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Integrating Digital Literacy and Design Thinking into Enquiry-based Learning: an ARCS motivational redesign within midwifery education

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Within midwifery education, enquiry-based learning (EBL) is a well-established means of optimising students' autonomous discovery, knowledge acquisition and problem-to-creative-solution design (Byrne 2016; Peace 2012). As a result, midwifery researchers evaluating the impact of EBL have reported positive effects in terms of life-long learning, transferable skill development and greater integration of theory and practice (Kahn and O'Rourke 2005; Fisher et al., 2005; Brown et al., 2008). At the same time, and as part of the wider undergraduate population, midwifery students have an innate relationship with technology, which also serves to enhance their cognitive processing skills and overall learning gain. In fact, according to Koh (2015) it is the Net Gens' 'hypertext mind' that enables them to be the non-linear and autonomous information processors, capable of creating solutions to some of today's most complex problems. Optimising learning via integrating technology into the curriculum is not new; as far back as 1991 Jonassen highlighted how hypertext plays a significant role in enabling the educator's knowledge structure to be "modelled and mapped directly onto the learners' cognitive structure" (pg 86). Yet, in spite of the many benefits of 'technology-infused' EBL, creating a motivating learning experience remains challenging.
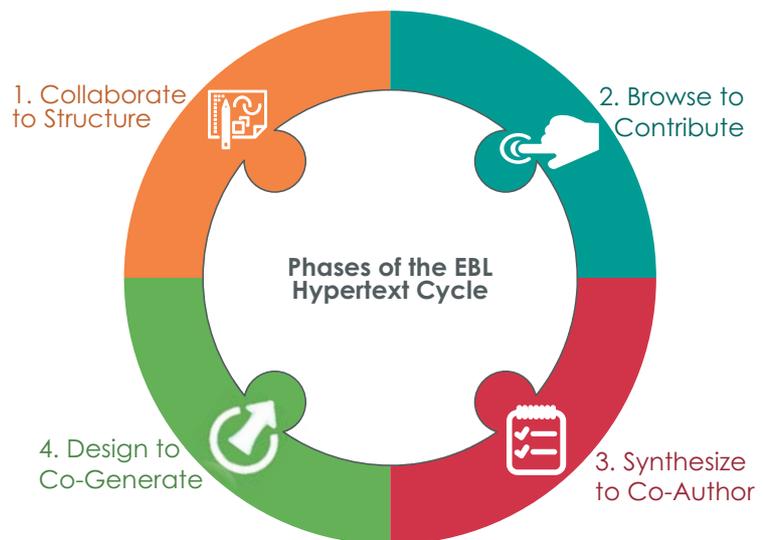

Figure 1: Phases of an EBL-hypertext cycle

Hypertext is best optimised in an unstructured, open-system of collective learning, where students are motivated to simulate and share the information-seeking and knowledge-generation cycle that they associate with technology (**Figure 1**). However, curriculums, by default, are structured, closed-systems of individual learning, where students are motivated to learn knowledge that is transferred to them (Jonassen 1991). Summarised by Chua et al., (2015), the key challenge to shift students' attention away from needing to '*know*', towards needing to '*think*' as part of an ongoing, meaning-making process, remains paramount. Evidence also demonstrates that netizens' motivation to use technology remains more centred on their personal and social needs than on their desire to collectively generate professional knowledge and expertise (Datt and Aspden 2015).

With both these main motivational challenges in mind, this short paper outlines the initial iteration of a rapid application of the ARCS motivational instructional design approach (Keller 2010), to an EBL group experience within the undergraduate midwifery programme. Further information about this well-known and easily applied heuristics approach to increasing the motivational appeal of instruction, can be found at **https://www.arcsmodel.com/**.

Methodology

In step with the model's action research approach, a midwifery educator and ARCS methodologist observed how one undergraduate EBL group naturally engaged in a series of hypertexting cycles. Following review by the midwifery education team, the observed motivational strengths and weaknesses relating to the expected phases of an EBL-hypertext cycle (shown in **Figure 1**), were summarised:

To overcome the observed motivational weaknesses associated with the final knowledge-generating phases of an EBL design, [*where each student required the self-motivation to cognitively map the retrieved knowledge to the agreed structure*], an easy-to-use infographic design app was introduced into the hypertexting cycle. Accessible via
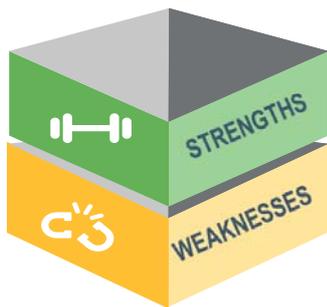
Figure 2: Summary of the Observed Motivational Strengths and Weaknesses Related to EBL Phases

Expertly Guided Structuring –through open discussion and facilitation, students agreed a structure [**step 1**] for information seeking and knowledge generation. Motivational effects included:

> Increased **Relevancy** of the learning goals
> Increased **Attention** on problem-solving via introduction of incongruent ideas to explore

Team Browsing – working to the agreed structure, team members **confidently** accessed multiple sources of knowledge, including databases, websites and national guidance documents [**step 2**]

Self-Synthesis – however, instead of creating a collective learning solution (steps 3 & 4 in the EBL hypertext cycle), detailed and independent Word documents were circulated via email. Students were therefore required to self-synthesise in order to create a knowledge solution; minimising both the intrinsic and extrinsic rewards [**Satisfaction**] associated with the team learning design.

their mobile devices, each infographic captured a concise synthesis and visualisation of their generated knowledge, including hyperlinks to open source videos and evidence-based guidelines. A password protected link was circulated within the group for each infographic created. In order to draw **attention** to completing the full hypertext cycle (including the **relevancy** of designing group infographics as learning solutions), a short EBL introductory video was captured by the EBL educational leads (see **http://bit.ly/2wUOps2**). Further pedagogical ARCS research iterations related to how midwifery students motivationally experience EBL are currently being explored.

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