

HUMAN-TEXT INTERACTION

STUDY OF SCIENTIFIC ANNOTATION PRACTICES

MICHAL LORENZ — MASARYK UNIVERSITY, BRNO, CZECH REPUBLIC

INTRODUCTION

We present ongoing research into the annotation practices of scientists reading printed scientific documents. The aim of the research is to understand information behavior during active reading of scholars as the basis for effective web-based e-book design.

The research is focused on the scholarly primitives and the usefulness and usability of the types of annotations generated by interactions of the scientist with the text.

Annotations – all information added by the reader to the text.
Annotation practice – a set of socially and culturally established ways of selecting, recording, organizing, evaluating, and using text information.

METHODS

The data collection took place in natural setting of the scientists. We use the methods of dual task analysis recorded by cameras, speaking aloud and eye-tracking movement technique. Subsequently, we conducted a semi-structured interview with each scientist.

The research has so far involved 20 scientists from disciplines representing the humanities (linguistics), social sciences (psychology), natural sciences (geography) and interdisciplinary research.

The scientists divided by their expertise as beginners (Ph.D. students), advanced (postdoc), experts (associate professors and professors) read during a task analysis theses, books and papers, each of the documents for 15 minutes.

Acquired data was processed into verbal protocols and through cognitive work analysis, specifically an analysis of the abstraction hierarchy.

OBJECTIVES

1. Identify the limitations of cognitive work during annotating.
2. Analyze the effect of the experience on the personal annotation systems.
3. Compare scientists' disciplinary and interdisciplinary annotation practices.
4. Deduce consequences for the Ecological interface design of web-based format of eBook.

Means - Ends Analysis

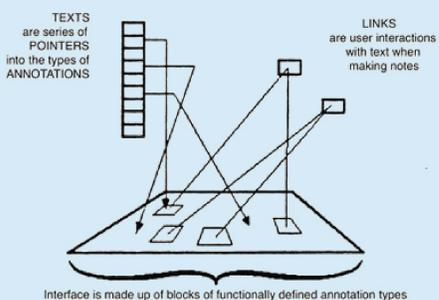
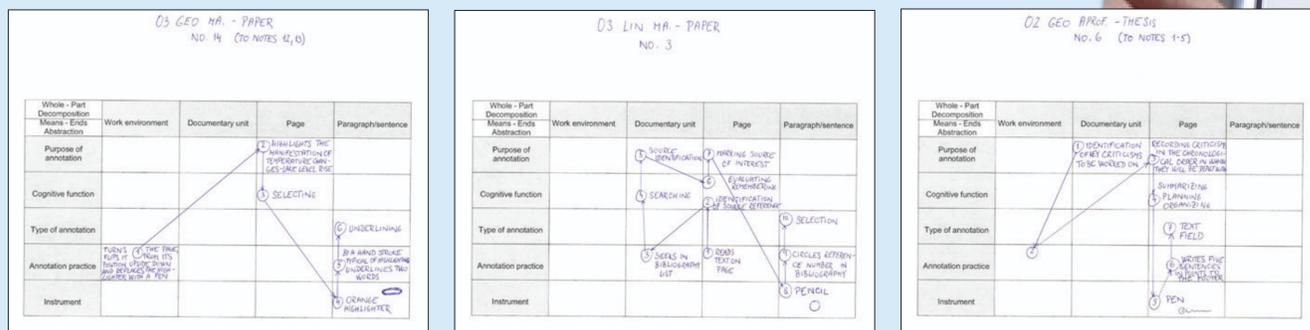
Functional Purpose	Purpose of annotation
Abstract Function	Cognitive function
Generalized Function	Type of annotation
Physical Function	Annotation practice
Physical Form	Instrument

Whole - Part analysis

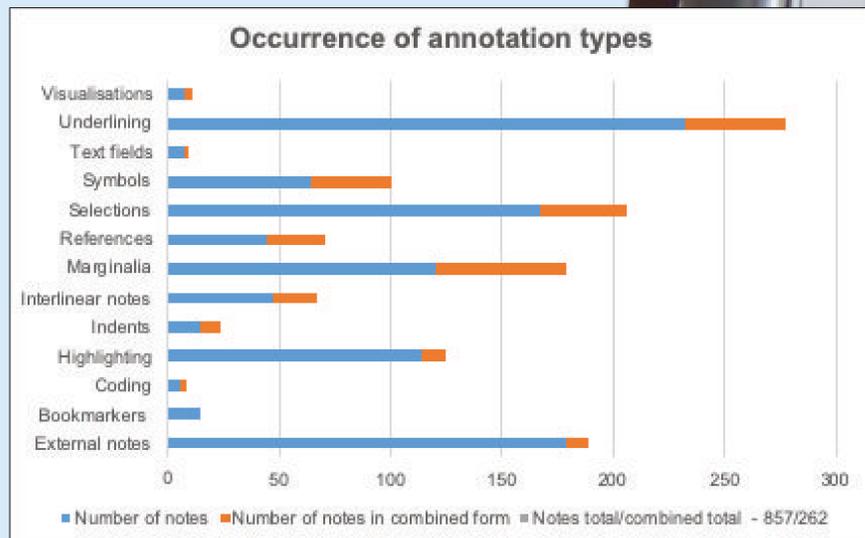
Total system	Work environment
Function Unit	Documentary unit
Subassembly	Page
Component	Paragraph/sentence

RESULTS

Examples of abstraction hierarchy



Solution of the topological conflict between cognitive functions and instruments (adopted and rewritten from NELSON, Theodor Holm. Literary machines. Edition 87.1. Swarthmore, 1987. ISBN 0-89347-055-4).



CONCLUSIONS

There is a conflict between instruments and cognitive functions. If the conflict is not resolved by the interface design, it causes increased cognitive load or inappropriate use of instruments.

Human text interaction has three basic dimensions: spatial, haptic, and perceptual. The result of overlooking these characteristics is de-embodied design of software tool that favors error-prone deep cognitive control instead of surface control. The result is reduced tool usability.

A smaller number of basic elements of annotations (13) form the basis of annotating practices. The co-occurrence of the elements reveals the composite annotations that make up the functional blocks of the design. The series of annotations are traces of the reader's deepening understanding.