Producing educational films that activate the emotions known to support learning

A thesis to meet the requirements of the Master of Philosophy

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20th July 2016

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ABSTRACT

Vocational educators often use a variety of online educational films to engage learners in an attempt to reduce boredom - a precursor to student attrition (Cuseo, 2012). While there are numerous educational films available on sites such as YouTube and Vimeo, production values vary greatly. Importantly for educators and filmmakers, new questions need to be asked about educational films: do they activate those emotions known or believed to support learning? Do filmmakers understand whether using cinematic techniques to activate the emotions of enjoyment, anger, frustration, boredom or relaxation actually support a subject or course's learning outcomes?

These questions led me on a journey where I was introduced to the field of Academic Emotions (Pekrun, Goetz, Titz & Perry, 2002). I came to understand the immediate importance of academic emotions to the craft of filmmaking and their power to either engage or disengage adult learners. Few filmmakers and educators know about the field of academic emotions and how it can be leveraged to produce educational films that emotionally support learning. To help educational filmmakers—like myself—assess what academic emotions educational productions activate in adult learners, I created a self-report wheel called the Wheel of Academic Emotions (WAE). The WAE draws upon the emotional categories of Pekruns et al. (2002) Academic Emotions and Filmic emotions (Smith,1999). After successfully piloting the paper prototype, I then created an online version and named it the WAE app, which was tested quantitatively with a sample of 12 vocational learners for usability and accuracy. A sample of four educational filmmakers also used the WAE app and participated in qualitative interviews to determine if it could be used in their own film production workflows. The WAE app worked as designed with adult learners. Educational filmmakers also reported they were keen to use the WAE app to evaluate and edit their productions to understand if their use of cinematic techniques activated the academic emotions believed to support learning.

These findings and my experience as an educational filmmaker working to activate academic emotions in my own film production workflows led to the creation of an updated version of the original paper and digital prototypes. Critically, both now contain the positive emotion of Awe, a complex emotion that educational filmmakers can activate by using one or more of the five elements of film, such as incredible stories, scenes of great beauty and music. The updated digital app is aptly named the AWE app, I argue that it can play an important role in assisting filmmakers in self-assessing and previewing their educational films with diverse cohorts of learners in our present network economy where augmented and virtual reality (VR) films will likely play a central role in future learning. The AWE app provides educators and educational filmmakers, teachers and students with a novel and easy-to-use tool to critically assess the capacity of their educational and edutainment productions to activate those academic emotions believed to support learning. Moreover, the AWE app is versatile and can be used to assess not only educational films and augmented and virtual reality learning content, but also the propensity of other multimedia content to activate academic emotions or the emotions believed to support learning.

ACKNOWLEDGEMENTS

My thanks go to Professor Chris Walsh, my supervisor for his wonderful support and fantastic encouragement. Thanks also to my fellow research students Louise Townsin and Heather Allanson for listening to my ideas and sharing this journey. This research could not have happened without the support of the inaugural vice-chancellor of Torrens University, Fred McDougall and his team. To all of those in front of my camera during the conceptualisation of this thank you. To my family, Sue, William and Edward thank you for your extra support over the final leg.

PUBLISHED PAPER AND CONFERENCE PRESENTATIONS ARISING FROM THIS RESEARCH

Peer reviewed paper

Hall, S. J, & Walsh, C. S. (2015, December). *Using digital technologies to activate and evaluate emotions to creatively communicate ideas*. Paper presented at the Australian Association for Research in Education Conference, Fremantle, Australia.

Conference presentations - Abstract refereed

Hall, S. J. (2014, December*) Can the use of film reduce the alarming rate of learner attrition in online education?* Presentation to the Australian Association for Research in Education conference, Queensland University of Technology, Brisbane.

Hall, S. J. (2015, September) *A new tool to improve educational films in MOOC's* presentation to the Higher Education Research Group Adelaide conference, Adelaide University, Adelaide.

Hall, S. J, & Walsh, C. S. (2015, December) *Using Digital Technologies to Activate and Evaluate Emotions to Creatively Communicate Ideas,* Presentation to the Australian Association for Research in Education conference, Notre-Dame University, Fremantle.

Future presentation – Abstract accepted

Hall, S. J, & Walsh, C. S. (2016, December) *The Academic Wheel of Emotions (AWE),* Future presentation to the Australian Association for Research in Education conference, MCG, Melbourne.

Future paper

Hall, S. J, & Walsh, C. S. (2016, December). AWE inspiring educational productions: Fostering learning through digital media. *Journal of Educational Technology & Society.*

DEFINITIONS

Academic emotions. The emotions that occur before, during and after studying. Pekrun, Goetz, Titz, & Perry (2002) describes these emotions as being; enjoyment, hope, pride, relief, anger, anxiety, shame, hopelessness and boredom. Pekrun et al. (2002) also determined that certain academic emotions can support learning while others do not.

Activity emotions. Specific emotions that occur during studying. Pekrun et al. (2002) describe four broad categories of Enjoyment, Boredom, Anger / Frustration and Relaxation. Each category is comprised of a number of similar academic emotions. For instance, the broad activity emotion of enjoyment contains the academic emotions of hope, pride and also enjoyment.

App. A software program written to run on a digital device such as computer, tablet or mobile phone.

Australian Quality Training Framework (AQTF). The Australian Quality Training Framework (AQTF) is the national set of standards which assures nationally consistent, high-quality training and assessment services for the clients of Australia's vocational education and training system.

Australian Qualifications Framework (AQF). The Australian Qualifications Framework (AQF) is the national policy for regulated qualifications in Australian education and training. It incorporates the qualifications from each education and training sector into a single comprehensive national qualifications framework.

Cinematography. How a camera is used to help tell the story of the film. This includes different shot types such as close-up, medium and wide shots. How the camera is moved such a pan shot where a camera is swung horizontally across a scene. Tilting, where the camera is tilted vertically from low to high or high to low. There are a number of camera movements such as dollying where the camera is physically moved closer or further away from a scene/actor. These movements can also be combined. Additionally, how images are lit and coloured is also part of Cinematography.

Edu-tainment. An entertaining educational film written using curriculum/learning outcomes as a base for scenarios and character development (De Fossard, 2008).

Educational films. Films or videos that are produced using film techniques and whose purpose is to educate audiences.

Emotion. A multifaceted phenomenon involving sets of coordinated psychological processes, including affective, cognitive, physiological, motivational and expressive components (Kleinginna & Kleinginna, 1981).

Emotional state. The state of a person's emotions can be a combination of emotion and a mood. For instance, Joe was in a happy state (Kleinginna & Kleinginna, 1981).

Film. A series of still images edited together to tell a story. Films nowadays use digital video cameras to capture images.

Film techniques – the five formal elements of film.

There are five elements of film which are called film techniques and comprise:

- *Cinematography* includes how the camera is used to frame the subject, for instance, different shot types – wide, medium and close-ups. Also, how the subjects are lit for the camera.
- *Mise-én-scene* what is in front of the camera lens, the sets, locations, actors and costumes.
- *Sound* which includes sound effects called Foley and music and that is used to enhance the story by encouraging emotional responses in audiences.
- *Narrative* the story of the film, which can follow a story arc such as a hero overcoming a problem.
- *Editing* how the story is told by ordering different shots/scenes together.

Filmic emotions. A set of emotions that films can activate in audiences, anger; fear; disgust; sadness; amusement; tenderness and a neutral state (Smith, 1999).

Mood. A longer term feeling similar to an emotion, differing by being less intense. Moods can be negative and positive. (Kleinginna & Kleinginna, 1981)

Registered training organisations (RTO's). A registered training organisation is a vocational education and training organisation registered by a state or territory registering body in accordance with the Australian Quality Training Framework (AQTF) Essential Standards for Registration within a defined scope of registration – Qualifications they can deliver.

Unit code. A unique identifier for an accredited unit that is a single component of a qualification, or a stand-alone unit that has been accredited by the same process as for a whole AQF qualification. In Australia, an accredited unit may be called a 'module', 'subject', 'unit of competency' or 'unit'.

Vocational film. A video of a simulated or real workplace. Sometimes containing a workplace scenario where a workplace skill is demonstrated.

Windowing. Where two or more web-browser windows are open and simultaneously viewable on the same screen.

ACRONYMS

AEQ	Academic Emotions Questionnaire.
AARE	Australian Academic Research in Education.
AR	Augmented Reality.
AWE	Updated version of the WAE - Academic Wheel of Emotions.
AWE app	Updated version of the WAE app.
BBC	British Broadcasting Corporation.
CSV	Comma Separated Value.
DIISRTE	Department of Industry, Innovation, Science, Research and Tertiary Education.
HDR	Higher Degree by Research.
HERGA	Higher Education Research Group Adelaide.
LMS	Learning Management System.
MOOC	Massive Open Online Course.
NCVER	National Centre for Vocational Education Research.
OU	Open University.
TAFE	Technical and Further Education.
VET	Vocational Education and Training.
VR	Virtual Reality.
WAE	Wheel of Academic Emotions.
WAE app	Online version of the WAE automating data collection and reporting**.**

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CHAPTER ONE – INTRODUCTION TO THE RESEARCH STUDY

1.0 Introduction

Personal frustrations are the drivers of this research study. This frustration emerged working as an online vocational educator and listening to the complaints received from learners about the 'boring' text-based learning content. Vocational learning does not have to be this way. Tired of observing first-hand, online learning resources that are little more than scanned training manuals required to read on a screen and learner interaction little more than a text-based threaded message board. I asked myself, what can I do differently in the vocational sector to produce engaging online content, particularly film? This question led me to update the media skills acquired in my youth and to become an educational filmmaker who works and aims to produce engaging vocational films to deliver vocational content vital to adult learners.

In 2007, I started producing educational films targeted at the vocational sector as a replacement for the online texts that adult learners identified as being boring. I had remembered from my television days, as a young bit-part actor, the ability of film and television to engage audiences. I intended to use this ability to make engaging educational films that would not bore learners. However, my frustration continued because I could not understand why some of my educational films that used film techniques to engage learners by activating their emotions did not work as learning content, while others did.

For instance, my Australian educational film *First Aid* (Hall & Press, 2013) based on the learning outcomes of the vocational unit *Provide First Aid* – Unit code HLTFA311A, was not a success. With few sales to Australian RTO's for use as online learning content, however, it has achieved some success as an online Udemy course where individuals purchase learning content. The film illustrates graphically, the triggers of a heart attack, the subsequent heart attack and the actions need to be taken to save the life of the victim. *First Aid* had high production values – technical competence, credible actors, multiple scenes/storylines and employed cinematic camera movements with a dramatic music score. The feedback from potential purchasers - vocational learning managers, was the film was 'too strong', resulting in a lack of sales. This was a big contrast to my previous educational film, *Responsible Service of Alcohol* (Hall, 2014) – Unit code SITHFAB009A, which also starred credible actors, used music and a storyline though lacked the high-quality production values of *First Aid*. *Responsible Service of Alcohol* was, and still is very successful. It is currently widely used as online learning content for those undertaking studies in hospitality in Australia.

I could not understand why *First Aid* was not a success. Prior to embarking on this study, I did not understand there was a relationship between different emotions that can be activated in a learner when they are viewing an educational film. Nor did I understand this could potentially impact the potential success of an educational film. There appeared to be something missing from my training

as a filmmaker, something missing from my understanding of adult learning and andragogy. This study was initiated to address this frustrating 'gap' by exploring how film techniques can be used to activate emotions in educational films. Moreover, this gap in my knowledge drove me to conceptualise, design and pilot a new tool to assist filmmakers, like myself, in identifying the emotions that learners experience, through self-reporting when viewing an educational film. A goal of this study is to investigate whether this tools works and understand if filmmakers believe it might be useful to successfully produce educational films.

This chapter introduces the background of educational films and the emotions learners experience when engaged in learning. These emotions are known as *academic emotions* (Pekrun, Goetz, Titz, & Perry, 2002) or the emotions believed to either support or not support learning. I then present the research context, theoretical location of the research, my experiential knowledge and the problem the research study aims to address. This chapter concludes by describing the significance of this research for educational filmmakers, the goal of the research and the content of subsequent chapters.

1.1. Background and research topic

This study aims to investigate whether a self-report tool I designed, the Wheel of Academic Emotions (WAE) and its online version the WAE app assists viewers in self-reporting their emotions when watching an educational film. To design this tool required me to learn about the emotions learners experience when engaged in learning. Without this understanding, filmmakers, like myself, will likely not understand how to use their craft—or film techniques—to activate similar emotions in their production of educational films. The relationship between emotions and learning is complex and informed by the relatively new field of academic emotions first introduced by Reinhard Pekrun in 1992. The seminal work entitled, *Impact of Emotions on Learning and Achievement: Towards a theory of cognitive/motivational mediators* (Pekrun, 1992) helped me understand there is an entire field of knowledge around activating emotions that either support or do not support learning.

Academic emotions include the emotions that learners experience during the act of studying or learning and comprise the broad emotional categories of enjoyment, relaxation, anger/frustration and boredom. Pekrun, Goetz, Titz, & Perry, (2002) suggests that in certain circumstances these academic emotions can either support or not support learning. From a filmmaker's perspective, similar to my own, films are produced to encourage an emotional reaction or response from audiences (Smith, 1999). Thus, my study aimed to apply the relatively new field of academic emotions to design an online tool I have called the WAE app that viewers can use to self-report the emotions that a film activates as they view it. More importantly, it also aimed to understand if the scale of academic emotions I have included in the WAE app will provide educational filmmakers with a viable means to test what academic emotions their films do/do not activate in learners. The ultimate goal was to test and refine the tool so that it is stand alone and can be used industry wide to improve the

production and impact of educational films as well other digital media. It is anticipated the WAE app will provide educational filmmakers with a better understanding of the academic emotions their film techniques activate and enable them to create productions, which are not only engaging but which also emotionally support learning.

1.2. Research environment and context

The environment for this study is the Australian Vocational Education and Training (VET) sector. Vocational training focuses on preparing learners to become productive members of society by providing them with workplace hard and soft skills. TAFE colleges and private organisations deliver training programs often using online learning as a method of delivering training programs. In 2013, the annual survey of RTO's by the NCVER reported 88% of RTOs using online learning technologies in one form or another (NCVER, 2013). The profile of VET learners shows them to be adults, typically between 25 and 50 years of age (Moore & Kearsley, 2005). The context of this study are the educational and edu-tainment films/videos that are used in VET courses as learning content.

1.3. Theoretical location of the research

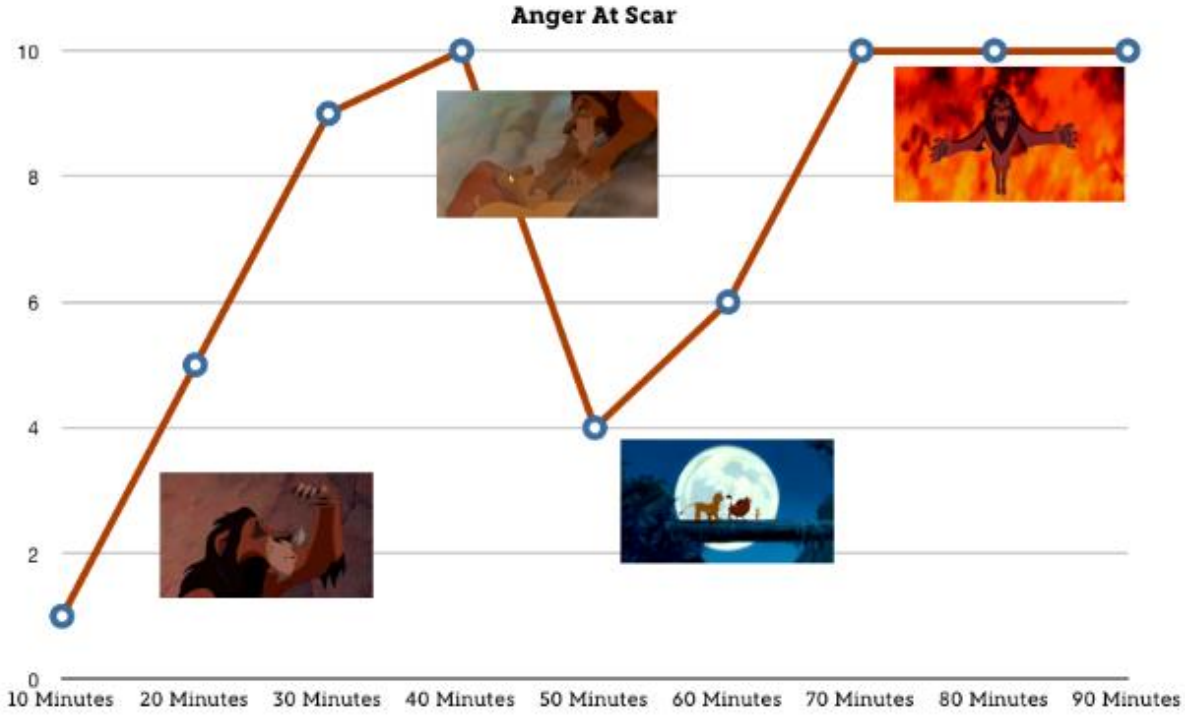
There are two academic fields that primarily inform this research study: film theory (Bordwell & Thompson, 1997) and academic emotions (Pekrun, Goetz, Titz, & Perry, 2002). Film theory includes the use of film techniques - the five elements of film to activate emotions in viewers: narration; cinematography; sound; mise'-en-scene or what is what is in front of the lens; and editing (Plantinga & Smith, 1999). Using these techniques to suspend audiences' belief when viewing films (Hopkins, 2010) allows the filmmaker to take viewers on an emotional journey (Sankey, Birch, & Gardiner, 2010). The second field is academic emotions—not yet applied to the production of films—specifically academic emotions those emotions that can, in certain circumstances, either support or not support learning (Pekrun et al., 2002). These two diverse fields provide the theoretical backdrop to support the study.

1.4. The use of emotional content in film

Filmmakers' use emotional content to keep their audiences engaged while they take them on an emotional journey to better enable them to follow and relate to the characters in the story (Smith, 1999; Plantinga & Smith, 1999). The techniques the filmmakers use to invite an emotional response are taught in film schools (Zeke, 2014) and relate to the use of cinematography, what is in front of the camera - misé-en-scene (Redmond, 2015), sound (Cohen, 2001; Douek, 2013) narrative stories (Dates, Mountain, & Movies, 2010), and editing (Smith, 2005). Each of these film techniques singularly or combined 'invites' a viewer to feel an emotion (Plantinga & Smith, 1999). Emotions activated in audiences can be plotted during the viewing of a film. For example Figure 1 shows a

temporal plot of the emotion of anger that the character of Scar activates in viewers of the film *The Lion King* (Allers, Minkoff, & Walt Disney Feature Animation, 1994).

Figure 1: The emotion of anger activated in viewers of The Lion King



However, the emotions that filmmakers activate in audiences when watching a film—like anger—for entertainment can be problematic when used in a learning context. For instance, producing a scene that invites audiences to feel anger, terror or great anxiety, when used in an educational film will not actively support learning (Ruthig, Perry, Hladkyj, Hall, Pekrun, & Chipperfield, (2008). As a consequence, the objective of the educational film, which is to provide a learning experience, is usually not achieved. This illustrates why it is important to explore the differences between the emotions that audiences are invited to feel when viewing a film as entertainment and the emotions they are invited to feel when viewing a film for learning.

