ONLINE AND BEYOND

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Abstract

This paper explores visual approaches to learning the law including digital flashcards, storyboards, cartoons and comics, animation and advanced branching simulations. The pros and cons associated with each type of visual approach are explained in the context of the practical implementation of that approach in a law degree program. The future of law simulations and data analytics is also discussed, together with models for their implementation in legal education.

I Introduction

This article explores the practical implementation of visual approaches to learning the law adopted by CQUniversity in interacting with mature-age online law students undertaking a three-year LLB degree. Five distinct visual approaches have been trialed at CQU, including digital flashcards, storyboards, cartoon and comics, animation and branching narrative-centered simulations. This article will also discuss the future of law simulations and data analytics and models for their implementation in legal education.

It is not uncommon for learning activities and assessment tasks to be designed to promote the creation of artifacts,[1] or learning by doing.[2] These approaches borrow from constructionism[3] and social views of learning,[4] enabling both individual and collaborative approaches to learning. Hermida, speaking about Canadian Law Schools in 2006, observed:

> Law School curricular, with its teaching philosophy built during an exclusively print-centered era, has not yet opened its doors to audio-visual teaching methodologies or to media literacy. … Visual pedagogy advocates the teaching of media literacy across the curriculum,[5] and as part of a plan that is sensitive to the diverse concerns, knowledge, and experiences of students.[6] Media literacy has been conceptualised as the 'the process of critically analyzing and learning to create one's own messages — in print, audio, video, and multimedia, with emphasis on the learning and teaching of these skills through using mass media texts'.[7] It includes the cognitive and affective processes involved in viewing and producing audio-visual materials.[8]

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1 G Hoban, W Nielsen and C Carceller, 'Articulating constructionism: Learning science through designing and making "slowmations" (Student-generated animations)' in C H Stell, M J Keppell, P Gerbic and S Housego (eds), 'Curriculum, technology and transformation for an unknown future', paper prepared for ASCILITE Sydney (2010) 433 <http://ascilite.org.ua/conferences/sydney10/procs/Hoban-full.pdf>.

2 Clarke Aldridge, *Learning by Doing* (John Wiley & Sons, 2005).

3 S. Papert, 'Situating constructionism' in I Harel and S Papert (eds), *Constructionism* (Ablex Publishing 1991) 32–64.

4 Etienne Wenger, *Communities of Practice: Learning, Meaning, and Identity* (Cambridge University Press 1998).

5 Citing David R Russell, *Writing in the Academic Disciplines 1870–1990: A Curricular History* (Southern Illinois University Press, 1991) 1; Paula Carlino, Escribir, Leer y Aprender en la Universidad (Fondo de Cultura Económica, 2005) 1.

6 Citing Brian Goldfarb, *Visual Pedagogy: Media Cultures in and Beyond the Classroom* (Duke University Press Books, 2002) 1, 20.

7 Renée Hobbs, 'The Seven Great Debates in the Media Literacy Movement' (1998) 48 *Journal of Communication* 16, 32.

8 Julian Hermida, 'Teaching Criminal Law in a Visually and Technology Oriented Culture: A Visual Pedagogy Approach' (2006) 16(1&2) *Legal Education Review* 153.

The combined influences of web 2.0 technologies, cheap, accessible and easy to use cloud-based systems and a rapid decline in the cost and difficulty in producing visual media affords an opportunity for law schools to further explore visual approaches to learning and assessment practices. What follows is a description of several visual approaches used in the CQU Law program.

II   DIGITAL FLASHCARDS

The objectives of the flashcard initiative were to design a cloud-based system for students to create and share digital flashcards, set the creation of flashcards as an assessment, define a taxonomy of flashcard types and create a spaced repetition learning system.

Traditional paper question and answer flashcards have long been part of the tradition for memorising information. They are commonly used by students taking their Bar exams in the United States. This has led to an industry in readymade legal flashcards prepared by commercial publishers[9] and by students.[10] Aside from testing knowledge and memory, the process of construction of flashcards by students promotes learning by doing, critical analysis and synthesis of information. Revision with flashcards promotes formative assessment and self-identification of misinterpretations and memory faults, which may in turn be corrected through self-reflection and discussion with other students and academic staff. Sharing of cards also affords an opportunity for peer review.

However, flashcards do not have to be physical cards, they may be incorporated into an online system for construction and sharing of cards, and staged repetition of cards as part of a memory retention system.

Figure 1 is an image of the FlashCram system interface for construction of digital flashcards. It assumes a traditional two-sided card. The interface enables the construction of some quite complex digital flashcards with considerable formatting, as can be seen in Figure 2, showing a casenote card.

Digital flashcards may use any of several retrieval systems. Flashcards may be retrieved in a set sequence, guided sequence, randomly, or as part of a staged repetition system based on the probability of forgetting the content of the card. A set sequence is useful for initial learning of cards, as related cards can be associated with one another. Memory is built upon the sequencing and according to the way cards relate to one another. There may be a guided sequence where one card is programmed to follow another, either as a series of links within the cards or as part of a separate retrieval system. For example, digital flashcards may be linked together in a fishbone matrix, as in Figure 3. The fishbone matrix indicates related cards, which may be accessed by clicking on the fishbone link. Both of these approaches enhance short-term memory retention, but if the sequence is broken, memory retention fades. Random allocation is far more effective in building longer-term memory, as it does not rely on a set sequence. Even more beneficial are spaced repetition systems that display cards only when the user is probably likely to forget them. Restudying the cards activates and reinforces long-term memory.

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9   Oxford University Press, *Interactive flashcards of key cases*, Online Resource Centres <http://global.oup.com/uk/orc/law/contract/poole_concentrate/resources/interactive_cases/>.

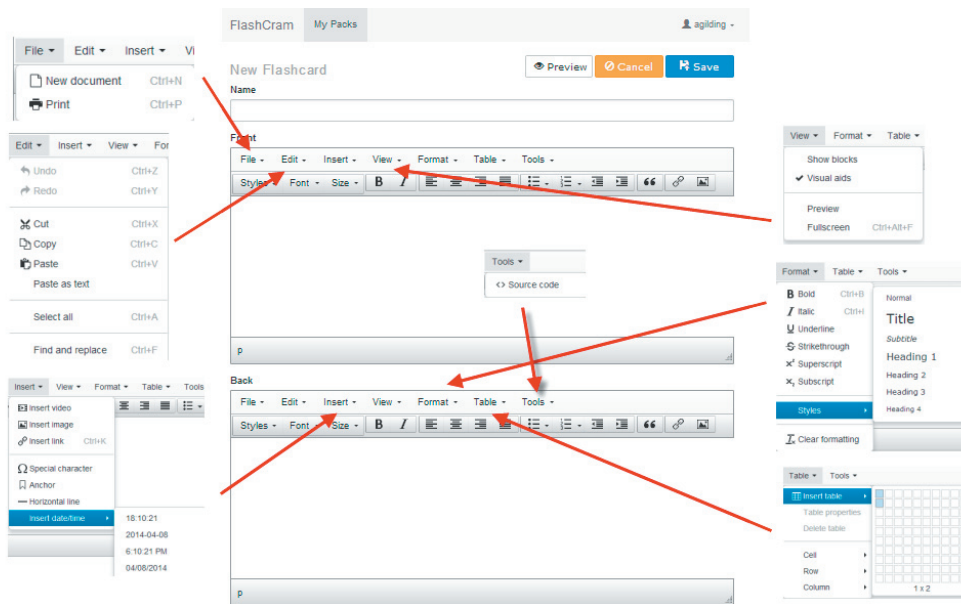10   Flashcard Machine, *Welcome to the Flashcard Machine*, <http://www.flashcardmachine.com.html>.

