

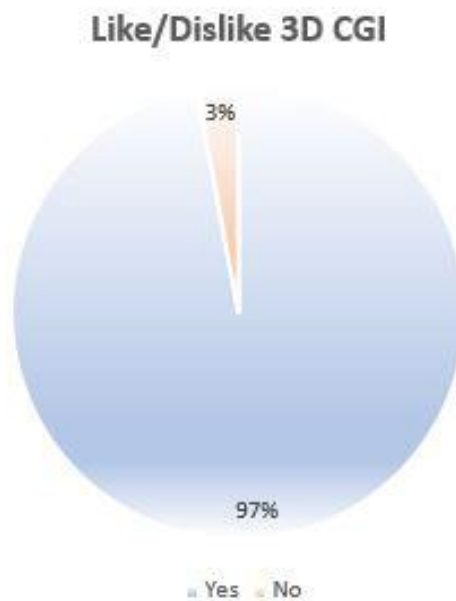
The Reluctant Learner: encouraging engagement with CGI animation tools

I teach and support animation across a few universities in the north of England. The courses that these institutes offer are not 'computer animation', 'traditional animation' or 'stop motion animation' but programmes of learning that aim to nurture creativity across their cohorts and help to develop a focussed understanding of the art of animation within any selected medium, whilst ensuring that academic benchmarks are met through theoretical and contextual learning.

The teams that I work as a part of encourage play and experimentation within their student cohorts to ensure that they have an opportunity to experience, and develop an understanding of, the different workflows across the spectrum of animation mediums. With this experience it is hoped that individuals will be able to make informed decisions about the area of animation in which they would ultimately like to be employed.

It is a rewarding vocation, to support and encourage the development of future artists and it is one that offers me the opportunity, or perhaps I should say that it requires of me, to continually develop my own approaches to practice whether that relates to animation, education or animation education.

While the practical aspect of the academic courses on which I teach is broad, I am by no means a jack of all trades and master of none. My own field of practice is geared towards 3D computer generated imagery and visual effects which, I have found over the past decade of teaching, is often the animation medium that most students on a broad-based animation course will enjoy watching but will avoid trying should they be given a choice.



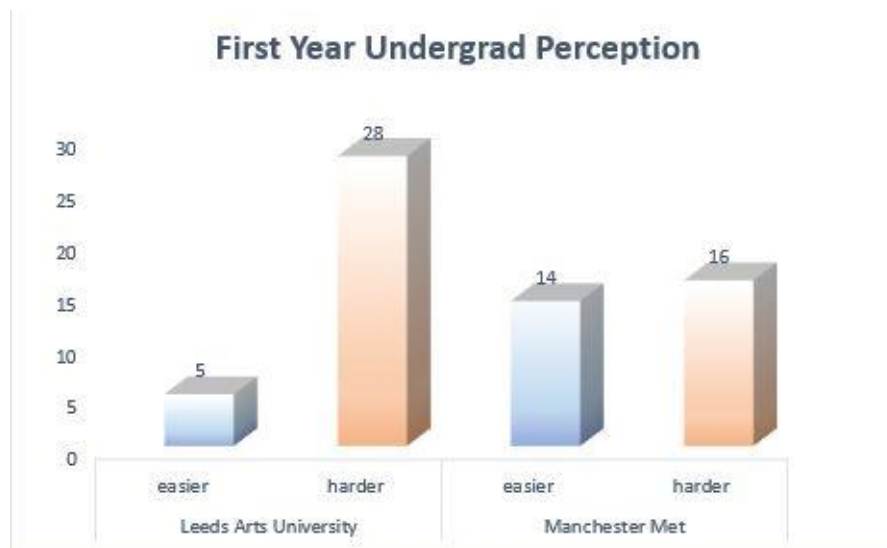
Student opinion of 3D CGI animation from data collected - Mat Clark 2018

Why should this be and what can be done to encourage student engagement within this medium of animation?

Over the course of this paper I shall discuss the approaches that I have adopted to make 3D computer generated animation and its associated software a more palatable prospect for anyone who might be thinking about animation as a career option, or simply as a hobby interest. And through analysis of data gathered from more than 130 animation students across 3 institutions I hope to develop a better understanding of 3D modelling and animation from the student perspective with an aim to encourage a greater interest in adopting this medium of animation from current and future cohorts.

Commonly, reluctant learners are referred to as “.... the ones who actively fight efforts to help them learn or passive-aggressively resist attempts to engage them.” (Jackson, 2011), in the context of this paper the *reluctant learner* refers to those students who lack motivation towards or might even reject the learning of new processes because of apparent complexity.

