool to this end, with which we will discuss our cases, elaborate our SES plans in a collaborative way..."
4	Play	Aesthetics, Emotion and Affection	"Hello! I liked a lot of the comments made by you..." (Emotion and Affection)
5	Protection	Informed Consent, Reputation and Security	"By reading this question I would like to use a text written in 2007 by Rita Bersch and others that cite..." (Reputation)
6	Exploration	Accessibility, Object, Property (ownership) and Usability	"This is a space for sharing! This space (the system) is yours enjoy it !!!" (Property)
7	Temporality	Availability, Awareness and Presence	"We are happy to have you here" (Awareness and Presence)
8	Territoriality	Portability, Privacy, Scalability and Visibility	"...Fill out your profiles and read those of your colleagues..." (Visibility)
9	Subsistence	Autonomy, Collaboration, Reciprocity and Sharing	"...Let's keep collaborating one with each other in order to deepen our knowledge about the SES in the inclusive perspective..." (Collaboration and Sharing)
10	Classification	Adaptability	"[For new users] Extend the TNR all over Brazil, contaminating the colleagues with this new way to constitute a strongly united group, full of enthusiasm for the changes caused by network communication..."

**Table 2.** Analysis of interdependencies between areas of culture and the framework of illutions based on the extracted examples of the case study

Area	local analysis (ill <sub>loc</sub> )				contextual analysis of comment (ill <sub>com</sub> )	contextual analysis of topic discussions (ill <sub>dis</sub> )
	T	I	M	Category	Predominant Category	Predominant Category
1	0	0	1	valuation	valuation	assertion
2	1	1	0	proposal	assertion	assertion
3	1	0	0	forecast	assertion	assertion
4	0	0	1	valuation	assertion	assertion
5	1	1	0	proposal	assertion	assertion
6	0	0	0	assertion	valuation	assertion
7	0	0	1	valuation	valuation/assertion	assertion
8	1	1	0	proposal	valuation	assertion
9	1	1	0	proposal	assertion	assertion
10	1	1	1	inducement	assertion	assertion

The examples presented in Tables 1 and 2 are not fully representative, but have been picked for illustrative purposes. For example, the contextual analysis of the whole discussion ( $ill_{dis}$ ) showed a predominance of assertions. This contrasts with the incidence of just one assertion in the local analysis examples presented in Tables 1 and 2. Assertions and valuations are also frequent in  $ill_{com}$ . Consequently, we could not identify an explicit correlation of  $ill_{com}$  and  $ill_{dis}$  with  $ill_{loc}$ , nor any indication that the categories of  $ill_{loc}$  are consequences of a sequence of similar illocutions in  $ill_{com}$  or  $ill_{dis}$ .

Although the number of 1813 messages yielded significant results for the analysis of illocution types, it did not yield statistically significant results for each value in the different areas of culture. For example, no messages were found that could be associated with the value “scalability”. On the other hand, the messages for the value “object” showed a distribution of illocution types that matched the distribution of all messages. Possible correlations between certain values and certain illocution types remain a question for future research. For example, there might be a relation between the value emotion and affect with illocution types containing mode “affective” (inducement, wish, contrition, valuation). We also need further research to answer whether or in which ways the analysis of values and illocution types in user generated content supports systems design. For instance, identity, norms, conversation, groups, relationship, and sharing are values that occurred frequently and that are regarded important by the research and design team. Reputation is a value regarded significant that occurred very infrequently. Does this mean that reputation is not important for users, or does it mean that this value manifests itself in other, less explicit ways?

As to our initial assumption, the interdependence of socio-pragmatic aspects and values, our analysis has provided various examples that show that considering values and illocution types together yields a better understanding than considering each one separately. For example, discussion #14 had a high percentage of messages about the values norms, conversation and groups, and a relatively low percentage of messages about the value object. It also had a balance between assertions and valuations, as well as a high percentage of affective illocution types. These pieces of information together indicate that, although its topic (“inverse inclusion”) was relatively “unsuspicious”, discussion #14 led to an engaged discussion in order to define some of the core values of the system. Another example is that of user 21 who posted a relatively high number of messages containing inducements and related to the values norms and groups. This can be interpreted as a user who took on the role to instigate others to discuss important values of the system.

## 6 Conclusion

Pragmatics and values play a central role for understanding and analyzing the human communication processes. The study of both concepts on collaborative systems may provide new alternatives for analyzing the social interactions and communication aspects. Nevertheless, the correlation between values and pragmatics and their impact on the design of web-mediated collaborative systems still remains uncertain.

This paper presented an exploratory study focused on the investigation of possible interdependencies between defined social values and categories of illocutions.

The achieved results pointed out promising opportunities for further explaining the communication in a structured way on collaborative systems. However, the study provides a limited view of the pragmatic and values aspects, and a deeper understanding of the interdependencies is required to concretely inform design. Our future work will propose a more detailed qualitative and quantitative investigation of these interdependencies, as well as expand the study on pragmatics and values, *e.g.* by analyzing the normative aspects.

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