Designing for multimodality: search for new contexts in digitally mediated written communication

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ABSTRACT
Multimodality of interaction is an often neglected topic when it comes to digitally mediated written communication. Described by the paper *Digital Body Language* project explores this topic and defines the role of the designer as searching for new emerging semiotic resources with the perspective that takes into account different modalities as interconnected and strictly bonded parts of interaction. DBL sets to explore a question of *Which characteristics of interactions with technology could open the design space for a new context, that could be perceived and processed simultaneously and interdependently with language?* Proposed approach of designing for new modalities of interaction, uses Slow Technology philosophy and Defamiliarization method to reach a state of interplay between pre-reflective and self-monitored embodied experience. Building on a belief that technology has a certain capacity for new modalities that emerge from its characteristics, paper suggests different start points for design and discussion of multimodal written communication.

CCS Concepts
• **Human centered computing → Activity centered design**

Keywords
Multimodality; Multimodal interaction; Embodied interaction; Written communication; Slow Design;

1. MULTIMODAL INTERACTION
In the recent years more and more scholars from various domains who have human interaction in the centre of their interest, focus on the multimodality of communication. [8] In the opposition to traditional paradigm of sender and a receiver, in which body is treated only as a vessel for a message, to the conventional division between verbal and non-verbal communication and to the analytic frameworks studying individual semiotics systems as self-contained wholes, they take a more holistic approach focusing on interdependence of various semiotic resources [9]. Streeck, Goodwin and LeBaron in their book *Embodied Interaction: Language and Body in the Material World* describe building action within interaction:

"...the participants simultaneously make use of a number of quite different kinds of semiotic resources that have different properties and are instantiated in different kinds of semiotic materials (linguistic structure in the stream of speech, signs such as pointing displayed through the visible body, the patterning of phenomena in the environment that is the focus of their work, etc.)." [9]

In this approach (that builds its understanding of embodied interaction on the works of Meads, Vygotsky, Bakhtin, Bateson, Goffman, Sacks, Schegloff and Jefferson), no single modality holds the capacity of fully expressing the utterance on its own (language and its materiality being only one of them) and the speech is interdependent to other embodied behaviours (such as gestures, gaze or body posture) [9]. Following the stream of thought of anthropologists, communication theorist and interactionist researchers, but taking the position of a designer, the task ahead is not only putting in practice existing analyses, "*systematic investigations of various kinds of semiotic resources and meaning-making practices"* [9] but rather exploration, search for new emerging semiotic resources with the perspective that takes into account different modalities as interconnected and strictly bonded parts of interaction.

2. GAINED IN TRANSLATION
2.1 Embodied interaction in the digital realm
Whereas face-to-face interaction is easily recognised as rich and multimodal with diversified sets of semiotic resources such as tone of voice, body movements or setting of the action, an interaction in a digital realm can be at the first moment assumed to be incomplete or even monomodal. Understanding translation as a phenomena of changing the medium, reality from material to digital, to many something seems to be lost with the translation from face-to-face to digitally mediated communication, or even from speech to written communication. Previously cited *Embodied Interaction* states:

While offering a powerful and most important arena for study, such logocentricism – what Linell [6] calls the written language bias in linguistics – nonetheless renders invisible many of the crucial forms of semiosis that shape human action in actual interaction (for example many of the embodied phenomena (...), as well as the crucial role of structure in the world that is a focus of participants' talk and action" [9]

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Through this paper an alternative approach is proposed: one that focuses on the aspects gained in these translations. Digitally mediated interaction and written language do not simply lose semiosis but rather should be associated with their own distinctive semiotic resources and particular representational capabilities.

2.2 Technologically specific context

In the *Digital Body Language* (DBL) project designing for multimodality in the digital realm focuses on the search for interaction's own context, modalities that emerge as specific for that particular technology. In contrast, popular emojis are an example of straightforward adaptation of the "lost" modality of face expressions into digitally mediated written communication. Exploring the interface of the interaction – in this case a keyboard - and its specific materiality allows for exploration of new, previously unused modalities and representations of digitally mediated written text. The keyboard and depending on its corporeal form embodied behaviour was a start point for DBL. Similar rule is followed by *Time Based Tex*t (TBT) [10] - one of the inspirations behind the project. TBT is a software application recording performance time of written text in a form of timestamp for each letter and allows for playback of the process of typing. Alternatively, *ReConsitution 2012* [7] by SOSO Studio, live graphical mapping of US Presidential Debates is an example that explores the representational capabilities of text in the digital environment (see Figure 1).