With this in mind, I would like to begin by briefly considering some of the reasons that may be responsible for the apparent reluctance in learners to engage with 3D CGI animation, what pre-conceptions do first year undergrad students hold towards 3D CGI animation and do those preconceptions reflect the eventual experience of applying 3D animation tools?



first year undergrad perception of 3D CGI tool-sets from data collected - Mat Clark 2018

When asked whether they thought that 3D CGI was easier or harder to produce than more traditional methods of animation, the difference in response between these two cohorts of first year undergrads is clear. The reason for this difference is most likely that the students from LAU had not yet been introduced to 3D CGI through their studies while, at the time of data collection, those studying at MMU had already been using the toolsets for several weeks. It is interesting to note that five students from LAU, the same number that selected *easier* in the questionnaire, had already gained some experience of 3D CGI production tools prior to starting at university. Further study of the LAU cohort will be undertaken to observe whether there are any changes in perception after they have been introduced to 3D CGI software, tool-sets and workflows.

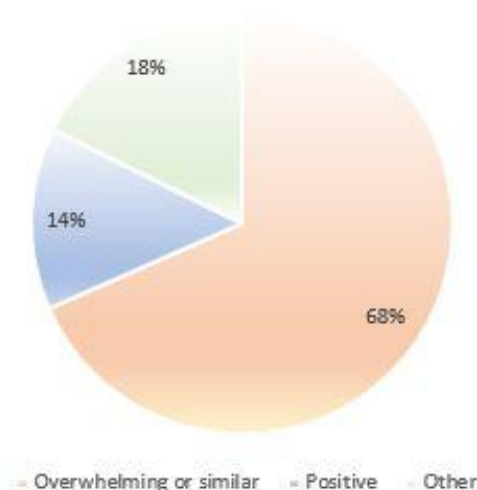
It appears that pre-conception has a heavy impact on student decision making when choosing which medium of animation they would prefer to adopt in their practice and, it is quite understandable for anybody, given the choice, to play to their strengths and continue to develop current skills rather than step into the unknown.

When we consider that the process of 3D modelling and animation is an unknown quantity for most first year students, 85% if we take our benchmark from LAU, and that the majority of these students believe that 3D CGI is *harder* than the more traditional approaches towards animation production, we find ourselves with a recipe for a room full of reluctant learners.

By the time that students enter university it is likely that they have been using drawing implements and modelling materials for at least seventeen years and the act of picking up and holding a pencil or of shaping a ball of modelling clay has become so ingrained in their muscle memory that it is a subconscious effort. But, these skills are the product of a lifetime of practice and it is likely that most people probably never consider the learning that has led to them being able to draw a simple picture or to write a short sentence and, it is even less likely that they can remember the frustration that was experienced in the early days of developing the skills required to achieve these feats.

Over the course of their first year, animation students will experience a wide range of software and practical production tools and, for most, there will be a sense of familiarity in these processes which has been developed through experience over the course of their lives or during their further education studies. Cameras provide the media input for stop motion animation and the facsimile of a pen is used to draw lines on a digital canvas in 2D drawing or animation software, this familiarity of process and interface encourages user engagement while in contrast, the surface complexity of 3D CGI solutions has the opposite effect.

Initial Impressions of Maya Interface

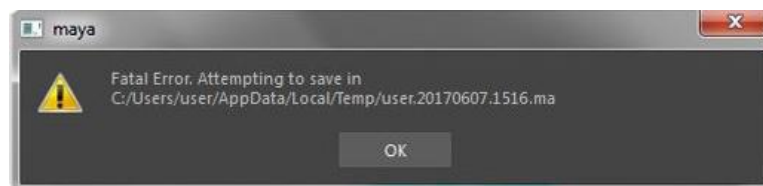


Student initial impression of 3D CGI interface from data collected - Mat Clark 2018

Initial impressions of most 3D modelling and animation software are often *overwhelming*, this word or similar was used by 68% of students when asked and unfortunately there is no way to dilute the inherent complexity of a complete specialist toolset.

Consider entering the cockpit of an airliner for the first time, would you understand the function of every knob, dial, lever or display? It is possible that you might be able to guess the functionality of a few of these pilot tools, but chances are that plane isn't going to get off the ground with you at the helm, or if it does something will probably go very wrong very quickly.

