

**Inferring Dynamic Learner Behavior for User Modeling in
Continuously Adapting Hypermedia**

by

Alessandro Souza Ferreira Rubim de Assis

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Examining Committee:

Prof. Dr. Michael Danchak, Thesis Adviser

Prof. Dr. Malik Magdon-Ismael, Member

Prof. Dr. Sibel Adali, Member

Prof. Dr. Mohammed Zaki, Member

Prof. Dr. Ron Sun, Member

Rensselaer Polytechnic Institute
Troy, New York

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ABSTRACT

Adaptive Hypermedia offers a technological solution for individualized and optimized online learning. However, effectively adapting web-based educational systems to individual learning traits remains an open issue. Inconclusive results and several criticisms to the popular approach of pre-screening individuals and adapting accordingly can be found in the literature.

This work investigated an alternative to pre-screening for adaptivity based on a learning style cycle. A learning cycle approach allows for the observation of learner interaction behavior over instructional events designed to attend to all different learning styles. The ADaPtor system was developed with the goal of optimizing learning efficiency and effectiveness by gradually and iteratively adapting the learning cycle based on learner behavior and performance. ADaPtor's adaptivity scheme personalizes presentation, content and navigation to satisfy individual learning needs.

Three learning cycles were developed for evaluating ADaPtor. Learners were split in two learning groups (control and adaptive) and adaptivity was gradually introduced for the adaptive group. Despite a reduction in the adaptive group effectiveness in the second cycle, when presentation was adapted, effectiveness was comparable in the third and fully adaptive learning cycle. Differences in effectiveness disappeared when more data was available for predictions and learners started following adaptive recommendations more often. Overall, learning efficiency was optimized.

This research provides the adaptive hypermedia community with a tool for using a learning style cycle in adapting to individual learning traits, namely ADaPtor. It emphasizes the need for a collaborative approach to better understand of how people learn online and how adaptive hypermedia can be employed for optimizing individual learning experiences.