DESIGN FOLIO

EDUCATIONAL RESOURCE

for

SUSTAINABLE TICK BITE MANAGEMENT

~ CONFIDENTIAL ~

No dissemination or publication please

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ABSTRACT

A teaching tool, in the form of a multimedia presentation advancing sustainable health promotion in the United Nations Decade of Education for Sustainable Development has been developed. Preliminary investigation identified a legitimate need to address a variety of misinformation relating to safe management of tick bites. Education that promotes current best management practices, whilst dispelling outmoded myths, serves to improve sustainable health outcomes yielding possible reductions in life threatening anaphylactic shock and tick-borne pathogenic transmission that cause the burden of tick-borne disease (Lowbridge, Doggett, & Graves, 2011, p. 237). This design folio presents the various planning, realisation and evaluation processes accomplished throughout the development of the multimedia presentation. The project outcomes were significant in that the development and delivery of a teaching tool employing engaging pedagogical methods to inform current best practice in tick bite management, particularly relating to anaphylactic indications, was realised.

YouTube link to multimedia production: http://youtu.be/RKwFaA6m5II

SECTION 1: PROJECT PROPOSAL AND MANAGEMENT

IDENTIFICATION AND EXPLORATION OF NEED

Why is the project being undertaken? What is your motivation?

A range of management advice has been previously proposed for tick bites, from the inadvertent application of carcinogenic (World Health Organisation, 2010) compounds (ASCIA, 2014) to scraping them with a razor blade (National Parks and Wildlife Service, nod) to the application of ice packs (Glenaeon Rudolf Steiner School, 2012, p. 1). It was found that a retail product for treatment of skin tags and warts, recently available in Australian pharmacies, contains only dimethyl ether, which is the active compound in Aerostart®. Aerostart® is a hazardous product that has been recently recommended by experts as a suitable freezing agent of ticks. Ixodes Holocyclus, also known as the Australian paralysis or shellback tick causes the great majority of health issues in Australia and is particularly associated with anaphylactic shock (Heddle & Solley, 2014, p. 25). It is claimed by experts that freezing of ticks reduces the onset of anaphylactic shock in human hosts, rather than forceful removal of the tick using tweezers or forceps.

The design brief requires design of a multimedia product that I can use as a teaching tool to educate present and future generations about learning to live and act sustainably. My multimedia product will promote awareness of health promotion in the context of safe management of tick bite. The multimedia product will employ a range of engaging methods including video, written content, sill & animated images, a voice over sound track and a user moderated comments section to assist realizing in a successful outcome.

My motivation therefore, is three-fold:

a. To create an educational resource that dispels outmoded methods of tick bite treatment,

b. To promote a sustainable alternative to Aerostart which is known to contain Benzene, a proven carcinogen,

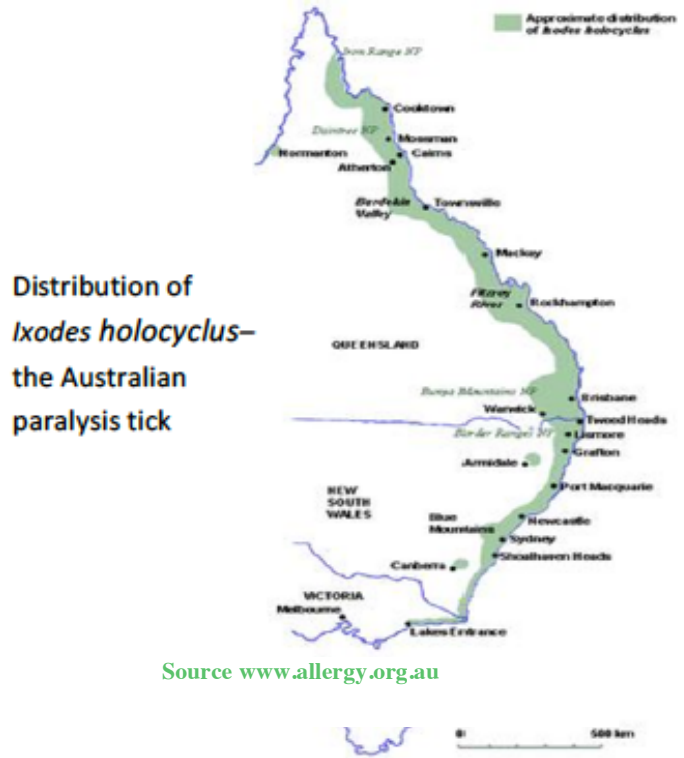
c. To educate people in the safe, effective application of retail available dimethyl ether sprays for the purpose of killing ticks in-situ.

Progressive Evaluation: *The broad scope of this need may be eclipsed by the complexity of the various research tasks required to realise an accurate presentation. The need to present an authoritative resource may be jeopardised in light of the various contradictory tick bite management protocols currently published. In keeping with my first motivation (a) I must aspire to presenting only current best practice as determined by expert opinion.*

Who will use the education tool? (Target market)

Ticks are distributed throughout Australia with the core habitat of Ixodes Holocyclus extending from coastal Eastern Victoria to North Queensland, "almost the entire Eastern seaboard" (Heddle & Solley, 2014, p. 22). A tick's propensity to target humans and their pets as hosts causing a variety of life threatening disease is well documented. What is less known is that allergic reaction can occur when the tick is pulled out or scratched in-situ and that any person who has previously suffered anaphylactic reaction is 40 to 60% likely of having a similar reaction to a bite from the same species (p. 22 & 25)

Therefore the target market for my presentation is indeed very large and might be best managed by breaking down into various large socio-economic sectors including educational institutions (esp. early childcare, primary & secondary schools), community associations (Lyons, Rotary, Bush care, Landcare etc.),



Source www.allergy.org.au

government (state departments and councils), social media, healthcare (hospitals, general practice and ambulance), first-aid educators, fit-aid suppliers, retail pharmacy, rural fire services, etc. In effect any organisation that has members, staff, clients or patients associated with the outdoors could benefit from the sustainable health promotion described by my production.

How will it be used?

A range of channels will be used to disseminate the production. Widespread and increasing accessibility to the Internet creates an opportunity to create a website, optimized with targeted search engine functionality to host the production. YouTube and Video are significant portals used web-based teaching, learning and research ("Jisc Digital Media," n.d.).

The subject matter is sufficiently engaging to warrant exploration of a TED Talk, presented by a medical expert as an idea worth spreading ("How TED works," n.d.). Although the production may not be to a TED standard future revisions could address its production deficits.

Various peak bodies including ASCIA (Australasian Society of Clinical immunology and Allergy inc.), TIARA (Tick Induced Allergies Research & Awareness) and AABR (Australian Association of Bush Regenerators) conduct public awareness campaigns educating about tick-borne disease and bite management (although some of their content may be considered hazardous, i.e. application of Aerostart®). An opportunity exists to provide a url link to the YouTube hosted production via their educational resources.

Progressive Evaluation: *Considering the very broad target market and my first motivation to present accurate information, I undertake not to publicly release my production without first gaining endorsement from clinical experts in the fields of allergy, immunology and/or entomology.*

How is it intended to meet the needs of the target market?

The production meets the needs of the target market by creating awareness through education, dispelling outmoded treatments and creating ground swell demand for ether based freeze spray products, which in-turn may support further investments in education through product marketing campaigns driven by commercial investment decisions.

The use of images, animation, voice over and text is intended to support an accessible production that delivers a simple yet vital message. Thorough research, limited only by my time constraints and expertise, will be referenced within the production to legitimise the production's content. YouTube permits producers to maintain a moderated comments section that will also be employed to provide research links to viewers for their own investigations and to receive crowd-sourced link suggestions.

AREAS TO INVESTIGATE

What is to be investigated?

