Does Syntax Highlighting Help Programming Novices?

Extended Abstract*

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CCS CONCEPTS

• **Software and its engineering → Integrated and visual development environments**; • **Human-centered computing →** *Empirical studies in visualization*; Empirical studies in HCI;

KEYWORDS

Syntax Highlighting, Source Code Typography, Code Colouring, IDE Interface, Program Comprehension

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BACKGROUND

Program comprehension is an important skill for programmers – extending and debugging existing source code is part of the daily routine. Syntax highlighting is one of the most common tools used to support developers in understanding algorithms. However, most research on code highlighting is more than 20 years old, when programmers used a completely different tool chain. Newer results on the effect of syntax highlighting as used in modern Integrated Development Environments (IDEs) are inconclusive.

OBJECTIVE

We examined the influence of syntax highlighting on novices' ability to comprehend source code. Additional analyses cover the influence of task type and programming experience on the code comprehension ability itself and its relation to syntax highlighting.

METHOD

We conducted a controlled experiment with 390 undergraduate students in an introductory Java programming course. We measured the correctness with which they solved small coding tasks. Each test subject received some tasks with syntax highlighting and some without.

RESULTS

The data provided no evidence that syntax highlighting improves novices' ability to comprehend source code. The differences in correctness between tasks with syntax highlighting and the same task without syntax highlighting have not been statistically significant. Furthermore, we calculated the difference in proportions between results for task with and without syntax highlighting, a metric of sensitivity to syntax highlighting. The results show with 95 % confidence that the influence of syntax highlighting on the difference in proportions is within the interval $[-0.022; 0.033]$. This shows that the positive or negative effect of syntax highlighting as used in this experiment is likely to be small if it exists at all.

LIMITATIONS

Two existing experiments observed a positive effect of syntax highlighting. It is unclear as of yet which factors impact the effectiveness of syntax highlighting and whether one of these factors caused the different results. One limitation may be the types of tasks chosen for this experiment.

CONCLUSION

The results suggest that syntax highlighting squanders a feedback channel from the IDE to the programmer that can be used more effectively.

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