

# Driving Test Success: Producing Instructional 3D Animation Aimed at Passing a Driving Test.

Gray Hodgkinson  
Massey University  
Wellington, New Zealand  
[g.f.hodgkinson@massey.ac.nz](mailto:g.f.hodgkinson@massey.ac.nz)

## Abstract

Driving Test Success is an instructional DVD containing over 60 minutes of 3D animation aimed at helping applicants pass their automobile driving test. It includes a variety of camera angles including in-car and aerial views to illustrate various driving situations. The content on this DVD is informed by the nature of driving test situations where the applicant either passes or fails; there is no “nearly achieved” grade. The script depicts situations which result in definite outcomes, using positive and negative reinforcement. This paper describes the development and production stages of adopting an early-stage project and developing it into a successful product. Many issues were encountered, including advising the client, working within a large university institution, directing inexperienced animators, and managing a project that began as a speculative trial, but rapidly grew into a viable product.

## The client, the institute and roles

The client approached the University in 2004 via a phone call seeking advice on how to proceed with this project. The client had already written several scripts, completed a sample animation, and had recorded a voice track using a locally sourced narrator. The commercial companies he approached to continue production were either unable to assist or provided very expensive quotes.

It was decided to bring the project into the University as an entrepreneurial research project. Essentially, the University would provide concept development and set up a production pipeline. Recent graduates were employed to assist, and a small production team was established.

## Taking over the client’s work

Upon viewing the client-supplied material, it was evident that some re-evaluation of style and direction was required. The material lacked sophistication and had many characteristics that would have undermined its authority. For example, the driver was modelled as a “muscle man”, bearing all the chunkiness of a computer game character. The client was advised that this style of character gave the DVD a tone that would distract from the instructional nature of the material.

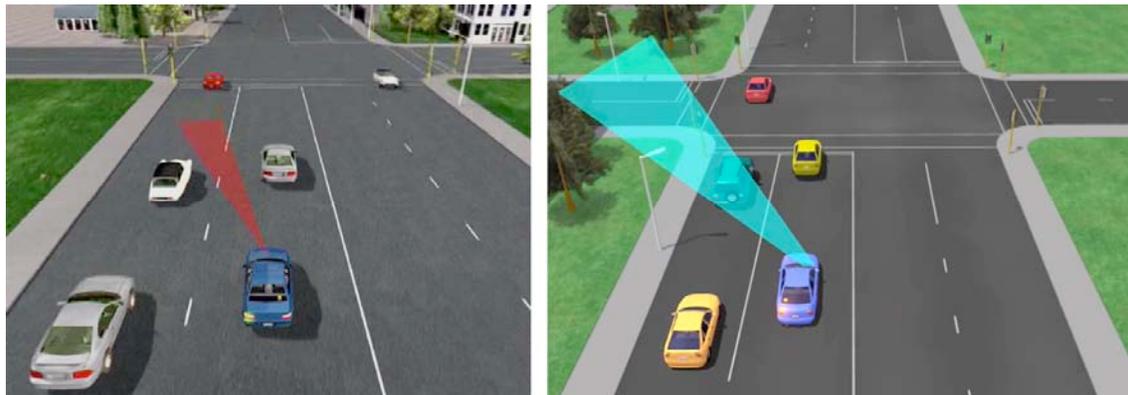


Left: Character from client. Right: Character remodelled.

The driver, and other characters, were replaced with softer, more generic models with neutral expressions. Identification with the main character was less important than the actions the driver would take, so distinctive personality or viewer identification with the characters was not necessary. A female version was also created.

The voice-over narration that the client supplied used a voice actor with a distinctive nasal New Zealand accent. The tone lacked authority, professionalism, and would have placed the production too specifically into a geographic location. The voice actor was changed to one with a deeper, more authoritative tone, and with clear “Queen’s English” pronunciation.

The buildings, vehicles and props used for the sample animations also contained items specific to locations. Some buildings included prominent signage, and some vehicles were very distinctive. These details had the potential to draw attention away from the instruction taking place, a known problem with instructional animation. (Mayer 2002, 2003). If, for example, the viewer is watching the main vehicle, and an exotic car crosses the view, this could draw attention away from the main topic. The vehicles therefore, were remodelled into 3 generic shapes; a sedan, a hatchback, and a sports utility vehicle. Colours were used to create more variations where required. As a result, once the viewer has seen these vehicles on screen, interest in the vehicles is reduced, and the viewer is able to focus on absorbing the instructional information.