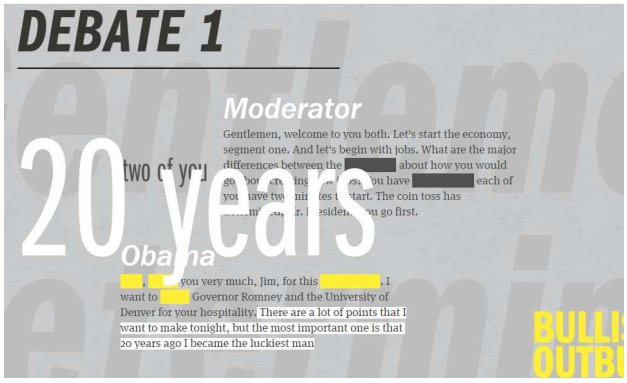

Figure 1. ReConsitution by SOSO Studio; Source: [7]

3. DIGITAL BODY LANGUAGE PROJECT

Digital Body Language is a text processor that integrates the dynamics of the writing process, pre-reflective (and self-monitoring) "body language", into digitally mediated written communication, detecting different typing behaviours and translating them into typographical distortions. An algorithm coded in Processing allows for input of text, recording time of a key being pressed and mapping the modality of typing dynamics onto the typographic representation of the text. This specific semiotic resource of embodied behaviour of keyboard usage is explored in four basic aspects: speed of typing (average time interval between typed characters inside words), time intervals between words, pauses inside words (interval between two characters inside a word bigger than a previously set maximum) and deleting (number of words deleted). These are mapped respectively to: tracking (the slower participant writes, the bigger tracking of a word is), blank spaces (representing long pauses between words), changes in opacity (words with long pauses within being represented by darker shade of black) and changes in font size (size of the first word typed after a deleted text increased).

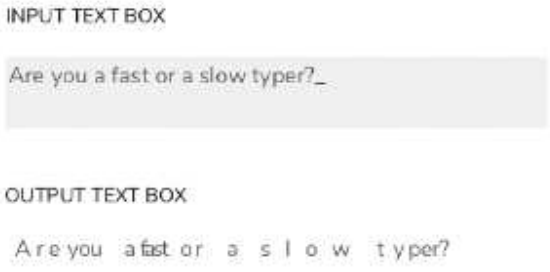

Figure 2. Example of mapping rule: of speed of typing

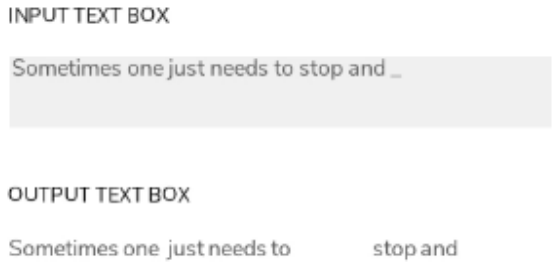

Figure 3. Example of mapping rule: pauses between words

This is an attempt of designing for modalities that emerge with the translation of abstract thoughts into digitally mediated written communication, specific only for interaction in the digital realm, with the aim of allowing for richer (both pre-reflective and self-monitored) expression of the context. It can also be said that the text processor emphasizes the *participative status* of the interaction, taking into account embodiment aspect in the understanding of Dourish [3].

Figure 4. Sample text written in the DLB processor: an official message written slowly and with hesitations

4. PLAY BETWEEN PRE-REFLECTIVE AND SELF-MONITORED

The important quality characteristic for developed DBL project is the interplay between pre-reflective and self-monitored states of interaction. Given understanding of reflectivity draws on the work of Meads: " By self –reflection, a term occasionally employed by Mead himself but left undefined, social psychologist refer to the ability of individuals to reflect upon their own circumstances, on the meaning and effects of their own (imaginary, possible or real) actions, on their beliefs about themselves, and on their beliefs about their beliefs. Self-control or self-monitoring are terms of more recent origin, not explicitly used by Mead, but clearly implied in his writings on the self. As it is now commonly used, self-control refers to the ability of individuals to direct their own actions on the basis of self-reflection; self-monitoring is that form of self-reflection directed towards self-control."[1] The pre-reflective status is connected to the habitual nature of writing (which can be understood in frames of Bourdieu's concept of habitus). During user test of the DBL prototype the initial interactions seemed to rely on pre-reflective embodied dispositions, whereas later actions of the participants could be interpreted as self-controlled. Knowing the dynamics of their movements is being mapped and reflected in the text, participants entered the self-monitored state in which they would for example change their typing speed to explore the outcomes. What happens after the initial phase of familiarization, after a participant seems to get the grip of the rules behind the algorithm is a constant play between the pre-reflective and self-monitored states. This phenomena is related to incorporation of *Defamiliarization* [2] and *Slow Technology* [5] concepts into the design process.