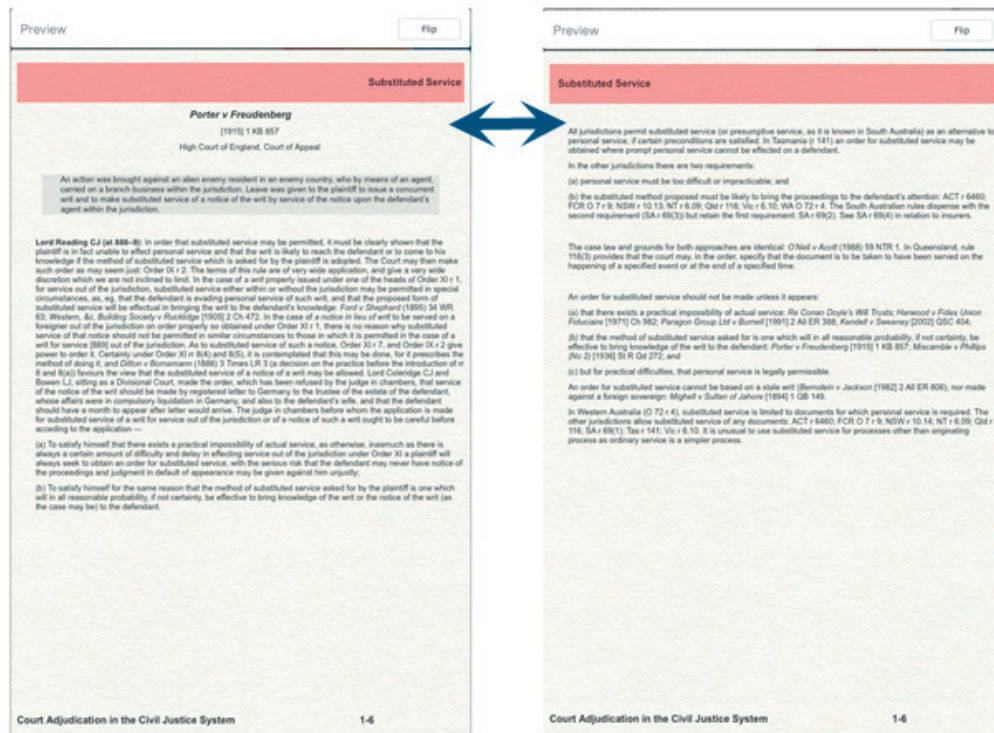Figure 1: FlashCram construction screen

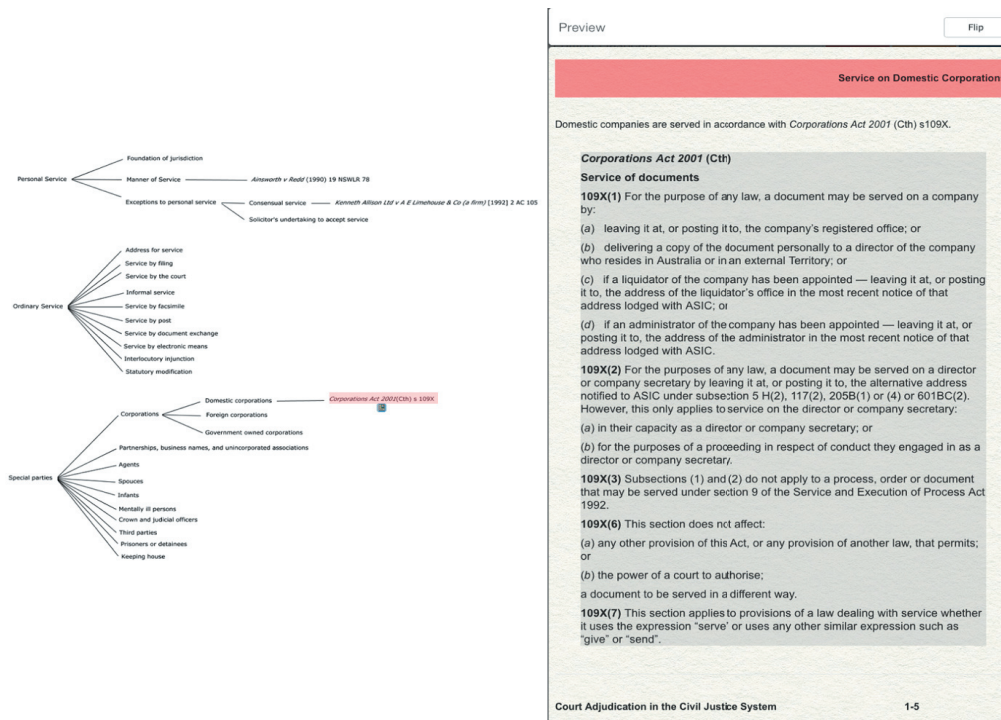Figure 2: Example of both sides of a detailed casenote flashcard

Figure 3: Legislation flashcard linked to a fishbone matrix

Digital flashcards are also often incorporated into packs of cards — see Figure 4. The FlashCram system enables creation of packs of cards and also has the ability to collaborate on the construction and use of packs of cards.

Digital flashcards may be formed into chronologies — see Figure 5. These could be used to examine the development of a legal principle over time. Such an approach could support a visual–historical and comparative analysis of the law.

Aside from the mechanism to create and share digital flashcards, consideration of the types of flashcards that may be relevant to legal education is needed.

Figure 4: FlashCram pack selection screen
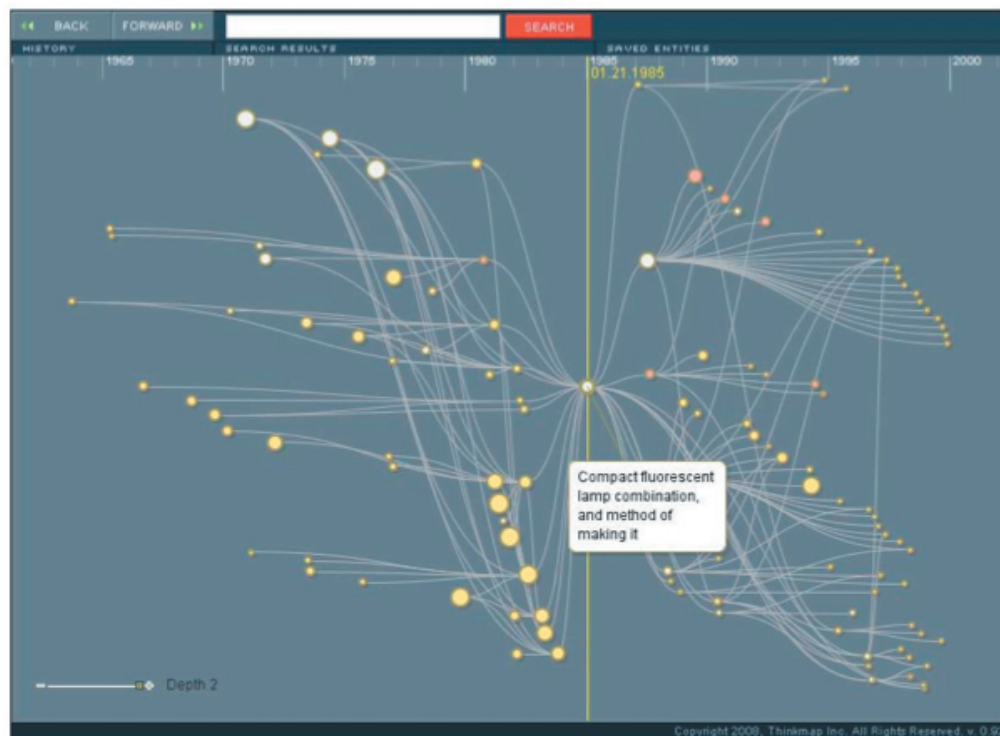
Figure 5: Thinkmap chronology flashcards

There are many possible classification schemes for digital legal flashcards. The flashcard classification scheme used in this article was influenced by different aspects of legal content being represented, the role the flashcard may have in learning the law and the capacity to include rich media and features of Web 2.0 technologies. None of these types of digital flashcards are mutually exclusive — some elements from different categories may be present in a single card.

