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What is it like to be a byte? Analysis of student self-reports after a role-playing learning activity

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#### Abstract

This paper reports on our ongoing linguistic analysis of reports written by college students after engaging in an experimental learning situation on the topic of “computer architecture”. In the class, rather than attending to a traditional lecture, students were asked to play the part of individual computer components, such as memory cells or processor, and to learn by experience. Their reports, answering the question “*what did it feel to be a byte?*”, show a very unusual mix of emotional and technical statements, many of them associated grammatically in the same sentence. This suggests that this novel teaching methodology has potential to create durable associative memory encodings, in which technical concepts that would otherwise be too arid are linked to personal and situated experience.

What is it like to be a byte?

Analysis of student self-reports after a role-playing learning activity.

This paper reports on our ongoing analysis of reports written by college students after engaging in an experimental learning situation as part of a class in Computer Science. Our research uses linguistic analysis to investigate the educational benefits of this new teaching methodology.

Methods

Material: We analyse a corpus of 22 one-page reports, written by undergraduate college students (M=21, 5 male, 17 female) after participating in a class session on the topic of computer architecture. Instead of a traditional lecture, students in the class were asked to play the role of individual components of an imaginary computer, e.g. addressable memory cells, processor, etc. A video of the class is available online (<http://www.youtube.com/watch?v=xPkcFARH2rk>). After the class, students were asked to describe their experience in free text form, on the topic “what is it like to be a byte?” (a parody of T. Nagel’s “What is it like to a bat?”, Oxford 1986).

Analysis: We conduct systematic analysis of the verbal content of the report, both manually and using the text analysis software LIWC (<http://www.liwc.net>).

Results

The reports present both a high ratio of cognitive and emotionally-connoted words (typically indicative of personal texts) and of articles and big words (>6 letters) (typically found in technical and formal documents). Technical statements found in the essays were generally correct (75%), which suggests a positive learning experience. Interestingly, a substantial share (9/22) of the technical statements were found directly associated, in the same sentence, with emotional expression (“*I am so proud because I am the only part of the computer that can do arithmetic and logical operations*”). This suggests a very peculiar process of associative memorization in which the arid and technical is linked to personal and situated experience.

Summary:

College students studied difficult aspects of computer architecture via a novel role-playing learning activity, then wrote reports about their experience. Linguistic analysis of these texts reveals unusual combinations of emotional and technical statements, suggesting that this teaching methodology can create durable associations in memory even for “arid” technical concepts.