Computer experience, learning style, and hypermedia navigation

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Abstract

This study focused on the extent to which prior computer-related experiences predicted linear and nonlinear navigation when using a hypermedia learning environment. Those with more years' experience at working with computers and those with more authoring experience took more linear steps, whereas those with more data base experience and those with more hypermedia experience took fewer linear steps. Those with more years experience at working with computers, those with more programming experience, and those with more authoring experience had a lower percentage of nonlinear steps than those with more experience in those three areas. Those with more word-processing experience, more spreadsheet experience, and more hypermedia experience had a higher percentage of nonlinear steps than those with less experience in those three areas. Also, those with more hypermedia experience took less time than those with less hypermedia experience. A major implication of the study is that we can predict the extent to which a hypermedia user may engage in a hypermedia environment in a nonlinear way by knowing his or her experience in a variety of computer-related uses. © 2000 Published by Elsevier Science Ltd.

Keywords: Hypermedia; Linear/nonlinear navigation; Computer-related experience; Learning styles

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1. Review of literature

1.1. Hypermedia and theoretical frameworks

The pervasive line of inquiry on hypermedia environments has centered on students' knowledge-base performance and attitudes toward the hypermedia environment (i.e. Liu & Reed, 1994; Overbaugh, 1995). The research has recently evolved into determining users' steps, or features they access, as they engage in a hypermedia program (i.e. Liu, 1995; Reed, Ayersman & Liu, 1996). A next logical step is, perhaps, how those steps or features might be categorized. One such grouping may be the linear-versus-nonlinear comparison. Because hypermedia has been defined — often touted — as being nonlinear, it makes some sense to determine the extent to which a student's use of the hypermedia program is nonlinear.

Another theoretical caveat for hypermedia environments is the notion of metacognition, or the extent to which a learner understands what to do and how to proceed while attempting a cognitive task (Klatzky, 1980). Metacognition develops as learners repeat such tasks. In terms of hypermedia, metacognition might involve the extent to which a learner engages in a hypermedia program in a nonlinear way, or maximizing the touted value of hypermedia programs: their nonlinear structure. Because hypermedia programs are fairly new to learning situations, higher degrees of other related computer experience might be related to more nonlinear behavior.

1.2. Hypermedia and learning style

In a recent review of research examining linear and nonlinear texts, Alexander, Kulikowich and Jetton (1994) emphasized two points that are relevant to our study: (1) nonlinear texts (hypertext-based) are generally associated with a more global perspective than the seemingly more microlevel linear texts; and (2) computer research has not yet progressed to microlevel explorations of variables. That there are differences in the two text types suggests stylistic differences comparable to typologies present within cognitive and learning styles. Processing linear text is depicted as being associated with abilities to formulate inferences and to discern between important and unimportant information, whereas the processing of nonlinear text is depicted as being associated with a strategic orientation (Alexander et al.). The relationship between differences for those using the two text types and the various learning and cognitive style preferential differences seems apparent. Field-dependent persons tend to have a much more global perspective than field-independent persons who tend to be more analytical (Jonassen & Grabowski, 1993). Learning style differences also seem relevant since convergers tend to focus on the heart of things while divergers are particularly adapted to viewing learning situations from multiple perspectives (Kolb, 1985; McCarthy, 1989). The procedures students use to learn content within a hypertext system do appear to vary with regard to individual differences even though learning outcomes do not necessarily differ (Ayersman & von Minden, 1995). Since true nonlinear systems offer options that can be construed as either linear or nonlinear depending upon the user's