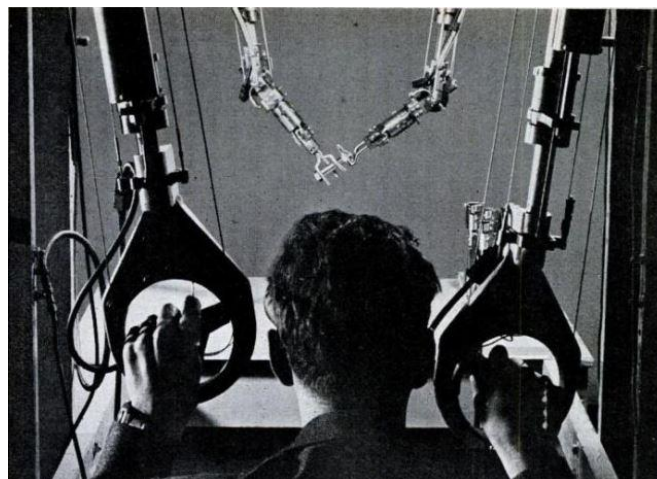
It is common knowledge that being able fly an aeroplane requires many hours of study and practice and developing the skill to apply the tools required in the production of 3D computer generated animation is no different. Granted, no lives are usually at stake while piloting Maya but, to reflect the aeroplane analogy, without the correct knowledge things can go very wrong very quickly.



Things can go wrong – Autodesk Maya

I am certain that people experiencing a flight simulator for the first time would enjoy the sensation of sitting in a cockpit, having access to the controls and trying to get the virtual plane off the ground but, would the experience be as *fun* if the same professional software was running on a 'normal' computer? Probably not. By removing the immersion, the experience is diminished, the fantasy of being a pilot has been reduced to the familiar sensation of sitting at a computer and frustration will quickly set in.

It was this notion that led me to consider a physical user interface for Maya with the hope that adding a new level of immersion to the experience might help to engage new users. The *Waldo*® controller is a concept inspired by sci-fi novelist Robert A. Heinlein and named after the eponymous inventor from his 1942 short story. It describes a remote manipulator that mirrors the control of its user's hands on a micro or a giant scale through mechanical, hydraulic or electronic connection and it has since evolved from the pages of science fiction to be applied in modern surgery, hazardous environments and in the creation of special and visual effects for film and television.



Remote control Manipulator – J.H. Payne 1948

My *Waldo*® inspired device would enable the user to interact with a puppet, or doll, to have those manipulations mirrored inside the Maya workspace on a digital facsimile of the controller, a far more relatable experience than Maya's 'stock' approach to human interface and one which could hopefully foster engagement and learning through play and performance, agency and embodiment.

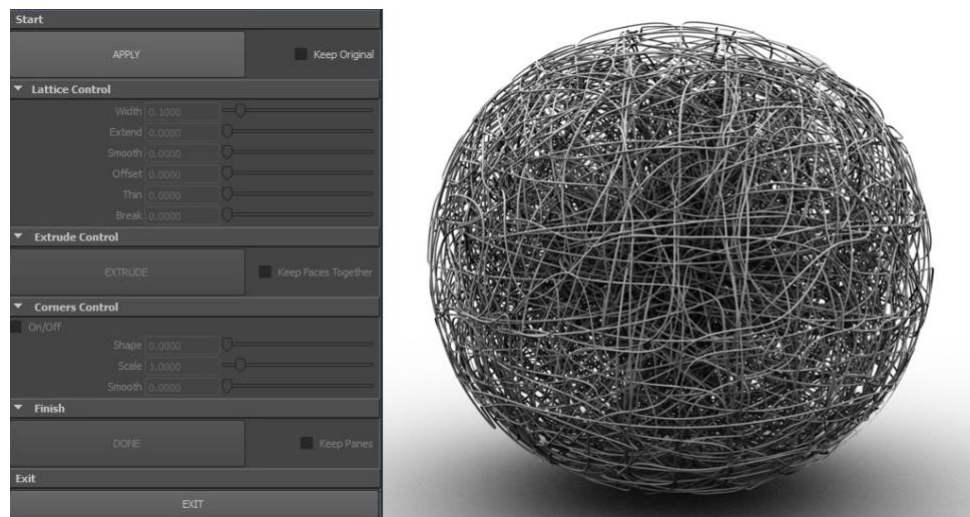
Using Arduino micro controllers, I was able to develop and build initial proof of concept devices that successfully demonstrate that it would be possible to construct a controller that could translate the variable outputs from a range of input components, including potentiometers, flex detectors and digital gyroscopes, into any attribute value of an object in Maya's workspace, in real time. The addition of a facility to record these changes in attribute values as key frame information provides a crude form of motion capture which can be used to review or amend each performance.