A   *Taxonomy of Digital Flashcards*[11]

- **Case card —** details the facts, points of law and outcomes of a case. The card includes the full reference and a link to full text where available.

- **Legislation card** — details legislation, subordinate legislation, rules, or practice directions. The point of law is clearly stated. Links are provided to the legislation and any relevant case cards.

- **Flowchart card** — visually depicts a series of events or processes. Flowchart cards may take any of several forms: a diagram with links to other cards; a series; or a stack of cards enabling a process to be followed. Links are provided to any supporting materials.

- **Principle card** — identifies a key legal principle, along with its primary authority.

- **Review card** — asks a question requiring a response. This may be a multiple-choice question, short answer question, reflection etc.

- **Audio-visual card** — requires the embedding of a link to a dynamic element such as an animation, film, YouTube film, interactive reveal of additional information etc. The audio-visual card may also identify the legal principle and link to any supporting materials.

- **Conundrum card** — presents a legal dilemma, or a point of law, which seems unreasonable or otherwise noteworthy. The student may simply choose to use the conundrum as food for thought, or they can tap the link and link through to a discussion board where the issue can be discussed. A conundrum card may raise a complex question requiring research or extended thought or group discussion. There may be no right or wrong answer.

- **Secondary source card -** contains information or issues arising from a secondary source such as a book, article, newspaper clipping, report, conference paper etc. Links should be provided to the secondary source where available.

- **Comparative card —** explores comparisons of the laws or legal systems, or both, between different jurisdictions or cultures.

- **Reform card —** explores issues for law reform.

- **Practical application card** - shows a real-world application of the relevant legal principle. Links are provided to any supporting materials.

- **Discussion card —** is similar to a conundrum card, but the topics for discussion are more about analysing the operating of the law (as opposed to discussing its quirks and difficulties). Again, the student may simply use the card as food for thought, or alternatively they may link through to a discussion forum to share in the discussion with others.

- **Role-play card —** is designed to allow students who are studying together to work through simple problem-style issues, which call into question the legal principles discussed elsewhere in the stack. These role-play situations may be quite simple (as in this one) or very complex, and the students may decide how "legalistic" their responses are to be.

- **Interview card —** may take the form of a transcript, audio recording, or video interview.

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11   Source (with minor variations): S Colbran, A Gilding and S E H Colbran, 'The role of digital flashcards in legal education: theory and potential' (2014) 5(1) *European Journal of Law and Technology*.

- **Question and answer card** - designed to ask one or more legal questions. The reverse side of the card provides the suggested answer and links to further information and associated cards.

- **Timeline card** — designed around a timeline of sequenced events. The timeline can run horizontally or vertically. Links on the cards may branch to different cards or outcomes. The reverse side of the card provides further information and links.

- **Polling card** — this card is designed to gather information from card users on one side and visually present a collaborative summary of responses in the form of a chart or graph on the other.

- **Gaming card** — this card includes a game or a puzzle. Examples would be a mix and match exercise, crossword, timed response (beat the clock or record) etc.

- **Social networking card** — this card may comprise several forms, but the essential element is social interaction and collaboration. Examples would include collaborative development of a wiki in response to an issue.

- **Mosaic card** —this card comprises cards that can be put together to form a greater whole. These could be digitally tactile in the sense they could be docked, reverse in quadrants, circular elements may spin to reveal new outcomes, e.g. a colour wheel. Mosaic cards may require complex programming.

- **Image capture card** — this task-oriented card requires a student to capture and insert an image or diagram.

- **Mind mapping card** — this task oriented card requires a student individually or collaboratively to map concepts and visually represent them. The resulting mind map may be captured as an image and stored on the flipside of a digital flashcard.

- **Wiki card** — this task-oriented card creates a wiki.

Academics, publishers, students or a combination of these authors may construct digital flashcards. At CQU we have tried academic and student construction of digital flashcards. Figure 6 includes examples of digital flashcards created by students in Constitutional Law. This aligns well with situated constructionism and learning by doing. Figure 7 includes examples of academic staff generated digital flashcards in Contract law, which supplement traditional approaches to legal education.

3. The Australian Federal Parliament - Question 1

‹   **Flip**   ›

Answer

Section 57 of the Constitution outlines the process to follow when there is a disagreement between Houses. It is at this time when the lessor numbers of the Senate is a disadvantage for the Senate in having a "voice".

As per s 57, when the two Houses cannot agree on legislation, a dissolution may occur. Section 57 states:

> If after such dissolution in the House of Reprsentatives again passes the proposed law, with or without any amendments wihch have been made, suggested, or agreed to by the Senate, and the Senate rejects or fails to pass it, or passes it with amendments to which the House of Representatives will not agree, the Governor-General may convene a joint sitting of the members of the Senate and of the House of Representatives.

Therefore, upon a joint sitting, the Senate only has (approximately) half the number of votes as the House of Representatives. Therefore the vote will more than likely pass in the favour of the House of Representatives.

Analysis: Perhaps this is a good example of where media coverage of politics works in the favour of "the people". Although the House of Representatives have the numbers to have a good chance at winning at a joint sitting, it is highly unlikely the Government will risk the support of "the people" and lose the next election.

2. How the Senate votes are counted

‹   Flip

The following video gives an example of how votes are counted for the Senate at election time.

(source: YouTube, <https://www.youtube.com/watch?v=VKswIvpgMws>)