Production and distribution of my resource will require various investigations. These include:

1. Message content sourced from a wide range of primary and secondary sources
2. Image content produced by myself and also sourced from a variety of secondary sources
3. Audio content produced by myself, and synced to the timing of content (images, text and animation)
4. Output testing to suit various digital platforms
5. Potential for endorsement of production content by subject experts
6. Folio development including orientation and text color scheme

Progressive Evaluation: *Due to the study of digital media units at SCU I have some practical skills that are ready to be employed in producing the resource. These skills give me some advantage considering the very tight time (self-imposed) frame required of the production and the significant content research demands required. I aim to challenge myself by developing digital skills to achieve a more polished production.*

How will it be investigated? What type of methods will you use to conduct your investigative research?

Primary Research

1. Telephone and face to face discussions with vets and their staff
2. An open-ended questionnaire with neatly typed and presented questions will be sent via email to experts in the field of medicine and entomology. The questions prepared maybe considered to lead the respondents however given the nature of enquiry this satisfied the objective of clearly determining consensus of expert opinion relating to safe treatment of tick bite management. In effect many of the questions might be framed as closed questions, however by not requesting a yes or no response I intend to allow respondents an opportunity to expand their answers in order to collect additional data. Following NSW HSC online guidance (NSW HSC Online, n.d.) the survey shall be succinct and include an introduction explaining its purpose, identification of myself and my role, an invitation to be cited (or by default, not cited, if they decline) and an expression of gratitude
3. Interviews with people who have experienced tick-borne disease to determine their previous and current understanding of tick bite management and to learn what current strategy they would employ
4. Interviews with field workers likely to experience tick bites, to collate their experience and advice
5. Investigations into efficacy of ether spray as an effective method of killing ticks in-situ
6. Technical investigations into the best method of filming tick death for demonstration

7. Request vets and social media provide tick samples. 2 dead & 1 living rec'd
8. Write to Museums for high resolution tick images that might be used in my presentation
9. Investigations into methods of animating tick process of feeding
10. Test tick video output format plays well with, and is suitably sized for YouTube HD output delivering to a range of devices ink desktop, tablet, phone and iPod type screens
11. Determine if video can be endorsed by peak bodies, including TIARA, ASCIA or other clinical experts
12. Seek support from Sharon Sands and Dean White (Directors of Education Sydney Northern Regions) to have video promoted across their school networks as a means to educate school communities, including staff, parents, care-givers and students
13. Review websites for suitable monochromatic colour swatches

Secondary Research

1. Collate and apply data sourced via SCU library and databases (primarily peer-reviewed papers), news articles, websites, information leaflets and material safety data sheets including:
    a. Understand and report on the benefits of sustainability in healthcare promotion
    b. Research peak body and expert suggested treatment/removal advice
    c. Locate & digest studies into ticks specifically including their lifecycle, habits and transmission pathways
    d. Study which diseases the tick is a vector of in Australia, and the health impacts of these diseases
    e. Consider the merit (sanity) of acting as host to a tick whilst filming the application of freeze spray to it, find another or which other means could be effective.
    f. Following from e) design and model a realistic tick (Ixodes Holocyclus) at engorged adult size to act in presentation

g. Confirm Aerostart's formulation and possible hazards of any compounds within
h. Confirm Wart-Freeze (or other similar product) formulation and possible hazards of any compounds within
i. Locate alternative dimethyl ether (the active freezing agent) products available as retail products in pharmacies

2. Review of YouTube data to locate various outmoded removal methods. Consider if this can be used (under creative commons) to support the argument that myths relating to safe tick management abound
3. Review web-forums for anecdotal user experience in tick removal
4. Locate images of ticks (in nature and feeding), and their hosts with a view to using in a creative context

***Progressive Evaluation**: Research revealed expert opinions differ. In the words of Dry Cameron Webb "There is no silver Bullet" (ABC Radio, 2014). Professor van Nunen states TIARA'S position is to kill with ether and leave alone confirming "Tweezers are squeezers" (Prof. S van Nunen, personal communication, Sept 19, 2014) yet NSW Health (NSW Health, 2013, p.1) says "Once found, ticks should be removed as soon as possible using fine tipped forceps or fine surgical scissors: press the skin down around the tick's embedded mouth part, grip the mouth part firmly, lift gently to detach the tick. Avoid squeezing the body of the tick during removal." Therefore the content message should be tailored to be narrow, specifically addressing management of the most serious complications (potential for major anaphylaxis) and let the audience make their own determination as to subsequent removal of ticks.*

What are the boundaries and limitations of the project? (i.e. knowledge, skills, time, budget)

A lack of time presents a significant boundary to on-time realisation of this project. I had already invested significant time exploring and researching another project opportunity and by chance I realised this opportunity. Being aware that several friends continue to suffer with tick-borne disease (mammalian meat allergy and tick induced anaphylaxis) the subject matter was of great interest to me and could not be left alone. This change in direction gave me four days to complete the project on time and due to family and work commitments I knew it would have to be late.

My knowledge of the issue was limited and I quickly needed to explore the needs associated with the project. Realising this objective was likely to require the input from various clinical experts and accessing them within the time frame would be difficult. Excellent access to papers and journal articles would be possible through the university library and Internet although digesting this material would also require much time.

The finance required for research and development of the production was not significant. All necessary equipment (camera gear, lighting, tools, epoxies, paints, glues, computer, iPad and iPhone) and software (Adobe Photoshop, Adobe Premiere Pro and Adobe Audition) were already available. Purchase of devices such as Medi Freeze Skin Tag Remover, various tick pullers was required as well as materials to craft a fake tick that would be used in the multimedia resource. These items were relatively inexpensive and could mostly be re-used for other needs later.

What are the possibilities?

Aside from my own personal development in research and digital media, the educational and commercial possibilities for this project quickly became apparent. On day one realised significant misinformation (and perhaps some debate) surrounded the issues. By day three I had personally proposed the potential for promotion of the production to Mr. Dean White, Director of Public Schools NSW (Warringah Network) covering 34 primary and secondary schools, and by day five I realised potential for a significant commercial opportunity relating to the project.

Successfully harnessing the many distribution channels previously described presented an opportunity to expose a national (and perhaps international) audience to the important message delivered by my production.

Progressive Evaluation: *I consider this project to be framed about the research and production of the multimedia resource, and not to detail its distribution strategies. It is important to note the distribution possibilities but detailing them is not within this project's scope. Project possibilities are subject to its approval from peak bodies and/or clinical experts.*

What factors may impact on the design?

Glover explains (Glover, 2006, p. 229) successful designs achieve a balance between design brief and user needs. I feel the brief includes the necessary elements required for a successful multimedia presentation. Developing these to have a positive impact will involve:

1. Video
    a. Design for a cohesive flow of information and images. Ensure screen ratio suits target devices. Explore animation frame rate aiming for smooth flow and the labour required to achieve this. Explore possibility of delivery accurate YouTube Closed Caption data (script) improving accessibility to the hearing impaired. Keep video length to minimum to keep audience engaged.
2. Written content
    a. Only present reference able content. Display important text on screen. Use same font and select for conservative font. Text display to allow for reasonable reading time.
    b. Selection of appropriate text colour swatch will improve aesthetic appeal and readability of the folio
3. Sills & animated images
    a. Select interesting images to maintain engagement and connection, attempt to use in transitions between images.
4. Voice over sound track
    a. Finalise script, rough in video and finesse timing to ensure audio and video is synchronized and flows well. Voice over should be interesting and authoritative. Music or sound effects were considered (especially those which would be humorous adding to the animation scenes). It was decided this could detract from the important message or make the matter somehow frivolous.
5. Interactivity
    a. Setup a moderated user comments function within the YouTube video.

CRITERIA FOR SUCCESS

What are the functional and aesthetic qualities the education tool will need to be able to demonstrate to be successful?

How will you know if the completed project has been successful?

The success of my educational resource requires that various functional and aesthetic qualities can be demonstrated. The qualities and the methods to validate success are addressed in the following tables.