Left: Distinctive black and white car creates distraction. Right: Cars all very similar, resulting in less distraction

The script overall was generally well written and suited the voiced-over narration. However, at times colloquial language was used. In one section the narration read “If you do this, the test will be terminated. Failed. Repeat. Go back and pay again”. This type of writing added an element of sarcasm that was not warranted, and as a means of reinforcement was more destructive than constructive. Examples such as this were rewritten.

The changes overall to more generic content created a stronger neutral environment. The aim was to reduce distraction and create more space for learning to take place. Also, a more generic product allows for marketing to a wider audience, including an international market.

### **Setting up a production team**

A small group of recent graduates was assembled, with one given the task of technical director and production manager. This key role is responsible for setting up the 3D computer animation environment and various controls, as well as maintaining file management. The University provided the workspaces. For several weeks the team worked together well. However, after a time, key members were offered jobs in the local industry, and left the team. This caused major interruptions, especially when the technical director/production manager left. As the project moved out of development stages and into outright production, and with the team fragmenting, it was decided to complete the project commercially.

### **Production issues.**

As with all computer animation productions, there were many technical issues. However, a significant, though amusing problem arose: none of the animators could drive. This inexperience was directly transferred into the animations: cars followed too closely, travelled too fast, cut corners, and were generally animated in the same way as an untrained driver would drive. Several cars also included an artistic lurch as they stopped. Though this had a convincing degree of realism, a real car would need to be braked quite heavily for such a lurch to take place. These issues were recognised by the academic supervisor of the project, but not before several segments had reached animatic stage and had been seen by the client.

### **Animatics**

An animatic is a “first pass” version of an animation. It has a low screen resolution and is rendered in a low quality format. It is fast to produce while being good enough for the client to judge the eventual final result. But, as with many situations where a “rough cut” is used, the client didn’t make all adjustments at the animatic stage. This phenomenon is experienced in many creative fields: until the client truly experiences a near-final version, the final adjustments are not considered. Furthermore, it usually takes more than one iteration for all errors to be recognised. With the timeline dragging on, both the client and the team were anxious to proceed to final renders. However, this was to prove costly.

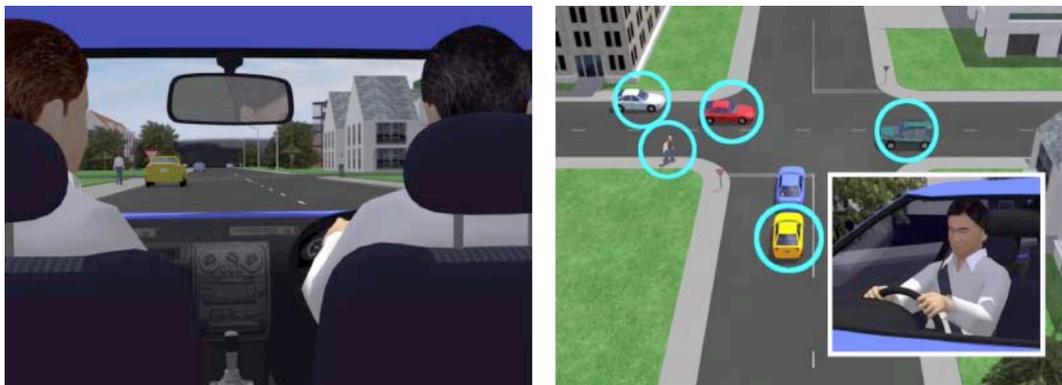
### **Final renders**

There were about 3 versions of “final renders”. This was a significant problem, as each segment’s final render would take several hours to render into a movie file. With such long rendering times, small corrections are often made to the final video files, rather than returning to the animation stage. For example, an unwanted tree in the background can be easily masked out on the video file. However, if this altered movie returns a second or third time from the client for similar “patch-ups”, a point is reached when the changes need to be made at the original animation stage, followed by a new render. The earlier patch-ups are now made to the original animation, effectively doing them again. This is a time-costly way of working, but is almost unavoidable.

