Assessing Learning from Hypertext: An Individual Differences Perspective

MARTIN GRAFF
University of Glamorgan, Wales, UK
mgraff@glam.ac.uk

From an instructional perspective, it is conceivable that employing an appropriate hypertext architecture should have the advantage of facilitating learning by representing logically the interrelationships between the different pieces of information contained within the hypertext. Furthermore, there would appear to be a sound theoretical rationale for suggesting that the degree to which hypertext-based instructional systems facilitate learning will be contingent on an individual’s cognitive style. This study aims to investigate whether different hypertext architectures can be matched to an individual’s cognitive style to facilitate learning. Three hypertext architectures, linear, hierarchical, and relational were employed, and cognitive style was assessed using the Cognitive Styles Analysis (Riding, 1991). The findings revealed that for certain hypertext architectures learning may be facilitated when the architecture is matched to the cognitive style of the user. The results have implications for the design of web-based learning systems.

The implementation of web-based learning in higher education over the last few years makes it necessary to properly evaluate such initiatives, principally because they represent a departure from traditional methods in education. One of the fundamental features of web-based learning systems is the use of hypertext. Accordingly, a useful starting point for investigation is an analysis of the relative benefits of using hypertext in education.

Theoretically, the nonlinear structure of hypertext should allow a degree of flexibility in the way in which educational information can be presented in comparison to ordinary text, and this would therefore be beneficial in terms of illustrating to the learner the interrelationships between the various units of information in the hypertext. Such a system could theoretically
facilitate more efficient deep learning (Marton, Hounsell, & Entwistle, 1984). However, Forsyth (1996) suggested that web sites offering instruction are no more than electronic textbooks, suggesting that learning in this way is a passive experience.

It is conceivable that the debate regarding the relative benefits of using hypertext for instruction may be settled in part through an investigation of individual differences in learner characteristics, that is investigating whether particular categories of individuals engage differently with hypertext. One category of individual differences, which has been adopted with great profit within the educational domain, is cognitive style, which is characterised essentially by variations in the ways in which individuals process information. Indeed several studies have investigated such differences employing the cognitive style type field dependence-independence and relating this to the manner with which individuals engage with hypertext (Korthauer & Koubek, 1994; Lin & Davidson-Shivers, 1996). However, further analysis of the style type field dependence-independence have found it to be related to general intelligence (Satterly, 1976; McKenna, 1984) and therefore it is questionable whether it meets the criteria of being a valid measure of cognitive style.

Riding (1991) advocated that the style constructs wholist-analytic and verbaliser-imager fulfil the criteria of being valid measures of cognitive style, being independent of personality, separate from intelligence and related to learning performance and learning preference. Accordingly, these cognitive style labels possibly represent more useful classifications of individual differences in information processing than the style construct field dependence-independence.

Wholist-Analytic Style and Hypertext

The wholist-analytic cognitive style can be operationalised as the tendency for individuals to process information either as an integrated whole or in discrete parts of that whole. In practical terms, analytics are able to apprehend ideas or concepts in parts, but have difficulty integrating such ideas into complete wholes. However, wholists are able to view ideas as complete wholes, but are unable to separate these ideas into discrete parts (see Figure 1).

Whalley (1993) suggested that hypertext versions of ordinary text may be difficult to understand because of the lack of a connecting narrative between the pages. Put another way, hypertext has the consequence of fragmenting the text into several smaller units, which reduces the overall meaning. Such a fragmentation of the meaning of the text would exacerbate an analytic individual’s tendency to see information in parts, which may ultimately debilitate their learning performance. Indeed, Riding and Grimley (1999), noted that analytics did not learn as well as wholists from using a multimedia presentation of information. This result was explained by the suggestion that the presentation was constrained by the constricted viewing window of
the computer, which meant that only small units of information were presented at any one time. This ultimately increased the tendency of analytics to comprehend the information content in discrete parts, thus affecting their learning performance.

However, unlike linear text, hypertext allows users the freedom to move between fragmented pieces of information, following their own routes. Theoretically, this freedom of movement should help users derive an overview of the information content more effectively than when using linear text, and thus help them derive an understanding of the structure of the system more rapidly. Riding and Douglas (1993) suggested that analytic individuals are superior at seeing structure, and therefore it is equally possible that the fragmentation of information could be more advantageous to analytics, who would be able to apprehend the system structure more easily, thus facilitating their learning performance.

