

## Comparing program comprehension in different cultures and different representations

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A visual annotation for imperative programming languages called R-Technology was developed in the Former Soviet Union in the 1970's and 80's. This notation, quite distinct from flow charts, makes the control flow of a sub-program much more explicit than the ordinary source code and it has been in widespread use by professional programmers for many years. This is in sharp contrast to most of the "visual" programming languages developed elsewhere which have been data flow-based with most only able to support toy programs. In this study we evaluated 24 professional C programmers in Ukraine who were also experienced in using R-Technology. After completing pre-tests to establish general programming skill, visual/spatial ability, and knowledge of C, each subject was given comprehension tests for two programs, each about 150 lines in length. The control group saw each program in standard C textual source code format on paper while the experimental group saw one of the programs this way and the other was presented using R-Technology notation. Following the comprehension tests, each subject was asked to write a small program in either standard C or R-Technology notation depending on their group. All subjects were asked to give verbal protocols throughout. In this paper we report on the qualitative and quantitative results as well as informal observations on the differences between "Western" and "Eastern" programmers. This study is part of a larger project which will also examine "Western" programmers using a data flow visual language as well as a textual language.

## **Psychology of Programming in the Former Soviet Union**

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