

A Research Simulation for the Humanities: Enabling students to experience the process of literary inquiry

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ABSTRACT

In the study of literature, traditional editorial apparatuses impose such cognitive obstacles that students are effectively prevented from conducting scholarly investigations. We report the development of learningware that alleviates these cognitive obstructions while providing an experience of the process of investigation.

1. STATEMENT OF THE PROBLEM ADDRESSED

Our Hypertext Explorer is an interactive learning environment that addresses two major classes of problems. The first is generic and cognitive while the second is inherent in the linear structure of traditional narratives and books and, therefore, more germane to text-based disciplines. A main goal of the humanities is the elucidation of the causes of change in literary texts. Since works of literature are never static entities, humanists ask what influences have shaped the evolution of a literary work before and after publication.

In the past four decades there has been a revolution in our understanding of the cognitive development of learning such that the 1990s became known as the Decade of the Brain. We are interested in two paramount insights that have emerged, the first bearing on the cognitive development of expertise and inquiry, and the second involving the way that the brain processes investigations.

1A. Development of Expertise

The cognitive development of expertise relates to the attainment of “transfer”, the level of learning at which a student can apply one set of learning experiences to a later set or to real-life applications. This is the capstone goal of the National Academy of Science’s “How People Learn” program, which discusses the kind of learning experiences necessary to attain expertise (Bransford, et. al., 2000). Essentially, to develop expertise, students must construct knowledge by grappling with foundational information suitable to the construction of the “big ideas” that transfer relies on. Moreover, the development of critical big ideas is a gradual process that requires iterative engagement with significant content, with each learning cycle punctuated by effective formative assessment to promote reflection and to collect diagnostic clues about the progress of student learning. One of the design goals of Hypertext Explorer is to create a learning environment in which students progress through repeated iterations of the analytical processes that literary scholars exercise, coupled to a routine of formative assessment.

1B. Development of Epistemological Skills

The second design goal of Hypertext Explorer is to enable students to experience the process of scholarly investigation in literature. Recent cognitive research indicates that human brains are not innately well prepared to conduct investigations (Geunther, 1998).

It may be that critical parts of the brain that we use for inquiry have evolved from perceptual regions of the brain which protect us from sensory and cognitive overload by routinely drawing conclusions on the fly, without considering alternative explanations or waiting for suitable evidence NOTE HERE? Sophisticated epistemological insights and practices therefore emerge only from extensive practice. For this reason, the core component of Hypertext Explorer is an investigative simulation intended to allow students to emulate the process of scholarly research.

One of the more important lessons that students may glean from this experience, for example, is that there are competing theories of creativity. One prevalent view, held by many scholars in the humanities, is that works of art are deterministic entities developing toward an Aristotelian goal or what the author “really” intended. By assuming the editor’s mantle, however, the student will have to consider a contending explanation—namely, that works of literature are a composite of authorial intention and other influences in a dynamic, interactive process of authorship. Hypertext Explorer will set in motion these various theories as students explore and create texts.

1C. Beyond the Book: Substitutional Hypertext

Teachers and researchers in the humanities profess largely through books. For all its virtues as a vehicle of communication the book has two principle drawbacks for teachers and students of literature. First, each version of a book’s text is a snapshot in time, set in a static form that does not easily reveal the dynamic process of literary creation from or through which it originated. Second, despite its great variety of formats and indices, which suggest different ways of reading its contents, the book limits the interactions of readers with its possible texts. Although methods of exploring the causes of textual change across versions of a text have been constructed within book technology, they lack the necessary dimensionality and thereby impose a tremendous cognitive burden on the student. These “critical editions” characteristically combine a full version of the text with an editorial apparatus in the back of the book, like a specialized index. When a reader encounters a string that has been modified from a previous version, the string may be circumscribed by delimiters or indicated by an alphanumeric symbol. The string is then indexed in an editorial apparatus where variants from other versions of the text are elaborated. In order to consider alternative variants, however, the reader must commit them to memory or paper, then return to the text, substitute them for the printed strings, and finally evaluate the significance of the changes within the larger text. This is a daunting cognitive task. A challenge for even professional scholars, the process isolates less experienced readers from the content area. Therefore, the third design goal of this project is the implementation of a hypertext solution that alleviates the need to memorize and imagine competing variant strings, and that allows students to explore change and operate like editors. For this purpose we have developed a sort of “smart” hypertext, which we refer to as “substitutional hypertext”.

2. DESCRIPTION OF THE PROJECT

The Hypertext Explorer system includes three stand-alone modules: Hypertext Explorer, Mix-and-Match, and Collator. The first two modules are learning environments and the third is an authoring tool to create additional hypertexts.

2A. Hypertext Explorer

Hypertext Explorer is the core package. It contains a window with one or more screens (only one shown at a time). Each screen contains either a single version of a story, or a comparison of two versions with substitutional hypertext wherever text strings in the two versions differ. These hypertext “variants” are imbedded in those portions of text that remained unmodified. When a user clicks on a substitutional hypertext string Explorer replaces the previous string with the next string, so the user can toggle between displays of (a) both variants of the passage together, i.e. <first variant>[second variant], or (b) just the first variant alone, i.e. <first variant>, or (c) just the second variant alone, i.e. [second variant]. There can be as many different delimiters as there are texts being compared. This system eliminates the need to refer to an appended editorial apparatus, and therefore it obviates the need to memorize alternative strings or to try to imagine what the alternative string would look like imbedded in the surrounding text. All the information needed for interpretation is provided in an eye-span. Substitutional hypertext removes the cognitive obstacles in print apparatuses that hamper student use, and thereby makes an otherwise closed content area accessible.

Hypertext Explorer is designed to serve as a research simulator for the humanities. In research mode the interface includes two sets of tools to enable student experience of the process of investigation.

First, for each variant passage the student must attempt to infer the influence(s) that caused the change—for example, the author’s “free will”, or “self-censorship” in the face of criticism, or editorial “collaboration”, or “corruption” (copy error), to name a few. The student may delete old motives, or introduce new ones, on the fly. This activity is intended to encourage reflection, analysis, and accountability, so each choice must

be justified by an annotation in a linked text field also within eye-span. Thus Explorer constitutes a formative assessment system.

The second set of tools enables the student to publish hypothetical reconstructions of the work after the attribution of motives is complete. In this process, the student decides which motives to enable and the published reconstructed text includes only changes authorized by those motives. Changes determined to have resulted from other motives will not be authorized and will not appear in the reconstructed text. These reconstructed texts enable student to communicate what they think the text might have looked like under other circumstances. This activity also returns the student from fine-grained study of individual variants to a more global consideration of the whole integrated work. In as much as these reconstructed texts and their justifications represent a major summary of the student's analysis, this activity constitutes an additional element of the formative assessment system and a product for the student's portfolio.

2B. Mix-and-Match: Imitating the Author's Style.

One of the common misconceptions that students harbor about writing is that a work emerges in linear fashion. However, an author will often begin again with an interesting idea, no matter where it ends up arising in the narrative. Moreover, first drafts usually give rise to revisions, so an author's work-flow will often develop as a sequence of collinear story elements. Mix-and-Match allows the student to pick and choose which story elements to use, perhaps rearranging them and writing new interstitial material in a collaboration with the author's material. Thus completion of a student's reconstructed text requires the stitching together of the author's story elements and the student's attempts to emulate the author's writing style.

2C. Collator

The last module, Collator, enables the user to search for differences in two versions of a text, and to create a new marked document that can be imported into Hypertext Explorer, where it is automatically converted to live substitutional hypertext.

Works Cited

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