There are possible remedies to this problem, though all have their disadvantages. These include faster rendering techniques, greater segmentation of scenes, greater use of layered assembly, known as compositing, and greater use of static cameras. With the experience gained from this project, appropriate preparation and production management will make subsequent projects of this nature more efficient.

### **Cognitive load**

Throughout the DVD the viewer will encounter situations that are reasonably complex and quite difficult to absorb, especially where animations continue to play and move on to new sections. This could potentially create cognitive overload ((Mayer 2003). One effective technique to deal with this is by segmentation (Wouters 2007). Devices are employed to segment or isolate the areas of attention. For example, at an intersection awareness test, the animation pauses, and highlighting graphics are used to guide the viewer from item to item, in synch with the narration. Cognitive load is segmented and directed.



A complex scene which risks cognitive overload. The camera changes to an external view, freeze frames, and items are explained one at a time, with highlighted circles directing the viewers attention.

### **Behaviours**

The script in Driving Test Success frequently makes use of behavioural reinforcement, both positive and negative. Positive reinforcement is when behaviour is strengthened by experiencing positive conditions. Negative reinforcement is when behaviour is strengthened by the desire to avoid negative conditions. (Skinner 1974).

Positive and negative reinforcement is used consistently throughout the DVD, particularly in that many actions result in either Pass or Fail. This is intended to reflect the adamant nature of the actual driving test in which the driver either passes or fails an action. Once enough negative points are gained, the test is terminated. There is no “nearly achieved” award. The author of this project was a testing officer, and was determined that these absolute

consequences were conveyed via the DVD.



Positive and negative reinforcement.

As many incorrect driving actions have potentially serious consequences, it was tempting to add more explicit negative reinforcement into the script. An early animation test showed a pedestrian being cut off by a car, having to jump out of the way, and then shake his fist at the driver. The pedestrian's action, though realistic, was rather humorous. Although it added entertainment to the story, it significantly reduced the gravity of the driver's action, which was, in fact, very dangerous for the pedestrian. It was decided to restrict the number and drama of consequential events, relying more on implication than depiction.



The left image shows the pedestrian shaking their fist at car. This was removed, and replaced with a surprise reaction, followed by confusion and dismay.

### Subtle moments

The DVD is not rigidly instructional at all times. When the opportunity arises, subtle actions are used to emphasise points. When the driver stops the car to let the pedestrian cross, the pedestrian quietly turns and looks at the driver. Not only is this accurate observation of behaviour by the animator, but it also serves to depict the relationship and communication that drivers and pedestrians have. This could be a glance that says "thank you", or "I'm glad you finally stopped". It is intended that it conveys the message that pedestrians are to be considered, and are very conscious of you, the driver.



## Summary

By using 3D animation, instructional animation can move from the diagrammatic to the increasingly realistic. The viewer is able to achieve greater comprehension of real world objects and events, increase immersion in a situation, and increase empathy with characters. However, this same realism also increases cognitive workload and distraction. The designer of 3D instructional animation must make a conscious choice about the degree of complexity and realism required.

If the animation maintains some diagrammatic characteristics, such as stylised or simplified objects, the communication of the instruction can be clearer. Other devices, such as pausing the animation, using over-layed graphics, and removing backgrounds can be used to focus on significant points. Realism can be increased when appropriate to emphasise a given point. And a good animator can often provide a subtle extra level of detail that adds life and meaning to the work, increasing its significance for the viewer.

## References

Skinner, B. F. (1974). *About behaviorism*. New York: Vintage Books.

Mayer, R. E., & Moreno, R., (2002). *Animation as an aid to multimedia learning*. *Educational Psychology Review*, 14, 87–99.

Mayer, R.E. and Moreno, R. (2003). *Nine ways to reduce cognitive load in multimedia learning*. *Educational Psychology*, 38 (1), 43-52.

Mayer, R. E., Sobko, K., & Mautone, P. D. (2003). *Social cues in multimedia learning: Role of speaker's voice*. *Journal of Educational Psychology*, 95, 419–425.

Wouters, P. (2007) *How to optimize cognitive load for learning from animated models*. Retrieved April 2, 2008, from <http://library.wur.nl/WebQuery/catalog/lang/1865269>.