**Verbaliser-imager cognitive style and hypertext**

The verbaliser-imager cognitive style can be defined quite simply as an individual’s tendency to process information either in words or in images. Verbalisers are superior at working with verbal information, (Riding & Mathias, 1991; Riding & Watts, 1997) whereas imagers are better at working with visual and spatial information.

Two of the major tasks a user needs to perform concurrently when using hypertext, are reading and understanding the contents of each page and secondly keeping track of their location within the hypertext document. Processing both tasks simultaneously demands a high level of cognitive load (Sweller, 1988, 1994) and accordingly, Tripp and Roby (1990) suggested that when using hypertext, learning performance may diminish because of this element of simultaneous processing. In other words, individuals will need to focus on the task of keeping track of their location in the hypertext,
thus leaving fewer mental resources directed towards reading and understanding the information to be learned.

As noted earlier, verbalisers are superior at working with verbal information and accordingly will be superior at reading and understanding the information content of the hypertext. This should be beneficial to some extent, although because they focus less on keeping track of their location within the hypertext, their learning performance may decrease. Conversely, because imagers are better when working with spatial information, they will be superior at keeping track of their location within the hypertext document, although their learning performance may diminish through not engaging with the information content as efficiently as verbalisers. To conclude, it is possible that verbalisers and imagers will direct attention to the tasks of reading and tracking location with different emphasis and this will be manifest in their learning performance.

Intermediate and Bimodal Cognitive Styles

Riding (1991) used the label intermediate to define individuals who fall between wholist and analytic, and bimodal to define individuals who fall between verbaliser and imager. Graff (2000) suggested that the adaptive nature of the intermediate and bimodal styles is unclear. In terms of the bimodal style, Paivio’s (1971) dual-coding model offered some clarification suggesting that verbal and imaginal information content is processed by different subsystems, one specialised for verbal language and the other for sensory images. The two systems are assumed to be distinct or independent in terms of the functions they serve. However, even though the systems are independent, they are interconnected so that a concept represented as an image can be converted to a verbal label in the other system. However, it is still unclear as to what extent intermediates possess the qualities of analytics and wholists and to what extent bimodals possess the qualities of verbalisers and imagers. Clearly following the rationale outlined earlier, the more wholist and analytic qualities which are possessed by intermediates, and the more verbaliser and imager qualities which are possessed by bimodals, the more effectively these individuals will engage with and learn from hypertext.

The Matching Hypothesis

It is also critical to note that the potential benefit of hypertext to learning may also be considered by assessing the relative benefits of delivering educational material using different hypertext architectures. There is evidence to suggest that learning performance is enhanced when mixed hypertext architectures are employed (Mohageg, 1992; McDonald & Stevenson, 1998; Shapiro, 1998). In these studies mixed hypertext architectures were hierarchical with lateral links. It is also possible, that the individual differences in
cognitive style, as previously described, may influence how effectively an individual engages with and learns from particular hypertext architectures. To this end certain architectures may be more appropriate to individuals possessing different cognitive styles and this reasoning is derived from the cognitive style matching hypothesis.

The cognitive style matching hypothesis essentially suggests that when the cognitive styles of instructor and student are matched, then the efficacy of learning experienced by the student will be improved (Figure 2). However, empirical findings on this theoretical notion would appear to be inconclusive (Packer & Bain, 1978; Saracho & Dayton, 1980; McKenna, 1990).

In this respect, hypertext would appear to offer far more promise to such a matching hypothesis, as the architecture may be designed with consideration to the cognitive style of the user, taking account of factors such as an individual’s ability to determine their current position within the hypertext and also their ability to effectively apprehend the structure of the system. The aim of this investigation is to enquire whether matching a hypertext architecture to the cognitive style of the user can facilitate performance.

**METHOD**

**Participants**

A total of 96 participants took part in this study, 38 male and 58 female, with a mean age of 22.97, an SD of 5.67, minimum age of 19 and maximum age of 45. The participants were all second year undergraduate students, studying courses in humanities. All participants were questioned informally before undertaking this study and displayed a good level of computer literacy.

