The challenge of facilitating and promoting undergraduate students' engagement with some of the central concepts within their respective academic disciplines is an issue that university teachers are continually faced with. Many academic disciplines, such as education, sociology, anthropology, philosophy and medicine are laden with concepts which are complex and often emotionally and politically charged. This can often make these central concepts difficult for undergraduate students to engage with as they navigate their way through the Higher Education system. Students are often reluctant to participate in group discussions which focus on these concepts because of a fear of appearing not to understand the concept and related issues or being uncomfortable expressing a minority opinion during these same discussions.

This paper reports on a project which attempted to address this issue by removing some of the potential emotional constraints on students during the early stages of concept introduction and interrogation. Several models of student learning emphasise the importance of learning through engagement or interaction with the learning task e.g. (Kolb and Fry, 1975; Jarvis, 2006). Traditional approaches to teaching and learning in higher education do not build on these models as effectively as they might (Biggs and Tang, 2007; Hay, Kinchina and Lygo-Baker, 2008). However, the introduction of curricula underpinned by the principles of "Research Led Teaching and Learning" (Jenkins, Healey and Zetter, 2007) dictate that a wider range of pedagogical techniques and approaches are utilised. In line with this a number of different pedagogical tools and techniques have been proposed in recent years as a means of stimulating this engagement and promoting a richer learning experience for students, the use of mind maps, for example, reflects one attempt to help students unpack concepts more effectively (Hay et al, 2008). Whilst such techniques are undoubtedly useful the diversity of the student population dictates that we do not adopt a single approach to course design and delivery and we need to find a range of ways of helping students explore concepts. Using a semiotic framework several researchers argue that the creation of 'digital artefacts' as a means of representing concepts promotes learning as it facilitates the production of 'signs' in relation to the concept (Ainsworth, 1999; Prain & Waldrip, 2006; Tyler & Prain, in Press; Waldrip, Prain, & Carolan, 2006). Hung and Wong (2000) argue that e-learning activities can result in increased student engagement when the tasks selected are authentic and simple. The current project utilises both the semiotic framework and Hung and Wong's arguments about authenticity by making use of a simple online programme that allows the creation of short video animations as a vehicle for concept representation. It takes a constructivist approach to learning and starts with the basic assumption that concepts are best understood when they are developed incrementally from the starting point of the student's current knowledge (Biggs and More, 1993; Bruner, 1960; 1966; Piaget, 1950).

The primary goal of the research was to explore the extent to which the production of digital artefacts, representing key concepts, using video animation software can be used to facilitate undergraduate students exploration and unpacking of key concepts within a discipline and in so doing further their understanding of, and engagement with, that key concept.

The research was conducted as part of a first-year undergraduate education module at Durham University. The module is an open module and generally attracts approximately 50 students annually. During the first teaching week of the module the students were introduced to a programme for creating video animations, Xtra-normal, (www.xtra-normal.com) accessed via the world wide web and given full instructions for using the programme. They were then asked to work in pairs to create a short video animation where two characters, of their choosing, discussed the question "What is learning?" Once all the animations were completed students

were asked to work in groups of 5 to carry out a content analyses of the animations created by the whole class, or a sub-set of them. A workshop introducing the ideas of content analysis was delivered. Students were asked to start to link the emergent categories from their content analyses to the wider research literature relating to the concept of learning and this formed the basis of group presentations and class discussions during a workshop.

Students were then asked to participate in short semi-structured interviews about their experiences of creating the video animations and the relationship they had to their learning and exploration of the concept of learning. The purpose of the interviews was to try to determine whether or not the creation of the animations in any way supported students learning about the concept of learning. Thirty out of forty-seven students agreed to participate in these interviews.

Preliminary results of the content analysis of the interview data (n = 30) indicates that students found the process of creating the video animations to be a very positive one which allowed them to start to think about the concept of learning from a personal perspective rather than one which forced them to analyse and interpret the research literature at the start of the module. A common theme in the interviews was one of the process as being supportive to their ideas of what learning was and through the subsequent group analysis of the videos produced by classmates a sense that their views were not unique, stupid or unworthy of discussion. Indeed one student commented "it was nice to be able to say what I thought without worrying about someone thinking I was stupid or having to keep, you know, explaining what I meant". Students seemed to like the initial anonymity that the creation of the videos afforded.

The interview data also indicates that students found the related research literature easier to navigate once they had analysed the class videos "when I went to read the books and articles about learning theories and what people think learning is I was linking them to our videos and I could think about it and how it (the theories) explained how people learn or how we (the class) learn and not just think about it - as you know Dewey says ...".

The data reported in this paper would seem to provide support for the claim that if used as part of a pedagogical strategy or framework digital artefacts can indeed support the acquisition and development of conceptual understanding.

References

Ainsworth, S. (1999). The functions of multiple representations. Computers and Education, 33, 131
152.

Biggs, J. and Moore, P (1993) The Process of Learning, Prentice-Hall, New York

Biggs, J. and Tang, C. (2007) Teaching for quality Learning at University. (3rd Ed) OUP: Maidenhead.

Boud, D and Walker, D (1998) Promoting reflection in professional courses; the challenge of context,
Studies in Higher Education, 23 (2)

Bruner, J.S (1960) The Process of Education, Harvard University Press, Cambridge, Mass.

Bruner, J. S (1966) Towards a Theory of Instruction, Harvard University Press, Cambridge, Massachusetts

Hay, D., Kinchin, I., and Lygo-Baker, S. (2008) Making Learning visible the role of concept Mapping in Higher education. Studies in Higher Education, 33(3) 295-311.

Hung, D. J. W and Wong, A. F. L (2000)Activity theory as a framework for project work in learning environments, Educational Technology, March—April, pp 33— 37

Jarvis, P. 2006. Towards a comprehensive theory of human learning: Lifelong learning and the learning society. Vol. 1. London & New York: Routledge.

Jenkins A ,Healey M and Zetter R (2007) Linking Research and Teaching in Disciplines and Departments
http://www.heacademy.ac.uk/research/LinkingTeachingAndResearch_April07.pdf

Kolb, D., and R. Fry. 1975. Towards an applied theory of experiential learning. In Theories of group processes, ed. C.L. Cooper. London: J. Wiley and Sons.

Piaget, J (1950) The Psychology of Intelligence, Routledge and Kegan

Prain, V., & Waldrip, B. (2006). An exploratory study of teachers' and students' use of multi-modal representations of concepts in primary science. International Journal of Science Education, 28(15), 1843-1866.

Tyler, R., & Prain, V. (In Press). A framework for re-thinking learning in science from recent cognitive perspectives. International Journal of Science Education.

Waldrip, B., Prain, V., & Carolan, J. (2006). Learning junior secondary science through multi-modal representations. Electronic Journal of Science Education, 11(1).