FUNCTION

Demonstrated	Validation
Upload and presentation of content on YouTube that conforms a standardized format and can be displayed across a range of devices.	Testing the URL link across various devices for playback.
Animation, text, images and audio closely synchronise.	Ask a friend to review and provide honest feedback.
Complete presentation must not exceed 10 minutes	Assess prior to upload.
Content must be delivered in an engaging and informative way.	Ask experienced educator to review.
Content to reflect current expert opinion on safe tick bite management.	Send URL to ASCIA and TIARA for endorsement
User comments fields operating as moderated forum	Test comments can be approved and edited where required

AESTHETICS

Demonstrated	**Validation**
The presentation should include screen text to improve accessibility	Text to be legible when static or animated
The presentation should how a professional authoritative style. There is scope for lightness as this presentation maybe delivered to younger audiences.	A subject assessment required, invite feedback from ASCIA and TIARA
Animation and images are appropriate to message being delivered	Check presentation in the way a document would be proof read
Model 'tick' to appear realistic and to size	Seek opinion from family before filming
Animations and text timed to flow well, free from jerkiness associated with low frame rate.	Invite friends and family to review and comment.
Accurate citations and thanks (with approvals) are necessary	Send individual emails to persons cited, seeking confirmation and approval. Send final url before broader URL release.

What may be the short and long term consequences of the design?

In the short term design is bound to elicit commentary and requests for clarification and revision. Although the design is not intended to be provocative it is staged to be a little graphic, intended to get people talking and hopefully sharing via social media.

In the longer term it is hoped the design will attract additional demand for research into the issues addressed.

PROJECT MANAGEMENT

Includes the development of a plan for the use of the available time, the budget available and how it could be dissected, and the proposed and actual actions that will be required to reach the successful completion of the project:

Action and time plan

My belated decision to pursue this particular project meant my organisational and time management skills would be sorely tested. I made the decision to risk a late submission and subsequent marking penalty knowing the subject matter, research and production would be personally satisfying. I believed the final production could have genuine merit as a teaching resource and could perhaps act as a driver to more research into the matter. Therefore my action and time plan would be compressed into several long days and I had to remain conscious of not pursuing unproductive 'rabbit holes' (as I am prone to doing) in my attempt to follow the plan. Day 1 of the project began on Tuesday 16th Sept 2014 and my evaluation date was Monday 22nd September.

Progressive Evaluation: The time plan associated to various actions is not entirely linear due to the length of days, actions spanning multiple days and need to compress various actions when possible, e.g., fitting interviews into others schedules. Important milestones were prioritized and this is reflected to some extent in the critical path.

ACTION	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Variation
Setup word document as diary to record ideas, tasks, findings etc.								
Identify needs relating to sustainability in healthcare								

ACTION	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Variation
Generate & record ideas as to where I should focus research activities								
Contact friends known to have tick-borne disease & arrange interview								
Conduct preliminary secondary research								
Identify issues and decide upon message relating to safe removal of ticks								
Identify influential experts and associations								
Source freeze spray and test methods of filming its efficacy on ticks								Day 2
Prepare and email primary research questionnaires. Conduct interviews.								
Conduct other primary and secondary not listed herein								
Test materials for production of model tick (as insurance if no real tick arrives or I decide against demonstrating freeze spray with a real tick)								
Put the call out for ticks, contact vets and friends via social media								
Contact to Dean White & Sharon Sands about promoting video								Only Dean contacted
Decide upon software to use in production of presentation, PS or Premiere Pro								
Source possible images for use in production								
Research and test appropriate video size, considering safe area								
Make model tick								

ACTION	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Variation
Prepare and Finalise script								Take notes from day 2
Record voice over from script								
Edit audio								
Research and review Premiere Pro video processing and Photoshop animation techniques								
Shoot video of tick freeze in use								
Presentation production period ink animation, sync, text and voice sync								
Review, publish and evaluate production								
Folio Preparation, resolve colour scheme.								Days 8 to 10

Finance Plan

As discussed in the project limitations and boundaries, financial resources were required to realize this project. Fortunately they were not significant. Fortunately I already had access to the various equipment and software required (see resources). In the event that all resources had to be financed I would have been unable to realise this project. For the purpose of the finance plan I have included the monthly subscription cost of my educational license to Adobe creative cloud.

ITEM	Purchased	Cost	Running Total
Adobe Creative Cloud Monthly Subscription (Education)	6/9/14	$24.99	$24.99
Medi Freeze Skin Tag Remover, ether based freeze spray	16/9/14	$29.95	$54.94
Ticked Off Tick Remover (only to be used for evaluative or emergency purposes)	18/9/14	$16.90	$71.84
Dremel engraving set for carving tick model	16/9/14	$24.96	$96.80
Tick Twister (only to be used for evaluative or emergency purposes)	18/9/14	$11.09	$107.89
Superglue to glue model tick to my skin in filming	18/9/14	$7.90	$115.79
Cross Section Skin Image (Dreamstime image Library)	19/9/14	$16	$131.79
		Total	**$131.79**

Resources

Ranges of resources were applied to realise the project. The resources used ultimately feed into the presentation elements of video, written content, sill & animated images and voice over sound track. They are listed in the following table, along with a justification for their application.

RESOURCE	JUSTIFICATION
Time	A managed use of time in achieving various set tasks improved the prospects of complete project within my planned time frame.
Finance	Various items were necessary to research and develop the project. Finance required was planned before the project to ensure costs did not overrun and would be able to meet my financial capacity.
Research	A critical resource necessary to investigate and formulate needs, determine issues and seed idea generation, evaluate the educational message and develop production techniques.
Equipment	Multimedia presentations require a range of inputs. Capture devices and associated equipment, (egg camera, lighting, iPhone) are necessary to create inputs required. A computer is required to run the software processes necessary for processing, assembly and testing of the production. iPhones and iPad were required to test production output.
Software	Software is integral to the computer and is used as mentioned above. Adobe Photoshop, Premiere Pro and Audition were chosen as main software in the production with VLC, QuickTime and Firefox used to test.
Materials	Building of a model tick required testing and use of various epoxies and glues. Medi Freeze Skin Tag Remover spray was used to test the efficacy of pure ether to instantly kill ticks.

RESOURCE	JUSTIFICATION
Experts	Experts were widely consulted (within my ability to access them and the time constraints) to research current opinions and results relating to effective safe tick bite treatment. In the absence of recent peer-reviewed data on the subject this was considered a good use of resources.

SECTION 2: PROJECT DEVELOPMENT AND REALISATION

RESEARCH

Collection of critically evaluated existing similar designs

"Using social media tools (including YouTube) has become an effective way to expand reach, foster engagement and increase access to credible, science-based health messages" (Centers for Disease Control and Prevention, 2011, p. 1). YouTube features several videos informing on tick removal methods. These appear to be published by a variety of people, from foreign health professionals to hacks. These videos might be a source of information for someone who has recently discovered they are hosting a feeding tick. This information is largely unregulated and according to my research there is no shortage of conflicting, ill-informed and potentially dangerous information at hand.

A selection of links is listed below.

- Removal using sub dermal injection at the bite site of a solution of Xylocaine and adrenalin, coaxing the tick to withdraw, unconventional but maybe effective. Also shows straw and knot method being recommended: http://www.youtube.com/watch?v=x9dsmFVPDqs
- Medical professional recommending removal of tick by surgical excision.: http://www.youtube.com/watch?v=hMBVgZK10Qk
- Personal suggestion using tick twister "to make them dizzy and they just come out" http://www.youtube.com/watch?v=DRXp9Tkx08w
- A gardener recommending using Vaseline: http://www.youtube.com/watch?v=SmkVUdZt98o
- Veterinary entomologist (PhD) recommending direct tweezers withdrawal http://www.youtube.com/watch?v=27McsguL2Og

My research did not reveal any professionally endorsed Australian multimedia productions (either on YouTube or elsewhere) addressing tick bite management. I am advised TIARA will address this in the near future.