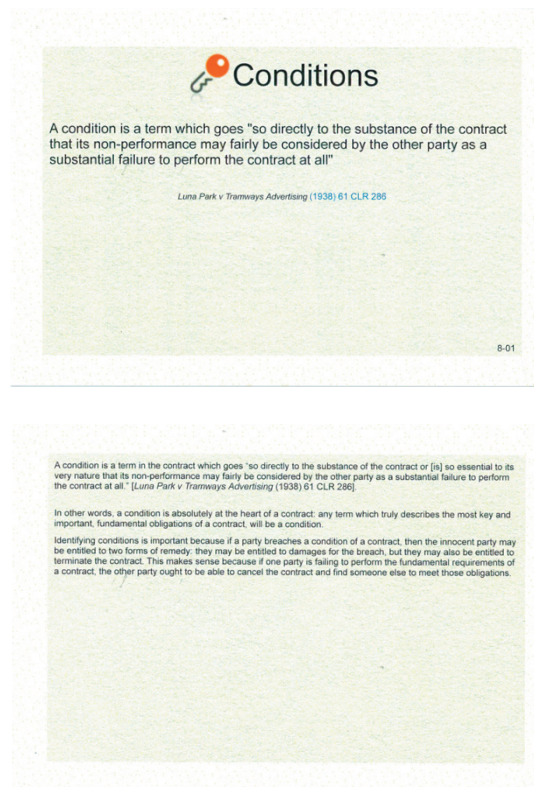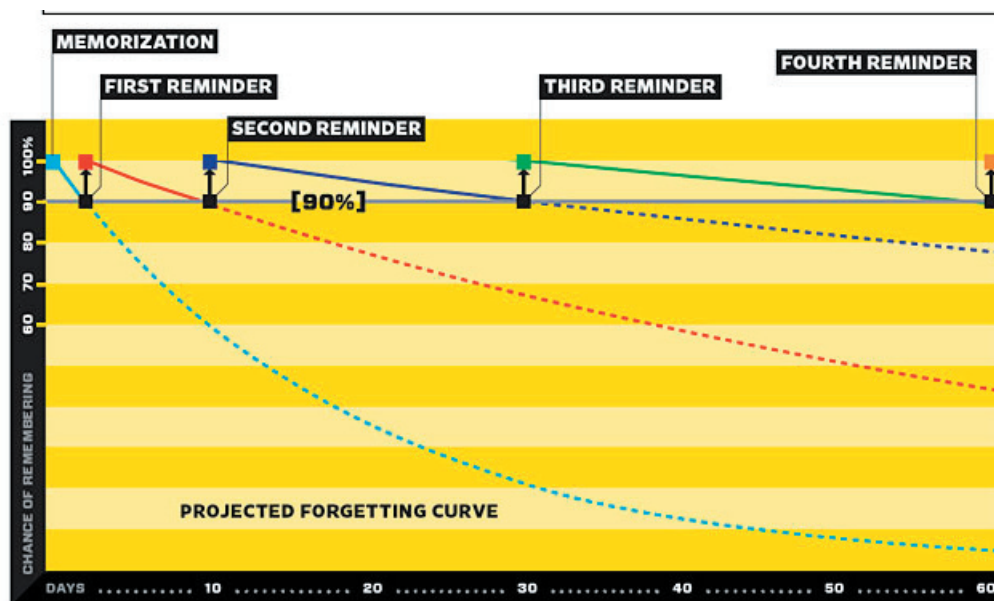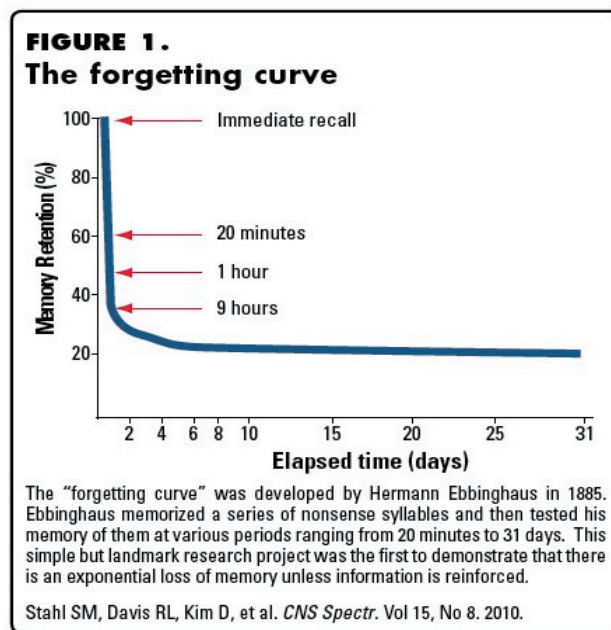Figure 6: Student-generated digital flashcards

Figure 7: Academics staff generated digital flashcards

One major advantage of flashcards is their ability to overcome the fact that human memory is designed to readily discard most perceived information in a relatively short timeframe. Forgetfulness can be plotted in forgetting curves as shown in Figure 8. It is generally only through the process of reminders that we can hope to retain information in the longer term. Digital flashcard spaced repetition systems are designed to bring up more frequently, as a reminder, the cards that the user has trouble remembering. As the knowledge is remembered, the card is less-frequently revised, until it is in permanent memory and revision is no longer necessary. The CQU law discipline is currently experimenting with differently spaced repetition algorithms governing the frequency with which digital flashcards are revised.

FIGURE 1.
The forgetting curve

The "forgetting curve" was developed by Hermann Ebbinghaus in 1885. Ebbinghaus memorized a series of nonsense syllables and then tested his memory of them at various periods ranging from 20 minutes to 31 days. This simple but landmark research project was the first to demonstrate that there is an exponential loss of memory unless information is reinforced.

Stahl SM, Davis RL, Kim D, et al. *CNS Spectr*. Vol 15, No 8. 2010.

Figure 8: Forgetting curves[12]

Using digital flashcards systems has various pros and cons:

Pros
- dramatically increases memory retention of facts and information
- easily edited, updated and shared
- students can create and collaborate in developing flashcards
- can be printed as PDF
- accessible on computer and mobile devices.

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12 Gary Wolf, 'Want to Remember Everything You'll Ever Learn? Surrender to this Algorithm' *Wired Magazine*: 16.05 (02.21.08) <http://archive.wired.com/medtech/health/magazine/16-05/ff_wozniak?currentPage=all>.

Cons

- requires an internet connection
- relies on a third party availability of FlashCram, the cloud-based delivery system.

III   STORYBOARDS

The objectives of the storyboard initiative were to set the creation of storyboards as an assessment and to explore the use of cloud-based systems for students to create storyboards. Storyboarding is another creative visual initiative enabling students to engage in situated constructionism and learning by doing.

In the CQU Law discipline storyboards have been used as an effective practical assignment in the core course Professional Responsibility.[13] The subject of professional responsibility was chosen as it has a wide variety of interesting stories. Students are asked to look for conflict and the dark side of human experience. Stories are a natural way for people to learn and remember. Our experience suggests that it is generally useful to adopt a three-act structure:

(i)   Act one — beginning — setting the scene (25%)

(ii)   Act two — confrontation (50%)

(iii)   Act three — resolution (25%).

All stories are character driven. It is better to have archetypes (universal characters) rather than sterotypes, which tend to be localised with cultural conditioning. The universal characters have to have a history, personality, moods and traits. Visual representations of characters may be easily created using online character generators — see Figure 9.

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13   S Colbran, A Gilding, 'Exploring legal ethics using student generated storyboards' (2014) *The Law Teacher* 1.
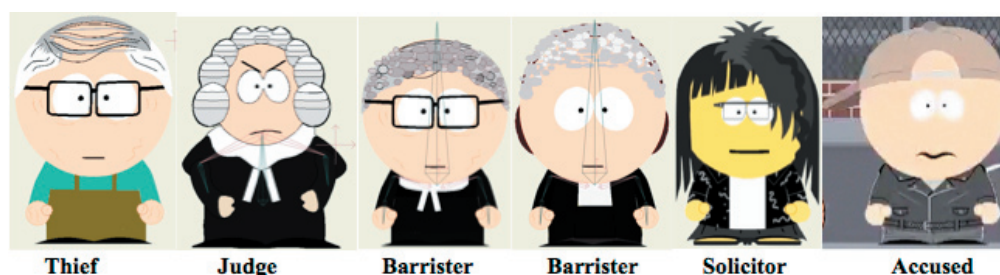
Figure 9: Simple digital character creation system

The script is where the ideas are expressed in a standard format. Each page of the script is usually one minute of screen time. The script expresses elements such as:

(i) Time and place where the scene takes place
(ii) Action — what is happening expressed in the present tense
(iii) Stage directions (what particular characters are doing/experiencing
(iv) Names of the characters and dialogue

The raw characters were constructed from templates of SouthPark style characters available on the Internet.[14]

Storyboards translate the script into images — visual representation of the events. They are so inseparable that we ask students to combine them together into the one document to simplify the process. Students can print out and put all the storyboards on a wall and see how the whole project runs.