1.5. Emotions and learning

The relationship between emotions and learning is complex. According to neuroscientists, emotions are regulated by the limbic area of the brain and act as a gatekeeper to long-term memory (Sylwester, 2015), which cognitive psychologists see as unlimited (Sweller, 1994). It is in this area of the brain where meaning and learning is stored (Moreno & Mayer, 1999). Emotions are part of learning (Mello et al., 2005). Simulations of learning events encourage learning because learners link any emotional scenes in the simulations to the real world task (Thayer, 1989). Emotions have an effect on memory, cognition and learning. For example, positive emotions are associated with better recall in older

people. This is also known as the positivity effect (Dolcos, Wang, & Mather, 2014), where an individual's cognition is the "broadening of attention and reliance on gist or heuristics" (Kaplan, Ilse, Van Damme & Levine, 2015, p. 89) and supporting their learning (Pekrun & Linnenbrink-Garcia, 2012). Negative emotions associated with a narrow focus are referred to as memory-narrowing, where peripheral messages are ignored in favour of a central message (Kaplan, Ilse, Van Damme & Levine, 2015). The negative emotions of frustration and anger are also associated with supporting learning (Pekrun & Linnenbrink-Garcia, 2012), however, they can become too much for learners and result in them being 'turned off' (Wang & Cheong, 2006). This is perhaps why my film First Aid was not successful. At the time, I did not understand the complex relationship between emotions and learning and possibly went too far in activating negative emotions.

1.6. Personal motivation for the study

The relevant experience I bring to this research is both as an educational filmmaker and adult educator. The educational films I produce are targeted at adult learners and are used by a number of online training providers in the VET sector and universities in the higher education sector. I am also a qualified and experienced adult educator with experience of conducting adult learning as a face-to-face, blended and online facilitator. My values include a strong belief in the efficacy of educational films as learning content, especially for those adult learners returning to vocational education who might lack literacy and numeracy skills. My personal epistemology is that of an educational storyteller, telling stories through the mediums of films and voice, a constructivist whose 'life' role is to help guide the meaning-making process (Jonassen, Peck, & Wilson, 1999). My experiential background provides me with a unique insight into using emotional content in educational films produced for adult vocational learners, and this motivated me to design this study.

1.7. Problem statement

Boredom is a major issue for online education, with learning content often produced that is boring and not relevant (Bonk & Khoo, 2014). Content that does not engage learners often encourages them discontinue their studies (Macfadyen & Dawson, 2010; Martinez, 2001; Park & Choi, 2009). The problem of learner attrition is highlighted by the attrition rates of occurring in the adult-centric VET sector, where 63% of VET learners dropped out in 2012 (NCVER, 2013). The recent phenomenon of Massive Online Open Courses (MOOCs) also suffer high attrition rates despite using video as a strategy to engage their learners, with over 94% of MOOC enrollments not completing (Jordan, 2015). New Zealand researchers, who investigated the high levels of online attrition, find a cause is 'boredom' leading to disengagement of students (Bonk & Khoo, 2014).

Academic boredom is where learners are bored and not stimulated. Moreover, boredom is associated with lack of control and a lack of valuing achievement activities in learning (Pekrun, Frenzel, Goetz,

& Perry, 2007). The impact of boredom is lower achievement in learning and lack of attention to learning messages. Leading to learners attempting to 'escape' from the boring situation by dropping out of courses (Pekrun & Linnenbrink-Garcia, 2012). I believe educational films can combat this inherent boredom and motivate learners (Fischoff, 1997; Grant, 2011; Till, Herberth, Sonneck, Vitouch, & Niederkrotenthaler, 2013) to continue their studies rather than drop out. But filmmakers, like myself, need to better understand academic emotions and whether our productions activate those emotions that support learning. However, without a knowledge of the emotions that learners experience, filmmakers may continue to produce educational films that are boring or worse yet, use the wrong emotional content and actively discourage learning (Liang & Jin, 2011; Wang & Cheong, 2006).

There is limited literature that describes the use of film to activate emotions for learning contexts despite content producers constantly being told to use emotions in their content (Pappas, 2014). The problems this study aims to address are to firstly understand how to improve the production of educational films—drawing on film theory and academic emotions—so that film producers, like myself, have a tool and can assess the extent to which our productions activate the emotions we aim to activate to not only support the learning of content, but also keep vocational students engaged and motivated to learn. If this is possible, then educational films stand a better chance of reducing attrition rates in the VET sector, but that lofty goal is well beyond the scope of this study. Moreover, secondly to determine if the app I created as part of this study, the WAE app functions as designed.

1.8. Significance statement

This research can impact positively on the practice of educational filmmakers, providing them with a tool to measure whether the emotions they intend to activate in audiences through their educational films are the emotions viewers feel, through self-reporting using the tool, when they watch the film. If the tool works well, then it is also possible that adult learners will benefit from not being bored in their VET classes because their learning content is more engaging. Furthermore, the tool can be used to assess a variety of other digital learning content (digital media, animations, presentations or even performances) or used by VET learners themselves or other students when producing films or other digital or live content that intends to activate emotional responses. Moreover, the tool has potential use as a pedagogical tool to help primary and secondary students discover academic emotions and their emotional responses to learning material.

1.9. Research goal

The primary goal of this study is to investigate if the WAE app I designed, works for audiences to self-report their emotions when viewing educational films accurately. A second goal is to understand

filmmakers' views about the usefulness of the WAE app in the production process of educational films.

1.10. Organisation statement

This chapter has introduced the study, its background, topic area and the major theories informing the study. The problem the study is designed to address and its significance has been discussed along with the researcher's experiential background and the research goal that the study seeks to achieve. The next chapter reviews the current literature surrounding the topic area, drawing together and analysing theory from this literature to form the argument of the study. Chapter 3 introduces the methodology to provide evidence to answer the research questions arising from the literature reviewed. Also, in this chapter I describe the construction of the WAE app which is a new bespoke digital self-report tool designed for this study. The answers to the research questions are provided in Chapter 4. Chapter 5 contains a discussion of issues emerging from this research, the possible impacts of this research for educational filmmakers, VET educators, students and teachers. I then present the rationale for an updated design I have called the AWE app. I conclude this study by remarking on the use of these apps in my practice and point forward to their use in virtual reality (VR) learning environments.

CHAPTER TWO – LITERATURE REVIEW

2.0 Introduction

This literature review chapter explores the historical and theoretical context of educational films, the use of educational films in the vocational education and training sector and how filmmakers use film techniques to influence emotions. I also review how emotions are identified and measured from two points of view, those emotions activated in audiences by films (Plantinga & Smith, 1999) and those experienced by learners that can be classified as supporting or not supporting learning (Pekrun et al., 2002). I then review learning and instructional theories relevant to educational films and online instructional environments that use educational films as learning content. I delve deeper and detail theories of learner motivation and engagement. This chapter concludes with the research questions that arose from this literature review.

2.1. Educational films the early days

Educational films have been produced since the birth of cinema and have a rich history. One of the most famous early screenings of film took place at the Grand Café in Paris. Ten films produced by the early cinematographers Louis and Auguste Lumiére were shown, including a film called *Le Repas de Bébé* (Lumiere, 1895). It could be argued that this film was an educational production, which used camera framing to help focus the audience's attention, thereby illustrating a Victorian societal view of how to correctly feed a small child.

> The film invites us to zero in on the emotional and cultural meanings encoded in the spectacle of the baby eating. This focus is encouraged by the camera, which centers directly on the baby, framed by an attentive parent on either side. (Adams, 2011, p.1)

Eighteen years later in 1913, Thomas Edison, an early pioneer of cinema, declared "Books will soon be obsolete in schools … It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in the next ten years" (Reiser, 2001, p.55). Shortly after Edison declared this future educational vision, World War I began followed by the Great Depression. As a result, there was simply less money available to make films as more pressing societal issues took centre stage. F. Dean McCluskey a leader in the field of what was called, at the time, 'visual instruction' complained in 1930 of adverse market conditions including industry losses of $50 million that basically halted the production of educational films for nearly two decades. The industry did not grow which subsequently rendered Edison's vision impossible, at least within schools (Reiser, 2001).

However, the field of educational films continued to evolve as a result of reporting the news in cinemas during the 1930s and 1940s. Many of these films were influenced by the work of Hoban,

Hoban and Zissman (1937) who argued in their 1937 textbook *Visualising the Curriculum*, that the value of audio-visual material was a function of their degree of realism (Reiser, 2001). Two years later the commencement of World War II witnessed a resurgence in the use of educational films. It could be argued that World War II was also an educational battle when it came to films with both sides using films to train combatants in the most efficacious manner. Adolf Hitler, the leader of the Nazi Party, demonstrated his support for educational films when asked about his most important new weapon in 1939, he answered "My 60,000 motion picture projectors" (McKown, 1945, p. 7). The Americans and British invested heavily in educational film production facilities, hiring skilled directors to produce training films for combatants. After the Americans and their allies defeated the Nazis in World War II, the defeated German Chief of Staff William Keitel remarked "We had everything calculated perfectly except the speed that America was able to train its people. Our major miscalculation was in understanding their quick and complete mastery of film education" (McKown, 1949, p.7). The successful wartime use of film education led to pressure on educationalists to use the "G.I. Way" (p. 7) of learning in schools (Olsen & Bass, 1982), which led to the heydey of 16mm educational films from the 1930s through to the 1980s (Ivestor, 2007).

2.2. Educational films in schools

Educational films were used extensively in schools from and produced for a variety of pedagogical purposes. Alexander (2010) describes his experience as both a school child, where he classified their viewing as schoolwork "warily filling out mimeographed – stencil duplicated, works sheets with one eye as we attempted to view the film with the other" (p.6). Moreover, as a Teacher appreciating the filmmakers craft of cinematic storytelling. "The cinematic treatments given academic (educational) films by their creators are often remarkable…their talent was in the art of telling a story in a period short enough to allow for classroom discussion afterwards, often in just 20 to 30 minutes" (p.5). The topics of the films included: science films to "show us the colorful, fascinating world of micro-organisms found in a drop of lake water"; literature films aimed at making "Shakespeare a little more accessible"; and social studies films that "instilled in us the desire to build and maintain a racially diverse and integrated society" (Alexander, 2010, p.6). The US government also started using educational films as a tool for social engineering. During the period between 1945 and 1970 a genré of films were produced by Coronet Films designed to affect the behaviour of US school children. Smith (1999) describes these films as "A uniquely American social experiment in social engineering…where teens who did not fit in were portrayed as deviant and deeply troubled, often ending up in tears or worse" (Smith 1999, p. 45). These 'mental hygiene' films included the *Do's and Don'ts of Dating* (Coronet Instructional Films, 1949), a graphical film about venereal disease warning against promiscuity and *Highways of Agony* (Highway Safety Foundation, 1969), an equally graphical film about the risks of driving too fast. Another significant influence was a film's distribution channel or how they successfully reached their audiences. The television revolution,

discussed below, provided a new distribution channel that could potentially reach entire populations without the limitations of 16mm film distribution that required viewers to be at a certain location (e.g cinema or school) to view the film.

During the 1960s, American teachers often required students to watch network produced documentaries as learning content, to provide perspectives on current affairs and history (Alexander, 2010). Alexander (2010) argues the use of television in schools was "one of the harbingers of the end of the academic film business" (p. 125). Due to the inability of the educational film industry, which was comprised of many smaller companies, who were unable to meet the needs of the large broadcasters (Ivestor, 2002). While documentaries are not educational films, television networks did produce a number of 'themed' documentaries, which were enhanced with film techniques – arguably educational films. William Bluem made the following observation about this type of documentary, "The poetic power of words, pictures, and music is combined with the aesthetic of cinema structures and the dramaturgical form itself to shape the documents or reality into thematic expressions of the human condition" (Bluem, 1965, p. 144).

In the 1970s, the demise of educational films was at hand due to commercial pressures on American television networks, long-form and themed documentaries falling out of favour with general audiences preferring 'magazine' type productions and competition from funded overseas productions (Alexander, 2010). Standout educational films from overseas producers were the BBC educational films of the 1970s included *The Ascent of Man* (BBC, 1973) written and hosted by Jacob Bronowski which represented a landmark in documenting the exploration of science in the cinema (Alexander, 2010, p134). Bronowski's (BBC, 1973) film shows the evolution of mankind from proto-ape to modern human, and how science influenced the development of human society. The educational film *Civilisation* (BBC, 1969) by the ex-director of the British Museum, Kenneth Clark described the rise of European culture following the fall of the Roman Empire. And *America* (BBC, 1972) by the commentator Alistair Cooke, described his view of the historical and cultural elements of the United States. Australian educational films produced by Film Australia included those examining the cultural history of China, Japan and Russia (Alexander, 2010). These productions highlight the concentration of educational films in a small number of large organisations, drawing to a close the educational film industry that used to comprise of many smaller production companies (Ivestor, 2002).

During the 1980s, the new technology of video cassette recorders (VCRs) disrupted the manner in which educational films and television programs were shown to school students. Prior to VCRs schools maintained 16mm film libraries, with newly released films distributed as a 16mm print of the original. Educational television productions produced by the commercial television stations were also sent to the school libraries (Alexander, 2010). VCRs provided clear advantages over 16mm film in terms of flexibility, for instance, "teachers could record educational programs and movies to share

with their students" (Perry & Houston, 2013, p.5) without waiting for films to be distributed and while the technical quality of the video was inferior to film, video did not lose its colour or suffer from physical degradation (Alexander, 2010). The use of VCRs increased the use of film and television content in school classrooms, teachers using taped programs extensively, with the use of VCR being viewed as having great potential teaching benefits "because students live in a media orientated world, they consider sight and sound as 'user friendly' (Kortner, 1999, p.2). However, while video and film from various sources was being used as learning content shown on VCRs, 16mm educational films were left neglected in libraries and replacement footage for damaged films was often not available (Alexander, 2010). Educational films targeted as learning content for schools has a rich history. However, rapid technological change and societal preferences led to the demise of the génre of educational films in school settings.

2.3. Educational films and the Open University

One of the most significant global players in the history of educational films and television was the UK's Open University (OU). The OU's television channel in collaboration with the BBC produced over 3,000 productions many of them educational films during the period 1970 to 1987. The programs catered for its open and distance education students (Bates, 1988). The University arose from an outline of a 'University of the Air' written by former United Kingdom Prime Minster Harold Wilson to include people from lower socio-economic groups into university education (Kirkwood, 1990). During the 1970s, the University's lectures and educational films were shown on BBC2 – the second BBC channel, and broadcast on radio. The broadcast schedule was dictated by the BBC, and OU productions were usually shown during the middle of the night. A snapshot of the OU's catalogue in 1978 – Table 1, gives an insight into the breadth and importance of its film collection and supports the OU's claim of an 'unparalleled resource collection', which was available in over 40 countries and also distributed by 16mm reels (Shepard, 1978).

Table 1:

The number and categories of the Open Universities films in 1978. (Shephard, 1978)

Discipline	***No. of Films***	***Discipline***	***No. of Films***
Arts	230	Mathematics	220
Social Science	280	Science	230
Education	130	Technology	210

The OU success as a producer of educational films in partnership with the BBC during the 1970s and the transitioning of educational films from 16mm film format to delivery via dedicated broadcast channels was a precursor to the largest challenge to the génre, that of online learning.

2.4. Australian distance education and the Internet

Before the introduction of the Internet in 1971, Australia already had a rich history of distance education. Correspondence courses for secondary students began in 1909 in Victoria after a reliable postal service was established (Stacey & Thompson, 1996). In 1951, the 'school of the air' provided radio lessons to outback school students from Kalgoorlie in Western Australia to Longreach in Queensland (Macdonald, 2013). By 1977 state governments encouraged Universities to be responsible for higher distance education with a lead University appointed in each state including; Deakin in Victoria, The University of Queensland, Macquarie in New South Wales and Murdoch University in Western Australia (Holmes 1977, cited by Stacey, 2005). However, while the Australia did establish an Internet academic network called the Australian Academic and Research Network (AARNET) "on the night of June 23, 1989 Robert Elz of the University of Melbourne and Torben Nielsen of the University of Hawaii completed the connection work that brought the Internet to Australia." Korporaal (2009, p.7). Australian universities were not quick to provide online courses. A report by Global Alliance in 1977 highlights, "the paucity of online delivery in Australia was implicitly demonstrated by an analysis of the University websites. Of 33 institutions with a Web site (a few did not have a website!), only seven used it to deliver courses" (Groves, 1999, p.23). However, this lack of online delivery was perhaps symptomatic of the limited Australian Internet infrastructure with students forced to use "poor rural telephone lines to link to their online course" (Stacey, 2005, p257). The introduction of the Internet disrupted distance education changing it away from a postal-based communication to an online learning paradigm despite the often poor quality of Internet connections.

2.5. Online learning and educational films

The adoption of online learning using the text-based Internet in 1981 brought further change to the fortunes of educational films. The first large-scale online courses, which contained educational films as learning content were offered by the OU in 1981 (Harasim, 2000). OU students requested via email a 'video-cassette' of an educational film that was sent out by mail. As computer technology improved educational films were sent out on 'floppy discs'. By the 1990s, computer technology was being used a learning platform by the OU with the development of a '*virtual campus'* with educational films sent out via mail on DVDs. The OU in 2015 still sends out DVD's to students who live in locations that do not have access to sufficient bandwidth to watch educational films online. Until 2006, the ability to use educational films was hampered by the inability of the Internet to stream high-bandwidth media. This changed in November of that year with the founding of the video sharing site '*Youtube'* which allowed educational films to be shared (Cloud, 2006), embedded and streamed online across a diversity of learning sites.

The Internet now abounds with online programs and courses with embedded educational films to cater for casual, professional, vocational, school-based and academic learners. Educational content is delivered using video and film from casual Youtube videos such as *How to open tin can without using a can opener* (CrazyRussianHacker, 2013), to specific workplace skills of *Learn how to program a computer* (Larry, 2011), or even hobby skills like the *Ten essential skills for easy singing* (Rouvas, 2014) on Udemy.com. The Kahn Academy provides elements of school curriculum such as '*Algebra 1*'(Kahn, n.d.) and TED talks including TED-Ed provide high-quality educational films aimed to enlighten and educate large audiences. The OU has continued to produced educational films with the BBC and the recent educational films it has produced in 2014 include: *Britain's Great War* (Paxman,2014); *Airport Live* (BBC2, 2014); *Wartime Farm* (WarTimeFarm, 2013); *Stargazing Live* (StargazingLive, 2013); BBC 1 Coast, 2013) *Coast; An Hour to Save Your Life* (4 Doctor, 2014); *Bang Goes The Theory* (BBC, 2014); *More or Less* (BBC, 2014) ; *Thinking Allowed* (ThinkingAllowed, 2014) and *The Bottom Line* (BBC Radio4, 2012). These films are shared via the OU's YouTube site which in 2014, had acquired 27 million views from a global audience. Another recent development in 2012 was the introduction of video and film intensive Massive Online Open Courses (MOOCs) by organisations such as Coursera and a number of American universities catering for learners seeking more academic content. These courses can be very popular, the MOOC: *The Future of Storytelling* (Schollerer, Gerling, Langer & Dieken, 2013) has over 40,000 enrolled learners and uses a diversity educational films as learning content.

From Edison's great vision, the use of educational films has had a rich and turbulent history. From the Great Depression hindering the growth of genré, to the needs of the American, British and Germany armies to educate large numbers of World War II combatants to the post-war heydey of educational films, the genre has evolved significantly. This happened despite the commercial requirements of television and text-based nature of the early Internet. The introduction of high-speed Internet access and video sharing now allows the Internet to deliver educational films to global audiences at scale. The use of educational films in Australian VET has followed a different path.