Primary and Secondary research as identified in research plan

A critical finding of my secondary research supporting the benefits of sustainable health care promotion was that health promoting schools focus "on creating health and preventing major causes of death, disease and disability by helping members of the school community to care for themselves, make decisions and have control over circumstances that affect their health and create environments that are conducive to health" (NSW Health, 2000, p. 8).

My tick research presented too much information to detail within the scope of this folio. The purpose of this aspect of the research was to distill the necessary information relating to safe tick bite management strategies and present this as an informative educational multimedia resource. In presenting a balanced, accurate and informative resource (that would hopefully be endorsed by peak bodies and clinical experts) I aimed to dispel the outmoded methods of tick bite management.

Research revealed a clear and perhaps pressing need for education into tick bite management.

Primary research conducted by interviewing tick bite victims revealed significant detrimental health impacts (although I only interviewed two people known to be suffering as a result of tick bite). Bites are frequent in the Sydney area, especially in the North & North West. Local vets explained it is by far and away the largest health issue in their surgeries. Secondary research confirmed, "The global burden of tickborne disease is significant" (Lowbridge, Doggett, & Graves, 2011, p. 237). Matthew Dowle (2012, p.155 & 169) informs in his PhD thesis "Ticks, above all ecto-parasites are capable of transmitting the widest range of pathogens". Ticks are ideal vectors because of their blood feeding habits, general

absence of predators, and the ability of their well-adapted bodies to shield from environmental harm (Sonenshire et al. 2002).P.155 and that "Ixodes Holocyclus is one of the least host specific and toxic species of tick in Australia (Roberts 1970; Stone et al. 1989)".

Australian Biosecurity notes, "The distribution of our most medically important tick, the Paralysis tick, Ixodes Holocyclus, is roughly confined to a 20-kilometre band that follows the eastern coastline of Australia." (PADIL, n.d.). This band is home to a significant proportion of the Australian population as evidenced in the adjacent 2010 ABS population density map.

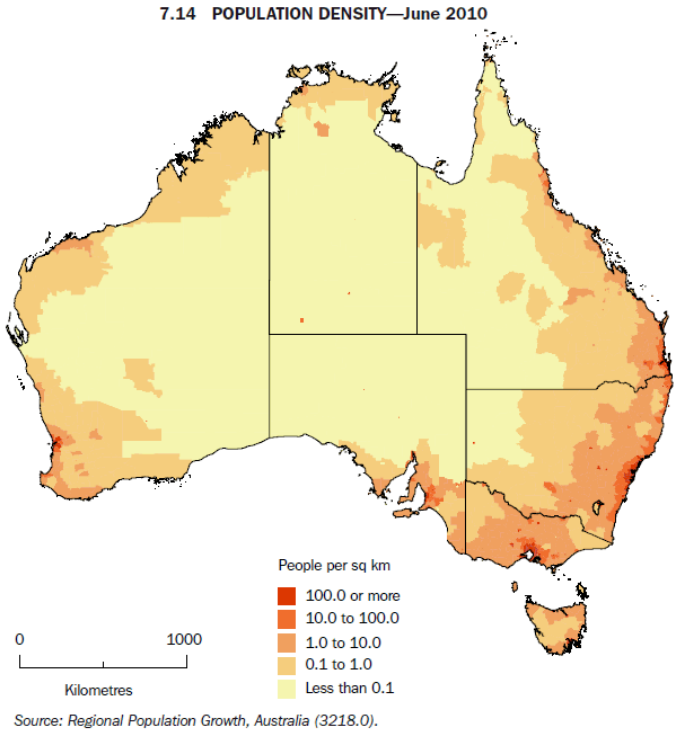


Image source ABS http://bit.ly/1muz5uz

Primary research into safe tick-bite management included interviews with clinical and entomological experts. This method was effective in determining expert opinions, however also contradicted the findings from some secondary research. The variety of tick-bite management advice is diverse, especially considering ticks are such a prevalent Australian pest known to regularly cause acute life-threatening allergic reactions and debilitating chronic diseases.

Secondary tick-bite management advice is available in the form of information booklets and leaflets, web sites, and school policy documents. I sourced several peer-reviewed articles courtesy of Medicine Today (previously referenced) although the one of these (2014) still proposed the use of Aerostart® known to contain benzene, a carcinogen. I was unable to locate any informative journal articles informing of clinical studies

into tick bite management. ASCIA, Australia's peak body for allergy & immunology recommends ether based WartOff freezing spray (and includes safety references to Aerostart®) (ASCIA, 2014, p.4) and specifically advises against the removal of the tick with tweezers or forceps. TIARA (Tick Induced Allergies Research & Awareness) recommends killing in-situ with ether spray or Permethrin (TIARA, n.d., p.2).

The proposed method adopted and advised by NSW Health is to "remove ticks as soon as possible" by fine forceps (NSW Health) although Prof. Sheryl van Nunen (convener on the chair of TIARA & clinical expert in allergy) explained in conversation to me "tweezers are squeezers". To physically agitate a tick has a two-fold effect:

1. Incorrect technique often resulted in the tick being grasped about the upper body where its salivary glands and stomach are. This could cause the contents of both to be pushed into the host via the hypostome (barbed mouth-piece).
2. The tick creates a little feeding pool under the skin where it maintains a toxic cocktail of anti-coagulants, paralysis and allergy causing compounds (not to mention a pathogen or two). When the tick is removed, which at a tick-size scale is a probably a fairly forceful process the area surrounding the pool is disturbed and the body endures a rush of the aforementioned cocktail.

Doggett (2004, p.37) explains the Stone method (after Dr. Bernard Stone formerly of the CSIRO) is to spray the tick with a synthetic pyrethroid or apply Lyclear, leaving the tick for some hours before careful removal with forceps.
Dry Graham Solley a consultant physician in allergic disease informed me he recommends ether based sprays explaining anecdotal evidence indicated they were "extremely effective" in reducing anaphylactic outcomes (Dr. G. Solley, personal communication, Sept 17, 2014).
National Parks & Wildlife guidelines for managing tick-related health issues advises severe infestations of larval ticks should be treated to a 30 minute bath with 1 cup of bicarbonate of soda (National Parks and Wildlife Service, n.d.).

A questionnaire was emailed to various experts. Although this addressed the issues in my project it was not returned by anyone. This is possibly due to poor timing. Telephone interviews asked similar questions and the responses were generally quite candid.

Various research proposed in the research plan was conducted through testing processes described later in Section 2. These tests included a camera test, YouTube test, Freeze spray test and materials test. The testing processes allowed me to achieve the stated aims of the research.

Progressive Evaluation: *A framework defined my research boundaries upon which I set tasks to achieve within set time frames. I am satisfied that nearly all tasks within the framework were attempted although some anticipated results failed to materialise.*

The data complied from my research may be used in a short instructional video that I am designing for a Major Design Project, as part of my Bachelor of Technology Education. I have chosen to focus my topic on health promotion, as there appears to be a genuine need for accurate, up to date information relating to the safe removal of ticks. It is possible to find all manner of contradictory, (and possibly harmful) information across the internet, as well as in older peak body fact sheets & papers. This is NOT a medical research project and a disclaimer that patients should always seek medical advice will be included in the video.

Research Questions for doctors, vets & subject experts;

1: Does research, or anecdotal evidence suggest an increasing prevalence of tick related illness in Australia?

2. Would you agree tick bites are causing significant health problems to many people and their pets/livestock within Australia?