Figures 10 and 11 are examples of academic staff and student storyboards, respectively. Figure 12 is an example of an online commercial storyboard program that simplifies the process of storyboard construction.

Figure 10: Sample staff storyboard example in the series Blackstump

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14 SP Studio, *Create your own cartoon character*, <http://www.sp-studio.de>.

Legal Professional Conduct (T1, 2015)
Written Assessment   Kylie Cookson s0018318

A) Ethical Issue that is Morally Repugnant

Scene 1	Action
.	The Law Firm's Principle Lawyer enters the office of the Graduate Lawyer with a case that has been accepted by the firm
Principle Lawyer: "The firm has just accepted the retainer for this case, it should be straightforward, can you please represent these clients?" Graduate Lawyer: "Sure, I don't have much on at the moment, I will be happy to take on another case."	Graduate lawyer, Holly and Principle lawyer standing in Holly's office discussing the case that he has accepted the retainer for and has subsequently given to Holly for representation.
	Graduate lawyer accepts file from Principle lawyer. Notes that retainer meets provisions applicable within the *Australian Solicitors Conduct Rules 2011,* and the *Legal Professional Act 2007* (Qld)
	Graduate Lawyer reads file and requests interview with clients
Graduate Lawyer: "Hello, I'm Holly, I will be your solicitor, and I will be working with you in an endeavour to resolve your legal issue." Clients together, "Hello, Holly" Graduate Lawyer, "Can you please tell me what has been happening, what has lead you to needing legal representation, how can I help you?"	
The brief that Holly was presented stated that Mr and Mrs Green seek reunification	

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Figure 11: Student storyboard in the subject Professional Responsibility

Figure 12: StoryboardThat — a commercial storyboard creation system

Using storyboards as a creative visual exercise has various pros and cons:

Pros
- visually rich
- easily edited and updated
- students develop written, visual and creative skills
- students find the visual presentation interesting
- extends and challenges students.

Cons
- some students find the exercise way out of their comfort zone
- scaffolding and support are required
- storyboards and characters need to be created
- several pieces of software need to be mastered — photo editing/drawing software.

Commercial storyboard software reduces this obstacle.

IV   CARTOONS AND COMICS

The objectives of the cartoons and comics initiative were to set the use of comics as an assessment and to use cloud-based systems for students to undertake creative assessment.
Current topical cartoons from the media may be easily scanned and incorporated with appropriate copyright permissions into class materials. They can be effectively used to generate discussion.

Comics are in effect sequenced cartoons. Inexpensive software such as Comic Life — see Figure 13 — enable academics or students to create interesting legal scenarios. The example shown in Figure 14 relates to sexual relationships between practitioners and clients as part of a Professional Responsibility course. There is also readily available online commercial comic development software, as shown in Figure 15. Many examples of comics being used to learn the law are also available on the Internet.[15]

Figure 13: A cartoon used in the subject Professional Conduct developed using Comic Life

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15 Nathan Burney, *The Illustrated Guide to Law*, <http://lawcomic.net/guide/?page_id=5>; Luis Romero and Ian Dahlman, 'Introduction — Justice framed: law in comics and graphic novels' (2012) 16 *Law Text Culture* 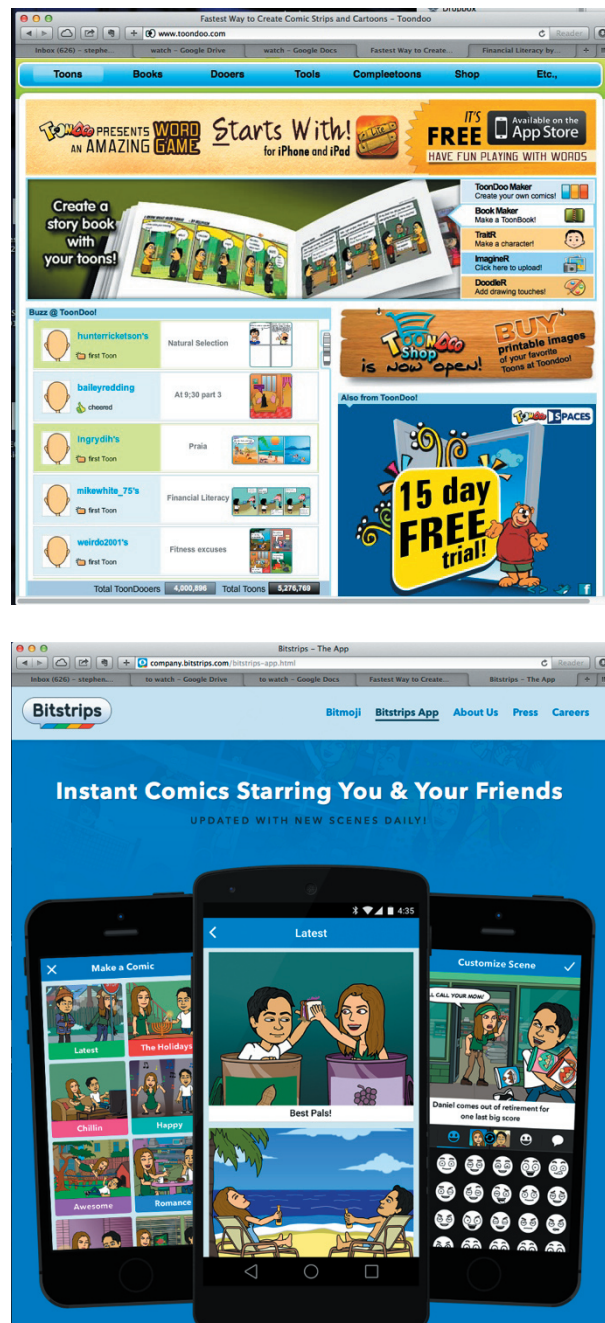article 2; Open Law Lab, Law Comics: *Alice in Patentland* <http://www.openlawlab.com/2014/08/04/law-comics-alice-patentland/>, < http://www.cambridge-code.org>.

Figure 14: Examples of online comic development systems[16]

16 Toondo, *World's fastest way to create cartoons!* <http://www.toondoo.com>, Bitstrips, *Introducing Bitmoji Your Own Personal Emoji*, <http://bitstrips.com.

In conclusion, using comics and cartoons has various pros and cons:

Pros
- visually simple
- easily accessible
- copyright permission is easy to obtain
- inexpensive software
- easily edited and updated
- easily embedded into iBooks, html pages, LMS, mobile devices
- students find the visual presentation interesting.

Cons
- visuals need to be created
- master files need to be stored
- several pieces of software need to be mastered: photo editing software, drawing software, scanning and distribution software.

V   ANIMATION

The objectives of the animation initiative were to use animation to illustrate fact scenarios and to embed animations into iTunesU and html pages associated with the Learning Management System, Moodle. The animations are used for two purposes in the law program — first, as a scaffold for discussion forums and second, as a formative exercise associated with multiple choice and short-answer questions.