5. DESIGNING FOR REFLECTION

5.1 Slow Technology and Defamiliarization

DBL is following the philosophy of Slow Technology, thus putting reflectivity at the core of design, taking into account its relevance for meaning-making processes. The text processor invites reflection by taking up time for all five determined by Slow Technology means.

"...it takes time to:

i)learn how it works

ii)understand how it works

iii) apply it

iv) see what it is

v) find out the consequences of using it" [5].

It is not only that DBL invites reflection from the reader but the reflection is inherent in the design by revealing expression of a present time. The typographical distortion reveals the presence and emphasizes the meaning of time spent on writing the message. At the same time reflective characteristic of DBL comes from the method of Defamiliarization: distorting something familiar, something that due to overexposition exists at the periphery of our attention, into something unusual, strange, unfamiliar [2]. Being used to conventional representation of text, its representational capabilities like tracking or white space seem invisible to an ordinary reader. A change attracts attention, a fact used eagerly in experimental typography, and thereupon reflection. At the same time, a slight change of calibration of the prototype could render the distortions back into something almost invisible, using the typography to create a certain feeling, going back to the periphery of the attention. Even those almost imperceptible changes contribute to creating an affect, allowing for richer expression by ambient approach.

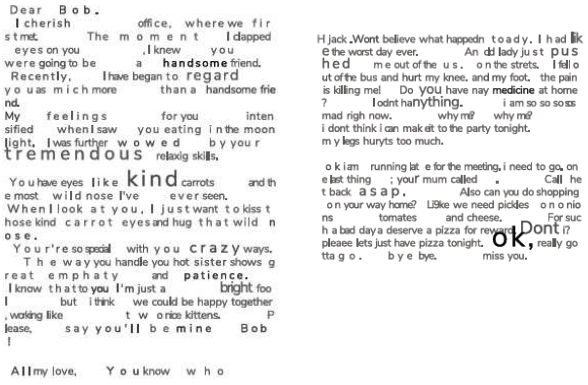

Figure 5. A comparison of two texts written in a DBL text processor: a love letter (left) and a quick note (right)

5.2 Between reflection and interpretation

With strong focus on reflectivity within the design and the introduction of mapping of certain aspects of embodied behaviours in the algorithm, the topic of interpretation should be mentioned. Firstly, the mapping is striving for lack of interpretation. It aims at logical representations (e.g. increased tracking results in the word taking up more space and in consequence increasing the reading time to reflect longer writing time), rather than interpreting possible cause of a certain behaviour. Secondly, even though the gestures and respectively mapped distortions have a meaning-making potential, in the same time their actual context remains an unknown. A pause inside a word could mean hesitation, but it could also be caused by an external distraction or any other kind of impossible to predict factor. Intentional emphasis of semiotic resources has the intent of both facilitating the meaning-making process, as well as subverting it.

6. DESIGNING FOR MULTIMODALITY

Digital Body Language project is described here to serve as an example of an approach of designing for new modalities of interaction in the search of creating new contexts and richer expression. It sets to explore a question of *Which characteristics of interactions with technology could open the design space for a new context, that could be perceived and processed simultaneously and interdependently with language?* Design process for DBL project started with a series of 4 experiments exploring various semiotic resources and sense-making patterns: a definition making algorithm for non-existing words, set of poetry created with Google Translate, an algorithm creating a flow of synonyms and digital dictionary of untranslatable words. Each experiment brought a set of new questions and insights into to the DBL project. This process of series of experiments seems to be suitable for the task of designing for multimodal interactions due to its divergent nature. In the final phase focused on digitally

mediated written text, building on the belief that technology has a certain capacity for new modalities that emerge from its characteristics, the design team started with the physical interface – a keyboard. Alternative suggested start points include, but don't limit to: specific *participation framework* [4] of interaction in the digital realm and its possible deformation by detachment of author and the text in the cognition of the reader, lack or shift of embodied co-presence or common course of action of participants, temporal organisation of the interaction and the potential of adding means of expression by partial or complete redesign of the interface component.

7. CONCLUSION

Even though digitally mediated written communication seems to be a neglected topic in the discussion of multimodality due to its strict conventional form, it still can be explored in the search for new modalities of interaction. The aim of the design team behind DBL project was to experiment with the context of written communication and start a debate about nature of embodied interaction in the digital reality.

8. ACKNOWLEDGMENTS

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