Proof of concept for puppet controllers – Mat Clark 2014

Unfortunately, a lack of time and funding, have prevented me from taking this concept any further. And, although I was unable to run any field tests, I maintain that there is a potential for this, or similar devices, to encourage engagement and willing participation from our *reluctant learners* within the field of 3D CGI animation. The simplicity and familiarity of this interface may even have the capacity to engage younger learners, those in primary or secondary education, as a playful introduction to the processes that can be applied within this medium with the potential allay any pre-conception of complexity.

Another approach that I have adopted in my role as educator is to develop tools that bring forward some of the higher functionality and simplify complex or repetitious processes which are a part of the Maya workflow. These scripts are not magic buttons that negate the necessity for understanding and they are aimed more towards the established learner, those who have selected 3D CGI as a focus of study, rather than the reluctant learner, with the intention of retaining interest and encouraging further exploration of interface, functionality and process.



Super Lattice Modifier interface and example – Mat Clark 2013

The final approach that I will mention, and arguably the most successful, is the online video guide. This type of guide provides the most accessible means of learning to most students, enabling individuals to develop their understanding at any time and at their own pace by simply pausing or reviewing the recorded session. According to Ofcom (2017), by the age of fifteen, 90% of children will use Youtube as a main source of entertainment and edutainment, so by the time they enter university students are well versed in accessing and navigating video media.

However, video guides should not be seen as a replacement for the classroom or studio, they are without interaction and they do not provide the on-hand expertise or support that is so often required while developing these new skills. A good video guide, one developed or endorsed by an educational establishment, should help to support a student's development in line with their curriculum of study and may well encourage the reluctant learner to engage more positively with 3D CGI animation but, the student familiarity with Youtube can also cause pitfalls in their approach to practice.

The internet is rife with video guides for everything, and a high percentage of these will teach bad practice or not explain process as it occurs. This can lead to frustration in the learner when things go wrong, they can't explain why, and don't know how to find a solution. I have been developing guides for longer than I have been an educator and, over the years my understanding and my approach to this form of education has continually evolved but two things remain constant.

- Bite sized is better
- Explaining every action is a requirement.

The initial picture that I painted of the scenes that might face a 3D animation tutor/lecturer upon entering a studio to introduce production software was an unfortunate one, especially if the tutor teaches on a broad-based course, the truth is that it is never that bad, but it can be difficult. I have discussed a few of the approaches that I have applied and investigated over the past ten years of teaching 3D CGI in the hope of engaging more students with the subject, some of these approaches have been more successful than others but as yet I can't claim that any of them have been perfect and so I shall continue my investigations, extending my teaching and learning toolkit so that I can call

upon it depending on the requirements or the dynamic of the group or individual/s that I am teaching.

Of course, not everybody embarking a broad-based animation course will have an initial interest in producing 3D computer animation but, as an industry that is expected to reach a global market worth of £17.75 billion by 2025 (GVR, 2017), it is important for animation students to develop a fundamental understanding of the processes used in the production of 3D CGI as well as the cross medium potential that they can offer. And, in an ideal world our students will not only understand but they will also enjoy the experience of learning these tools so that they are better prepared to enter industry when they are ready.

Reference:

Grand View Research. 2017. Grandviewresearchcom. [Online]. [7 November 2018]. Available from: <https://www.grandviewresearch.com/press-release/global-3d-animation-market>

Jackson, R.R. 2011. How to Motivate Reluctant Learners (Mastering the Principles of Great Teaching series). Association for Supervision & Curriculum Development.

Ofcom. 2017. Ofcom.org.uk. [Online]. [7th November 2018]. Available from https://www.ofcom.org.uk/data/assets/pdf_file/0020/108182/children-parents-media-use-attitudes-2017.pdf

Glossary:

CGI -= Computer Generated Imagery.

Agency – learning through activities.

Embodiment – Using the body to shape the mind *eg. counting on fingers in maths*.

Appendix:

Waldo®, Facial Waldo®, Body Waldo®, Warrior Waldo®, and any use of the term Waldo when referring to data-capture input devices are all trademarks of The Character Shop. (www.character-shop.com/waldo.html#TRADEMARK)

Waldo Controller – Proof of Concept. Available from: <https://vimeo.com/110992639>

Waldo Controller – Testing Sensors. Available from: <https://vimeo.com/111511689>

Super Lattice Modifier 3.1.0. Available from <https://www.highend3d.com/maya/script/super-lattice-modifier-for-maya-58995>