



Reflecting the Science of Instruction? Screencasting in Australian and New Zealand Academic Libraries: A Content Analysis



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ABSTRACT

Research problem: Instructional screencasts are increasingly part of the online tutorial mix offered by academic libraries. However, what makes for effective screencast design? This research provides a snapshot of screencast design in Australian and New Zealand academic libraries and appraises it through the lens of multimedia learning theory.

Methodology: Evidence-based design principles that promote effective learning for multimedia were identified from the research literature. A cognitive psychological approach was taken, drawing principally from Mayer's cognitive theory of multimedia learning. The principles outlined in Mayer's theory were translated into guidelines applicable to screencast tutorial production. These guidelines formed the basis for an assessment rubric which was applied to screencasts produced by New Zealand and Australian Universities. Content analysis was then applied to determine to what extent screencast tutorials in the sample reflected the principles outlined in Mayer's theory.

Results: On average, screencasts from the institutions surveyed integrated 7.6 of 9 effective multimedia principles. The low variance across the sample suggests this high standard was approximated or exceeded by most tutorials. Australian and New Zealand libraries were of a comparable standard overall with similar areas of strength and weakness.

Implications: Mayer's principles provide a useful foundation for designing effective multimedia instruction. The translation of these principles into screencast design guidelines will hopefully serve as useful considerations. Commonly neglected principles (coherence, signalling and segmenting) present areas for design improvement but also opportunities for further research in an academic library context.

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INTRODUCTION

Screencast tutorials (or screencasts) vary in content, production level and the tools used to create them, but simply put are “a digital recording of computer screen activity, often with an audio commentary” (Raftery, 2011, p. 665). Screencasts are commonly used by academic libraries (Cordes, 2011; Ergood, Padron, & Rebar, 2012), echoing the kinds of instruction often provided in person e.g. using the library catalogue; searching databases (Notess, 2005) and providing research guidance for particular subjects and courses (Ergood et al., 2012).

For those new to screencasting, there is ample advice in the literature on technical and planning considerations (Ergood et al., 2012; Notess, 2005; Plumb, 2010; Raftery, 2011; Slebodnik & Riehle, 2009; Small, 2010). Less common are guidelines for identifying those design features best proven to facilitate learning. Though there has been extensive research on multimedia learning more generally, there are few

articles that outline best practices for screencast tutorials specifically. Those that do (Betty, 2008; Loch & McLoughlin, 2011; Oud, 2009; Raftery, 2011; Sugar, Brown, & Luterbach, 2010), naturally draw recommendations from wider instructional frameworks such as cognitive psychology and educational theory.

This research:

- Identifies from the research literature evidence-based design principles that promote effective learning for multimedia – in particular it takes a cognitive psychological approach drawing from Mayer's cognitive theory of multimedia learning (Mayer, 2008, 2009; Mayer, 2014a)
- Translates the principles outlined in Mayer's theory into guidelines applicable to screencast tutorial production
- Determines to what extent screencast tutorials currently produced by academic libraries in New Zealand and Australia reflect the principles outlined in Mayer's theory

For the purposes of this study, a design element is an observable, extractable feature of the screencast e.g. voice narration.

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There is a small international body of literature focused on best-practice design principles for instructional screencasts. Related to this literature are a number of studies that look at how best-practice principles are being reflected in practice. This research adds to the practice-oriented literature by comparing screencasts produced in the New Zealand/Australian academic library context against a multimedia learning framework. To date, there have been few studies looking at online tutorials in this context (Cordes, 2011) and none, to our knowledge, focusing on screencasts exclusively.

This research provides a snapshot of screencast design in Australian and New Zealand academic libraries from a cognitive psychology viewpoint. Commonly neglected elements of effective design are identified along with suggestions on how to integrate them. In addition, by identifying a sample of high quality tutorials (i.e. scoring high on the assessment rubric), academic librarians inexperienced in creating screencasts will have concrete examples to emulate. Additionally, identifying those libraries that are demonstrating these principles consistently in practice may spur further research into what is driving their approach.

REVIEW OF RELATED WORKS

This literature review situates screencasts within library online instruction; explores recommendations for effective screencasts, and highlights research approaches that evaluate their design. It also summarises Mayer's cognitive theory of multimedia learning and explains why this has been chosen as an evaluative framework for this study.

Academic libraries have a long history of using computer-aided instruction, reaching back to the late 1960s (Ergood et al., 2012). However, the fact that creating tutorials required specialist skills and hardware proved to be a barrier to widespread use. By the mid-1990s, this began to change with the emergence of the World Wide Web. Soon after, a number of academic libraries began to experiment with creating and delivering tutorials online. An early example of this was PLUTO (Purdue Libraries Undergraduate Tutorial Online), targeting first-year students, with a library orientation and introduction to database searching (Scholz, Kerr, & Brown, 1996). Almost a decade later, web-based tutorials have become thoroughly mainstream in academic libraries (Mestre, 2012).