Initial 2d animations made using Animie Studio Pro 9 were associated with a mythical Australian town, Blackstump. Various characters inhabit Blackstump and regularly find themselves interacting with the law. The scenario shown in figures 15 and 16 relate to representation of a delinquent and guilty client. Students are presented with the unfolding scenario as a series of animated films. They are then given a series of formative questions designed to test their knowledge of the applicability or otherwise of legal professional conduct rules and regulations.

As academic staff gained experience, 3d animations were explored using the software xtraNormal. The scenarios centered around the character Stuart, a solicitor with a range of challenging clients, including the amorous Mrs Robinson and the cat-loving Mrs Munk. Students are placed in Stuart's situation and have to determine how best to avoid the ethical issues depicted. The animated sequences are available via YouTube, iBooks and as html pages linked to Moodle.
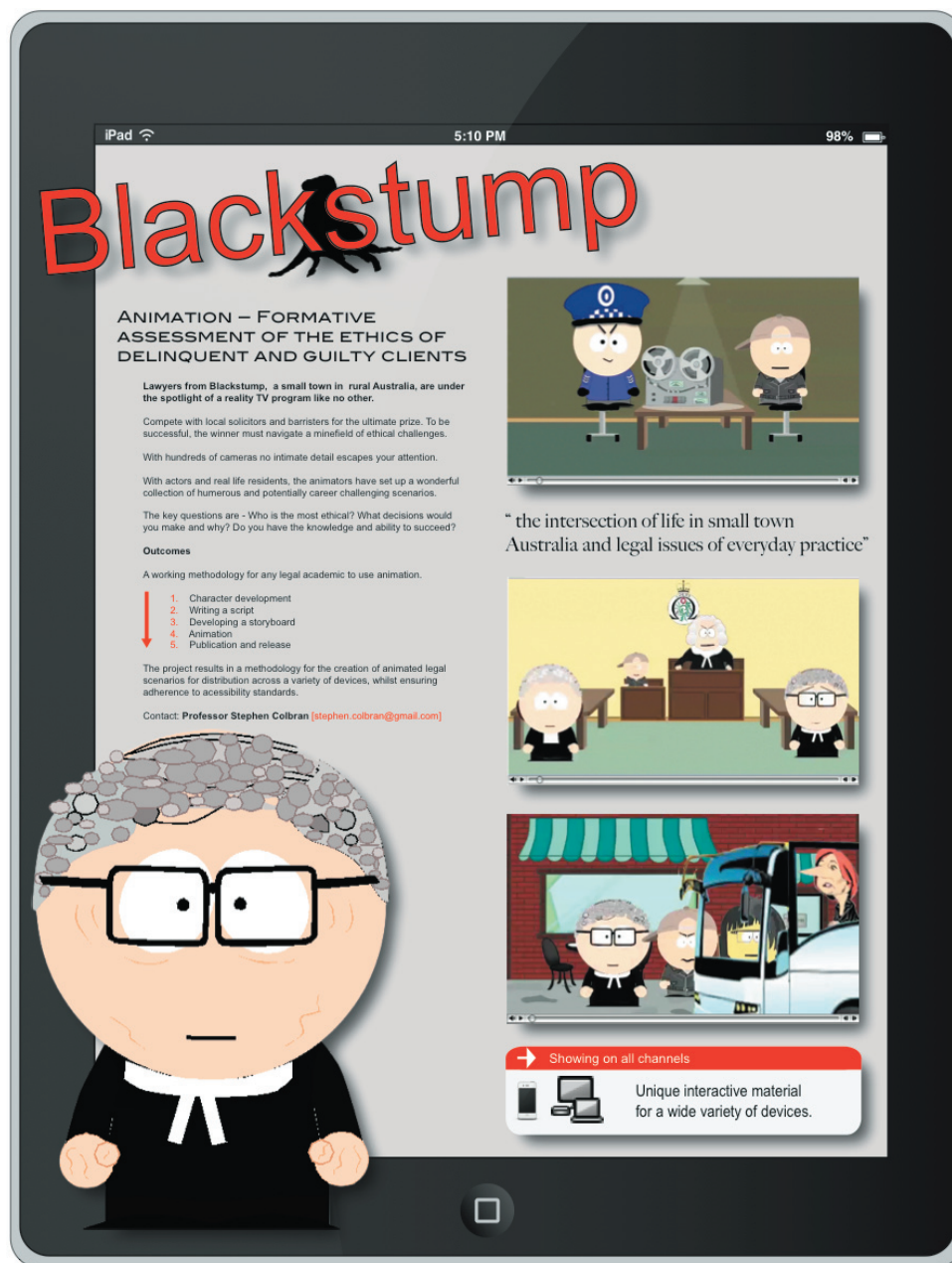
Figure 15: The Blackstump initiative

Figure 16: Animated sequence from Blackstump and formative questions

Figure 17: Stuart's seduction animation embedded in an iBook and on YouTube
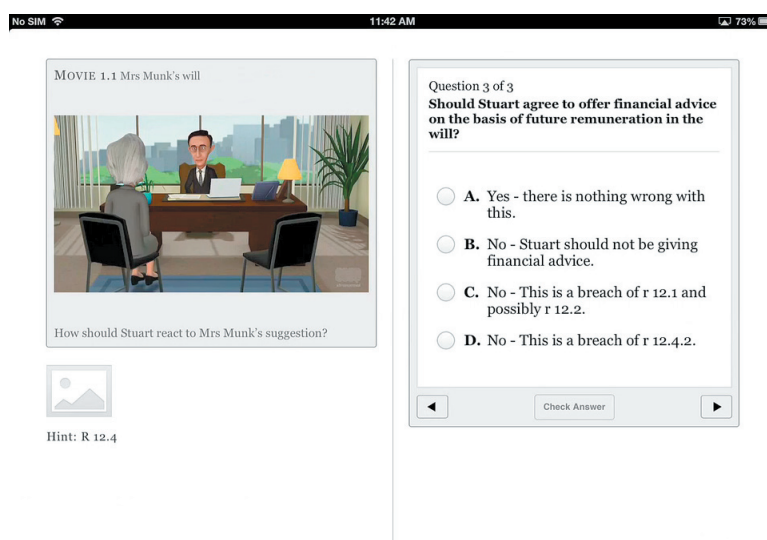
Figure 18: Mrs Munk's will animation embedded in an iBook with interactive questioning

Using animations has various pros and cons:

Pros
- visually rich
- easily edited and updated
- easily embedded into iBooks, html pages, LMS
- students find the visual presentation interesting.

Cons
- considerable animation skills required
- storyboards, characters and sound files need to be created
- master files need to be stored and securely backed up
- several pieces of software need to be mastered: animation software, photo editing software, file format conversion software, distribution software.

