Developing Flash Based Learning Objects

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'Teaching in an online world'

Strategies, Tools & Techniques'

Grant Warren Sherson

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Introduction

This session will look at the technical aspects involved in the development of Flash based learning objects. Attendees will be given a behind-the-scenes look at the 'Portrait Lighting' and 'Depth of Field' learning objects including information on how they were developed, issues overcome and lessons learnt.

Why Learning Objects?

So what is the big deal about learning objects
David Wiley from the Digital Learning Environments Research Group suggests that
'An instructional technology called "learning objects" currently leads other candidates for the position of technology of choice in the next generation of instructional design, development, and delivery, due to its potential for reusability, generativity, adaptability, and scalability.'*
A little research confirms that a lot of investment and energy is being focussed on Learning Objects.

So what is a Learning Object?

David Wiley calls them .. "… any digital resource that can be reused to support learning."

The Learning Federation calls a learning Object "… a digital resource facilitating learning experiences related to a particular educational purpose." The Le@rning Federation (2003)

The Learning Technology Standards Committee of IEEE has a wider definition. " … any entity, digital or non-digital, that may be used for learning, education or training."

Learning Object – Key Features

I favour the digital viewpoint with the need to be useable as a stand alone component with an educational purpose. Digital Resource, Reusable, Supports Learning)
This could be a Picture, a piece of text through to a complex interactive simulation.

Why Flash?

Flash was chosen for building the learning objects as it has the best combination of:

- ease of development
- quality multimedia
- small file size.

Seen as the standard for creating interactive Multimedia on the Web

Flash based Learning Objects at UCOL

In many ways my involvement in Learning Object development started like Peter Sellers' Chance Gardener in Being there.
Mark Nichols works in my office and he had prepared a brief in conjunction with Subject Matter Experts relating to building a photography learning object. The plan was to outsource the development and the brief was given to commercial interests to develop a proof of concept and get an idea of costs etc.
Listening to what was being discussed, I asked if I could also have a go seeing as I had 'played' with Flash a little.
I also have a background in software development, animation and interface design.

Project Brief – Experiment Section

The learning object was to contain text, an experiment area and a challenge area. The experiment area was to be interactive. The brief described it as …
'Students will be able to 'position' the lights according to ten times ten pre-selected positions, shown in Figure 1. Students choose one of ten positions for the outer array, then one of ten positions from the inner array. The effects of the lighting arrangement on the mannequin are shown to the student immediately, and the student can make further adjustments to the lights' positioning immediately.
A bank of photographs of a mannequin taken from the camera position shown in Figure 1 will be used to show the students the effect their lighting arrangement will have'

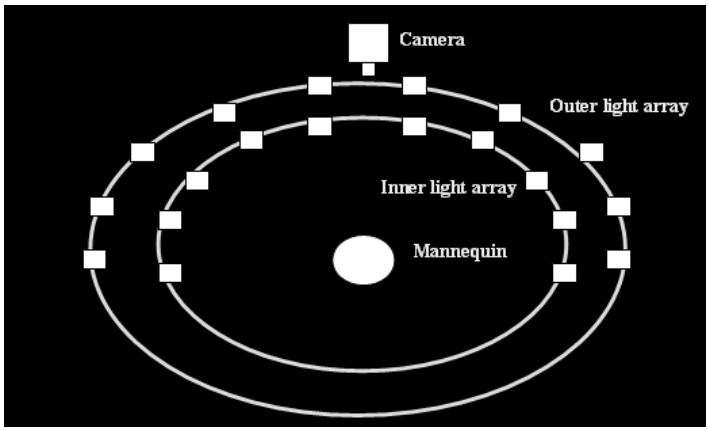


Figure 1. Inner and outer light array options.

Clearly the design brief was fairly tight - the proof of concept from what was outsourced and the output from me were fairly similar.

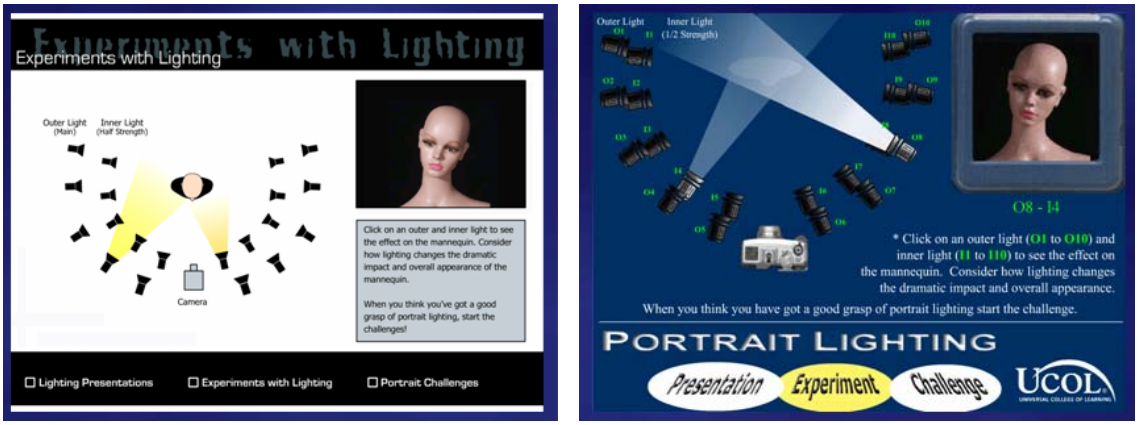


Figure 2. Outsourced and Grant Sherson's Portrait Lighting proof of concept documents.