2.6. Educational films and the South Australian VET sector

The use of educational films in the Australian VET sector has been problematic. Before 1990, South Australia vocational education was confined to further education colleges which are precursors to modern day TAFE colleges. Within each college were resource centres that supplied learning resources to lecturers and shared these resources with other colleges. Learning resource development was somewhat ad-hoc, however, in South Australia, a centre for Resource Development did provide educational technologists, who had the skills to create educational films (Hannaford, 1981). Educational films were borrowed from the South Australia Film Corporation library and made available for lecturers to use. However, barriers existed to the use of educational films because

lecturers often did not have the hardware (projectors and then VCRs and TVs) to play the films. An automotive studies lecturer commented in a 1980 report surveying the use of learning resources in South Australian Further Education Colleges:

> We could use video tapes but access to the machines is too limited, what's the use of the tapes with the machine. Moreover, then you've always got the hassle that's right through the department – are the tapes going to be compatible with the machine? (Hannaford, 1981, p. 35)

During the 1990s, access to the VET system and funding was opened up to private organisations, allowing private organisations to deliver VET qualifications. The first VET online learning enterprises appeared in the late 1990s, with TAFE SA Online having over 100 online modules and NSW TAFE Open Training Education Network having 18 online courses (Groves, 1999). During the late 1990s I provided consulting services to two private sector online training organisations the Port Adelaide based *elearning.com* and the Adelaide-based *studypages.com.* Both organisations delivered VET qualifications nationally but did not use educational films because of the inability of the Internet to stream the films and the lack of suitable film content.

2.7. Present day VET educational films

The use of educational films as present day VET learning content is also problematic while practitioners recognise film as engaging; the scarcity of educational films that match specific learning outcomes creates difficulties. Video and film content is engaging according to a small-scale study, I conducted in 2014 of the perceptions of VET professionals towards video and film as learning content. Terry Pokorny, a VET professional, recognises the ability of film to engage learners "showing how a bridge is built rather than a 2D model is much more engaging" (personal communication, 21 August 2014). David Machen another VET professional also supported Terry's view "workplace situation so silly, which does strike a good response from learners, call it the 'theatre of absurdity' if you like" (personal communication, 19 August 2014). Moreover, "someone walking into a pub, falling over and getting kicked out, a great way to show people how things really are, to keep their attention". However, finding content is difficult; Terry Pokorny puts it this way:

> There is a surfeit of films on the YouTube on how to do something, but again the problem is you cannot be sure of their credibility, they are not accredited and you have the balancing act of trying to ensure relevancy, currency and accuracy and it must be challenged for every video (personal communication, 21 August 2014).

From my experience working as an educational filmmaker in the VET sector, I have witnessed the difficulty in finding content that matches learning outcomes. VET instructional designers include films in their courses, however these are most often embedded generic content from *YouTube* or *Vimeo*. These films provide some background information but do not match the specific learning outcomes of the learning program. To help address the issue of a lack of online content the Australian Commonwealth Government and State governments have provided limited funding for content development through the National VET-Elearning strategy, which builds upon the previous Flexible Learning Advisory Group's (FLAG) strategies. (DIISRTE, 2012). This content includes videos and educational films and are contained in *Toolboxes* which are a collection of digital resources for RTOs to purchase. There are over 120 complete *Toolboxes* that cover a diverse range of industry and educational areas from Training and Assessment, Construction, Electrotechnology, Manufacturing, Language Literacy & Numeracy, Frontline Management, Health to Indigenous Awareness and more.

In 2013, learning content was extracted from Toolboxes that cover complete qualifications and packaged up into *learning objects* that cover a competency unit – the components of a qualification. Reviewing a sample the films and videos contained in 10 learning objects reveals significant differences between the production values and use of film techniques. The Baking unit *Scale and Mold Dough for Intermediate Proof* (DIISRTE, 2013) – Unit code: FDFRBSM2B, used video to show baking machines in action with a voice describing what happened to the dough. The technology unit, *Connect Internal Hardware Components* (DIISRTE, 2013) - Unit code*:* ICAI3021B, provided a video showing the inside of a computer with a voice over. These film clips, while capable of orientating learners towards recognising specific parts of machines and hardware by showing them in a video are not educational films. However, the Agricultural unit, *Manage the Implementation of Milking Shed Routines* – Unit code: RTE4112A contains a film *CowTime* (Department of Primary Industries, Victoria, 2003) that uses strong imagery, camera movements, music – some of the techniques of film, and includes interviews from milking shed workers. Figure 2, show the film title screen which contains the stylised logo and layered graphics from *CowTime.*

Figure 2: CowTime: Making Milking Easier

Unfortunately, *CowTime* lacks the emotional content that would make it an educational film – it is a Vocational film. *CowTime* is not story based, the interviews with the workers are not engaging. If *CowTime* had used a story approach and used the techniques of film to support the story, it would have been an educational film; resulting in likely greater engagement of learners through activating their emotions (Busselle & Bilandzic, 2009; De Fossard, 2008).

This brief review of the learning objects highlights the missed opportunity of not using educational films as VET learning resources. The use of video clips is common and restricted to showing a workplace machine or device in action. Vocational films, which show workplaces, while rare do provide benefits to adult learners. They can draw upon their existing knowledge or schemas of a workplace (Sweller, 1988), allowing their cognitive resources to focus on the learning messages contained in the film. The benefit of acquiring the skills shown are also immediately apparent to adult learners (Knowles, Holton, & Swanson, 2005). I did not discover any educational films in my sample and argue that adult learners would find learning objects and toolboxes boring and disengaging because they do not use emotional content. Boredom and disengagement is a known trigger for learners to discontinue their programs (Pekrun & Linnenbrink-garcia, 2012). Educational films have the potential to keep learners engaged (Fischoff, 1997; Grant, 2011; Till et al., 2013) while encouraging a positive learning state. The opportunity to engage learners with educational films, and possibly reduce the alarming rate of attrition in the VET sector – 63% of learners dropping out of their programs in 2103 (NCVER, 2014) has not been taken.

2.8. Films and emotions

Central to this study and design of the WAE app is understanding and documenting the techniques filmmakers use to activate emotional responses in audiences. This includes techniques such as emotional cueing, which invites viewers to experience a range of emotions when watching films. Celebrated filmmakers have used emotions to powerfully affect their audiences. The celebrated filmmaker Alfred Hitchcock argued the filmmakers' task is to manipulate the emotions of their audiences by using the tools of cinema (Springer, 2015). The Russian filmmaker and film theorist Sergei Eisenstein regarded activating emotions in audiences as an engineering process for filmmakers, believing that cinema was "a factor for exercising emotional influence over the masses" particularly during the cold war in the former Soviet Union (Smith, 2004a).

2.8.1. Film techniques to activate emotions in film audiences.

Film techniques can activate emotions across different cohorts of age (Richter & Kunzmann, 2011) and gender (Prince, 1997) by using a number of different emotional cues. For instance, an individual

audience member's emotions might be activated by a music score, another by empathy for a character in the film (Plantinga & Smith, 1999). Therefore by using a number of different film techniques to emotionally cue and invite audiences to 'feel' a specific emotion the filmmaker will be more successful at inviting the whole audience to 'feel' the same emotion despite differences in emotional activation due to gender, age and cultural influences. Despite the ability of filmmakers to activate emotions, it is important to remember emotions are short-lived (Efklides & Volet, 2005; Ekman, 1994) and on their own, do not keep audiences engaged with a film. Smith (2003) argues that film creates a *mood* – a longer lasting emotional state—and uses emotions to *sustain* that mood.

2.8.2. Mood and films.

The beginning of a film is most crucial when establishing and sustaining a mood throughout the film (Smith, 2003). Smith describes the accomplished filmmaker Steven Spielberg's use of film techniques at the beginning of *Raiders of the Lost Ark* (Speilberg & Marshall, 1981) to establish "adventure serial pleasures of fear and excitement" (p.43) to support a mood of enjoyment. This mood is then re-enforced throughout the film despite other opposing emotions being activated. Spielberg achieves this by understanding that emotions are short-lived, for instance, an emotion of fear will can be replaced by cueing an emotion of enjoyment, to re-enforce the mood of enjoyment.

An analysis of the popular movie *Jaws*, (Speilberg & Zanuk, Brown, 1975) also directed by Steven Spielberg in 1975 provides insight in the use of emotions to establish and maintain a mood. The film commences with emotional cues inviting the audience to feel disturbed and fearful. This is achieved by setting the opening scene in near darkness, a known emotional cue for fear (Haselton & Ketelaar, 2006). The disturbing and haunting scene is a moonlight beach with a silhouette of a person entering the sea (Redmond, 2015), small waves are heard breaking on a beach with an occasional bell from a navigation buoy. The swimmer sinks into the sea disappearing, the only sound to be heard is that of the bell. The audience is startled by a close up of the swimmer's face as she emerges, with a satisfied sigh. The swimmer is then viewed from underneath the surface and two musical notes in succession a steady F, then F# played on a cello in a low octave announce the arrival of the *beast* or great white shark (Tylski, 2015).

The *Jaws* music is so effective at cueing fear because it is heard inside and outside of an audience's heads, through hearing and vibrations. In this sense, there is no escape from the sound as the audience cannot close their ears in the same way they close their eyes. Moreover, secondly humans' brains associate low pitches with large mouths, and as the volume increases the brain associates the loudness with aggression (Thompson, 2002). The music disappears with the *beast* only to quickly return. The music is signalling the *beasts* return, yet the audience cannot see the *beast* and that also increases their anxiety and fear. The music builds to a crescendo when the *beast* attacks the swimmer then an

eerie silence ensues. The audience now has been introduced to the *beast* and through learned association (Thompson, 2002) whenever the music is heard the emotion of fear is consecutively cued. This is illustrated succinctly later in the film where there is a typical family beach scene with children splashing in the water and sand castles being built. The emotional cues are of happiness and friendliness, through smiling faces, which are also a known emotional cue (Plass, Heidig, Hayward, Homer & Um, 2014). However, the audience knows the *beast* has returned unbeknownst to the beachgoers because the music is the emotional cue, and the audiences' fear is activated from the learned association and the *beast* strikes again. In this case, the emotions of fear juxtaposed over the emotions of happiness. The music continuing as the camera tilts to a shot of the Sea, leaving the music to cue the emotion of fear. The music and learned association in *Jaws* is used to not only help establish the mood but to keep the mood of fear and terror throughout the film. Filmmakers use emotions cues in this way to create and sustain a mood throughout a film or part of a film ensuring that other cued emotions do not change the mood.

2.8.3. Film techniques and how they activate viewers' emotions.

Film techniques are also called the five formal elements of film. These five formal elements are further explored in the following section to illustrate how film producers emotionally cue an audience inviting them to emotionally 'feel' what the filmmaker has planned for them (Smith, 2003). The five elements of film, cinematography, Mise-en-scène, sound , the narrative and editing all have an ability to cue emotions in an audience (Smith, 2003).

2.8.3.1. ***Cinematography***.

Cinematography is often cited as 'writing in the moment', where the focus is on how a scene is being shot (Pierson, 2013). For example, Hitchcock uses a close-up shot of a face to show the emotion a character might be feeling so much so that "drama emerges from the emotions and thoughts shown on a character's face" (Markle & CBC Television, 1964). Hitchcock also uses low camera shots in his films to create the impression of power and high shots to create the impression of smallness or weakness. Wide shots are used to establish scenes or create impressions of loneliness or awe at a scene (Mollison, 2003). The use of light is critical in cinematography with academy award winner John Alton (2014) describing how cinematographers 'paint with light' to provide emotional cues for audiences. For example, a dark gloomy shot adds suspense to a scene, but can also provide an emotional cue of fear (Plantinga & Smith, 1999). Understanding these choices are intentional to achieve the feeling or perspective the filmmaker is trying to convey, is critical. Consider the powerful 30 second Australian Commercial, *Hey mate, we can do something to stop violence against women* by WhiteRibbon, Australia's Campaign to Stop Violence Against Women. The commercial stars hi-

profile football players as a method of engaging over 18 years old males. Which is the target audience for this production.

The cinematography in *Hey mate, we can do something to stop violence against women* is crucial to the learning message. The opening medium 'over-the-shoulder' shot, invites viewers to vicariously join the group at the bar table (Figure 3). The viewer becomes part of the group hearing the antagonist speak.

Figure 3: Cinematography from Hey mate, we can do something to stop violence against women.

The next series of shots starts with objective views of the protagonists looking at each other and the viewer (Figure 4), as they agree how offensive the comment is. This invites the viewer to also agree with the protagonists.

Figure 4: Cinematography from Hey mate, we can do something to stop violence against women.

The camera is taking a subjective point of view stance, where the viewer now is one of the 'blokes' being asked to agree to a course of action by being directly looked at (Figure 4). This camera shot

or cinematography cues the emotion of anxiety. This is enhanced by the narrator saying in deep authoritative voice, "There is something you can do about it. Thousands of good men have got your back". The closing shot then shows the antagonist looking down in embarrassment (Figure 5). The cinematography is powerful because of the use of close-up shots which helps cue the emotions the actors are showing in the viewers themselves (Hithcock, 1946). Close-ups also help male viewers identify with the characters in the film, because they can see them clearly, again helping emotional cueing (Igartua, 2010).

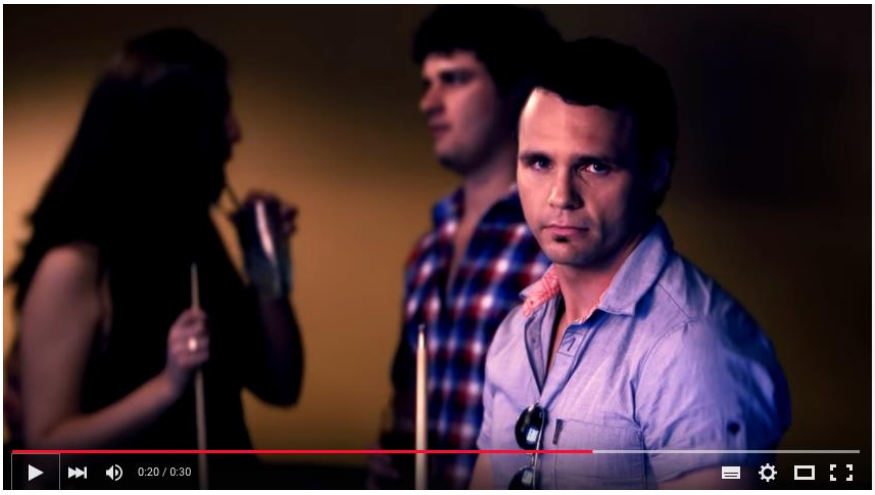
Figure 5: Cinematography from Hey mate, we can do something to stop violence against women.

2.8.3.2. Mise-en-scène.

Mise-en-scène, translated from French, means what is in the frame of the camera or what is captured by the lens onto the film or camera sensor. It also includes what the actors are wearing, the lighting and props used (Pierson, 2013). Figure 3 illustrates the mise-en-scène from the commercial. The offender in the film is talking nonchalantly about hitting his girlfriend, "It happens all the time, I just give her backhand. It usually shuts her up." The setting, lighting and props highlight how it is ordinary men who are perpetrating violence against woman.

Elements of Mise-en-scène can create an emotional cue, an example being the colour used in a scene. In western cultures the colour red is a symbol for danger, aggression, passion and sexuality. Figure 6 shows how lighting the set has created a deep reddish hue, attempting to cue an emotion of anxiety in viewers.

Figure 6: Mise-en-scène from Hey mate, we can do something to stop violence against women.



The use of colour can also show transitions, such as the red sets used in the beginning of the film *The Last Emperor* (Bertolucci & Thomas, 1987). As the emperor learns his purpose at the climax of the film, the colours of all the scenes and sets turn to green, the colour of fertility. Furthermore, colour can be used in a film to show characters or an idea. Darth Vader's red lightsabre in the *Empire Strikes Back* (Kershner & Luca, 1980) is immediately associated with evil.

2.8.3.3. Sound.

The element of film, sound also includes sound effects – foley and music. Music is also well known for its ability to activate emotions (Cohen, 2001). When music is combined with images, emotional cueing is enhanced (Plantinga & Smith, 1999). Neuroscience provides photographic evidence of the brain 'lighting up' in response to music. Blood flow is increased to the reward areas of the brain when it is stimulated by music. Bernard Herman used music to activate emotions in Hitchcock's '*Psycho'* with jarring strings and brass to recreate the sounds of animals in panic (Stewart, 2015). The use of music in Hitchcock's films was also commented on by the celebrated director Martin Scorsese talking about film scores that stood out, during a BBC interview (BBC4, 2013).

> Two or three key scores one was Psycho not necessarily the screeching violence it was the other music the 'waiting' music – the music where you knew something terrible was going to happen you know somehow this energy is building up and you are suppressing it. And Vertigo, particularly the driving sequences when driving around …That music stayed with me, no it didn't stay with me I could not hum it, could not think what it was, but when I heard it I immediately knew that world, knew that mood, knew that emotional state and psychological state really.

In the *Hey mate, we can do something to stop violence against woman* commercial, which lasts for just 30 seconds, at 13 seconds, disjointed and unsettling music is added, which is designed to cue the emotion of disgust at the comment of the antagonist. The use of music in the short commercial demonstrates how emotions can be activated through music.

2.8.3.4. Narrative.

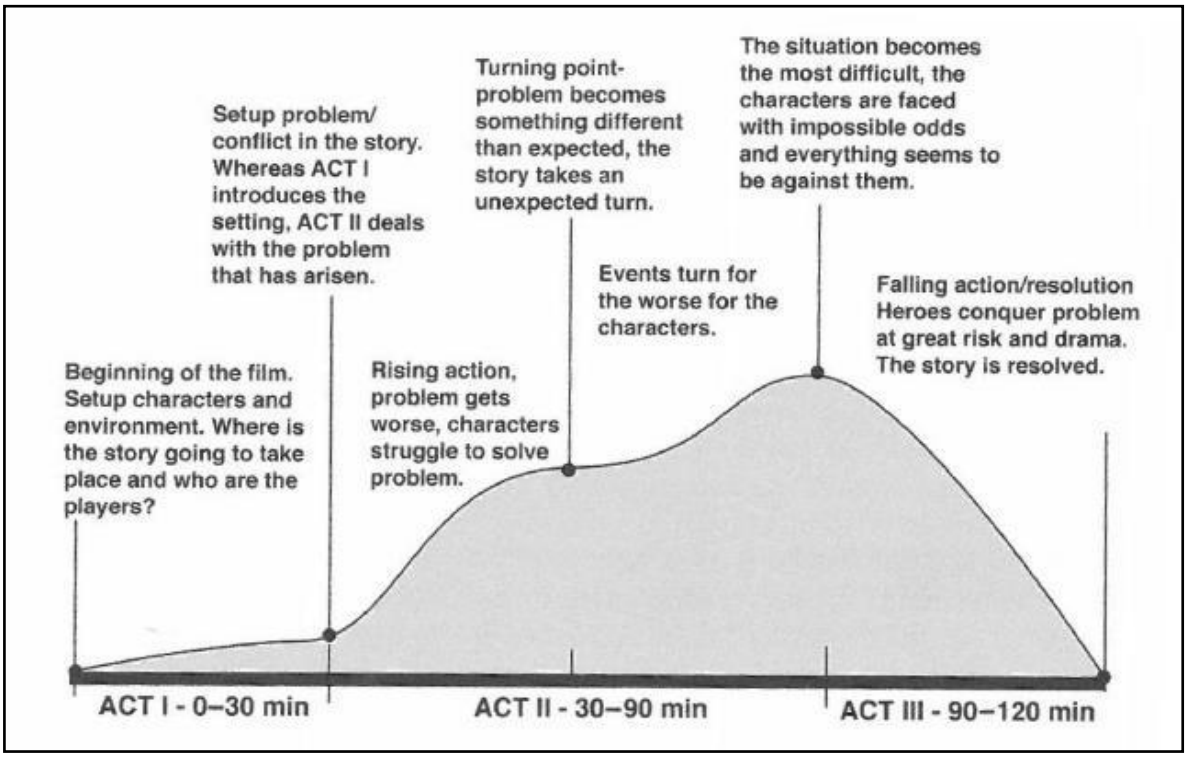
The narrative element of film is the story it tells. When creating productions, the technique of storyboarding is used to visualise the story, breaking it down into individual camera shots and grouping them into act structures. Central to the story is the characters and their roles as protagonist and/or antagonist within a standard three-act structure of films (Parmaggiore & Wallis, 2005). The three-act

structure is as follows:

Act 1: Exposition leads to turning point.
Act 2: Complications lead to climax and
Act 3: Action leads to resolution

Figure 7, illustrates a three-act structure plot line for a 90-minute film and details a typical story of hero overcoming challenges to resolve the story (Mollison, 2003).

