

# **ABSTRACT OF THE THESIS**

## **A study of unequal computer platform effects on task performance and collaboration patterns**

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Personal data assistants are being used in the field to collect data and to communicate with others both in the field and in the office. The individual in the office invariably has a laptop or a high-end personal workstation and thus, significantly more computing power, more screen real estate, and higher bandwidth input devices, such as a mouse and keyboard. These differences give the high end user the ability to represent and manipulate collaborative tasks more effectively. It is therefore useful to know what impact these differences have on work performance and work communications. Four different platform combinations involving a PC and a PDA were used to examine the effect of communicating via heterogeneous computer platforms. The PC platform used a mouse, a keyboard, and a 3-dimensional screen display. The PDA platform used a stylus, soft buttons, and a 2-dimensional screen display. A variation of the Tetris wall-building game called Slow Tetris was used as the subjects' collaborative task. A second factor in the

experiment in addition to platform communication was role asymmetry. One subject was arbitrarily put in charge of the task solution in all of the combinations. An analysis of the solution times found that subjects with mixed platforms worked slower than their homogeneous counterparts, i.e., a person in charge with a PC worked faster if their partner had a PC. This was also true when the person in charge had a PDA. An in-depth analysis of the communication patterns by means of conversation analysis techniques found conversational exchanges from pairs in homogeneous platforms or pairs where the person following direction was assigned to the higher-end platform to be significantly different from their counterparts. The platform of the person in charge of solving the problem was not a significant factor in the communication differences. The PC to PDA combination (with the person on the PC in charge of the solution) took significantly more time than the PC to PC combination. The PC to PDA communication exchanges had more episodes of one-sided conversation while the PC to PC combination had more attempts of take-over over the task solution by the person following directions. The PDA to PC combination took more time than the PDA to PDA combination (not significant) despite having one team member with a better representation. The PDA to PC heterogeneous combination exhibited more collaboration, less one-sided communication, more direction giving and more takeover attempts than any of the other combinations. On the other hand, PDA to PDA collaborations presented the highest frequency of one-sided conversation and less collaborative behavior.