![Figure 2. Theoretical interaction between student and instructor cognitive styles](image)
Hypertext

The subject matter of the hypertext document employed in this study was taken from various pieces of historical information and edited so that the names dates and events were altered in order to maintain consistency. Each page of hypertext typically contained between one and four sentences of information. The whole document consisted of 64 nodes or pages containing 3,388 words.

The hypertext document was presented as one of three architectures corresponding to linear, hierarchical, and relational. A description of each architecture is outlined below. Diagrams of the hypertext architectures employed are shown in Figures 3 to 5.

In the linear architecture, the hypertext pages were linked such that the user could move only to the next or the previous page. Each page however had a link to the first page, and the first page had a link to the top page of each of the four general sections within the architecture. In this way the hypertext resembled a book-like structure, in that the user could start at a contents page, and move to the beginning of any chapter, and similarly from the middle of any chapter could jump back to the contents page again (Figure 3). The linear architecture comprised 66 links between pages.

The hierarchical architecture was designed so a user could move from reading a page at one level, down to a page below it in the hierarchy, or back to a page above it in the hierarchy. In the hierarchical architecture, general concepts subsumed more detailed ones. Users could move up and down the

Figure 3. Linear architecture
hierarchy, exploring subordinate and superordinate relationships. However, no facility was provided for lateral moves (Figure 4). The hierarchical architecture comprised of 62 links.

The relational architecture was identical to the hierarchical architecture, in that users could move up or down the hierarchy. However, this structure also contained additional links, which meant that the user could move laterally to other locations within the architecture, related by subject matter (Figure 5). The relational architecture comprised of 62 links plus a further 32 lateral links.

**Assessment of Cognitive Style (Cognitive Styles Analysis) (Riding, 1991)**

The Cognitive Styles Analysis is a computer presented test used to determine an individual’s position on the wholist-analytic and verbaliser-imagery
dimensions of cognitive style. It consists of three subtests. The first contains items relating to the verbaliser-imager cognitive style, the second set of items relates to the wholist dimension of cognitive style, and the third set of items relates to the analytic dimension of cognitive style. The test taker is required to react by simply pressing either a “true” or “false” button in response to each question item. The computer then calculates an individual’s position on each style dimension by comparing response times between the verbal and imagery items and the wholist and analytic items on the test. Scores on this test typically range between 0.5 and 2 for each cognitive style dimension.

**Procedure**

Participants were assigned to one of the three hypertext architecture conditions, and were permitted 10 minutes to read through the hypertext pages in any order they chose, provided that this reading order could be accommodated by the hypertext architecture to which they were assigned. They were then asked to write a short essay about a question, which could be answered from the information in the hypertext. Each essay was scored on two criteria. First, the level of detail each essay featured, which was rated by two judges according to a predetermined rubric and which gave an indication of the quality of each essay. Second, essays were scored according to the number of words they contained, which gave an alternative more objective measure of the quality of the essay.

Finally, participants completed questionnaires regarding their ease of using the hypertext.

**DATA ANALYSIS**

**Cognitive style**

The wholist-analytic categories of wholist, intermediate and analytic were categorised according to the following scores, < 1.02 wholist, 1.03 - 1.35 intermediate, >1.36 analytic. The verbaliser-imager categories of verbaliser, bimodal and imager were categorised as <0.98 verbaliser, 0.99 - 1.09 bimodal and >1.10 imager. These score boundaries are in accordance with the standardisation scores reported by Riding (1991).

**Essay scores**

Two judges scored the essays produced by participants according to the criteria of detail. Inter-rater reliability between judges for scoring on level of detail was \( r = .79, p < .001 \). The mean score of the two judges was used as the final essay score. Essays were also scored for number of words used. The
rationale for scoring the essays in this way was that these scoring methods represented two diverse methods of assessing the essays, one more subjective and the other more objective.

Results

Table 1 displays the means and standard deviations for essay detail scores and number of words per essay for wholist, intermediate and analytic cognitive styles in the three architecture conditions of linear, hierarchical and relational and also the outcomes of a MANOVA with cognitive style as a factor within architecture.