Figure 7: Example Three Act structure plot line (Mollison, 2003).



Hey mate, we can do something to stop violence against woman is also split into three acts. The first act introduces the characters, ordinary blokes, chatting in the pub over a few beers (Figure 3). This is a atypical scene in many Australian communities. The antagonist is introduced as a 'normal' bloke making an offhand comment about slapping his partner. The second act, introduces the conflict of the story, the surprise by the other blokes, looking at each other, querying each other's response to the antagonist's comment (Figure 4). The final act is the resolution to make a stand against domestic violence against females. This act is reinforced by the antagonist now looking down in shame, being rejected by his mates (Figure 5). The story is resolved with the commercial asking viewers (e.g. regular blokes), "So wear an oath this White Ribbon day to put a stop to violence against women."

The three-act structure creates drama of the film; drama can hold the attention of the audience. Drama can also provide the audience with vicarious experiences, including learning (Roberts, 2010), allowing them to feel and express emotions that they might otherwise have to repress in real-life (De Fossard & Riber, 2005).

2.8.3.5. Editing.

Unique to the medium of film is editing. An editor's job is to piece together film clips and music using time and continuity to tell the story. The academy award winning film editor Walter Murch in his seminal film theory book *In the Blink of an Eye* (Murch, 1992) discusses six cuts that fulfill his criteria of a good cut between different film images:

- being true to the emotion of the moment;
- how the cut advances the story;
- is rhythmically interesting;
- follows an eye-trace – where a character is looking;
- the 'planarity' of the scene; and
- how the cut respects the dimensionality of where the characters are in relation to each other.

Murch (1992) justifies the order of his criteria:

> At the top is emotion… because it's the hardest to define and deal with 'How do you want your audience to feel?'… What they finally remember is not the editing, not the camerawork, not the performances, not even the story – it's how they felt. (p. 22).

The art of editing, assembling together different camera shots, adding music, sound effects and graphic elements while keeping the narrative of the story intact is a skill unique to film-making. In *'Hey mate, we can do something to stop violence against women'* the editing helps create the

emotional cues, by combining the other formal elements of film. The film opens with a graphic element supported by deep male voice introducing the topic of the film (Figure 8).

Figure 8: The art of editing

The next cut is to the establishing shot of the bar scene (Figure 3). Henceforth the editing follows the eye traces of the actors as they look at each other. An actor will look at another; the editor will then cut to other actor, following their eye traces (Figures 4). To enhance the emotions cued, temporal adjustments have also been made, slow motion is used to emphasise frowns and facial expressions. The film flows smoothly because the editor has also used the technique of editing on action, following the movements of actor's heads when turning, this creates seamless transitions between the shots. The quality of editing in *'Hey mate, we can do something to stop violence against women'* meets Murch's (1992) criteria for good editing of clips together. The editor has used all of the film techniques to create a powerfully moving piece.

Educational films, such as '*Hey mate, we can do something to stop violence against women'* can activate a range emotions. In order to analyse the film from these emotions, we need to also be aware that an individual viewer's age (Ross & Mirowsky, 2008), gender (Bianchin & Angrilli, 2012), cultural background (Chentsova-Dutton & Tsai, 2007; Schaefer, Nils, Sanchez, & Philippot, 2010a), topic interest (Pekrun et al., 2002), and identification with character(s) in the film (Igartua, 2010) will impact on the emotions experienced by a viewer. In this case the 'target' of the commercial are males over the age of 18 from a white working-class or middle-class cultural background. Asking a subject who meets these criteria to assess the emotions through self-reporting they feel when viewing *'Hey mate, we can do something to stop violence against women,'* might produce the following results. The emotion of anger might be cued due to the topic being confronting and then the frustration of seeing the antagonist describing how he treats women. Perhaps, followed by the emotion of enjoyment where the protagonist took a stance. However, while this analysis is a useful

starting point, it does not suggest where learning might or might not be supported during the viewing of the film. The recent field of academic emotions discussed in the next section can assist educational filmmakers in being able to answer this critical question.

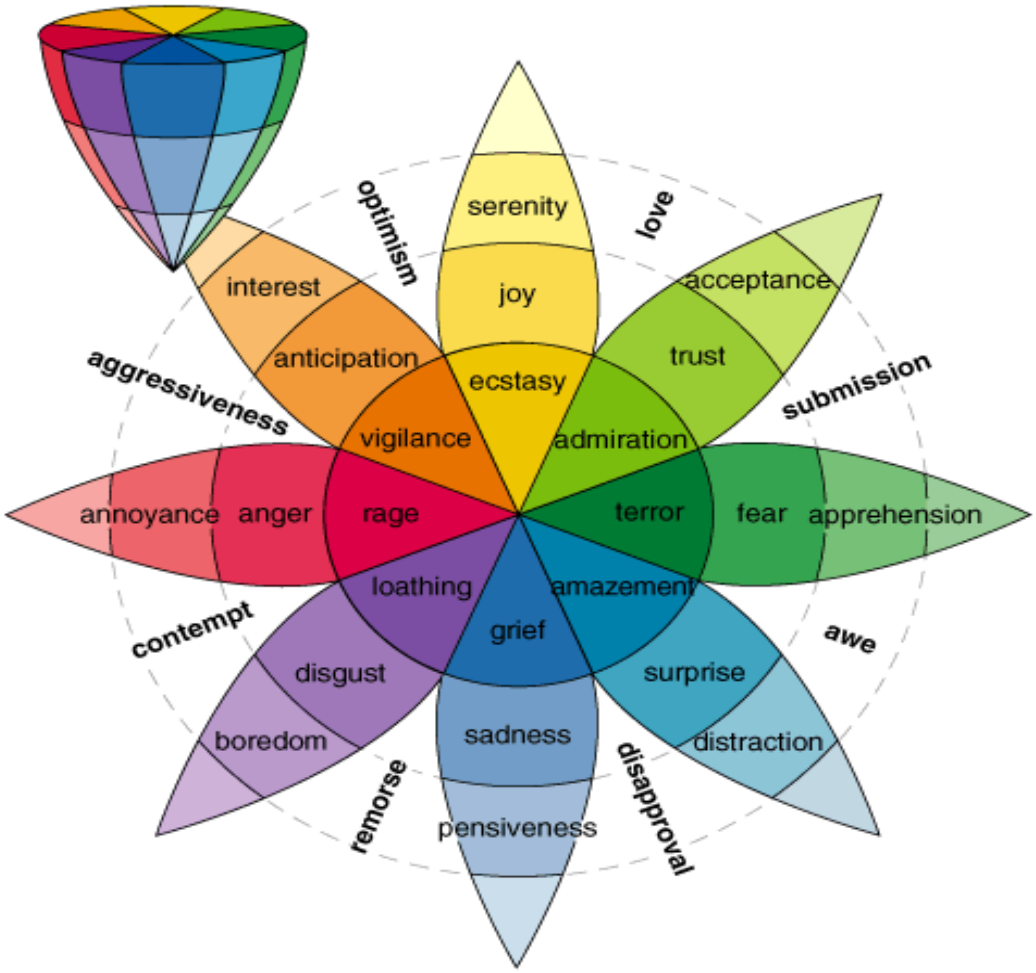
2.9. Emotions

Emotions are complex with a number of views on the nature of emotions. The emotional researcher Robert Plutchik (2001) explains:

> The reason behind this is that the language of emotions is so broad, with hundreds of different words to describe various emotional states… Complicating the topic of emotion further is the plethora of theories of emotion whose authors interpret the role of emotion in life very differently" (p. 344).

Izard (1974) saw emotions as discrete and separate in his theory of differential emotions. Plutchik (1980) saw emotions having a number of attributes including valence, which is positive for enjoyable states such as happiness and enjoyment, and negative for unpleasant states such as anxiety or fear. Valence can be perceived as linking two opposing emotions together, such as happiness (positive) and sadness (negative). He constructed a 3-dimensional circumflex emotional wheel showing the relationships between emotions in his emotional model, with similar emotions close to each other and valence shown by emotions being on the opposite side of the wheel. Figure 9 shows Plutchik's (1980) emotional colour wheel and the relationships between emotions. For example, *Interest* has opposite valence to *Distraction* and *Joy* opposite valence to *Sadness.* Plutchik (1980) also assigned different colours to different emotional groups, for instance in the emotional group of aggressiveness/contempt the colour is red. Depending on the level of activation – which is the degree of physiological response, how strongly a person feels the emotion, the colour changes bright red for rage and pink for annoyance.

Figure 9: Plutchik's (1980) Emotional Wheel



Pluchik's (1980) Emotional wheel is helpful in understanding the complex relationships between different emotions and the attribute of valence – which links two emotions. It is used as a tool to aid in the identification of emotions and is used in a number of different fields including and marketing and healthcare. For instance carers identify the feelings of their patients by using it provide reference words for patients to describe their emotions (Makua, 2013). However, Plutchik's emotional wheel does not provide a strong enough insight into the emotions activated when learning.

2.9.1. Academic Emotions.

The study of human emotions and learning is complex, however, whilst complex, research into the relationships between emotions and learning has generated a significant body of work. The field of academic emotions, emerging from Pekrun's (1992) paper titled the 'Impact of Emotions on Learning and Achievement: Towards a theory of cognitive/motivational mediators' provides an insight for educators into the emotions experienced by learners. Pekrun, Goetz, Titz and Perry (2002) developed his theory further and in 2002 argued the academic emotions commonly experienced by learners when they are in the classroom environment, during studying and when taking exams are:

- enjoyment;
- hope;
- pride;
- relief;
- anger;
- anxiety;
- shame;
- hopelessness; and
- boredom

In later work, Pekrun et al. (2007) drew together the diverse range of academic emotions designing a taxonomy with the three dimensions of valence (positive/negative), physiological activation (high/low) and Task/Activity or outcome (pleasant/unpleasant), when describing those emotions that relate to achievement and learning in academic settings: Table 2 illustrates the relationships between academic emotions and the three dimensions.

Table 2:

Pekrun et al. (2007). A Three-Dimensional Taxonomy of Academic Emotions

	Positive[a]		Negative[b]	
	Activating	De-activating	Activating	De-activating
Activity focus	Enjoyment	Relaxation	Anger Frustration	Bored
Outcome focus	Joy Hope Pride Gratitude	Contentment Relief	Anxiety Shame Anger	Sadness Disappointment Hopelessness

[a]Positive, pleasant emotion [b]Negative, unpleasant emotion

Table 2 also shows Pekrun et al.'s (2007) four broad categories of emotions that learners experience during the activity of learning (task/activity focus): enjoyment; relaxation; anger/frustration; and boredom. They assigned each of these emotions with an attribute of positive or negative and activating and de-activating. Pekrun et al. (2002) argue there is relationship between academic emotions and learning, the statements in table 3 show the argument for each academic emotion.

Table 3:

Academic emotions and learning

Statement 1:	The emotion of enjoyment has been linked to improved learning outcomes and holistic creative ways of thinking (Pekrun et al., 2002).
Statement 2:	The positive emotion of relaxation is associated with lesser academic performance and disengagement (Hasher, 2010; Linnenbrink, 2007).
Statement 3:	The emotion of boredom is associated with disengagement, reduced learning outcomes and reduced persistence (Pekrun, Goetz, Titz, & Perry, 2010; Tulis & Fulmer, 2013).
Statement 4:	The negative-activating emotion of anger can be motivating at a low level of activation (Harmon-Jones, Harmon-Jones, Abramson, & Peterson, 2009).
Statement 5:	Anxiety is a negative emotion. Depending upon the level of its activation, anxiety can both support and not support learning. High levels of anxiety diminish a learner's attention and degrades performance (Hembree, 1988; Zeidner, 2007). Lower levels of anxiety can aid focus and encourage greater effort (Bandura & Cervone, 1983; Graesser & D'Mello, 2012).

The theory of academic emotions provides a theoretical backdrop to this study. While the theory of academic emotions has been based on face-to-face classroom learning, a recent study has proved evidence to support the theory of academic emotions in online learning. This was achieved by validating the *Academic Emotions Questionnaire* (AEQ), in an online survey. (Daniels & Stupnisky, 2012). The AEQ is a self-report tool developed by Pekrun, Goetz, Titz, & Perry (2002), to measure academic emotions. Therefore, I argue that the theory of academic emotions can be applied to educational films that are used as online learning content. However, a deeper understanding of the emotions that learners experience when learning from an educational film is required. While academic emotions can provide a guide to when a learner is in an emotionally supported learning state, subject to the statements above (table 3) the emotions that films activate in audiences needs to be explored.

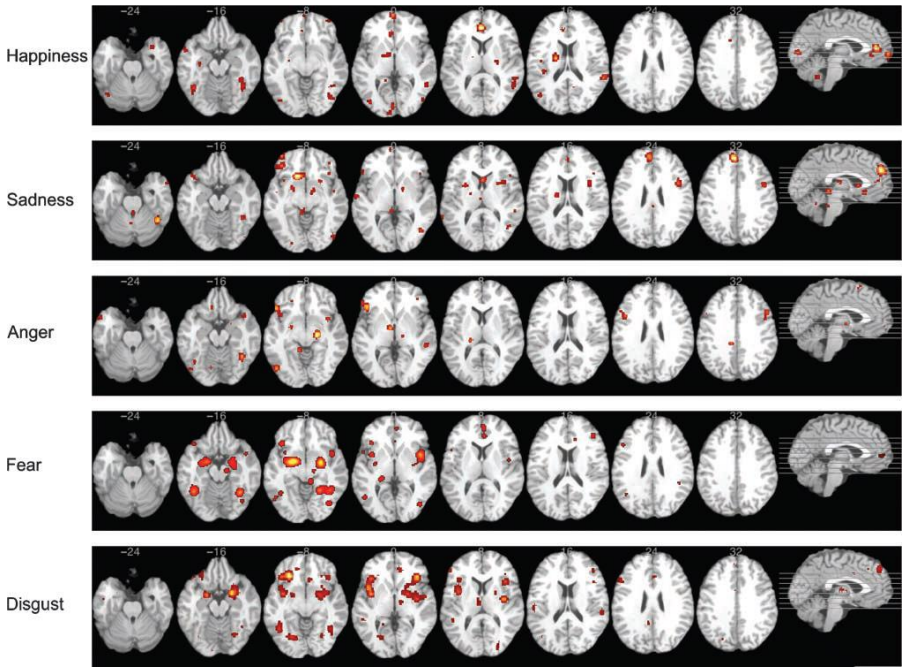
2.9.2. Filmic emotions.

This section describes what filmic emotions are and how they are measured. It is important to understand what emotions filmmakers attempt to activate in viewers and understand their relationship to academic emotions – those emotions that support or do not support learning. There are a number of methods of measuring what filmic emotions are activated in an audience. These range from a neurobiological 'brain-scan' approach of Neurocinema to audience self-reports using scales that have been empirically tested for accuracy.

2.9.2.1. Measuring filmic emotions.

Psychologists have classified the emotions activated by film as *filmic emotions* (Smith, 2003). Filmic emotions consist of a number of discrete emotions: anger; fear; disgust; sadness; amusement; tenderness and a neutral state (Crawford & Henry, 2004; Gregory, 1984; Gross & Levenson, 1995). Researchers use a variety of tools and methods to determine the emotions a subject is experiencing or believes they are experiencing when they watch films. The field of psychophysiology uses observational methods such as measuring heart rates, blinking and movement of eyes and body parts to determine emotional impacts (Gross & Levenson, 1995b). D'Mello & Graesser (2012) observe facial expressions that are identified with specific emotions as part of their work on affective states in complex learning. Self-report tools are popular among educational psychologists (Brummer, Stopa, & Bucks, 2014; Laurans, Desmet, & Hekkert, 2009; Yik, Russell, & Steiger, 2011), despite the drawback of them impacting on the emotional perception by reducing or changing the emotional perception (Bartsch & Viehoff, 2010; Mayer & Estrella, 2014). Emotional researchers in the field of neuroscience use brain scans to provide evidence of different parts of the brain activating during an emotional experience (Vytal & Hamann, 2010). Figure 10 illustrates the various regions of the brain 'lighting up' with colour in response to the emotions of happiness, sadness, anger, fear and disgust (Vytal & Hamann, 2010).

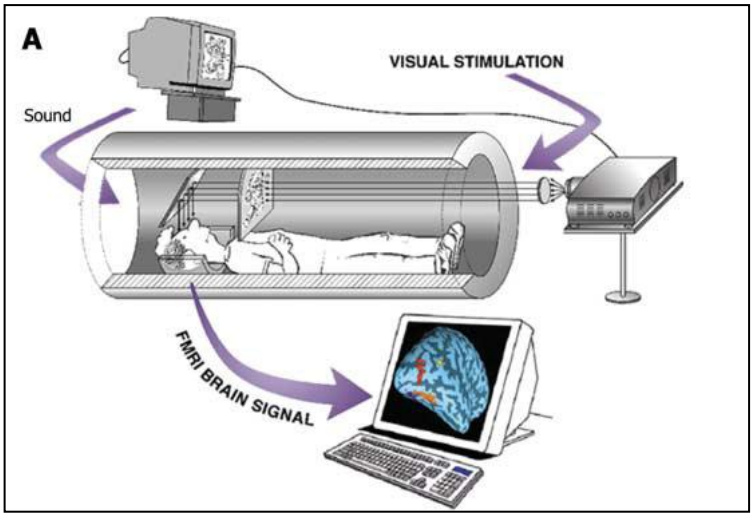
Figure 10: Activation likelihood maps representing regional brain activity consistently associated with each basic emotion. (Vytal & Hamann, 2010).



2.9.2.2. Neurocinema to measure emotional responses.

Interestingly the field of neuroscience applied to cinema has created a new interdisciplinary field of study called Neurocinema where brain scans are recorded when a subject is viewing a film (Hasson et al., 2008; Tikka et al., 2012). Neurocinema aims to understand and identify what parts of the brain become active when viewing a film in response to a particular emotional cue. This knowledge is used by film editors to edit for emotional content. Brain imaging machines are used to take a Magnet Resonance Image (MRI) of a slice of the brain (Figure 11) during viewing of a film when the subject lays prone in the machine, while their brain is being scanned. Once the film has been shown analysis of the images are undertaken. However, there is controversy surrounding the results with criticism of the unfamiliar environment effecting the emotions displayed in a subject's brain. (Hasson et al., 2008). Moreover, the emotions measured by Neurocinema are basic emotions. Emotional researchers use other tools to report on the more complex emotions that filmmakers cue in audiences.

Figure 11: Neurocinema brain scan being conducted (Hasson et al., 2008)



2.9.3. Scales used to measure emotions activated by films.

Researchers have created a number of empirically validated tools, which are used to classify the emotions film clips activate in subjects (Crawford & Henry, 2004; Gregory, 1984; Izard, 1993; Watson & Clark, 1994). The two popular scales are the Expanded Positive and Negative Affective Schedule (PANAS-X) scale (Crawford & Henry, 2004) and the Differential Emotions Scale (DES) (Izard, 1977). The PANAS-X scale is comprised of twenty sub-scales of emotions and is designed for the assessment of the positive (PA) and negative affect (NA). PA affects are characterised as feeling active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud and strong. NA affects are characterised be feeling afraid, ashamed, distressed, guilty, hostile, irritable, jittery, nervous, scared and upset. To assess a film clip subjects indicate on a five-point scale the emotions they felt from the PA and NA emotional words. Marking the level of activation of 1 for

"very slightly or not at all" and for 5 "extremely". The DES scale uses ten discrete emotions to determine a subject's emotional experience from facial expressions. The DES emotions are Anger, Disgust, Contempt, Interest, Joy, Surprise, Sadness, Fear, Shyness and Guilt. Izard (1974) cited by Gregory, (1984) describing the DES scale this way:

> the DES focuses on ten discrete emotions, each of which was defined theoretically as having neural, neuromuscular-expressive, and experiential components. The components are interactive, but in the fundamental emotion process the common order of occurrence is: (a) efferent neural activity in the facial nerve and consequent patterned facial expression, (b) sensory feedback from the expression via the trigeminal nerve, (c) cortical integration of the sensory data and consequent subjective experience (p.1).