The manequin photos were provided.

For reasons I don't remember I took on the job of building the full learning object.

As already mentioned, the LO was planned to have 3 sections – the presentation or teaching area, the experiment area and a challenge area.

It was a great learning curve for me getting to grips with the use of the drawing tools and buttons.

It was very scary looking at it when preparing for this presentation because there were so many things I would do differently now. For example there is a button for the light that turns the light on. I would have embedded the button a layer down in the same clip as the light (currently there is duplication of objects and the image jumps based on the current zoom of the flash player.

Portrait Lighting Version 1

Things I wanted to include

- a consistent navigation in keeping with the theme.
- a fairly clutter free layout
- intuitive navigation and control

Once the initial experiment and challenge areas were developed, we asked for feedback from industry only to be told ‘we don’t do things like that’ and then the lecturer agreeing that no we don’t do it like that!

So the initial well planned LO had to go back to the drawing board.

Figure 3: Version 2 of the Portrait lighting Learning object.

The new version made use of a graphic designer – it only had 5 lamps and only one of those could be dimmed

Lessons Learnt

Clearly the rewrite was a major issue as all aspects of the experiment and challenge area had to be rewritten. Fortunately the content section had not been started.

Then again there were design spinoffs because of the level of experience gained from the first version could be applied to the second.

Version control was important as many of the changes were small coding changes so it was important to know which was the latest rendition.

Managing assets was a vital part of the process as many of the files were updated but needed to retain the same name. The use of the flash ‘update’ feature was used quite a lot.

Design Issues

I have an extensive background in user interface design and had difficulty balancing the needs of User interface such as not scrolling text and not cluttering up the look vs the amount of content needed and the extra explanations.
It was important for the user not to feel that they had been shifted off somewhere else.
To get around this layers have been used extensively. And repurposing display areas to maintain consistency. Things like making sure the close button is in the same place as the open button.

Lessons – Depth of field

It was great to be able to treat some stumbling blocks as stepping stones.
One stumbling block was copyright. The graphic designer had dutifully replicated the text book chart to represent the various changes that happen when the variables change. Unfortunately, or fortunately, it was so like the original we were forced to consider alternatives. The chance to think outside the box and make use of the strengths of Flash also changed the approach which became very important later on in the development. What we ended up with was a more true to life representation of the depth of field relating to the variables. (figure 4)

Figure 4. Static (copyright) version of the chart vs the developed interactive (original) version.

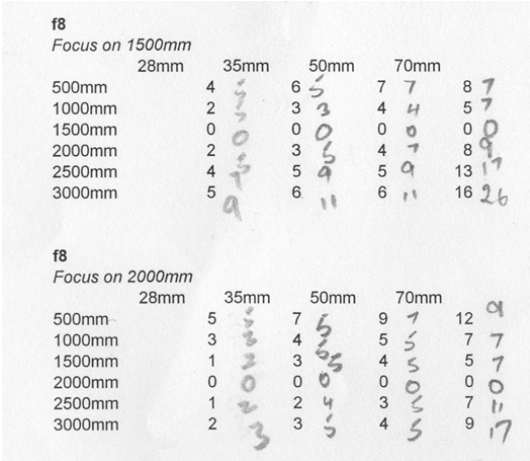
With the Depth of field learning object the plan was to take photos of art models and swap pictures to show the change in the variables.
Hundreds of photos were taken but unfortunately the differences in the general look of the photos meant that they were unusable.

Figure 5. Photos that were to be the way that depth of field would be demonstrated.

The colour, the angle and other things were going to distract from the key message. So it was back to the drawing board (literally as it turns out).

We already had a graphic version of the art models so that was used to generate a ‘fade’ from in focus to out of focus.

A chart was used to build a full set of digital images matching what could be expected at each variable combination



f8
Focus on 1500mm

	28mm	35mm	50mm	70mm	
500mm	4	6	7	8	
1000mm	2	3	4	5	
1500mm	0	0	0	0	
2000mm	2	3	4	8	
2500mm	4	5	5	13	
3000mm	5	6	6	16	

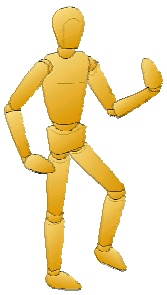
f8
Focus on 2000mm

	28mm	35mm	50mm	70mm	
500mm	5	7	9	12	
1000mm	3	4	5	7	
1500mm	1	3	4	5	
2000mm	0	0	0	0	
2500mm	1	2	3	7	
3000mm	2	3	4	9	

Eg when focused on the 1500mm object using f8 and a 28mm lens, the object looks like the object labelled ‘4’ on the chart.

In flash the movieclip object of the model was positioned and adjusted to look like the ‘4’ on the chart and the code number for that was jotted down.

Once all the permutations were noted then an interface was developed to display the appropriate images foe the experiment section and the challenge section.



References

David A. Wiley, II (2000) Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. Utah State University, Digital Learning Environments Research Group (P7) Online URL: http://www.reusability.org/read/chapters/wiley.doc

(http://www.reusability.org/read/chapters/wiley.doc)

The Learning Federation (p3) Online URL: http://www.thelearningfederation.edu.au/repo/cms2/tlf/published/8519/Technical_Specifications_V3_1.pdf

Learning Technology Standards Committee of the Institute of Electrical and Electronics Engineers (IEEE) (2002, Section 1.1, ¶ 1). Online URL: http://ltsc.ieee.org/doc/wg12/LOM_1484_12_1_v1_Final_Draft.pdf