VI   NARRATIVE-BASED BRANCHING SIMULATIONS

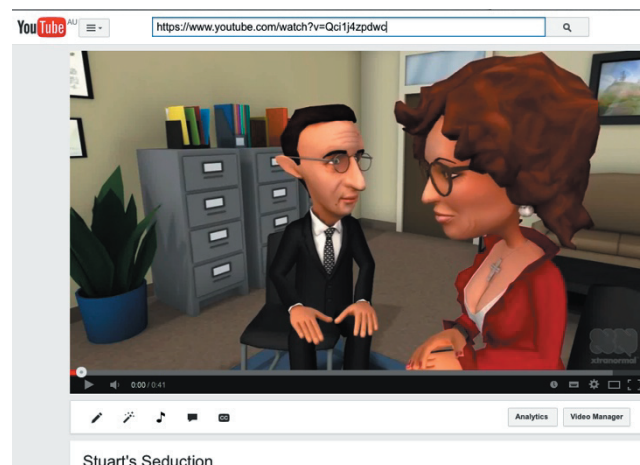The objectives of the narrative-based branching simulation initiative were to create a cloud-based system for anyone to easily create legal simulations and provide an easily accessible online system for students to undertake legal simulations.
Narrative-guided branching simulations may be designed to:[17]

- provide authentic contexts that reflect the way legal skills will be used in real life
- provide authentic activities based on industry exemplars, including the construction of legal documents
- provide access to expert performances and the modelling of processes
- provide multiple roles and perspectives within the same scenario
- support collaborative construction of knowledge, particularly where simulations involve multiple roles and construction of associated legal documents
- promote reflection to enable abstractions to be formed
- promote articulation to enable tacit knowledge to be made explicit
- provide coaching and scaffolding by the teacher at critical times
- provide for authentic assessment of learning within the tasks.

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17   J Herrington, T Reeves and R Oliver, *A guide to authentic e-learning* (Routledge, 2010).
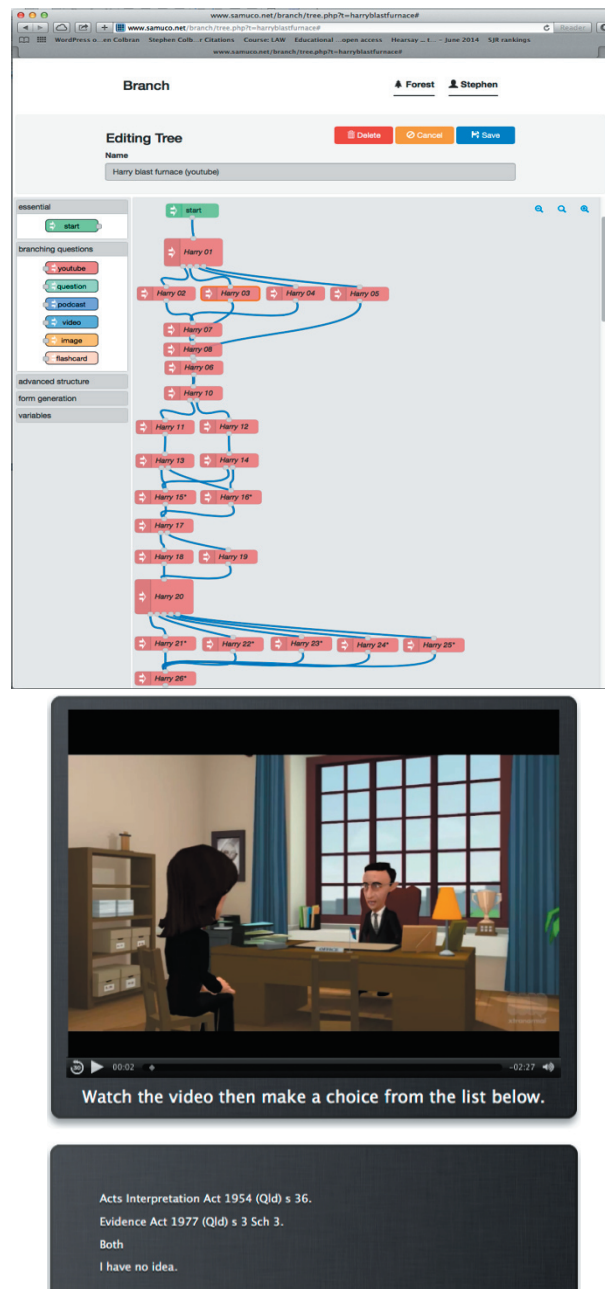
Figure 19: Branch software interface and corresponding animation

This initiative differs from previous projects focused on the broad use of multi-choice conversations (Nelson 2012), online simulations in 3D worlds,[18] scenario-based learning and serious gaming in the health sciences,[19] veterinary science,[20] and business.[21] It is also different from general projects such as LiveSim (which is no longer available) developed in Cybulski

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18 D Wood et al, *Facilitating flexible, enquiry-based experiential learning through an accessible, three-dimensional virtual learning environment (3DVLE)*, OLT project (2013).

19 S Cooper et al, *Can eye-tracking technology improve situational awareness and student feedback during simulation?* OLT project (2012).

20 R Bencini, *Facilitating independent student learning through a computer simulated animal dissection*, National Teaching development Grant (1998).

21 Beckendorff et al., *Enhancing student learning outcomes with simulation-based pedagogies*, OLT project (2014).

et al (2010) *Building academic staff capacity for using eSimulations in professional education for experience transfer.*

The branching simulations were constructed using the *Branch* software developed by the second author. As may be seen in the left of Figure 19, *Branch* enables a user to drag events into a sequence. This includes a series of streamed animated sequences from YouTube. Branch enables branching paths to be easily inserted into the flowline. The final result is shown on the right side of figure 19. These simulations may be embedded into iBooks, as shown in figure 20, or into html pages. The example in figure 20 shows a scaffolding flowchart of the logic students need to apply in order to be able to solve the legal task involved in the animated branching scenario that follows.
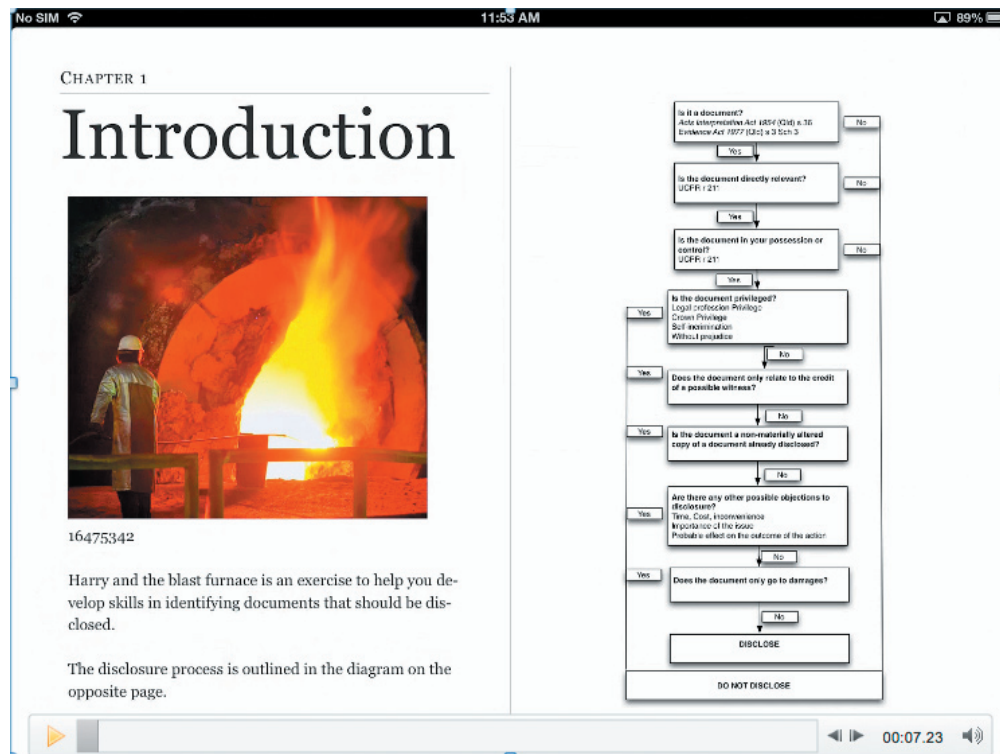