Researchers often make additions to scales and group emotions together. Schaefer, Nils, Sanchez, & Philippot (2010) used this technique when creating a large database of films clips that activate an emotional response. They used an updated PANAS scale known as the Positive and Negative Affect Schedule – Expanded form (PANAS-X) (Watson & Tellegen, 1988) and modified categories of emotions from the DES emotions. Table 4 illustrates sample emotional rating from film clips using the PANAS-X scale (Schaefer et al., 2010).

Table 4:

Sample emotional ratings for film clips using the PANAS -X (Watson & Tellegen, 1988) and modified DES scale (Schaefer et al., 2010)

FILM SCENE	Description	Emotion
A Fish Called Wanda	One of the characters (John Cleese) is found naked by the owners of the house.	Amusement
A Perfect World	Butch (Kevin Costner) is gunned down, at the end of the movie.	Sadness
American History X	A Neo-Nazi (played by Edward Norton) kills an Afro-American man smashing his head on the kerb.	Anger
Benny and Joone	Benny (Johnny Depp) plays the fool in a coffee shop.	Tenderness
Blue (1)	A person passes a piece of aluminium foil through the window of a car.	Neutral
Copycat	One of the characters gets caught by a murderer in a toilet.	Fear

Schaefer et al.,'s (2010) study demonstrates the use of a self-report tool that uses categories of emotions from the PANAS-X scale and enhanced DES emotions as a tool for audiences self-report emotions activated when watching a film clip.

This section has explored emotions from the perspective of academic emotions and those activated by film and how they are empirically measured. Emotions play a part in motivating and engaging learners with educational content and educational films. The next section explores how learning and instructional theories are used to help keep learners engaged with learning content.

2.10. Theories of learning and engagement

In this section, I explore four learning and instructional theories and introduce theories of student motivation and engagement. I give examples of how they are applied from the perspective of educational films and online learning environments - which often utilise educational films as learning content. The fields of psychology and philosophy inform learning and instructional theories; the four main theoretical stances form a continuum with Instructivism and Constructivism at opposite ends and Cognitivism and Social Constructivism in-between (Merriam & Caffarella, 1999). Instructional designers use these theories as frameworks to theoretically inform their creation of learning experiences; they are eclectic and use different educational and instructional theories as they create learning experiences (Bonk & Khoo, 2014).

The theory of *Instructivism* is based upon *Behaviourist* theory (Malibar & Pountney, 2002), and is a systemised approach to learning which became popular in the 1920's (Svinicki, 1999). This approach is still evident in pedagogies of modern day MOOC's where learners are required to learn from an instructor presenting content then undertaking quizzes to test their learning. Bonk and Khoo (2014) describe this approach as a 'carrot and stick' approach to learning "where 'canned' approaches are apparent…. which often rely on the instructor's preset delivery of content and later student regurgitation of it in computer-scored objective tests" (p. 32).

The theory of *Cognitivism* became popular as a learning theory in the 1980's and focused on the mechanics of how the brain learns; how learning messages are coded, memorised, meaning created and synthesised as new knowledge. Learners in this theory are seen as active participants, seeking out new learning experiences and develop their metacognitive skills as they develop their learning (Bonk & Khoo, 2014). Elements of cognitivism still exist in the field of instructional design. Sweller's (1998) theory of cognitive load suggests creators of online educational media be mindful to ensure writing and voice are not presented together as there is a risk of overloading learners learning channels. He proposes that humans possess two learning channels, visual and voice plus written. The consequence for instructional designers is when a learner attempts to make meaning from learning media that simultaneously presents voice and the written word reduced cognition is likely to result, due to overloading this single learning channel.

In 1985 Gagne proposed an instructional theory that fits between Instructivism and Cognitivism when developing a set of principles for instructional designers:

- the 'demonstration principle' where learning occurs through observing demonstrations,
- the 'application principle' where learning occurs through applying new knowledge,
- the 'task-centered' principle where learners engage in task-based instruction,
- the 'activation principle' when learners activate relevant prior knowledge or experience,
- and the 'integration principle' where learners integrate new knowledge into practice.

These principles are commonly used by instructional designers when creating learning content (Merrill, 2009).

The theory of *Constructivism* is a learner-centric approach. Learner's control their learning, they complete activities at their own pace and make meaning from synthesising their 'lived experience' with new learning. This theory casts the instructor as a learning guide for an individual learner. Constructivism became popular in the 1980's, though has its roots earlier with the work of theorists such as John Dewey and Jean Piaget (Bonk & Khoo, 2014). Constructivism surfaces in online and distance education as self-paced learning where learners choose when and at what pace of they interact with their learning activities and the creation of educational activities that have relevance to learners lived experiences.

A learner-centric constructivist approach that is relevant to the VET sector, due to its predominately mature age learners (Moore & Kearsley, 2005) is that of *Andragogy*, commonly referred to as the art and science of helping adults learn (Fidishun, 2000). The ideas that adults learn differently to children by using self-reflection and their life experiences was initially detailed by German Alexander Kapp in 1833 (Wang & Global, 2009), though as a learning theory fell out of popularity. In 1970 Knowles revived andragogy adding assumptions of self-directedness, social role task and immediacy of the application of learning (Knowles, 1970). Mezirow (1981), Suanmali (1981) and the Nottingham Andragogy (1983) group continued developing the concepts surrounding adult learning with the addition of self-directed learning and critical thinking. Criticism, of andragogy, has focused on a lack of empirical evidence (Davenport, 1993) and of it not being a comprehensive learning theory for adults (Hartree, 1984; Jarvis 1984). In 2005 Knowles published his work '*The Adult Learner*' (Knowles, Holton & Swanson, 2005) in which he identified six principles of adult learning;

- adults are internally motivated and self-directed,
- adults bring life experiences and knowledge to learning experiences,
- adults are goal oriented and relevancy oriented,
- adults are practical, and
- adult learners like to be respected.

Huang (2002) investigated these principles of andragogy and discovered that adults learn best when knowledge is presented in real-life context. Herrington, Reeves, & Oliver, (2010) also supported these andragogy principles when describing an ideal online learning environment which should provide "authentic examples of real-world practice" (Herrington et al., 2010, p2). The findings of the studies by Huang (2005) and Herrington et al. (2010) support the use of vocational films set in workplace environments using common workplace scenarios as authentic content. Educational films can be part of a constructivist learning approach by providing learning scenarios set in a rich authentic world that adult learners identify with and recognise, thereby leveraging their existing experience to aid learning. Moreover, learners also benefit from mentally associating themselves with onscreen characters successfully completing tasks (Linnenbrink & Pintrich, 2003) and seeing how tasks are accomplished in a simulation or a documentarised film of the real world (Herrington et al., 2010).

The theory of *Social Constructivism* describes learning as a social process and based on the Russian Vygotsky's (1978) view that learning is facilitated through scaffolding instruction from others, not necessarily the leader in a group setting. Social constructivism manifests itself in instructional design principles such as scaffolding learning tasks to build knowledge. Other social constructivist approaches include creating puzzles for learners to solve - problem-based learning (Savery & Duffy, 1996) and communities of practice, where learners socially interact around learning content (Wenger, 1998). Applying these practices to educational films instructional designers could create online interactive chat channels where learners opine how the learning messages that are part of an educational film, problem solve and scaffolds, their existing understanding of a topic.

This section has outlined the theories that inform instructional designers when creating learning content, however, to reduce learner attrition it is important to keep learners engaged.

2.10.1. Student motivation and engagement.

How a learner engages in learning activities is different to learners' motivation to undertake and complete learning programs. Bonk and Khoo (2014) describe how much progress the cognitive psychology movement made towards understanding learner motivation during the 1980's and 1990's. They describe key theories such as 'attribution' theory (Weiner, 1980), 'self-efficacy' theory (Bandura, 1989), 'goal orientation' theory (Ames, 1992; Dweck, 1986), and 'self-determination' theory (Deci, Vallerand, Pelletier, & Ryan, 1991). However, engagement with learning activities is different, Ingram (2005) suggests that engagement is comprised of three parts, attention to the learning task, the activation of effective cognitive processes and the social context in which learning occurs.

Emotions influence how engaged learners are with a learning task, and the emotion of boredom is a key driver of abandonment of learning activities (Bonk & Khoo, 2014). Greater emotional engagement is linked to increased levels of interest, enjoyment, and a sense of belonging (Brown & North, 2010). Johnmarshall Reeve (1996), suggests engagement comprises of the intensity and the emotional quality of a learner's involvement in a task or activity. With engagement manifesting itself as sustained task involvement and feeling positive emotion towards that task. He goes onto to describe disengaged learners as lacking commitment and not valuing the learning task, resulting in boredom and withdrawal (Reeve, 1996). Instructional designers use strategies such as blended learning, chunking learning content into often five-minute sections, creating of communities of practice, puzzles and quizzes, gamification and educational films to encourage engagement. They are all examples of instructional designers put learning theory into practice to engage learners (Lowerison et al., 2008). Bonk and Khoo (2014), propose a comprehensive TEKVARIETY framework comprising of 10 parts and 100 different types of learning activities to help engage learners and reduced the emotion of boredom.

In this section, I have reviewed four theoretical stances used in the creation of learning content. I have detailed motivational theories and described some of the strategies instructional designers use to encourage learner engagement. These approaches to engaging learners are comprehensive, but how do instructional designers know what emotions their learning content activates in learners? The emotions of learners do impact upon their engagement with learning experiences, in the next section, I investigate online tools to measure and record emotions.

2.11. Reviewing existing applications that capture emotions

Before designing the WAE app in October 2014 I conducted a review of applications available on the internet to ensure I was not going to re-create an application that recorded academic emotions, I did not find any. Eighteen months has now passed from this initial review, and there are now a plethora of applications to measure emotions. I briefly review and compare two self-report smart-phone applications: the *'Mood Meter'* (Hopelab & Reliable Coders, 2015) and *'My Mood Tracker'* (Aspyre Solutions, 2011).

2.11.1. Mood Meter.

The purpose of the *Mood Meter* smartphone application is to help users develop emotional intelligence (Goleman,1995). Users self-report their daily emotions and use the app to understand what events cue different emotions. Figure 12 illustrates the mood meter running on a smartphone. The application uses Plutchik's (2001) emotional colours. There are 25 emotions per quadrant which are revealed after a user selects a quadrant they feel represents the emotions they wish to report. The

dimensions of pleasant and unpleasant and low and high energy differentiate the quadrants. The colours and energy levels represented are:

- RED for emotions that are unpleasant and high in energy like anger, frustration and anxiety
- YELLOW emotions are pleasant and high in energy, like excitement, joy and elation
- BLUE emotions are unpleasant and low in energy, like boredom, sadness and despair, and,
- GREEN emotions are pleasant and low in energy, like tranquillity, serenity and satisfaction

Figure 12: The Mood Meter (Hopelab & Reliable Coders, 2015).

Importantly the Mood Meter does not record levels of activation of emotions; rather it records the names of different emotions. Recording levels of activation is important because the academic emotions of anger/frustration support learning at low levels and not high levels (Pekrun et al. 2002). Therefore, reports from the Mood Meter would not accurately show where learning is or is not supported when learners are viewing an educational film.

2.11.2. MyMoodTracker.

The purpose of this self-report smartphone app is to track events that influence the mood of the user (Aspyre Solutions, 2011). These include sleeping times and sleep quality, as well as medications taken, the amount of exercise performed, stress levels, and menstrual cycles. Figure 13 shows three screens from the application, the ‘Entries’ screen, the ‘How Are You?’ screen and the ‘Mood Chart’.

Figure 13: Three Screens from MyMoodTracker (Aspyre Solutions, 2011).

MyMoodTracker uses emoticons to aid mood/emotion identification to help users self-report their emotions. The application reports by using a graph of mood its level of activation the y-axis plotted against time. MyMoodTracker report is based on an activation scale of 1-10 of emotions in response to life events. Self-reports are made in response to events, not the emotions an educational film might activate, and reports are made over a day rather than the timeline of a film. Mood Meter and MyMoodTracker are both examples of self-report applications neither reports on academic emotions recorded in a manner that can be used by educational filmmakers to critically evaluate their productions for academic emotions.

2.12. Conclusion

This literature review has explored the history of educational films including their background from the beginning of cinema to the present day. It has highlighted educational films' early rich history, a subsequent downturn due to the early Internet's inability to support 'rich media' and the present unprecedented opportunities to use educational films as online learning content. Central to the study of educational films are techniques that filmmakers use to invite audiences to 'feel' emotions and the tools used to measure these 'filmic' emotions. The theories of learning and instructional design have been explored in addition to theories of learner motivation and engagement. Specific strategies used by instructional designers including educational films and how these relate to learning theory and engagement have been investigated. Finally, I have also reviewed two applications to see if they could be used to record academic emotions. This literature review creates the argument for the construction of an application - the WAE app - that can record academic emotions activated by learning experiences particularly educational films.

2.13. Research questions arising from the literature

The questions arising from this literature review concern understanding if an application I created to record learner's academic emotions – the WAE app, has the potential to accurately capture and report the emotions adult learners self-report when watching educational films. It is also important to understand whether educational filmmakers believe the WAE app would be useful to their future workflow and production of educational films. Therefore, the following questions have been selected for this study:

1. *Does the WAE app accurately capture the emotions adult learners self-report when watching an educational film?*

2. *What are educational filmmakers' perceptions on the extent the WAE app is useful in informing them in the production of educational films that activate emotions supportive of learning?*

CHAPTER THREE - METHODOLOGY

3.0 Introduction

This chapter begins by discussing the conceptual framework for this study. The discussion revisits how the research questions arose from the review of the literature. I also state my personal ideology in regards to the production of educational films. Then I describe my research strategy, including how I created the WAE app and choice of methods to gather evidence to answer my two research questions. This is followed by a description of how the data was collected and the analytical strategy employed. The chapter concludes by describing how this study meets the ethical requirements of Torrens University Australia and the strategies used to ensure the validity of this research was not compromised.

3.1. Conceptual framework and research questions

The primary purpose of this study was to understand if the WAE app, could be used to capture viewers' self-reported academic emotions as they watched educational films. A secondary purpose was to understand what happens when educational filmmakers were introduced to and used the WAE app and whether they believed the WAE app could assist them in the producing educational films that activate the emotions that are believed to support learning outlined in the review of the literature.

The importance of disclosing a researcher's ideology is paramount to undertaking successful research. I understand that my perspective has impacted on all areas of this study from inception to data collection, analysis and reporting (Mirriam, 1998). Furthermore, my identity cannot be separated from my 'lived' experiences as an educational filmmaker, which has shaped me as a researcher. It is at this nexus that knowledge presented in this study has been formed (Creswell, 2009). Previously, I have used cinematic techniques to activate emotions in learners and have witnessed mixed results. To understand why these results were mixed was my motivation for conducting this study.

The research covered in the literature review strongly suggests that educational filmmakers can use cinematic techniques to activate the academic emotions of anger/frustration and enjoyment to keep learners in an emotionally supported learning state during the viewing of an educational film. But this hypothesis needed to be supported with evidence. This led me to design the bespoke WAE app to capture the different academic emotions and levels of their activation that viewers self-report when watching educational films. To my knowledge, there is no other app like this yet developed specifically for self-reporting academic emotions when viewing an educational film or entertainment films.

It is important for me to declare my strong and passionate belief that educational films that have been intentionally produced to activate the academic emotions of enjoyment and, anger and frustration in viewers—in this case VET learners—are likely more effective in supporting learning messages than those that do not (Pekrun, 1992). This passion and belief led me to design the WAE app and formulate my research questions that emerged from my review of the literature. This strongly held belief gave rise to the following two research questions:

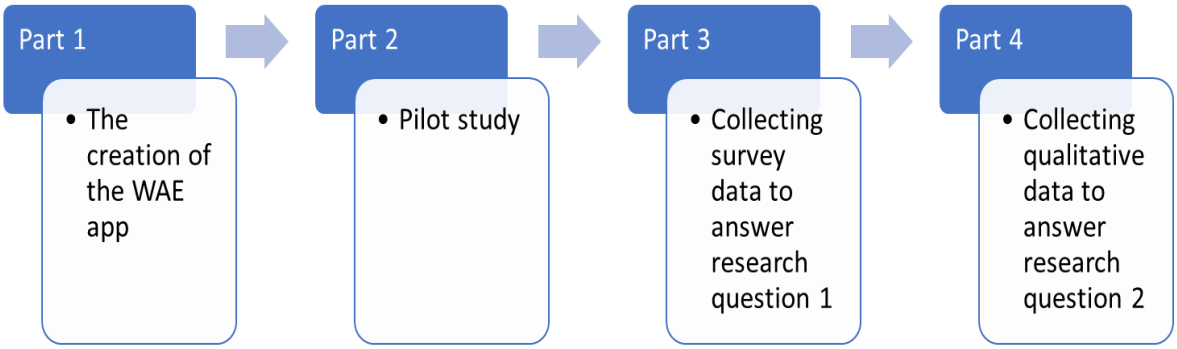
1. *Does the WAE app accurately capture the academic emotions adult learners self-report when watching an educational film?*
2. *What are educational filmmakers' perceptions on the extent the WAE app is useful in informing them in the production of educational films that activate emotions supportive of learning?*

3.2. Research journey and research design

How one answers his or her research questions is a journey that includes research design, methodology, data collection methods, analysis and conclusions concerning the research questions. I start here with my research design. My research design's objective was to ensure I generated evidence to answer my research questions (Maxwell, 2013). To answer the first research question, I designed a survey to uncover VET students' beliefs about the functionality and accuracy of the WAE app to record the academic emotions cued by an educational film at timed intervals. This was administered immediately after they experienced using the WAE app. The second research question was designed to understand educational filmmakers beliefs about the potential usefulness of the WAE app to assist them in the production of educational films. Moreover, I wanted to understand if educational filmmakers—new to the field of academic emotions—believe the WAE app can assist them in producing educational films that activate the academic emotions believed to support learning.

Taking the evidence requirements into account, I created a four part research design (Figure 14).

Figure 14: Parts of the research design



In the first part I detail the different stages of the creation of the WAE app and how I employed some of the theories described in the literature review to inform the app's design – To aid understanding of the complex design process I also include specific examples from the literature reviewed. The second part describes my pilot study to test my survey questions and the WAE app's functionality from a user perspective. This stage also includes my rationale and the design of a 'mashup' film intened to activate different emotions. To test if the WAE app could record different academic emotions and to determine if the WAE app could successfully and accurately generate a report of the academic emotions recorded at timed intervals during the playback of the mashup film. In the third part, I describe how I employed an online survey to uncover recruited study participants beliefs about the ease of use and functionality of the WAE app. In this stage, I again tested the app's ability to generate the reports of viewers self-reported academic emotions at 15-second intervals when they viewed the mashup film. In the fourth and final part, I describe how I collected qualitative interview data about whether educational filmmakers believe the WAE app can assist them in producing educational films that activate the academic emotions believed to support learning.

3.3. Research strategy

The relationships between parts 2, 3 and 4 of the research design, research questions and data collection activities is illustrated in Table 5.

