Exploring the Online GLAM through a Downloadable Tangible User Interface

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The Web has changed many of the Cultural Heritage (CH) organisations. For example, Semantic Web technologies have enabled the homogenisation of information and helped reduce the uncertainty of the collection records. Semantic Web technologies such as ontologies and Linked Data, have provided the diverse CH organisations such as Galleries, Libraries, Archives, and Museums (GLAM), the technology to integrate large sets of external information. Nevertheless, such benefits have not been fully embraced by their users (e.g. general users, academics, etc.). There are vast sets of data and information describing the collections that could enhance and facilitate online learning, but that are difficult to query due to the high level of skills (e.g. digital and search literacy) usually required.

This research presents an approach to ease the engagement with these online collections through a downloadable Tangible User Interface (TUI). The methodology used looked to understand the engagement levels behind online collections and has identified two main layers of engagement with information. Firstly, the technical and technologic layer of engagement focuses on the role that technology has in empowering users to produce complex queries through a wide range of data fields, properties, and operators. Secondly, the conceptual layer aims to understand the different cognitive and engagement with information processes that users have to experience, in order to relate different concepts across the GLAM spectrum on the Web.

User interfaces play an essential role in this research due to the fact that all interaction on the Web takes place through an interactive system. Therefore, this research has relied on the use of TUIs to facilitate the different layers of engagement. The interactive design was carried out through a User Centred Design (UCD) process, where users express their agency as part of such design. In addition, Human Information Interaction (HII) provided an understanding of the different stages of information needs, such as visceral and conscious, where users present different behaviours when searching for information (Taylor, 1967, Case, 2002).

While the vast majority of searches on the Web rely on a single keyword, the interface prototype provided an interaction paradigm where users managed to produce complex queries with multiple keywords, data fields and operators. The interactive prototype used Europeana as a case study, thus producing queries through their API.

The use of TUIs in this research is based on a growing number of Human Computer Interaction (HCI) literature that suggest that TUIs can alleviate the process of and mental effort required to interact with a computer (Hornecker and Buur, 2006, Bakker et al., 2012, Shaer and Hornecker, 2010, Dourish, 2004). By reducing the complexity of operating a computer within the first layer of engagement, users can focus on the tasks in hand, such as the production of queries and relating the information. In addition, TUIs can embrace users' sensorimotor and cognitive processes to make the actions and affordances of the interactive tools more comprehensible (Mayes and de Freitas, 2004). This aspect of TUIs is particularly beneficial to facilitate a transition from the technical and technologic layer into the conceptual layer, where the physical tools can aid users with the mental aid to structure their mental tasks and manage the complexity behind the queries.

The prototype presented in this research presents a novel way for users to explore and embrace the complexity behind the diverse GLAM organisation collections on the Web. In addition, users were able to produce extensive and complex queries behind the Europeana Data Model, thus using multiple data fields, keywords and operators. In addition, the prototype resorts to standard Web technologies and consumer electronics to encourage its adoption and distribution as a downloadable system. Finally this interdisciplinary research aimed to provide a constructivist approach that encourages the transition between the different states of need of information of the users when querying information.

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