Figure 20: Branching simulation main screen Harry and the Blast Furnace
embedded in an iBook

Narrative-based online branching simulations bridge the divide between law school education, with its focus on participation, knowledge and comprehension to achieve stated learning outcomes (what lawyers know), with competency-based expectations of Professional Legal Education courses, industry, professional bodies and ultimately clients (what lawyers can do). Simulations can move beyond traditional instruction to include competency, industry performance and professional expectations. Figure 21 depicts levels of achievement (left) and stakeholder expectations (right).
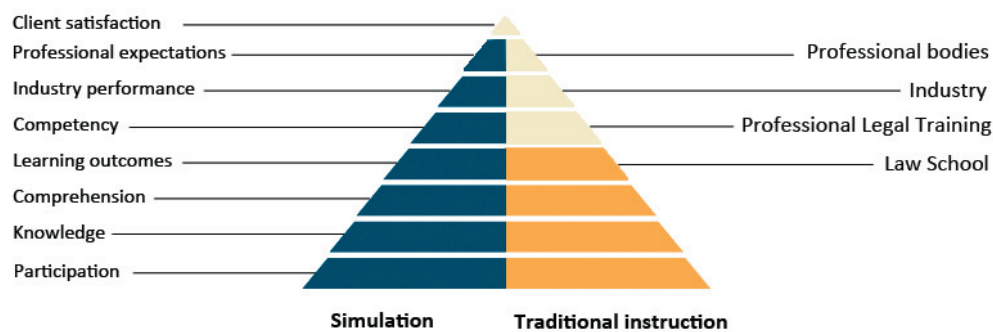
Figure 21: Simulations and traditional legal instruction

Traditional law school instruction promotes participation, knowledge, and comprehension to achieve stated learning outcomes. The approach changes to a competency-based system with Professional Legal Training and, ultimately, employment. Simulations provide an opportunity to span both learning outcome and competency-based approaches as they can include remedial, instructional, and extension activities within the same simulation according to the standard displayed by each respective student user.

Simulations may also be developed as single-player and multiplayer games. Branches within the simulation may be triggered by the responses of various players within the system. This can result in highly interactive and realistic scenarios.

Using simulations has various pros and cons:

Pros

- visually rich and interactive
- easily edited and updated
- easily embedded into iBooks, html pages, LMS
- students find the visual presentation interesting
- can be tailored to suit the needs to students at different levels of capability
- allow for remedial and extension scenarios
- bridges tertiary and professional practice.

Cons

- considerable animation skills required
- considerable flowcharting and planning required
- storyboards, characters and sound files need to be created
- master files need to be stored
- several pieces of software need to be mastered — branch flowcharting software, YouTube, animation software, photo editing software, file format conversion software, distribution software.

VII   THE FUTURE OF LAW SIMULATIONS AND DATA ANALYTICS

Aside from simplicity in use, the Branch simulation software has useful diagnostic features for performance tracking and analysis of learning outcomes and competency-based approaches.

Performance tracking enables comparison of user performance against expert and cohort performance (see Figure 22). Tracking also enables evaluation of the flowchart design and areas for improvement and empirical evidence supporting evaluation of alternative approaches for the underlying design.

The *Branch* system is equally useful for approaches based on learning outcomes or competencies, or a combination of these approaches. Defining expert performance enables the construction of gap analysis charts — see Figure 23. The analytics can also be used to recommend to students or automatically branch to remedial or extension instruction and exercises.
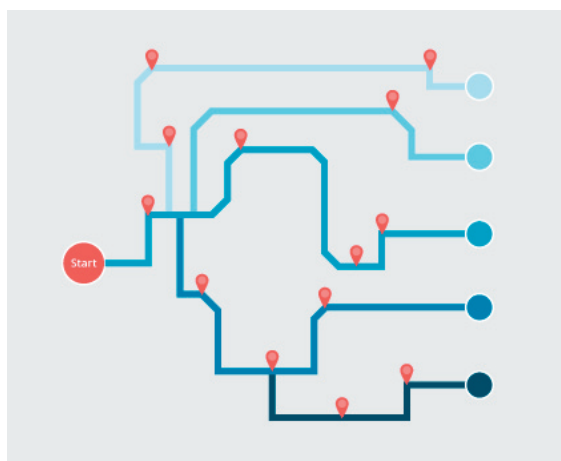
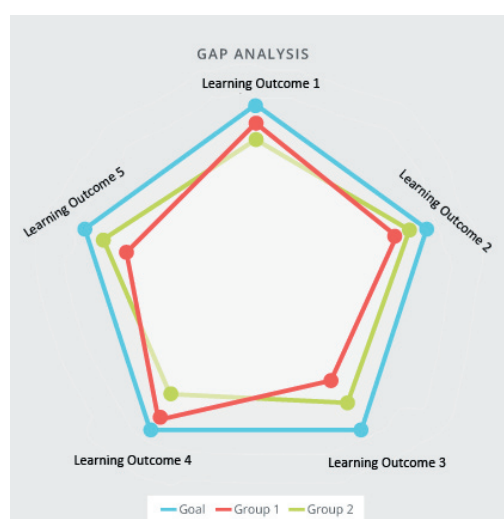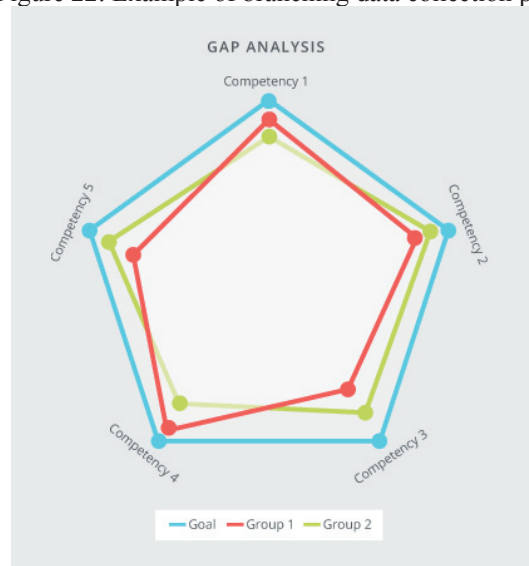Figure 22: Example of branching data collection points

Figure 23: Gap analysis graphs for approaches based on competencies and learning outcomes

A   *Models for implementation in legal education*

The five visual approached to legal instruction outlined in this article may be used in numerous contexts in a law curriculum. For example:

- embed in lectures
- embed in tutorials
- embed in narrative-based games (single and multi-player)
- use to create new App development subjects, whereby students create legal software (eg document assembly systems and engaged in competitive hackathons with other students)
- embed in assessment, eg students write storyboards, create simple animations, create complex forms/documents based on branching choices.

The approaches may be used in conjunction with, or to replace, traditional instruction methods.

VIII   CONCLUSION

This paper has outlined five visual initiatives for the study of law adopted at CQU — digital flashcards, storyboards, cartoons and comics, animation and narrative-based branching simulations. All are grounded in situated constructionism and involve learning by doing. Each approach presents significant opportunities for students to explore their creativity. However, each approach also presents pros and cons, which need to be considered when developing the scaffolding materials for implementation in the curriculum. All the initiatives outlined in this paper have been successfully implemented into the CQU law curriculum and serve as exemplars for other law schools to consider adopting as part of a broad range of learning activities for their students.