

Chapter I

Individual Differences and Web-Based Learning

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ABSTRACT

This chapter considers a range of individual difference variables that have potential relevance to specifically designed Web-based learning packages. These include: cognitive style, working memory efficiency, anxiety, gender, and current knowledge. It discusses, in general terms, the conditions under which the variables are important, and the potential interaction between them in affecting learning performance. The roles of the variables within the context of Web-based learning are then examined. It is argued that technical developments in computer technology that allow materials that can accommodate learning preferences by responding to the student's choices and learning performance combined with a better psychological understanding of individual differences in learning should result in improved educational effectiveness.

INTRODUCTION

Web-based learning can range from putting topics into a search engine and then selecting from those found, on the one hand, to on the other, using specifically designed learning materials for, say, a university course. In the former, the search is likely to bring up much that is either ir-

relevant, out of date, or items that are not directly accessible such as some journal articles or books. The focus here will be limited to the design of specifically designed learning materials for a particular course.

The chapter is in two sections: the first will consider the individual difference variables, the second their relative importance and interaction,

and the practical application to the particular characteristics of web-based learning. The sections will be as follows:

- **Section 1: Individual difference variables.** The variables of cognitive style, working memory efficiency, anxiety, gender, and current knowledge are examined in terms of their nature, assessment and effect on learning performance.
- **Section 2: Variables that affect learning and their relevance to web-based learning.** The individual differences are considered to see under which conditions they are related to learning performance and contrast these with those conditions when they have little or no effect. The variables are then examined in combinations to see how they may interact with one another in affecting learning outcomes. Finally, strategies developed by individuals to overcome or compensate for missing facilities in their learning repertoire of natural abilities are considered.

Web-based learning offers a special learning environment, which has characteristics that differ from traditional learning modes and materials. These characteristics include, for example, the mode of presentation in terms of verbal and pictorial and diagrammatic format, the choice between spoken and textual format, the rate of presentation, the opportunity for on-going assessment of learning performance and the provisions of feedback on progress, etc.

Each of these will be examined in the context of individual difference constructs to evaluate the relevance of individual difference assessments to the range of features available with web-based learning. Recommendations will then be made of the application of individual differences research to practical web-based learning.

SECTION 1: INDIVIDUAL DIFFERENCE VARIABLES

The variables of cognitive style, working memory efficiency, anxiety, gender, and current knowledge are examined in terms of their definition, nature, assessment and effect on learning performance.

Cognitive Style

Nature

Cognitive style, in the context of this chapter, is seen as the default approach that an individual takes when processing information. Two fundamental dimensions of style will be considered – the Verbal-Imagery and the Wholist-Analytic:

- Verbal-Imagery style is seen as an individual's preference in terms of how information is represented during thinking – verbally or in terms of images. On this basis an individual may be categorised as either a Verbaliser or an Imager.
- Wholist-Analytic style is the inclination of an individual to prefer to integrate information into a whole versus separating information into its constituent parts – the wholist approach or the analytic. Here an individual may be seen as either a Wholist or an Analytic.

When the two dimensions are taken together, one individual may be labelled, for example, as a Wholist-Verbaliser, while another may be an Analytic-Imager. Each dimension is seen as a continuum such that an individual may be at any point from one extreme to the other on either dimension.

An important point to note is that style represents a preference (the default), but this does not preclude representing information in a different mode if necessary. Thus, for instance, Verbalis-

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