3. Do you think prompt safe removal is likely to result in less harm to the host?

4: Aerostart (containing dimethyl ether as an additive) is mentioned by ASCIA (Australasian Society of clinical Immunology and Allergy) as method of killing ticks in situ before removal. Professor Robert Heddle's recent peer reviewed article in Medicine Today (2014) states *"The most effective method of reducing the risk of an allergic reaction is to kill it in situ. Ether has been shown to kill ticks rapidly. Furthermore, once dead the tick will desiccate and may fall out by itself or can be easily scraped out with a credit card or a blunt knife without a reaction occurring. Products containing ether, including Aerostart, which is well known to mechanics, and sprays containing dimethyl ether used to freeze warts are recommended."* Is this a safe method for tick removal (using Ether, not Aerostart) that you would endorse?

5. Considering Aerostart contains Benzene, a known carcinogen, would you agree its promotion as a tick-killing agent should cease and ether freeze products should be suggested instead?

6. Once the ether freeze spray has been applied to the tick do you think the tick should be removed, or left in place to desiccate and fall off in time?

7. My personal priority would be to want it out. Is the forceful removal of a dead in-situ tick (using tweezers at the head) a likely health threat?

8. May I cite you and/or use your name in credits as one of the experts who have assisted in my video project?

Thank you sincerely for any information you can assist with.

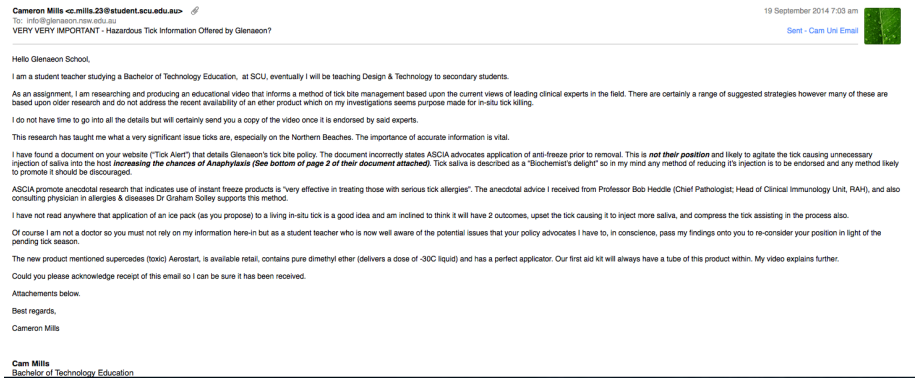
Kind regards,

Cameron Mills
c.mills.23@student.scu.edu.au

Questionnaire presented to clinical experts and entomologists

To Finalise my commentary on conflicting research findings into educational resources advising how to manage tick bites I note the University of Adelaide Clinical Toxinology Website on treatment of tick bites states that “If the tick is present, kill it by swabbing it with alcohol, methylated spirits, turpentine, or kerosene.” (The University of Adelaide, n.d.) (NBthis site has since been updated) Also that Glenaeon School in Sydney states in their Tick-Alert policy document they will not remove ticks but that “We will apply an icepack to the site to relieve itching” (Glenaeon Rudolf Steiner School, 2012, p. 1). I wrote to both orgnaisations warning of their potentially harmful public advisories, I have received an email from one confirming updates to their advice, the other has not yet replied.

Progressive Evaluation: *In view of the various suggestions for treatment my message must be very narrow and focus only on the strategies most likely to reduce the serious risk that anaphylaxis presents, that is, the use of ether based spray to kill the tick in-situ. I made a curated list of research available in the comments section for others to consider.*



Cameron Mills <c.mills.23@student.scu.edu.au> 19 September 2014 7:03 am
To: info@glenaeon.nsw.edu.au
VERY VERY IMPORTANT - Hazardous Tick Information Offered by Glenaeon? Sent - Cam Uni Email

Hello Glenaeon School,

I am a student teacher studying a Bachelor of Technology Education, at SCU, eventually I will be teaching Design & Technology to secondary students.

As an assignment, I am researching and producing an educational video that informs a method of tick bite management based upon the current views of leading clinical experts in the field. There are certainly a range of suggested strategies however many of these are based upon older research and do not address the recent availability of an ether product which on my investigations seems purpose made for in-situ tick killing.

I do not have time to go into all the details but will certainly send you a copy of the video once it is endorsed by said experts.

This research has taught me what a very significant issue ticks are, especially on the Northern Beaches. The importance of accurate information is vital.

I have found a document on your website ("Tick Alert") that details Glenaeon's tick bite policy. The document incorrectly states ASCIA advocates application of anti-freeze prior to removal. This is ***not their position*** and likely to agitate the tick causing unnecessary injection of saliva into the host ***increasing the chances of Anaphylaxis (See bottom of page 2 of their document attached)***. Tick saliva is described as a "Biochemist's delight" so in my mind any method of reducing it's injection is to be endorsed and any method likely to promote it should be discouraged.

ASCIA promote anecdotal research that indicates use of instant freeze products is "very effective in treating those with serious tick allergies". The anecdotal advice I received from Professor Bob Heddle (Chief Pathologist; Head of Clinical Immunology Unit, RAH), and also consulting physician in allergies & diseases Dr Graham Solley supports this method.

I have not read anywhere that application of an ice pack (as you propose) to a living in-situ tick is a good idea and am inclined to think it will have 2 outcomes, upset the tick causing it to inject more saliva, and compress the tick assisting in the process also.

Of course I am not a doctor so you must not rely on my information here-in but as a student teacher who is now well aware of the potential issues that your policy advocates I have to, in conscience, pass my findings onto you to re-consider your position in light of the pending tick season.

The new product mentioned supercedes (toxic) Aerostart, is available retail, contains pure dimethyl ether (delivers a dose of -30C liquid) and has a perfect applicator. Our first aid kit will always have a tube of this product within. My video explains further.

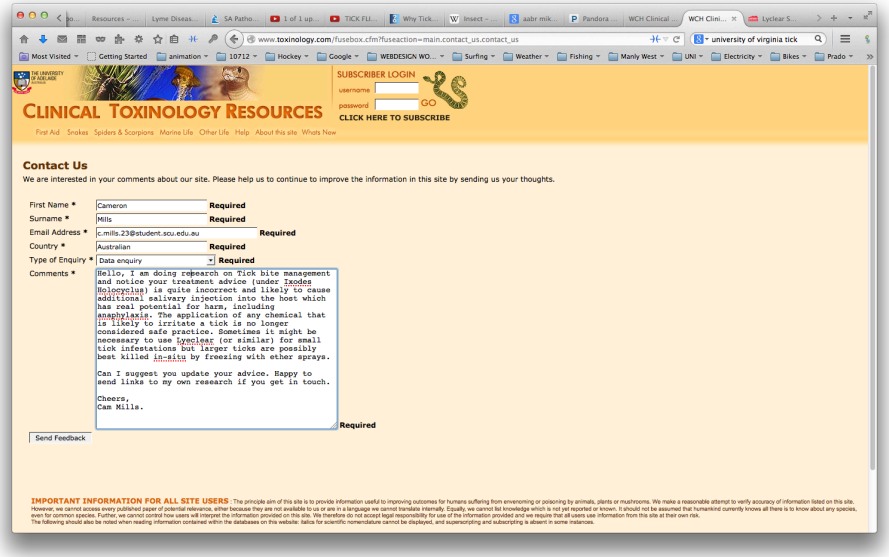
Could you please acknowledge receipt of this email so I can be sure it has been received.

Attachements below.

Best regards,

Cameron Mills

Cam Mills
Bachelor of Technology Education



My investigation into the safe use of products described as suitable by experts required access to material safety data sheets (MSDS). Adjacent images indicate Aerostart® contains >60% gasoline which in turn has up to 4.9% Benzene a known carcinogen.

The Skin Tag Remover distributor sent me a copy of that product's MSDS and it showed to be safe for use on human skin.

Research of animation techniques rested with the entertaining podcast from Russell Preston Brown at Adobe TV.

