Chapter XII
Impact of Cognitive Style on User Perception of Dynamic Video Content

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ABSTRACT

This study investigated two dimensions of cognitive style, including Verbalizer/Imager and Field Dependent/Field Independent and their influence on user perceived quality of multimedia video. Perceived user quality was characterised using the Quality of Perception (QoP) metric, which captures the infotainment duality of multimedia presentations. Results indicate that, generally, clip dynamism impacts on user QoP; in particular, it is worthwhile to remark that in the clips with strong and medium dynamism, Field Dependent users performed worse than the other two groups, while Field Dependent users had a (slightly) better performance than Field Independent users in clips with weak dynamism.

INTRODUCTION

Notions of quality are of paramount importance in distributed multimedia systems – simply stated, a user will not invest time, money or, indeed, other resources if (s)he does not believe that (s)he is getting quality commensurate with expectations. Whilst efforts to characterize distributed multimedia quality have been forthcoming along the years (Apteker et al., 1995; Cranley et al., 2003; Steinmetz, 1996; Wilson and Sasse, 2001), the proliferation of multimedia applications, display devices and – last but certainly not least – users, have led researchers to investigate novel ways of exploiting perceptual quality measures to transmit bandwidth-intensive multimedia content over fixed size pipes to an increasing numbers of users.

Information transfer constitutes, in most cases, an important side of multimedia applications. Nonetheless, a dimension that is often overlooked in such cases, particularly in respect of quality considerations is the one of *cognitive*

style (an individual's characteristic and consistent approach to organising and processing information (Weller et al., 1994)), especially since it affects the ways through which people organize and perceive information. Accordingly, in this chapter, we propose to explore the impact of cognitive style on a user's perception of quality for dynamic multimedia content. In particular, we will focus on two dimensions of cognitive style: the *Verbalizer/Imager* and *Field Dependent/Field Independent*, because the former refers to information representation, while the latter relates to information organization.

USER COGNITIVE STYLES

Cognitive style refers to a user's information processing habits, representing an individual user's typical mode of perceiving, thinking, remembering, and problem solving (Messick 1976). Jonassen and Grabowski (1993) defined cognitive style as inbuilt and relatively consistent preferences in organising and representing information. It is notable that there is a number of dimensions of cognitive styles, such as Holism/Serialism (Pask, 1976), Divergent/Convergent (Hudson, 1966), Field Dependence/Independence (Witkin et al., 1977), and Verbalizer/Imager (Riding, 1991). Among these, Field Dependence/Independence and Verbalizer/Imager are related to perceptual multimedia. The former concerns how users process and organize information, whereas the latter emphasises how users perceive the presentation of information.

Field Dependence/Independence is related to the degree to which a user's perception or comprehension of information is influenced by the context (Jonassen and Grabowski, 1993). The key issue of Field Dependence lies within the differences between Field Dependent and Field Independent learners, which are presented below:

- **Field Dependence:** the individuals are considered to have a more social orientation than Field Independent persons since they are more likely to make use of externally developed social frameworks. They tend to seek out external referents for processing and structuring their information, are better at learning material with human content, are more readily influenced by the opinions of others, and are affected by the approval or disapproval of authority figures.
- **Field Independence:** the individuals tend to exhibit more individualistic behaviors since they are not in need of external referents to aide in the processing of information. They are more capable of developing their own internal referents and restructuring their knowledge, are better at learning impersonal abstract material, are not easily influenced by others, and are not overly affected by the approval or disapproval of superiors (Witkin et al. 1977).

The Imagers/Verbalizer dimension describes the tendency for individuals to represent information being processed in the form of text or in the form of images (Riding and Cheema, 1991). Their different characteristics are:

- **Imagers:** Imagers tend to be internal and passive. Imagers perform better if the environment presents text and also pictorial material such as pictures, diagrams, charts, and graphs. Imagersprefer to process information by seeing and they will learn most easily through visual and verbal presentations, rather than through an exclusively verbal medium.
- **Verbalisers:** Verbalisers tend to be external and stimulating. Verbaliser individuals perform better if the environment presents only information in the form of text. Verbalizers prefer to process information through words and find they learn most easily by listening and talking (Laing, 2001).