Table 5:

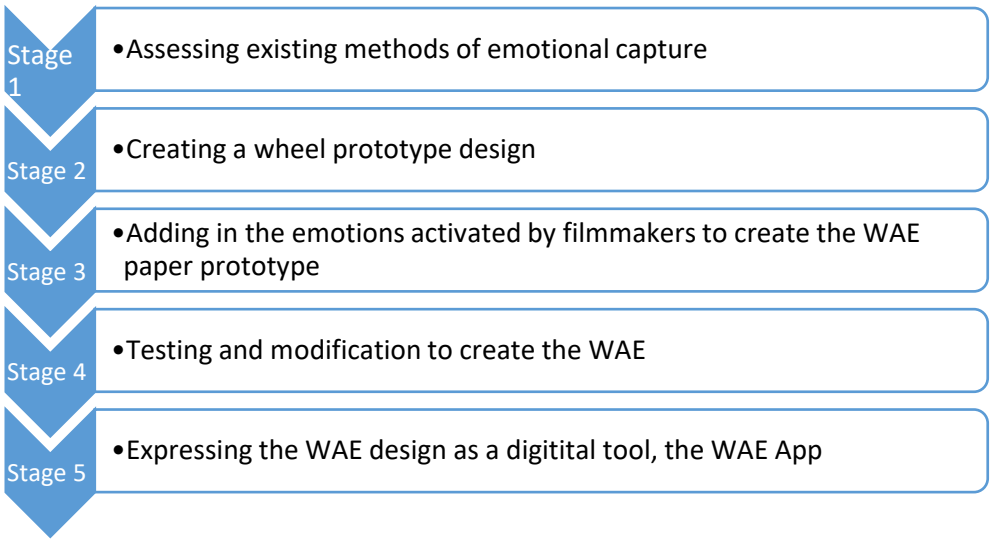
Relationships between the research design, research questions, data collection strategy and data collection type and apps used

Research Design	Research questions	Data collection strategy	Data collection type - Educational filmmakers	Data collection type and– VET learners
Part 2	Pilot study	Recruited 4 friends who are VET practitioners teaching or have taught Hospitality to use the WAE app and self-report any emotions activated from watching the Mashup film	N/A	Online Survey responses WAE app Informal comments
Part 3	Does the WAE app accurately capture the emotions adult learners self-report when watching an educational film?	Recruited a sample of 12 VET learners to use the WAE app and self-report any emotions activated from watching the Mashup film. Then asking the VET learners to complete an online survey.		Online Survey responses and the WAE app
Part 4	Do educational filmmakers believe the WAE app can assist them in the producing educational films that activate emotions believed to support learning?	Recruited a sample of 4 educational filmmakers to use the WAE app and self-report any emotions activated from watching the 'mashup film. Then conducting qualitative interviews with the educational filmmakers.	Qualitative interviews	

3.4. Part 1: Prototype design of the Wheel of Academic Emotions

This section describes the five stages I completed when designing the prototype Wheel of Academic Emotions (WAE) and the final stage of expressing the WAE as a digital tool, the WAE app (Figure 15). I started by assessing existing methods of capturing the emotions of film viewers – stage 1. In stage 2 I created a wheel design by drawing upon a circumplex model of academic emotions and adding in selected emotions from those that filmmakers plan to activate in audiences (Henry, 2005), those recorded by neurocinematic techniques, Izards (1977) discrete emotional scale, the eXpanded Positive and Negative Affect Schedule (PANAS-X) and Schaefer et al's., (2010) enhanced DES emotions. In stage 3 I produced a paper prototype of the Wheel of Academic Emotions (WAE). I then tested and modified the WAE paper prototype to create the WAE in stage 4. The final stage was expressing the WAE as an online app that I refer to as the WAE app.

Figure 15: Stages in the design of the Wheel of Academic Emotions



3.4.1. Stage 1 - Assessing methods of capturing the emotions of film viewers.

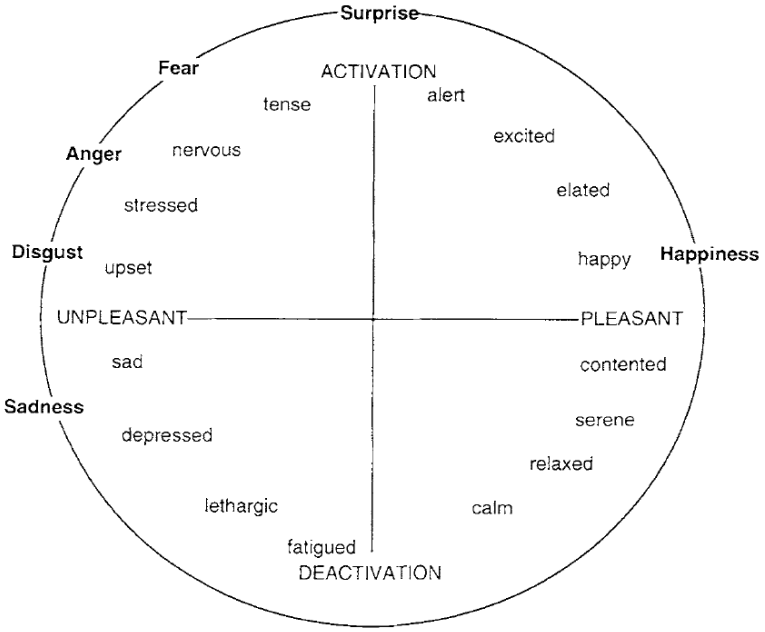
There are various methods used to capture emotions of film viewers and each has different strengths and weaknesses. I undertook and an assessment of these methods to design the WAE paper prototype. Methods assessed included observation of physiological responses, biometric monitoring (Oliveira, Martins, & Chambel, 2011) via heart rate for example and use of brain imaging devices (Hasson et al., 2008). However, these methods have limited usefulness because they report a small number of emotions, and there is uncertainty regarding the reporting of the of activation of these emotions. For instance, the emotion of fear might be reported but to what level of activation? Self-report methods were also investigated including the 'emotional slider' (Laurans et al., 2009) which provided a method to determine the valence and activation of emotion, but did not provide specific information about the range of emotions that are needed for this study – specifically academic emotions. The results of the investigation of the strengths and weaknesses of the methods assessed is contained in Appendix A. A self-report method was selected for use in this study because of its flexibility in drawing from different emotional categories and the ability to record different levels of activation.

3.4.2. Stage 2 - Construction of a wheel design.

Reviewing other empirically validated wheel designs that are used to report emotions and creativity including The Geneva Emotional Wheel (Sacharin, Schlegel, & Scherer, 2012), Plutchik Emotional Wheel (Plutchik, 2015) and the C^2Learn Creativity Wheel (Craft, Chappell and Walsh 2014), it became apparent that a self-report tool based upon a wheel design could meet the needs of this study. I settled on a wheel design because it allows relationships to be shown, specifically the broad emotional categories of academic emotions, with subordinate emotions associated with film. Shuman & Scherer (2014) argue the broad categories contained in circumplex models are used "to

assess discrete emotions that are then aggregated according to superordinate dimensions, factors or clusters" (p.27). Feldman, Barret and Russell's (1999) circumplex model of affect is an example (Figure 16) of aggregating emotions. In their circumplex model the superordinate emotion of happiness contains the subordinate emotions of elated, excited, happy, contented and serene.

Figure 16: Feldman, Barret & Russell (1998) circumplex model of affect



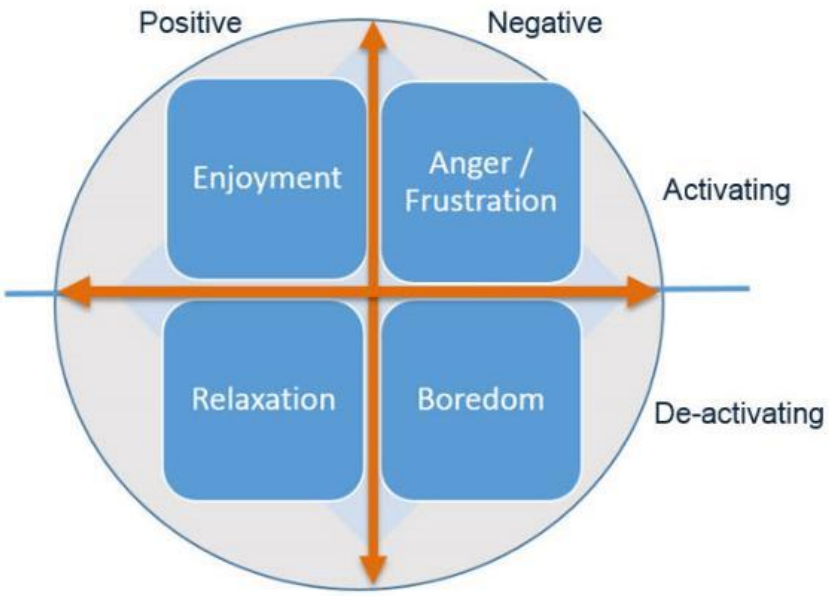
Moreover, the wheel approach permits the level of activation of a emotion to be shown, the further away from the centre the more the emotion is activated.

Figure 17 shows the initial design that I created using a circumplex model of academic emotions using Pekrun & Linnenbrink-garcia's (2012) 2x2 dimensional view of academic emotions. It shows the relationships between each academic emotion and its attribute. In this case the broad categories of academic emotions are:

- *positive activating:* enjoyment
- *positive deactivating:* relaxation
- *negative activating*: anger/frustration
- *negative de-activating*; boredom

With positive affect on the left-hand side, negative on the right-hand side, above the central horizontal line activating – supporting learning and below deactivating – not supporting learning. However, this design lacks the application of those emotional categories researchers use when assessing a film for its ability to activate emotions.

Figure 17: Initial 2 x 2 circumflex (wheel) of academic emotions



3.4.3. Stage 3 - Adding the emotions activated by film into the wheel.

In order to provide the wheel, design the ability to capture emotions VET learners self-report when viewing an educational film. I divided the broad academic emotions into those emotions used to assess film clips for their ability to activate emotions in audiences. I adopted the circumplex approach of Shuman & Scherer (2014) of aggregating discrete emotions, into subordinate categories. In this case, the Schaefer et al., (2010) modified DES scale emotions (Table 6), into the broader superordinate categories of academic emotions.

Table 6:

The Filmic, Neurocinema, Academic emotions, DES, Modified DES and PANAS-X emotional categories drawn on to design the WAE app

Filmic Emotions – Henry (2005)	**Neurocinema Emotions**	**Activity Emotions (Broad categories) Pekrun (2002)**	**DES Izard(1997)**	**Modified DES Schaefer et al., (2010)**	**PANAS -X Positive Affect**	**PANAS -X Negative Affect**
Anger	Anger	Anger / Frustration		Interested, concentrated, alert;	Active	Afraid
Fear	Fear	Enjoyment	Surprise	Joyful, happy, amused;	Alert	Ashamed
Disgust	Disgust	Boredom	Joy	Sad, downhearted, blue;	Attentive	Distressed
Sadness	Sadness	Relaxation	Sadness	Angry, irritated, mad;	Determined	guilty
Amusement	Happiness		Fear	Fearful, scared, afraid;	Enthusiastic	Hostile
Tenderness			Shyness	Anxious, tense, nervous;	Excited	Irritable
Neutral State			Guilt	Disgusted, turned off, repulsed;	Inspired	Jittery
			Disgust	Disdainful, scornful, contemptuous;	Interested	Nervous
			Contempt	Surprised, amazed, astonished;	Proud	Scared
			Interest	Warm hearted, gleeful, elated loving, Affectionate, friendly;	Strong	Upset
				Guilty, remorseful;		
				Moved;		
				Satisfied, pleased;		
				Calm, serene, relaxed;		
				Ashamed, embarrassed.		

However, as table 6 illustrates there are many modified DES emotions, to reduce the number of emotions and to ensure emotions were assigned to the correct broader emotional category, I drew on the emotional categories from Parrot's (2001) emotional groupings and the groupings used in the Geneva Emotional Wheel (Siegert, Bock, Vlasenko, Philippou-Hubner, & Wendemuth, 2011) – Figure 18, and Feldman, Barret & Russell (1998) circumplex model of affect (Figure 16) this approach allowed me to use one emotional adjective to describe similar emotions.

Figure 18: Geneva Emotional Wheel

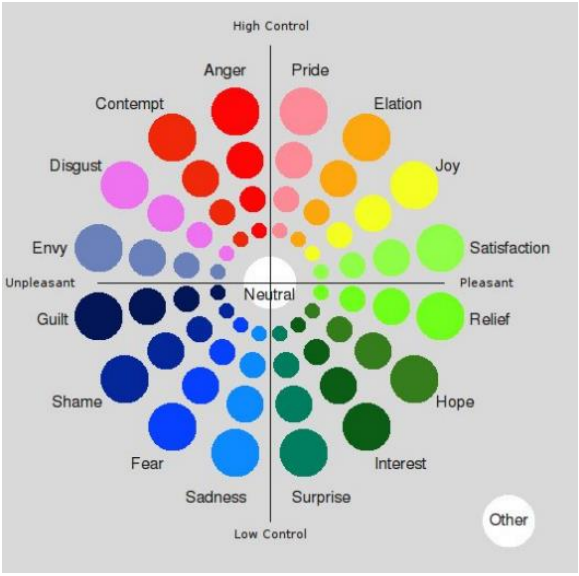


Table 7, illustrates how I achieved this regrouping. For instance, the broad academic emotion of enjoyment has subordinate emotions of interested, concentrated, alert, joyful, happy, amused, surprised, amazed, astonished, warm-hearted, gleeful and elated. The negative emotions of disgusted, turned off, repulsed, guilty, resentful, disdainful, scornful, contemptuous sad, downhearted, blue, were assigned to the negative de-activating academic emotion of boredom.

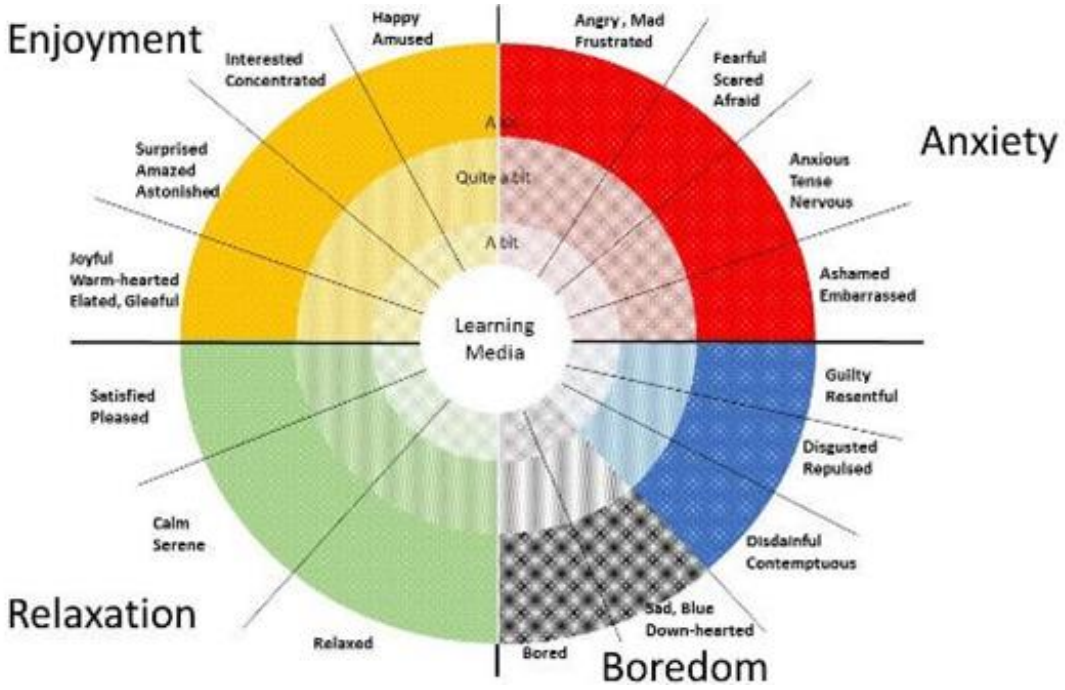
Table 7:

Emotional categories used in the creation of the prototype WAE design

Broad categories of academic emotions	**Reduced set of modified DES emotions as subordinate academic emotions**
Enjoyment	Interested, Concentrated, Alert, Joyful, Happy, Amused, Surprised, Amazed, Astonished Warm-hearted, Gleeful, Elated
Relaxation	Relaxed, Serene / Calm, Satisfied / Pleased
Anger / Frustration	Angry, Irritated, Mad, Frustrated, Anxious, Tense, Nervous, Fearful, Scared, Afraid, Ashamed, Embarrassed
Boredom	Boredom, Disgusted, Turned off, Repulsed, Guilty, Resentful, Disdainful, Scornful Contemptuous Sad, Down-hearted, Blue

To complete the prototype design, I split the wheel into segments that contained the modified DES emotional categories (Table 6) used by Schaefer et al. (2010). To aid identification of the broad emotional categories, I coloured them using Pluchick's (1980) emotional colours. I selected green for relaxed, yellow for enjoyment, blue for turned off, grey for bored and red for anger/frustration. Figure 19 shows the first paper prototype design of the tool which I called the *Wheel of Academic Emotions* (WAE).

Figure 19: Paper Prototype Wheel of Academic Emotions (WAE) design



3.4.4. Stage 4 - Testing and modification.

I casually piloted the WAE paper prototype at an HDR seminar that held in October of 2014; the attendees were four HDR students and five staff from Torrens University Australia. The seminar included testing the WAE prototype by viewing two short educational films. The films shown were *Responsible Service of Alcohol* (Hall, 2007) and *Mistakes* (Motor Accident Commission, 2014). Attendees marked on a paper print out of the WAE prototype the category of emotion they felt was being activated in them by the film. Attendees wrote a number in the emotional category they perceived they felt every 15 seconds starting with a '1' continuing with the next subsequent number until the film ended. Individuals compared and discussed their results with the group.

Analysing the seminar feedback about the WAE design, there were too many emotions marked and the tool was difficult to use. Attendees experienced difficulty when quickly trying to find an emotional category, the act of looking away distracted from the educational film and the lack of a report meant that attendees had difficulty discovering when their self-reported emotions changed. Also, some attendees said they did not experience any emotions during parts of the films, and there was nowhere to report this. There were also issues of numbers being over-written due to the overcrowding of categories on the tool.

To create the Wheel of Academic Emotions I used the feedback provided from the casual testing regarding the emotional categories used. I needed to reduce the number of subordinate emotions and add in an emotional category of 'No emotion'. To reduce the number of subordinate emotions, I

used the same technique of referring to emotional families to discover which emotion could be closely associated with another as I did when creating the WAE prototype. This process led to the reduced number of subordinate emotions shown in Table 8. For instance, the broad academic, emotional category of enjoyment now contains four emotions; focussed, amused, surprised and feel-good, compared to the previous 12. Additionally, I added the category of 'No Emotion' as a broad category.