Instructional video using PuppetWarp

Source AdobeTV

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

Gasoline composition. Source www.hess.com

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
GASOLINE	Not Available	8006-61-9	>60%
DIETHYL ETHER	C4-H10-O	60-29-7	10-30%
ETHANOL	C2-H6-O	64-17-5	<10%
CARBON DIOXIDE (PROPELLANT)	Not Available	124-38-9	<10%

Aerostart compoisition. Source www.crcindustries.com.au

Exposure controls

Personal protective equipment:
General protective and hygienic measures:
Wash hands before breaks and at the end of work. Do not inhale gases / fumes / aerosols.

Respiratory protection:	*Not required.*
Protection of hands:	*Not required.*
Material of gloves	*Not required.*
Penetration time of glove material	*Not required.*
Eye protection:	*Not required.*

Page 3 - 7 *Dimethylether* Printi

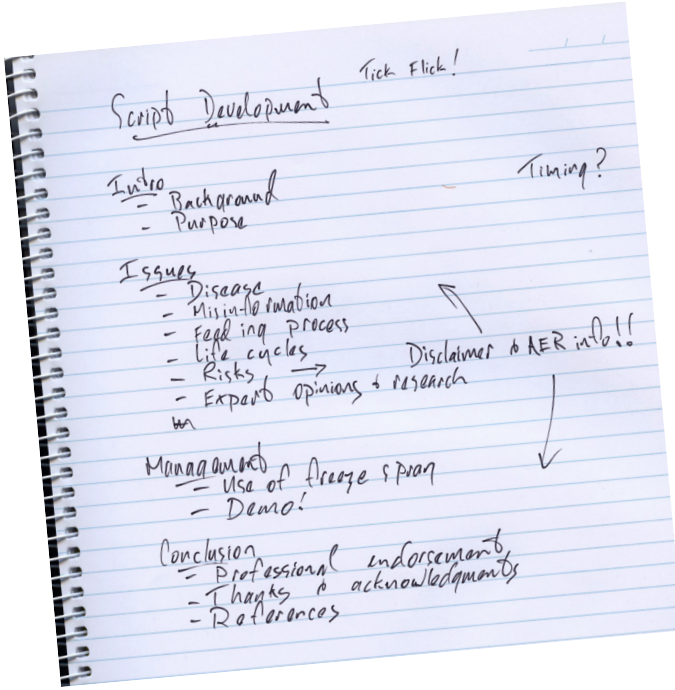
Skin Tag Remover Exposure Controls. Source supplied.

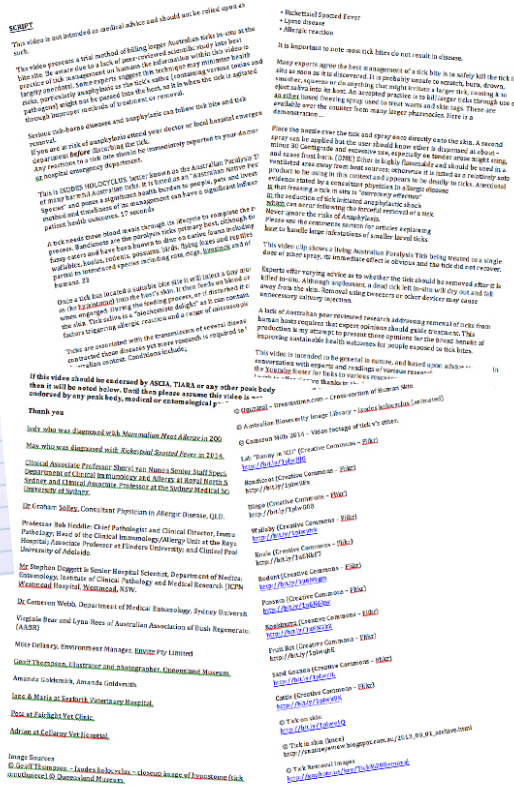
EVIDENCE OF CREATIVITY

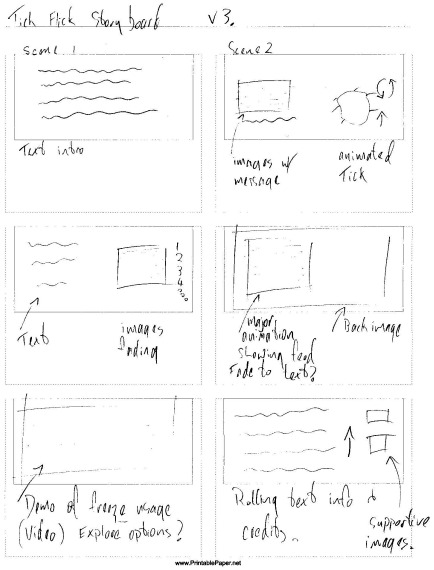
Idea generation showing development of ideas into a final design

SCRIPT

The final design is the culmination of research, planning, ideas generation, evaluation and testing. Although idea generation can occur as a creative process I found using tools to support the process to be worthwhile. These tools included a running point form summary of ideas that supported script development. This process allowed me to manage the script's development keeping me focused on the key areas and not missing any either.







STORYBOARD

A storyboard was used to generate and record scene ideas.

This process required several versions and was very useful in managing my limited time resources.

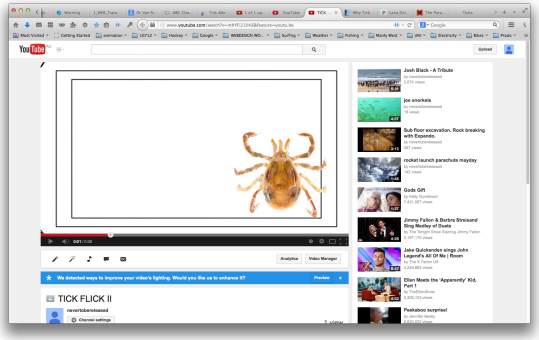
Versions of the storyboard were refined after the script was developed.

DOCUMENTATION OF EXPERIMENTATION AND TESTING

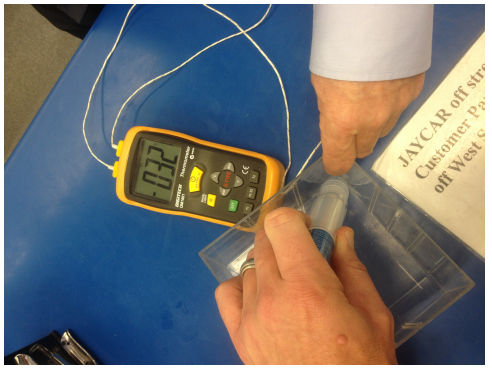
Samples of different techniques and methods

Testing occurred throughout the project. Testing was used as a tool to plan and also as a means of reducing failures during final production.

CAMERA TEST		**EVIDENCE**
AIM	Demonstrate Freeze Spray Delivery & effectiveness.	 
METHOD	A pane of glass was installed on timber frame with camera below. Using macro lens a cockroach was filmed being treated to one spray of ether.	
RESULT	The cockroach died instantly although it was not really possible to see the ether spray, only as a liquid and the result was deemed too unsettling to use in the video production.	
CONCLUSION	Continue with idea generation for other means of demonstration.	

YOUTUBE TEST		**EVIDENCE**
AIM	Establish required size and aspect ratio for video hosting on YouTube	
METHOD	A Photoshop document was prepared according to present HD sizing. Safe area guides were setup and borders drawn. A basic animation was prepared and uploaded to see if my screen reflected the YouTube delivery on different devices.	
RESULT	This worked perfectly with no need for adjustments	
CONCLUSION	I used the document as a template in final production.	

MATERIALS TEST		**EVIDENCE**
AIM	Establish which epoxy will carve best for model tick production	
METHOD	Crafting an imitation tick was an idea to use in demonstrating the application of freeze on skin but it was also a fallback if I could not acquire a living tick. Making a real tick to size of an engorged female (13mm) meant carving. The best product to use was tested from a range of Builders epoxy, metal epoxy and 5-minute epoxy. The yellow Plastolina pictured was used as moulds.	
RESULT	The metal epoxy was best for carving with a Dremel grinding bit.	
CONCLUSION	Metal epoxy had the added advantage of earthy colouring and when coated in PVA, painted and given some brass legs looked quite realistic.	

