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Establishing Design Principles for Diagrammatic VPLs

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Abstract: This poster describes research which resulted in a checklist and design principles for diagrammatic visual programming languages (VPLs) based on empirical data collected through a series of controlled experiments and a qualitative-naturalistic inquiry.

Keywords: VPLs, guidelines, usability evaluation, experiment, immersion, diary study

1 Introduction

Applying a user-centred design approach to VPL design is challenging because of a lack (or scarcity) of empirically grounded design principles for programming languages. Usability studies of such complex applications are difficult to conduct *holistically*. At best, there is a set of design principles, based upon the heuristic evaluation method, available online for textual programming languages (Myers, n.d.). Nonetheless, a published set of empirically grounded design principles for VPLs is still non-existent.

2 The Research

This PhD research investigates usability issues of programming languages and of diagrammatic notations to recommend design principles and a checklist for diagrammatic VPL design. Six empirical studies were conducted, employing both quantitative and qualitative methodologies. Five of the studies were controlled experiments and one was a *holistic* usability evaluation of a commercial VPL utilising Immersion and diary study techniques.

3 Poster Description

This poster describes the research and the process by which findings from the empirical work were synthesised to produce a checklist and design principles for diagrammatic VPLs.

3.1 Poster outline

- Introduction to the research and its objectives.
- Model of the Programming Process (MoPP).
- Visual Language Matrix for visual programs.
- The six empirical studies conducted.
- Description of the process of generating the design principles and checklist.
- Research deliverables: 14 design principles and a list of 58 checkpoints for diagrammatic VPLs.

3.2 The 3- step process

There are three steps to the process by which the checklist and principles were generated:

- Formation of a checklist in two iterations based on an analysis of theoretical and empirical findings in the literature and the quantitative and qualitative data from our studies.
- Refinement of the above checklist by augmenting it with Myers' (n.d.) principles to form a final set of checklist and principles.
- Evaluation of the final principles obtained by triangulation with problems reported by two usability studies of programming languages and environments in the literature.

3.3 Who benefits from this poster

The comprehensive checklist and design principles derived should benefit VPL designers as well as programming language and software designers.

References

Myers, B. (n.d.). Usability Issues in Programming Languages, Retrieved April 15, 2003, from: http://www2.cs.cmu.edu/~NatProg/langeval.html#Principles.