WHY DO LIBRARIES OFFER ONLINE TUTORIALS?

This is partly due to the relative ease with which they can now be created. The rise of web-authoring tools (e.g. WordPress), means specialist knowledge is no-longer required to create basic web content. Apart from this, other factors cited include: increased demand for distance learning (Blummer & Kritskaya, 2009), expectations from students accustomed to online on-demand content (Dewan & Steeleworthy, 2013) and limited opportunities (and resources) for in-person contact (Arant-Kaspar & Benefiel, 2008).

In terms of content, library tutorials vary across institutions but a number of major themes can be identified. These include information literacy concepts, academic tools, search strategies and library resources and services (Somoza-Fernández & Abadal, 2009; Su & Kuo, 2010).

So, online tutorials are expedient, but are they effective? In principle, the answer seems to be yes, with a number of studies suggesting they can be as effective as face-to-face classes (Anderson & May, 2010; Silver & Nickel, 2005; Zhang, Watson, & Banfield, 2007).

MULTIMEDIA VIDEO TUTORIALS, SCREEN-CAPTURE VIDEOS AND SCREENCASTING

Screencasts are referred to in the literature by various names, but this is the name that appears to have stuck (Cordes, 2011; Ergood et al., 2012; Oud, 2009; Tewell, 2010). As a term, screencasting was popularized by technology journalist Jon Udell after crowd sourcing suggestions from the readers of his blog (Udell, 2004b). As Udell noted at the

time, the technology had been around for at least a decade (Good, 2006). The difference now was that increased access to broadband and low-cost screen-recording software was promising to “democratize the use of screen videos” (Udell, 2004a). What had previously been the domain of instructional designers and product developers was now in the hands of anyone with a computer and broadband connection. Screencasts are now a widespread and popular method of online instruction and are increasingly part of the tutorial mix in academic libraries (Cordes, 2011; Oud, 2009; Tewell, 2010).

WHAT MAKES FOR AN EFFECTIVE SCREENCAST TUTORIAL?

There are a number of instructional approaches that can be taken when designing screencasts. This section looks at some attempts to define effective multimedia instruction more generally, along with recommendations specific to screencasting.

There are two main approaches within the literature for establishing best-practice guidelines. The first is to take an instructional theory (or theories) and derive from these the elements needed for effective instruction (Cordes, 2011; Mayer, 2009; Oud, 2009; Tempelman-Kluit, 2006; Tewell, 2010). The second is to look at tutorials delivered in practice, and identify elements that appear to work well or need to be improved (Bowles-Terry, Hensley, & Hinchliffe, 2010; Oehrli, Piacentine, Peters, & Nanamaker, 2011; Sugar et al., 2010). Examples of both are discussed below.

Tempelman-Kluit (2006) is of interest as an early attempt to link multimedia theory with library practice. The aim was to determine the effectiveness of HTML versus “streaming media” as a teaching tool. Drawing from cognitive psychology (cognitive load theory (CLT), Paivio's dual-coding theory and Mayer's cognitive theory of multimedia learning) and constructivism, Tempelman-Kluit identified a list of multimedia principles that support learning. This identification of cognitive psychology (cognitive load theory) and constructivism as relevant theoretical lenses is echoed in subsequent research (Morris & Chikwa, 2014; Morrison, Ross, Kalman, & Kemp, 2013; Oud, 2009). The conclusion of this comparison was that a streaming media tutorial better reflects these multimedia learning principles – and is therefore more likely to be effective – than the same tutorial in HTML.

Oud (2009) draws from research in cognitive psychology and educational theory to develop a best practice checklist for effective screencast instruction. Like Tempelman-Kluit, she also cites cognitive load theory as an important theoretical lens. While not explicitly mentioned, statements such as “learning is an active, interactive process where learners make meaning from new experiences” (p. 169) are indicative of a constructivist approach (Cooperstein & Kocevar-Weidinger, 2004). Synthesizing research from cognitive psychology and educational theory, Oud presents five overarching principles for effective screencasts: ask whether multimedia is needed; minimize cognitive load; include interactivity; promote critical thinking and know your students. Other multidisciplinary best-practice articles exist (Blummer & Kritskaya, 2009) but Oud's stands out for focusing on screencasts rather than online instruction more generally.

Tewell's aim was to review the nature and quality of online tutorials (including screencasts) offered by academic art libraries and identify potential areas for improvement (2010, p. 54). There was no stated theoretical underpinning to Tewell's survey of online video tutorials in academic art libraries. However, he references three sources as the basis for his best practice criteria (Blummer & Kritskaya, 2009; Oud, 2009; Smith, 2010). Tewell does not specify which elements he has taken from each, but some aspects associated with Mayer's multimedia theory (integration of video, audio and text; segmenting topics) are identifiable. The majority of his criteria however are usability-focused, technical and/or aesthetic e.g. “is the visual information presented in an attractive...manner?”; “is unwanted background noise audible?”; “which recording software was chosen, if appropriate?” (2010, p. 61).

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