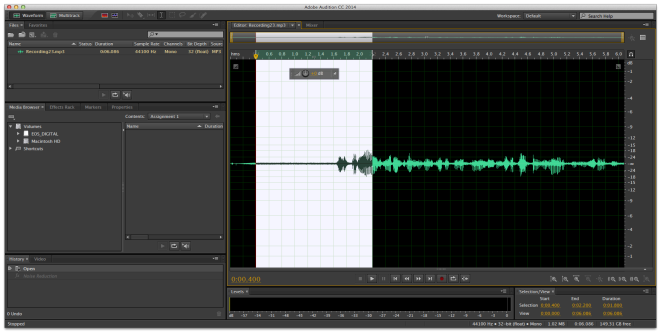
FREEZE SPRAY TEST		**EVIDENCE**
AIM	To know the temperature of the freezing agent (dimethyl ether) when it is dispensed.	
METHOD	Jaycar Electronics allowed me use of their industrial grade temperature-measuring device. Thermocouple test probes were placed in a container and several tests were carried out to average the results.	
RESULT	Tests showed a minimum temperature of -32ºC and a maximum of -25ºC. The mean temperature was -28ºC.	
CONCLUSION	The ether dispensed remains liquid state for a few seconds before quickly evaporating. It reasonable to postulate this product would be extremely effective is causing instant freezing of all arachnids able to fit within the dispensing nozzle, which happens to be of a suitable size for the largest Ixodes Holocyclus (Australian Paralysis or Shellback tick) likely to be found on a human or animal.	

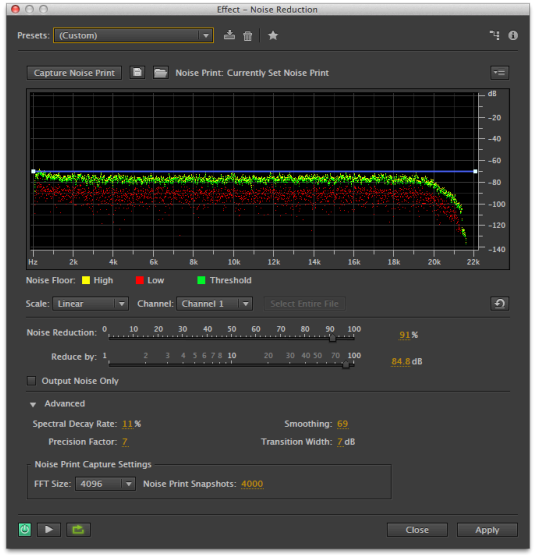
Progressive Evaluation: *Testing provides a lot of insight into the processes being considered for production. Although it may seem tedious at times it has proven to save unnecessary effort and improve crafting skills. Often the test setup can be immediately applied (per the YouTube test) to production.*

EVIDENCE AND APPLICATION OF PRACTICAL SKILLS TO PRODUCE A QUALITY PRODUCT

AUDIO

I had previous experience with audio capture and processing. The capture method was performed with my iPhone and the audio was then processed with Adobe Audition. Background noise was avoided by reading the script in my bedroom, this reduced chances including outside traffic noises. The iPhone recording included 'noise' which I attempted to remove through a process of researching techniques, and testing to determine the best process settings. I attempted to keep my voice over volume uniform and clear and the volume was further normalized in Audition. Each paragraph was recorded separately as this reduced rework when mistakes occurred, and earlier testing had shown this would be the easiest way to roughly synchronise voice to video scenes.



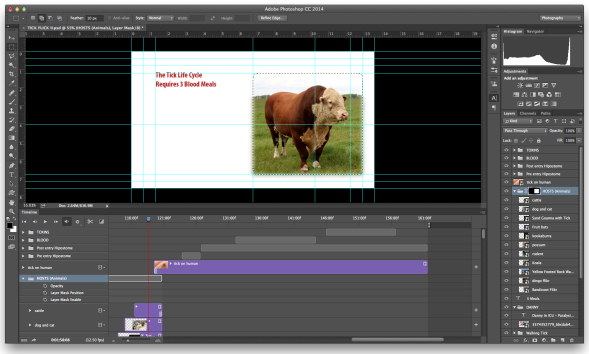


Progressive Evaluation: *I wasn't pleased with the audio voice over as my goal was to present an interesting, yet authoritative narration. The result sounded stale to me although due to time constraints and my natural lack of talent I decided not to pursue another take. I doubted the result would be much better!*

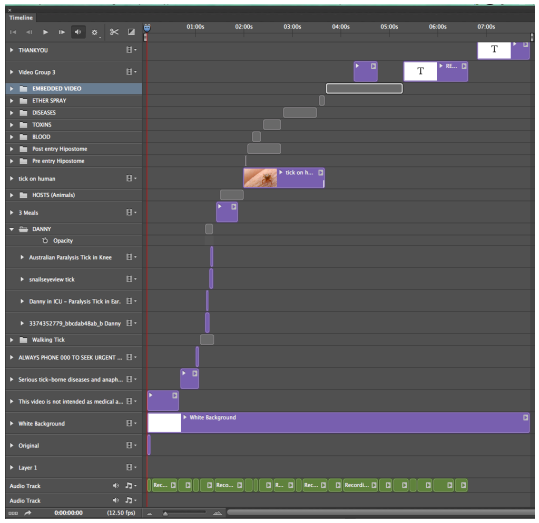
ANIMATION

Photographers often say never work with kids & animals. Doubting a tick would obey my direction I realised animation was a necessary approach for creation of interest, movement and realism. Three techniques were employed to achieve my animation:

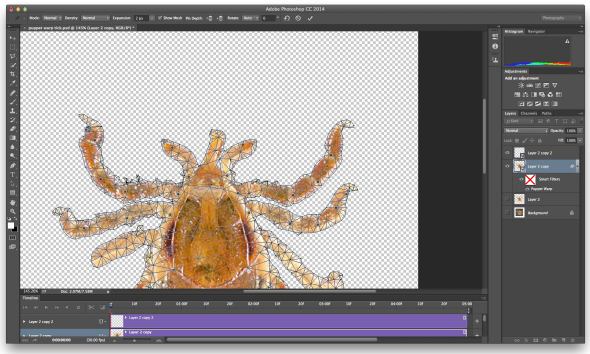
1. Planning to map out positions of image elements
2. Use of Photoshop's animation timeline
3. Use of Photoshop's Puppet Warp tool



Screen guides (blue lines) allow measured and repetitive placement of design elements. This greatly improves efficiency and continuity throughout the production process.



A section of the animation timeline showing various audio files in green. Note flow of assets from bottom left to top right. The process is not complex but best attempted when layers concepts are mastered.



Puppet warp is an incredibly efficient and powerful tool for animating images. This image was 'deep etched' to isolate it from the background and then each leg, and the palps were independently manipulated.

VIDEO

Testing revealed a shakiness of the image due to camera movement. Extreme magnification was the cause of this despite using a quality tripod. Research showed that Premiere Pro has an effect called Warp Stabiliser that analyses footage. If the raw footage is suitable Premiere will output video without the shakiness. This process was used to good effect when processing footage of the tick being treated to the freeze spray.