For assessment of detail, a significant effect emerged within the relational architecture condition, $F(2, 66) = 4.45, p < .01$. Intermediates scored highest in this condition. Employing a Bonferroni post-hoc test, significant differences were found between the intermediates and analytics conditions ($p < 0.05$). There were no significant differences between intermediates and wholists, or between analytics and wholists. Also for number of words a significant effect emerged within the relational architecture condition, $F(2, 66) = 3.80, p < .05$. Intermediates again scored highest in this condition. A Bonferroni posthoc test revealed significant differences between wholists and intermediates ($p < 0.05$). There were no significant differences between wholists and analytics and intermediates and analytics. The MANOVA revealed no overall effects for cognitive style on detail scores and words per essay.

Table 2 displays the means and standard deviations for essay detail scores and for number of words per essay for participants with verbaliser, bimodal, and imager cognitive styles in the three architecture conditions. It also presents the outcomes of a MANOVA with cognitive style as a factor embedded within architecture.

### Table 1

Cognitive Style (Wholist, Intermediate, Analytic) Within Architecture

MANOVA for Detail Scores, and Number of Words per Essay ($N= 74$)

<table>
<thead>
<tr>
<th></th>
<th>Wholist</th>
<th>Intermediate</th>
<th>Analytic</th>
<th>$F$</th>
<th>$df$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detail</td>
<td>Linear</td>
<td>4.73 (1.84)</td>
<td>5.64 (1.64)</td>
<td>5.20 (1.98)</td>
<td>&lt;1.0</td>
<td>2, 66</td>
</tr>
<tr>
<td></td>
<td>Hierarchical</td>
<td>5.69 (1.57)</td>
<td>4.93 (2.24)</td>
<td>4.21 (1.78)</td>
<td>1.36</td>
<td>2, 66</td>
</tr>
<tr>
<td></td>
<td>Relational</td>
<td>5.08 (1.75)</td>
<td>6.84 (1.87)</td>
<td>4.22 (1.84)</td>
<td>4.45</td>
<td>2, 66</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>5.18 (1.72)</td>
<td>5.89 (2.04)</td>
<td>4.46 (1.78)</td>
<td>&lt;1.0</td>
<td>2, 66</td>
</tr>
<tr>
<td>Words</td>
<td>Linear</td>
<td>5.90 (2.39)</td>
<td>6.43 (1.37)</td>
<td>6.84 (2.92)</td>
<td>&lt;1.0</td>
<td>2, 66</td>
</tr>
<tr>
<td></td>
<td>Hierarchical</td>
<td>6.55 (2.10)</td>
<td>5.96 (2.83)</td>
<td>4.73 (2.77)</td>
<td>1.21</td>
<td>2, 66</td>
</tr>
<tr>
<td></td>
<td>Relational</td>
<td>5.78 (2.02)</td>
<td>8.42 (2.59)</td>
<td>6.00 (2.08)</td>
<td>3.80</td>
<td>2, 66</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>6.09 (2.14)</td>
<td>7.08 (2.571)</td>
<td>5.73 (2.54)</td>
<td>1.10</td>
<td>2, 66</td>
</tr>
</tbody>
</table>
For assessment of detail, a significant effect was found within the hierarchical architecture condition, \( F (2, 65) = 2.97, p < .05 \), with bimodals scoring highest. A Bonferroni post-hoc comparison however revealed that no significant differences were found between cognitive styles. A further significant effect was found for the number of words per essay. In the hierarchical condition \( F (2, 65) = 3.82, p < .05 \). Here again bimodals scored highest, although employing a Bonferroni post-hoc comparison, no significant differences were found between any cognitive style, although differences between verbaliser and bimodal were approaching significance \((p = .06)\). The MANOVA revealed no overall effects for cognitive style on detail scores and number of word scores.

Table 3 displays the means and standard deviations for ease of use scores for participants with wholist, intermediate, and analytic cognitive styles in the three architecture conditions, linear, hierarchical, and relational. It also presents the outcomes of a MANOVA with cognitive style as a factor embedded within architecture. No significant effects are evident here, although an effect approaching significance can be observed in the hierarchical condition, with analytics reporting this architecture more difficult to use.