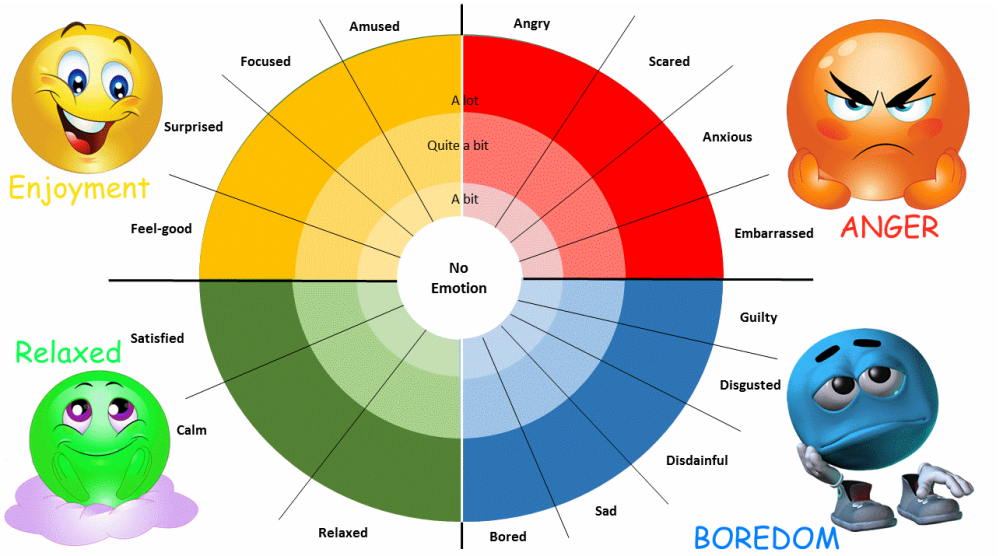
Table 8:

Emotional categories used in the creation of the WAE

Broad emotional categories of Academic emotions + No emotion	**Subordinate emotions from modified DES (Schaefer, et al., 2010)**
Enjoyment	Focussed, Amused, Surprised, Feel Good
Relaxation	Relaxed, Calm, Satisfied
Anger / Frustration	Frustrated, Anxious, Scared, Embarrassed
Boredom	Bored, Disgusted, Guilty, Disdainful, Sad
No Emotion	

Emoticons were added to aid users in quickly identifying the broad emotional categories, as they have been shown as a more efficient aid to identifying categories than text-based labels (Feidakis, Daradoumis, Caballé, & Conesa, 2014). Furthermore, emoticons have been used in a similar manner by D'Mello (2012) when investigating the use of affective computer systems and learning (D'Mello & Graesser, 2012). Figure 20 illustrates the updated design of the WAE.

Figure 20: The Wheel of Academic Emotions (WAE)



3.4.5. Stage 5 - Expressing the WAE design as a self-report tool in the form of an app.

I created an online version for the WAE called the WAE app to address the feedback from the TUA seminar participants concerning how the act of looking away distracted from the educational film and the lack of a report meant that attendees had difficulty discovering when their self-reported emotions changed.

I divided up the wheel graphic into each segment, for instance, the segment of 'disgusted' at activation of 'a lot' then used a web-based programming language to record when this segment was clicked on. To use the WAE app requires a device that can access the Internet, via a web-browser with the ability to show the WAE app and an educational film alongside each other (Windowing). Figure 21 illustrates how the WAE app is designed to be used onscreen alongside an educational film to reduce the self-report effect by not looking too far away from the educational film.

Figure 21: The WAE app in use - side by side with an educational film

Moving from the prototype WAE design to the final WAE app an online version allowed the following improvements:

- reducing the self-reporting effect, described as a problem in by the users at the seminar held at TUA, by windowing the WAE design next to the educational film being assessed;
- allowing those who use the WAE app to select an emotional category by 'clicking on' that category rather than marking a paper-based version;

- ease of use on device where most academic films are now watched (e.g. tablets and computer monitors or laptop screens); and
- an ability to quickly and easily generate a report showing emotions reported, the level of activation and when reported during the watching of an educational film.

Generating a report was a critical new component of producing the WAE app. Educational filmmakers or any designer of digital media can use this report to understand what emotions their audiences self-report. Then they can use the data from the report to edit/amend a film/production based upon the report. Specifically, an educational filmmaker can compare the emotions self-reported by viewers in the report to the different scenes in their educational films. For instance, the report might show that at 5 or 15 minutes into the film the emotion of boredom is reported. The educational filmmaker can then decide to change the scene or even use a film technique to activate the emotion of anxiety, for example, to encourage a learning state in a viewer. Significantly, using the WAE app potentially assists educational filmmakers to edit or create different productions for specific emotional cohorts. For instance, more negative emotional cueing to keep younger learners engaged and more positive emotional cueing for older learners.

This part of the research design has described how I used the theories outlined in the literature review to design the WAE app as a tool to measure what academic emotions learners self-report when viewing educational films. However, I needed to pilot the WAE app before asking learners to use it and before presenting it to educational filmmakers.

3.5. Part 2 - Pilot study

The part of the reseach design describes how I piloted the WAE app, created and tested an online survey tool and the production of a ‘mashup’ film produced to activate different academic emotions in learners. The pilot study was completed in September 2015. The pilot study aimed to test the functionality of the WAE app using my self-produced ‘mashup’ film. I needed to make sure participants could use the app to self-report the academic emotions I believed my ‘mashup’ film activated as they watched it on a computer screen with the app opened in mirrored screen. In the pilot study, I also tested my online survey to understand if my statements made sense. Four friends who are VET practitioners participated in the pilot study. They tested the WAE app as they watched the mashup film by self-reporting the academic emotions they felt using at 15-second intervals. Then they completed the online survey (Table 9).

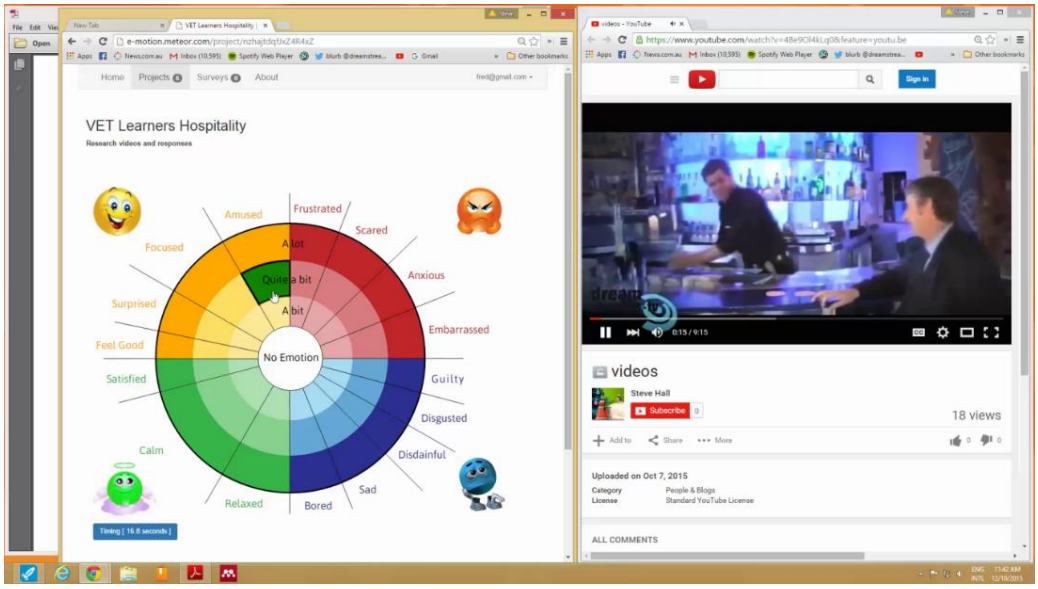
Table 9*:*

The survey

Questions on using the WAE app	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I believe the WAE app was easy to use.				
2. I believe that most people could easily use the WAE app to record the emotions they feel when viewing an educational film.				
3. I believe it was easy to record the emotion I felt when signalled to do so.				
4. I found starting and stopping the WAE app was easy.				
5. I found generating the WAE app report was easy.				
6. I found the WAE app very cumbersome to use.				
7. I found the WAE app unnecessarily complex.				
8. It was easy for me to select the emotion I was feeling at the indicated signal.				
9. I feel I need more training to use the WAE app to report the emotions I feel.				
Questions on the WAE app's functionality	Strongly Disagree	Disagree	Agree	Strongly Agree
10. I believe the sound used to signal when to report was not distracting				
11. I believe the confirmation of my reporting by flashing a color was helpful				
12. I believe the colours of the emotions helped me in locating the emotion I wanted to report.				
13. I believe the emoticons were helpful in locating the emotion I wanted to report.				
14. I felt the WAE app accurately reported the emotions I recorded when signalled to do so.				
15. I felt the WAE app had all of the emotions that I needed to report as I watched the educational films.				
16. I found the WAE app report was easy to understand.				

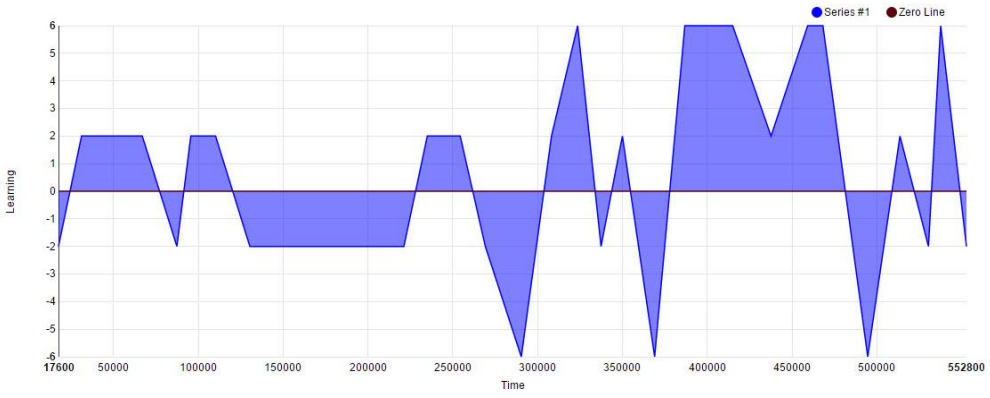
The pilot study participants completed these activities online using a web-browser which was 'windowed' (Figure 22). 'Windowing' is the process of establishing a web browser window for the WAE app and a window for the mashup film, enabling study participants to view the mashup film and use the WAE app simultaneously using a mouse to select the academic emotion at 15-second interviews. Participants then completed the online survey by opening a hyperlink in another browser window.

Figure 22: The WAE app 'windowed' alongside the mashup film



The pilot study participants provided feedback via email and their survey responses. Two issues emerged from the pilot study concerning the WAE app. The first issue that 2 participants reported via email was difficulty 'windowing' - creating two web-browsers windows, a window for the WAE app alongside a window for the mashup film. The second issue that arose was the time taken to see their WAE app report. Participants expected their WAE app report to be shown instantaneously rather than the 10 seconds the WAE app was taking to show, create and display the report. The WAE app creates a graph based on the viewers selected academic emotions and plots the emotions reported as being positive – supporting learning, above a horizontal axis and those not supporting learning as negative below the axis. The level of activation of an emotion is represented as 6 for 'a lot', 4 for 'quite a bit' and 2 for 'a little' (Figure 23).

Figure 23: WAE report



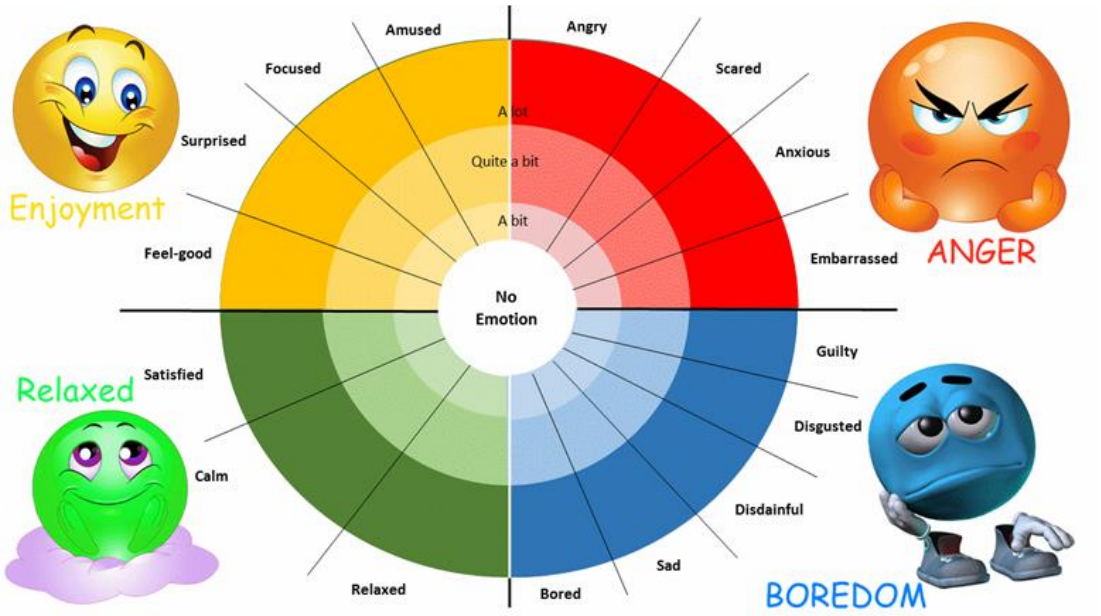
To address the issue of 'windowing', I produced an online video tutorial detailing how to 'window' the WAE app in a web-browser window alongside another 'window' containing the Mashup film (Appendix L). The tutorial also modelled how to access the WAE report and the estimated wait time.

The pilot study participants did not highlight any other issues in regards to the filling out the survey online or not understanding any of the statements. After the pilot, I felt both the WAE app and online survey were ready to be used for parts 2 and 3 of the research design.

3.5.1. Producing the Mashup film.

I produced a mashup educational film for the study to determine if it activated the academic emotions that the WAE app was designed to record. Choosing the topic of the mashup film was important, as the topic would guide my selection of participants in Stage 2 of the research design. Topic interest in learners is significant. Pekrun (2010) argues "enjoyment of learning is experienced when the learning material is perceived as interesting and valuable" (p.12). The topic of Hospitality was chosen because of the wide availability of learning films on the topic, as well as my access to VET learners who study hospitality from my friends who are VET trainers. I created the mashup film from four hospitality learning films by taking scenes from each one and producing a new film. I designed the mashup film to activate as many emotions at different levels of activation as possible from the WAE emotional categories, which are illustrated in Figure 24.

Figure 24: WAE emotional categories



The specific production strategy I took for producing the mashup was to design 4 clips that would activate emotions from the WAE are outlined below in Table 10.

Table 10:

Design of the mashup film

Clip	Academic emotion I wanted activate	Why?
Clip 1	Enjoyment	To reduce any carryover effects of learner's emotions from their daily lives, preparing the learners to learn (Schaefer et al. 2010)
Clip 2 & 3	Low and high levels of Anger/Frustration	To discover if the WAE's report would show that learning is supported at low levels of anger/frustration and not at higher levels (Pekrun, 1992).
Clip 4	Boredom/Turned off and No emotion,	To test the WAE app for recording and reporting these emotions.

The rationale for the inclusion of parts of each film in the mashup film, plus the emotions and levels of activation I intended each clip to cue in viewers is described below.

3.5.1.1. Clip 1: Activating 'enjoyment'.

The first clip (2 mins) is part of a light-hearted learning film entitled *Responsible Service of Alcohol*, (Hall, 2009) showing an atypical drunk business person being refused service in a hotel. The clip is slightly humorous in nature (Figure 25), its purpose was to reduce any emotional carry-over effect – where learners bring emotional baggage with them from their lives. To put it more simply, I chose a mildly humorous clip to relax viewers and put them in an emotional state where they are ready to learn.

My goal was to minimise high levels of anxiety from work stress that often reduces the cognitive abilities of learners (Medina, 2008). Following work by Schmidt & Schmidt (2015), I aimed to ameliorate carry-over emotions by showing a this film segment that cues the mild emotional response of humour.

Figure 25: A scene from Responsible Service of Alcohol (Hall, 2009).

3.5.1.2. Clips 2 and 3: Activating 'anger/frustration'.

Hotel Impossible (Bible & Atlas Media, 2012) was the second clip I chose (Figure 26), where an expert, a hotel 'fixer' Anthony Melchiorri, 'helps' unprofitable hotels improve their financial performance to become profitable ventures (2 Mins). I was hoping this clip would active the superordinate emotion of anxiety/frustration which according to Pekrun's (1992) theory of academic emotions should support learning in the VET learners. Other emotions I expected to be activated were the subordinate emotions of focused, surprised, embarrassed and disgusted because of the scenes shown. For instance, the scene showing cockroaches in an unwashed bathroom I expected to activate the emotion of disgust in viewers.

Figure 26: A scene from Hotel Impossible (Bible & Atlas Media, 2012.)

My editing objective for the third clip was to activate high levels of the superordinate academic emotions of anger/frustration. I took the clip from a Gordon Ramsey television show, *Kitchen Nightmares* (ITV Studios America & Optimen, 2007). The clip consists of scenes of interpersonal conflict verging on violence (Figure 27). There is much swearing that is 'bleeped' out which enhances the ongoing conflict. The subordinate academic emotions I believed the clip could potentially activate in the hospitality students were anxiety and scared as well disdain and disgust.

Figure 27: A scene from Hell's Kitchen (ITV Studios America & Optimen, 2007).

3.5.1.3. Clips 4: Activating 'boredom and no emotion'.

The final clip was included to activate the superordinate emotion of boredom which according to research does not support learning (Pekrun, 1992). It was another responsible service of alcohol (RSA) clip *Responsible Service of Alcohol – Refusal of Service* (Clubs SA, Licensed Club Industry Training Foundation of SA Inc. & Northern Light Theatre Company, 2013) and shows the recommended method of refusing service of alcohol to an inebriated client (Figure 28). The production values are not high, I believed the poor acting when combined with the learners having already watched another RSA production would activate the emotions of boredom and no emotion.

Figure 28: A scene from Responsible Service of Alcohol – Refusal of Service (Clubs SA, Licensed Club Industry Training Foundation of SA Inc. & Northern Light Theatre Company, 2013).

Editing the four film clips discussed above together produced the mashup film, which had a running time of 9 minutes and 16 seconds. I believed this was enough time to test the WAE app to find out if it activated the emotions I produced the mashup to activate at timed intervals. The editing process

also afforded the opportunity to embed audio cues into the Mashup film. The cues comprised of a pre-recorded vocal 'beep' and were placed every 15 seconds. The purpose of the cues was to alert viewers of the Mashup film to self-report any emotions they felt using the WAE app upon hearing the 'beep'.

The pilot study participants self-reported the academic emotions I produced the Mashup film to activate in viewers. I was surprised by the self-reporting of the emotion of disgust (I did not expect that emotion to be reported), I expected the emotions of anxiety and scared to be activated from the Gordon Ramsey scene from *'Hells Kitchen'*. I believed the reporting of disgust to be an artefact from the 'positivity effect' due to the mature ages of the pilot study participants preferring positive emotions (Charles, Mather & Carstensen, 2003). Having completed the pilot study and improved my learning resources by creating a tutorial on how to use the WAE app combined with the positive feedback on the mashup film, I felt confident on proceeding to part 3 of the research design where I investigated whether the WAE app accurately captured the academic emotions adult learners self-report when watching an educational film.

3.6. Part 3 – Collecting data from VET Learners

This part of the research design describes the methods employed to generate data to help answer the first research question, "*Does the WAE accurately capture the academic emotions adult learners self-report when watching an educational* film*?"* To test the accuracy to the WAE app, I used a stratified, purposeful sample of VET learners. I invited them to use the WAE app to self-report their emotions when viewing the mashup film at timed intervals. Then, I asked them to complete an online survey concerning the WAE's ease of use and functionality of the WAE app.

3.6.1. Sampling and Recruitment of VET learners.

I used a stratified purposive strategy to recruit 12 VET learners. I adopted this sampling strategy to reduce the risk of emotional outliers. Hwang & Salvendy (2010) recommend a sample size of 12 is appropriate for discovering 80% or greater of software problems (Hwang & Salvendy, 2010), which is the sample size I chose for this study. The sample was 12 VET learners who were are aged over 25 years old, identified themselves as Australian and an interest in the topic of Hospitality. There were chosen for the study because;

- older adults have different emotional responses to those under 25 years of age (Tsai, Levenson, & Carstensen, 2000), favouring positive emotions when processing information (Mather, 2011);
- the culture of an individual also affects their emotional responses to film stimuli (Schaefer, Nils, Sanchez, & Philippot, 2010a; Jeanne Tsai, Levenson, & McCoy, 2006); and
- interest in a topic has a relationship to the emotions of learners (Pekrun et al., 2002).