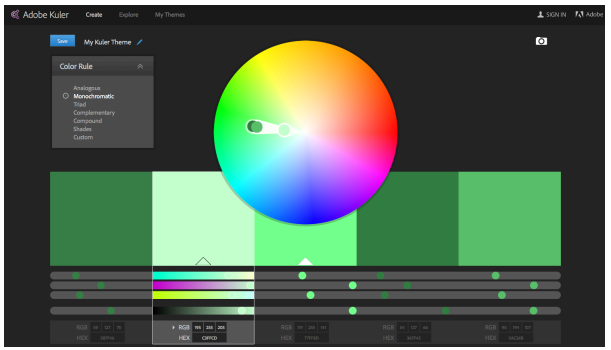
Addressing my limited lighting and need to colour balance video output was achieved using exposure and levels effects.

Pictured is my multi-function ad-hock studio with assistants busy at work. By way of a contra-deal it wasn't necessary to include their wages in the finance plan.

FOLIO DEVELOPMENT

Once the base text colour of green, representing the natural world and the environment of a tick was selected the task was to identify a range of monochromatic RGB colours that would be used as headings and table fills. Adobe Kuler is a website that performs this process (and more).

Using Word heading styles and colour swatches it was a quick process to apply these colour settings.



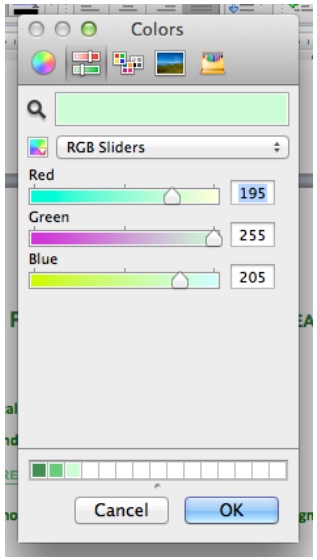
Source: https://kuler.adobe.com/

The monochromatic colour scheme selected was:

HEADING 1 & 2 : RGB 54, 127, 66

HEADING 3 & 4 : 90, 194, 107 (includes evaluations & captions)

COLOUR FILLS : 195, 255, 205



The folio presentation format was considered.

As the submission was to be delivered digitally I chose to use a landscape orientation as it better suited screen reading.

Progressive Evaluation: *Using a landscape format resulted in excessively wide paragraphs and the use of columns would have been desirable. Testing of a 2-column layout proved complicated and I need to improve my skills to realise this for future.*

SECTION 3: PROJECT EVALUATION

Iterative evaluation procedures throughout the design project

Throughout the course of this project I have recorded progressive evaluations reflecting upon analysis of needs, similar designs, research, testing and production processes. This process promoted a continual evaluation and refinement of my approach so that I could approach the necessary criteria for success in a coherent and ordered fashion.

Final analysis and evaluation of the design in relation to the criteria for success

The project proposal, management, development and realisation of my production, and its supporting folio, demonstrate the value of innovation, creativity and enterprise.

The benefit of promoting sustainable health outcomes through use of a multimedia presentation delivered via accessible social media (YouTube) was realised. An analysis and evaluation of the functional and aesthetic criteria for success is presented below.

FUNCTION

Upload and presentation of content on YouTube that conforms a standardised format and can be displayed across a range of devices.

- The video delivers the required format and content across all intended devices

Animation, text, images and audio closely synchronise.

- Feedback confirms this to be the case although some jerkiness is noticed in the rolling text. The major tick feeding animation is well scripted and elements are well syncronised.

Complete presentation must not exceed 10 minutes

- The presentation is 7m 55 seconds being well below my targeted maximum time.

Content must be delivered in an engaging and informative way.

- Several opinions were sought including one from Alana, medical specialist of immunology and parasitology. She described the presentation as an excellent resource for high school students.

Content to reflect current expert opinion on safe tick bite management.

- For reasons verbalised to the unit assessor this was not possible to confirm. I hope to reconcile the situation so as not to waste the effort and value invested in this production.

User comments fields operating as moderated forum

- A tests confirmed comments can be approved and edited where required

Progressive Evaluation: *A scripting error was made in that I should have suggested any patients at risk of anaphylactic shock to seek help at a facility that has resuscitation facilities available. This would probably exclude many doctors' surgeries as recommended in the script. A hospital would be the best option.*

AESTHETICS

The presentation should include screen text to improve accessibility

- Text is legible when static or animated, although not as smooth as intended. This was due to the lower frame rate applied throughout the animation.

The presentation should how a professional authoritative style. There is scope for lightness as this presentation maybe delivered to younger audiences.

- Feedback from ASCIA and TIARA was not possible so this evaluation could not be concluded.

Animation and images are appropriate to message being delivered

- Image selection and timing addressed the message content

Model 'tick' to appear realistic and to size

- Adult tick sizing, proportions and markings were researched and feedback indicated it was quite realistic

Animations and text timed to flow well, free from jerkiness associated with low frame rate.

- Image and text syncronisation was appropriate although some jerkiness as already evaluated was noticed.

Accurate citations and thanks (with approvals) are necessary

- All contributions were acknowledged. Various communications were sent to participants although the final product has not been released. I hope to do this in due course.

Final reflective evaluation

Although my own efforts may never be presented publicly the consequences of this design process might be to spur others parties into action. Hopefully this results in the production of authoritative educational resources as I have attempted to do. In some small way I may have motivated further clinical research into the sustainable management of tick bites in Australia, which will surely be beneficial in promoting sustainable health outcomes for the broader population. This was a thoroughly interesting and challenging project. I am grateful for the opportunity to develop my skills and knowledge gained in the course of completing it.

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Centers for Disease Control and Prevention. (2011). *The Health Communicator's Social Media Toolkit*. Retrieved from http://www.cdc.gov/socialmedia/tools/guidelines/pdf/socialmediatoolkit_bm.pdf

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Images referenced within multimedia project

Lab "Danny in ICU"
http://bit.ly/1plwBJG

Bandicoot
http://bit.ly/1plwEFx

Dingo
http://bit.ly/1plwG08

Wallaby
http://bit.ly/1plwyh9

Koala

http://bit.ly/1u6NbF7

rodent

http://bit.ly/1u6N9gm

Possum

http://bit.ly/1u6N6kw

Kookburra

http://bit.ly/1u6N2kZ

Fruit Bat

http://bit.ly/1plwqhE

Sand Goanna

http://bit.ly/1plwrlL

Cattle

http://bit.ly/1plwk9K

Tick on skin

http://bit.ly/1plwe1Q

Tick in skin (knee)

http://snailseyeview.blogspot.com.au/2013_09_01_archive.html

TAGS – Tick Alert Site. Dead website (as at 20/9/14)

http://www.tickalert.org.au/

Tick Removal Images

http://gophoto.us/key/Tick%20Removal

LINKS moderated to the comments section on Youtube resource

Perhaps the most comprehensive compilation of general tick information I have yet found. An excellent resource for all. Navigate via Learn/Publications/Ticks

http://www.aabr.org.au/

Tick Induced Allergies Research & Awareness

http://www.tiara.org.au/

Australasian Society of Clinical Immunology and Allergy

http://www.allergy.org.au/patients/insect-allergy-bites-and-stings/tick-allergy

Allergy & Anaphylaxis Australia

http://www.allergyfacts.org.au/

Dr Sheryl van Nunen in conversation with Margaret Throsby. Very current, informative and important information.

http://mpegmedia.abc.net.au/classic/midday/201403/miv-2014-03-20.mp3

Sydney University Department of Medical Entomology

http://medent.usyd.edu.au/fact/ticks.htm

University of Virginia (Mammalian Meat Allergy)

http://allergytomeat.wordpress.com/

CSIRO Publication on Tickborne Diseases

http://www.publish.csiro.au/?act=view_file&file_id=NB11025.pdf

Lyme Disease Association of Australia

http://www.lymedisease.org.au/

Karl McManus Foundation

http://www.karlmcmanusfoundation.org.au/lyme-information/ticks-in-australia

(Comprehensive research links within this doc)

https://sites.google.com/site/ticktransmitteddiseasesaust

Interesting comments of tick removal

http://www.lowchensaustralia.com/pests/paralysis-tick/removal-and-treatment.htm#killing