Table 4 displays the means and standard deviations for ease of use scores for participants with verbaliser, bimodal, and imager cognitive styles in the three architecture conditions, linear, hierarchical, and relational. It also presents the outcomes of a MANOVA with cognitive style as a factor embedded within architecture. Again no significant effects are evident here, although an effect approaching significance can be observed in the hierarchical condition, with bimodals reporting this architecture easier to use.

### Table 2

Cognitive Style (Verbaliser Bimodal Imager) Within Architecture MANOVA for Detail Scores, and Number of Words per Essay \((N= 75)\)

<table>
<thead>
<tr>
<th></th>
<th>Verbaliser</th>
<th>Bimodal</th>
<th>Imager</th>
<th>(F)</th>
<th>df</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Detail</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear</td>
<td>5.19 (1.68)</td>
<td>5.75 (1.41)</td>
<td>4.30 (2.17)</td>
<td>&lt;1.0</td>
<td>2, 66</td>
<td>0.38</td>
</tr>
<tr>
<td>Hierarchical</td>
<td>4.31 (1.46)</td>
<td>6.05 (2.01)</td>
<td>4.30 (1.32)</td>
<td>2.97</td>
<td>2, 66</td>
<td>0.05*</td>
</tr>
<tr>
<td>Relational</td>
<td>6.37 (1.99)</td>
<td>5.78 (1.98)</td>
<td>4.47 (1.89)</td>
<td>2.55</td>
<td>2, 66</td>
<td>0.08</td>
</tr>
<tr>
<td>Overall</td>
<td>5.36 (1.87)</td>
<td>5.90 (1.82)</td>
<td>4.37 (1.73)</td>
<td>&lt;1.0</td>
<td>2, 66</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>Words</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear</td>
<td>6.56 (2.37)</td>
<td>6.58 (1.93)</td>
<td>5.36 (2.06)</td>
<td>&lt;1.0</td>
<td>2, 66</td>
<td>0.54</td>
</tr>
<tr>
<td>Hierarchical</td>
<td>4.65 (1.48)</td>
<td>7.28 (2.65)</td>
<td>4.97 (2.08)</td>
<td>3.82</td>
<td>2, 66</td>
<td>0.02*</td>
</tr>
<tr>
<td>Relational</td>
<td>8.10 (2.89)</td>
<td>6.69 (2.09)</td>
<td>5.62 (2.09)</td>
<td>2.67</td>
<td>2, 66</td>
<td>0.07</td>
</tr>
<tr>
<td>Overall</td>
<td>6.58 (2.66)</td>
<td>6.93 (2.26)</td>
<td>5.34 (2.00)</td>
<td>1.69</td>
<td>2, 66</td>
<td>0.19</td>
</tr>
</tbody>
</table>
DISCUSSION

The results from the present study go some way to suggesting that individuals possessing different cognitive styles learn more effectively from certain hypertext architectures.

A significant interaction effect was observed in the relational architecture condition, where essay detail scores and number of words per essay was higher for individuals with an intermediate cognitive style than for analytics and wholist individuals. This finding may be interpreted as being due to the fact that intermediates would appear to possess the characteristics of both analytics and wholists which facilitates their learning performance. In other words, intermediates benefit from having information segmented into parts, yet benefit from being able to derive an overview of the information content of the system, thus aiding their understanding of the structure of the hypertext. This is in accordance with the rationale proposed by Graff (2000).

What is perplexing however, is why this result was only observed in the relational architecture condition. The questionnaire data revealed no differences in perceived ease of use between wholists, intermediates, and analytics in the relational architecture condition, therefore the differences in learning cannot be accounted for by differences in perceived ease of use between cognitive styles. One possible explanation is that the relational architecture condition provided a complex enough environment to discriminate between the scores of wholists, intermediates, and analytics, although this suggestion needs to be submitted to further research.

