



Canonical Navigation Structure for Children's Software



Bowen Hui
 Department of Computer Science
 University of Toronto

Eileen Wood
 Department of Psychology
 Wilfrid Laurier University

Teena Willoughby
 Department of Psychology
 Brock University



Abstract

The educational experience of students using computers is dependent on the software with which they interact. As such, it is important to determine the educational, cognitive, and social value of the content of software that may augment or provide an alternative to more traditional instructional approaches. This study provides a systematic analysis of a variety of educational software. Tasks and cognitive demands are mapped onto cognitive learning goals for children in preschool and kindergarten. The goal is to discover and document alternatives in software design for customizing to individual needs. In addition, it is important to provide educators of young children with information to help them to navigate the software in which their students will be engaged.

Our method consists of analyzing educational software for preschool and kindergarten children, made by companies including Edmark, Disney, and The Learning Company. For each product, navigation skills and strategies for completing each game were identified. Common navigational streams were aggregated into a canonical template as shown in Figure 1.

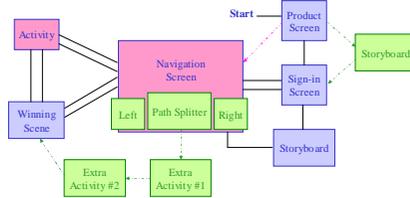


Figure 1: Canonical Navigation Structure – the Core (pink), the Context (blue), and the Peripheral (green).

Within company products, navigation structures were **identical**. Edmark software provided the core navigational structure (Figure 2), Disney software provided a goal-oriented context around the core structure (Figure 3), while software from The Learning Company provided a structure that elaborated on the storyboard, navigation screen, and extraneous activities beyond the goal (Figure 4).



Figure 2: Trudy's Time and Place House made by Edmark. The playhouse serves as a navigation screen with time telling activity.

The context structure provides motivation for students to explore and complete activities. Students sign into the game so their progress can be monitored. A story is told at the beginning to explain the goal of the game and outline intermediate tasks. Upon finishing each task, students receive a small reward that leads toward the final goal. Once all the small rewards have been completed, students immediately enter the last screen where they watch a winning animation.



Figure 3: Winnie the Pooh Preschool made by Disney. After the student signs into the game, a story is told where the student has to help Pooh organize a surprise birthday party for Eeyore. Pooh travels around the navigation screen to tell everyone about the party. At each activity, the student's task is to help prepare a birthday present. Once all the characters are ready with a present, everyone gather together to celebrate the occasion.

The peripheral structure extends the navigational screen by giving more control to the student in the exploration process. However, careful design in separating the navigation screen is required so the student remains spatially oriented. The peripheral structure also makes the game more realistic and challenging by having extra activities after collecting the immediate rewards.



Figure 4: Reader Rabbit Preschool made by The Learning Company. After the student is introduced to the main characters, signs into the game, and watches the story unfold, the student is brought to a navigation screen that splits into multiple paths. As the alternatives are explored, the student receives a yellow brillite after completing each activity. When five yellow brillites have been collected, the student enters the mountain to blow the pirates' boat off. This final task is complicated by requiring the student to accomplish two small activities before arriving to the winning scene.

Children who master the navigation structure of one product should be able to transfer this knowledge to other software by the same company. The contextual and peripheral structure increases the student's incentive to play the educational activities, but does not require additional skills. Furthermore, children who master the encompassing navigational structure will have no trouble navigating software designed with simpler structures.

Partager la science. Éveiller les esprits. • sharing the science. opening minds.