Table 3
Cognitive Style (Wholist Intermediate Analytic) Within Architecture MANOVA for Ease of Use Scores (N= 90)

<table>
<thead>
<tr>
<th></th>
<th>Wholist</th>
<th>Intermediate</th>
<th>Analytic</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>13.42 (3.82)</td>
<td>14.50 (3.96)</td>
<td>13.60 (4.56)</td>
<td>&lt;1.0</td>
<td>2, 81</td>
<td>0.81</td>
</tr>
<tr>
<td>Hierarchical</td>
<td>15.94 (3.49)</td>
<td>14.60 (4.35)</td>
<td>12.22 (4.29)</td>
<td>2.82</td>
<td>2, 81</td>
<td>0.06</td>
</tr>
<tr>
<td>Relational</td>
<td>12.07 (3.81)</td>
<td>12.73 (2.53)</td>
<td>12.30 (2.95)</td>
<td>&lt;1.0</td>
<td>2, 81</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Table 4
Cognitive Style (Verbaliser Bimodal Imager) within Architecture MANOVA for Ease of Use Scores (N= 90)

<table>
<thead>
<tr>
<th></th>
<th>Verbaliser</th>
<th>Bimodal</th>
<th>Imager</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>12.64 (3.35)</td>
<td>15.63 (3.46)</td>
<td>13.50 (4.93)</td>
<td>1.55</td>
<td>2, 81</td>
<td>0.21</td>
</tr>
<tr>
<td>Hierarchical</td>
<td>13.73 (5.35)</td>
<td>16.27 (3.45)</td>
<td>12.89 (2.52)</td>
<td>2.82</td>
<td>2, 81</td>
<td>0.06</td>
</tr>
<tr>
<td>Relational</td>
<td>13.00 (2.83)</td>
<td>12.88 (3.94)</td>
<td>11.54 (2.93)</td>
<td>&lt;1.0</td>
<td>2, 81</td>
<td>0.58</td>
</tr>
</tbody>
</table>
In the hierarchical architecture condition a significant interaction effect was observed, where essay detail scores and number of words per essay was higher for individuals with a bimodal cognitive style than for verbalisers and imagers. As mentioned earlier, Paivio’s (1971) dual-coding model suggested that individuals can exhibit the characteristics of verbalisers and imagers at the same time because verbal and imaginal information is processed by different cognitive subsystems. Therefore, their ability to work simultaneously with text-based media, and also their ability to use spatial and directional information may account for the superiority of bimodals in this situation. Cognitive load theory (Sweller, 1988, 1994) also provided some support for this dual coding explanation as follows. Two of the tasks a user needs to perform concurrently when using hypertext, are reading and understanding the contents of each page and also keeping track of their location within the hypertext document. Performing these tasks simultaneously requires a high degree of learner effort. It is possible that bimodals who can perform these tasks concurrently, suffer lower levels of cognitive load than either imagers or verbalisers, and consequently they are able to learn more effectively from hypertext.

Again, what is more interesting is why this effect was evident only in the hierarchical condition. The questionnaire data revealed that bimodals reported that they found the hierarchical hypertext architecture easier to use than the verbalisers and imagers and this reported ease of use supports the idea of low cognitive load and also provides a possible explanation as to why the learning performance of bimodals was superior in this condition.

The implications of the findings from this study suggest that the performance of individuals with different cognitive styles is superior in certain hypertext architectures. However, several other factors also need to be considered in future research.

First, it is possible that individuals may engage differently with certain types of information depending on their cognitive styles. Tinajero and Paramo (1997) suggested that individuals with different cognitive styles have different academic preferences. Therefore it is possible that a different type of information content in the hypertext may yield different results.

Second, in this study, learning was measured by scoring essays for level of detail. It may also be prudent to consider other measures of learning in future studies. Furthermore, because users in this study were only given 10 minutes to read the hypertext, it is uncertain as to whether learning occurred on a deeper level.

**CONCLUSION**

The results from this study contribute to the knowledge base on the cognitive style construct and how cognitive style should be considered when constructing hypertext structures for instructional purposes. More specifi-
cally, the results suggest that certain hypertext architectures can be matched to the cognitive style of the user to facilitate more effective learning. This finding clearly has important implications for the design of e-learning systems as individuals would seem to benefit by using hypertext architectures designed to match their cognitive styles. Further work is however required to investigate different and deeper levels of learning in this context.

References