This sampling strategy was adopted, because I needed participants who had an interest in Hospitality (purposive sample) and meet specific demographic and cultural requirement (stratified sample) to try and reduce any outliers from the emotions they report. Twelve VET learners, who were over 25 years of age, identify as culturally Australian and are undertaking Hospitality programs were recruited as study participants from the following registered training organisations:

- Careers Australia Pty Ltd;
- Access All Areas Training Pty Ltd. and; and
- Adelaide Hospitality and Training School Pty Ltd.

I recruited the VET learners by telephoning my personal contacts in these training companies and asking them for their assistance in enabling me to recruit VET learners. I then sent them a flyer (Appendix B) by email for distribution. VET learners who responded were sent the 'VET Learner Participant Information sheet' (Appendix C), and 'VET Learner Informed Consent form' (Appendix D). The 'VET Learner Informed Consent form' instructs those who agreed to participate and who met the study's sampling requirements to sign, photograph/scan and email the completed form back to me. Once this was received, the VET learners were sent another email (Appendix E) which provided details of how to participate in the study and included:

- a document called *'How to use the WAE app'* (Appendix F);
- a YouTube link to an instructional video of the same name;
- a YouTube link containing the hospitality focused 'mashup film' I produced;
- a link to the online 'Google form' survey; and
- instruction on how generate the WAE report, which shows what emotions they self-reported, when and to what level of activation as an aid to completing the survey.

The strategy described above resulted in 12 VET learners who had an interest in Hospitality and met the age and culture requirements being recruited as study participants.

3.6.2. Data collection tools.

There were two tools used to gather data to answer the first research question. The first tool was an online survey designed using 'Google forms'(Table 9) to understand what VET students self-reported about using the WAE and its functionality. The rationale for using 'Google forms' was they are easy to create and easy for study participants to access anywhere they have access to the internet. 'Google forms' work on any web-browser and any on any device. The output is a saved as a 'Google'

spreadsheet with access only available to the linked Google 'Gmail' account, in this case, my *Torrens University Australia* student email account, therefore protecting the privacy of the data.

The survey I designed used a Likert ordinate scale to record responses. Ordinate scale categories indicate a preference, however there is not an interval relationship between the categories. For instance, when a respondent indicates they, 'strongly agree' with a question, this cannot be seen as having twice the weight of 'agree.' All it indicates is a stronger response, similarly with 'disagree' and 'strongly disagree'. The Likert scale I used had four categories and were bi-polar, there was no neutral category. The reason for this choice was to force a response to either agreeing or disagreeing with the question statement. Moreover, using a four-category scale has been shown to reduce any effect of participants wanting to please the researcher (Garland, 1991). The online survey was designed to gather data concerning the VET students' beliefs about the use and functionality of the WAE app. The questions and Likert scale categories are shown in Table 9. The online 'Google form' survey I created provided an efficient method of gathering data from participants free from the limitations of distribution, collecting and collation needed with paper-based surveys.

The second data set was collected by the WAE app itself in the from the academic emotions self-reported at 15-second intervals. To generate this report the WAE app gathered the VET learners self-reports which are the academic emotions and level of that academic emotions' activation along the scale: 'a bit'; 'quite a bit'; and 'a lot'. Table 11 shows an excerpt from this data set for 6 VET learners.

Table 11 :

Excerpt from the data set for 6 VET learners self-reports at timed intervals.

mail	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp
annon2@thewaetool.cc	neutral	0	36.4299	scared	1	53.6434	anxious	2	69.1870	disgusted	2	86.5143	disgusted	1	104.2339	disgusted	3	121.5218
annon3@thewaetool.cc	bored	1	19.5513	bored	1	35.9432	bored	1	50.3890	frustrated	1	64.9866	disgusted	1	84.8374	disgusted	2	100.2001
class1@hotmail.com	feel-good	2	21.2863	focused	2	38.1302	calm	3	53.4115	bored	3	70.3787	feel-good	3	82.4840	feel-good	3	96.2724
class23@gmail.com	amused	1	26.9770	relaxed	1	40.3502	focused	2	57.4312	embarrassed	1	69.6857	bored	1	87.9178	feel-good	1	102.9077
classr@gmail.com	calm	2	32.2282	focused	3	45.9586	calm	2	63.2059	relaxed	2	79.9080	focused	2	92.0522	surprised	3	105.0832
class1@hotmail.com	calm	2	28.9227	feel-gooc	2	41.7775	disgusted	1	56.1987	feel-good	2	72.2563	satisfied	2	86.1608	disgusted	1	106.9752

3.6.3. Data collection – VET learners

Data was gathered from the 12 VET learners during the period 10th of October to the 20th November 2015. The VET learners all resided in the metropolitan area of an Australian city. Two participants completed the research tasks online of using the WAE app when watching the mashup film and completing the online survey. Two research sites (RTO's) each with 5 research participants, used the research tasks as a classroom activity. Table 12, shows the distribution of learners at each site.

Table 12:

Participants at each data collection site

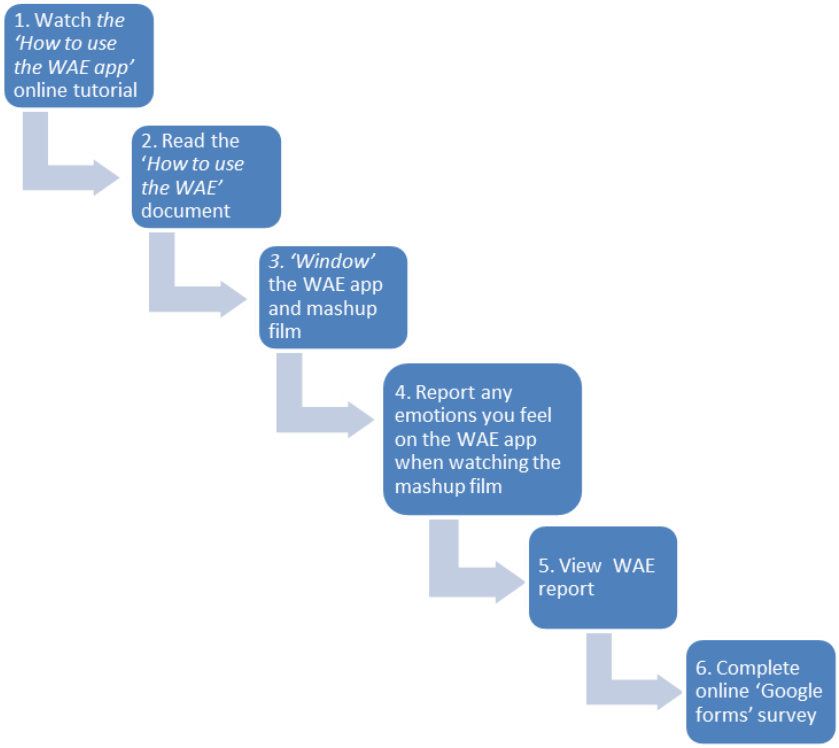
Number of participants	*5*	*2*	*5*
Research Site	Site 1	Site 2	Site 3
Context of WAE app use	Classroom activity	Online at home	Classroom activity
Dates data gathered	10th November	13th October	20th November

VET learners who volunteered to participate in this research responded to the flyer I asked my contacts in the following RTO's to distribute; Careers Australia Pty Ltd, Access All Areas Training Pty Ltd. and Adelaide Hospitality and Training School Pty Ltd. I sent them an email introducing the research study and the process they needed to follow to participate in this study, previously described in section 3.5 Sampling strategy. I planned the data gathering process as follows:

1. VET learners were asked to watch the YouTube tutorial '*How to use the WAE app'.* That I had created to instruct the VET learners how to use the WAE app when watching the mashup film, by 'windowing' the WAE app alongside the mashup film and how to self-report their emotions at the audio cues (Appendix M).
2. Then read the accompanying pdf document of the same name to further aid VET learners familiarisation of the WAE app and how to use it (Appendix F),
3. Open the WAE app and Mashup film in different web-browser windows alongside each other, as shown in the *'How to use the WAE app'* tutorial,
4. After starting the Mashup film, self-report any emotions, they felt upon hearing an audio cue embedded in the Mashup film. They did this by clicking on the emotion and level of activation of that emotion on the Wheel of Academic Emotions which is part of the WAE app,
5. When the Mashup film finished, the VET learners then viewed their WAE report to see where their learning was or was not supported when viewing the mashup film, and
6. Lastly, open the link to complete the 'Google form' survey.

The 6 stage data collection process I planned for VET learners is shown in Figure 29.

Figure 29: Six stage data collection process - VET learners

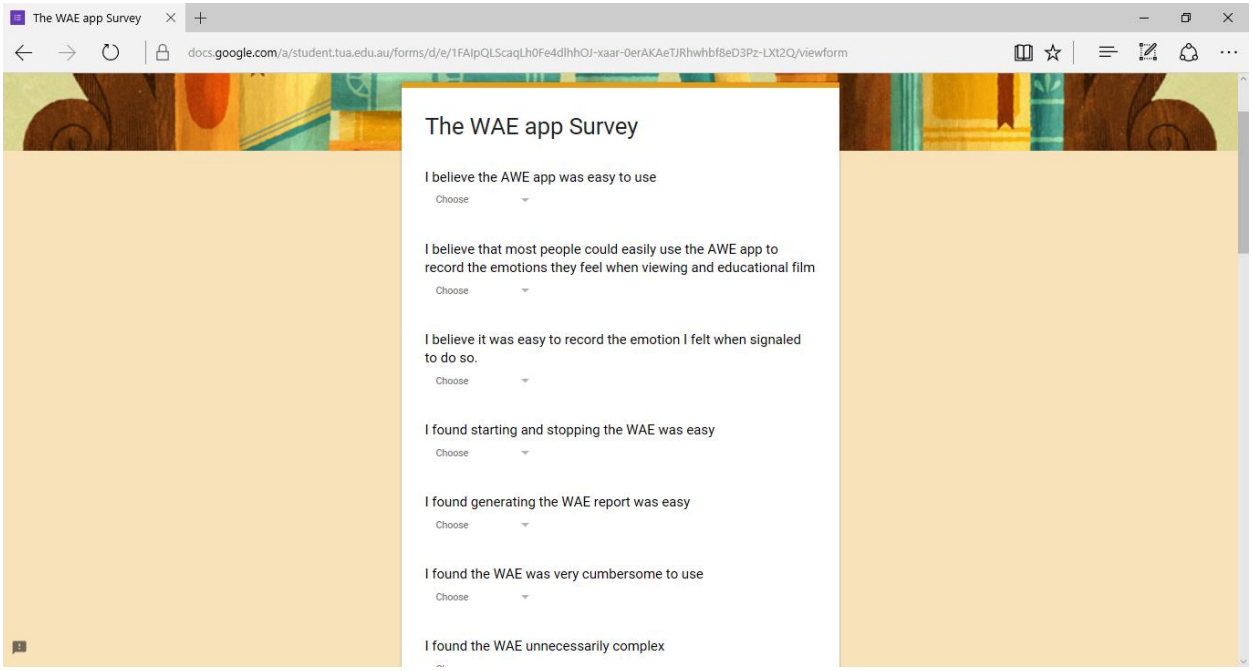


Unfortunately, 5 learners at Site 1 were unable to complete the research process of using the WAE app when watching the mashup film and the completing the Google survey because they had difficulty establishing the WAE app in a 'window' alongside another 'window' containing the Mashup film (Figure 22). The VET learners at site 1 gave up after being unable to establish the different windows for the WAE app and mash up film and their learning facilitator asked me to assist. I attended the site the next week and set up the 'windowing' for each VET learner before they arrived so they could complete the data gathering process. Figure 30 illustrates the data collection process in action at Site 1 during my visit.

Figure 30: Data collection VET learners

At the end of the data collection period, twelve VET learners used the WAE app to self-report their emotions as they watched the mashup. Each one of them also completed the online Google form survey (Figure 31). The Google form reported the survey responses from VET learners in a Google spreadsheet.

Figure 31: The Google form and link https://docs.google.com/forms/d/e/1FAIpQLScaqLh0Fe4dlhhOJ-xaar-0erAKAeTJRhwhbf8eD3Pz-LXt2Q/viewform



3.6.4. Analytic strategy employed.

Two forms of data were collected, online survey data from VET learners and also their individual WAE reports. The WAE report from each VET learner (Figure 31) was checked to confirm the VET learner had self-reported emotions when prompted to do so at the 27 audio cues embedded in the mashup film. This provided data that the VET learner had used to app to self-report emotions activated by the mashup film. The approach of analysing the survey data was dictated by the ordinal nature of the Likert categories used. Ordinal scales require a different approach to analysis and reporting compared to interval data. I used the following four categories in my ordinal likert scale; "Strongly Disagree", "Disagree", "Agree", "Strongly Agree". Bertram (2007) says of ordinal scales "we cannot presume that participants perceive the difference between adjacent levels to be equal" (p2). I have used his recommended methods of analysis on the survey data, specifically;

- using Bar charts to represent summary data about each question,
- using the median and mode – not mean, for measures of central tendency.

The analysis and findings from the data gathered from VET learners is presented in the next chapter.

3.7. Part 4 – Interviewing educational filmmakers

This part of the research design describes the methodogy I used to collected data to answer the second research question. The second research question examined what the beliefs of educational filmmakers are concerning using the WAE app as a production aid and what they felt when they were introduced to it. This approach made meaning from the "participant views of the stimuli being studied" (Creswell, 2013 p. 9) and is a qualitative approach common in educational research that is focussed on individual subjective experiences (Patton, 2002). Qualitative data collection commonly uses focus groups and interviews. To answer this research question, I employed an interview method. The reason for conducting interviews over convening focus groups is due to the difficulty of gathering filmmakers from different time zones into either a physical or real-time virtual environment. Moreover, interviews provide a personalised, in-depth perspective, which is well suited to the exploratory nature of this study (Catterall & Maclaran, 1997).

3.7.1. Sampling of educational filmmakers.

A convenience sample was used to recruit educational filmmakers to participate in the study. I selected research participants according to the needs of the study (Glaser & Strauss, 1967; Morse, 2001) and who could provide a richness of information (Patton, 2002). I used my professional and academic contacts and recruited four educational filmmakers from the following organisations:

- Hairy Fish Productions;
- Royal Institute of Australia (RiAus);
- Torrens University Australia; and
- Lydia Fay Productions.

At first, I considered the sample size problematic for this study as the sample size was too small to be representative of the views of other educational filmmakers. However, it became apparent that few new insights were coming to light after three interviews had been completed and preliminary analysis undertaken, therefore the data collect was beneficial in understanding the views of these particular filmmakers.

3.7.2. Collecting interview data from educational filmmakers.

Educational filmmakers were inducted into the research using the same process as the VET learners discussed in the previous section. They were supplied with and required to sign an informed consent form (Appendix H). Filmmakers used the WAE app on the same 'mashup' film used by the VET learners; they then viewed their WAE report.

I then interviewed the filmmakers either face-to-face or by Skype. I recorded the interviews using a microphone attached to a smartphone for the face to face interviews or by screen and audio recording for Skype interviews. I transcribed interviews immediately assigning a pseudonym to each filmmaker as part of the transcription process. I conducted the interviews during the period of 10th October the 20th November 2015. I also took interview notes and reviewed these after each interview to help improve my interview technique for subsequent interviews (Bryman, & Cassell, 2006). The interview topic and focus were disclosed to the filmmakers before the interview. However, specific questions were not disclosed, allowing me to observe any spur of the moment responses from the participants as the question were asked.

There were seven interview questions (Appendix J) supported with a number of unscripted questions. Each interview commenced with a briefing covering the following:

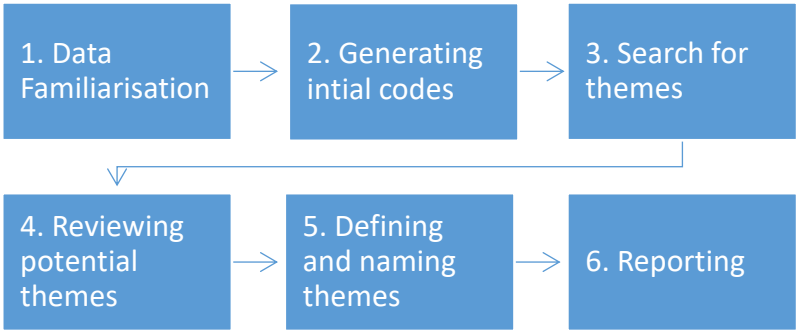
- content of the information sheet to check for understanding;
- the consent form and signature collection if the signature had not been already submitted;
- details of audio recording:
- clarification of privacy and how the data was going to be anonymised; and
- my contact details.

I structured the interview questions using the interview protocol suggested by Creswell (2009) that included an "ice-breaker question" and "final thank-you" (p. 183). Interviews lasted from approximately 30 minutes to 50 minutes. Conducting the interviews was very enjoyable and as an educational filmmaker, I believe I was considered an "insider" (Patton, 2003, p. 6) which may have allowed me to capture the five filmmakers' perspectives about using WAE app as part of the study and into the future to assess their own productions.

3.7.3. Interview data analysis strategy.

Data analysis is the process of making sense of the information collected, "the themes, patterns, understandings, and insights that emerge from fieldwork and subsequent analysis are the fruit of qualitative inquiry" (Patton, 2001, p. 5). I employed an inductive method of data analysis to support the exploratory nature of this study (Patton, 2002). Inductive analysis generates themes and patterns from the interview data without restraints of other methodologies (Thomas, 2006), such as pre-determined themes and categories. I used the six-phase thematic analysis process detailed by Braun & Clarke, (2006), illustrated in Figure 32, to generate evidence to answer the second research question.

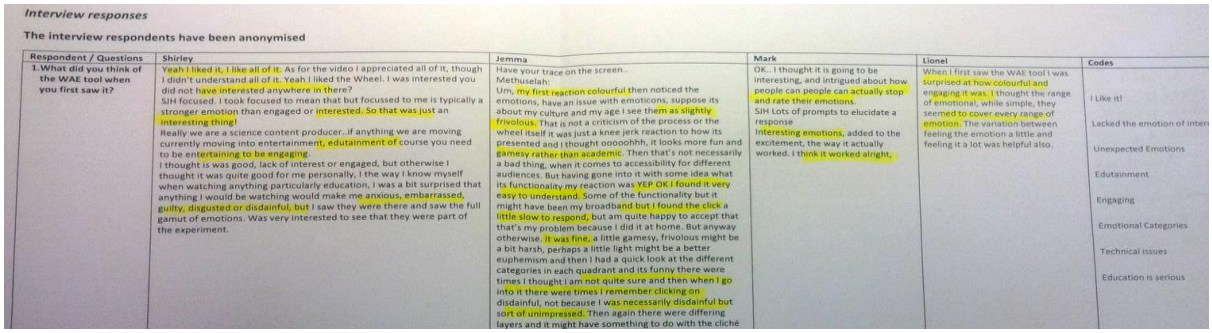
Figure 32: Braun and Clarke (2006) Six Stages of Thematic Analysis.



3.7.4. Data familiarisation and generating initial codes.

I transcribed the interviews from the filmmakers and then coded them. The coding steps I took included re-reading of the anonymised interview transcripts, and reflecting upon the reflexive notes I wrote during the interviews. I re-read my notes to ensure that I was aware of my bias towards the WAE app and how I needed to be mindful of this bias when coding. I then coded text segments that represented a pattern through similarity, difference, frequency, sequence, correspondence, and causation (Braun & Clarke, 2006). I assigned these patterns codes that were either a short phrase or one word. The codes emerged from the transcriptions rather than a theoretical coding frame I had pre-determined. I undertook two passes at coding, this iterative approach being part of the inductive analysis process. Figure 33 illustrates my approach to the coding process. The codes I assigned are shown on the right-hand column and the words from the interviews that are associated with the codes are highlighted in each transcript. I used a manual method of coding because of the small sample and small size of the interview transcripts.

Figure 33: Sample coding


Interview responses

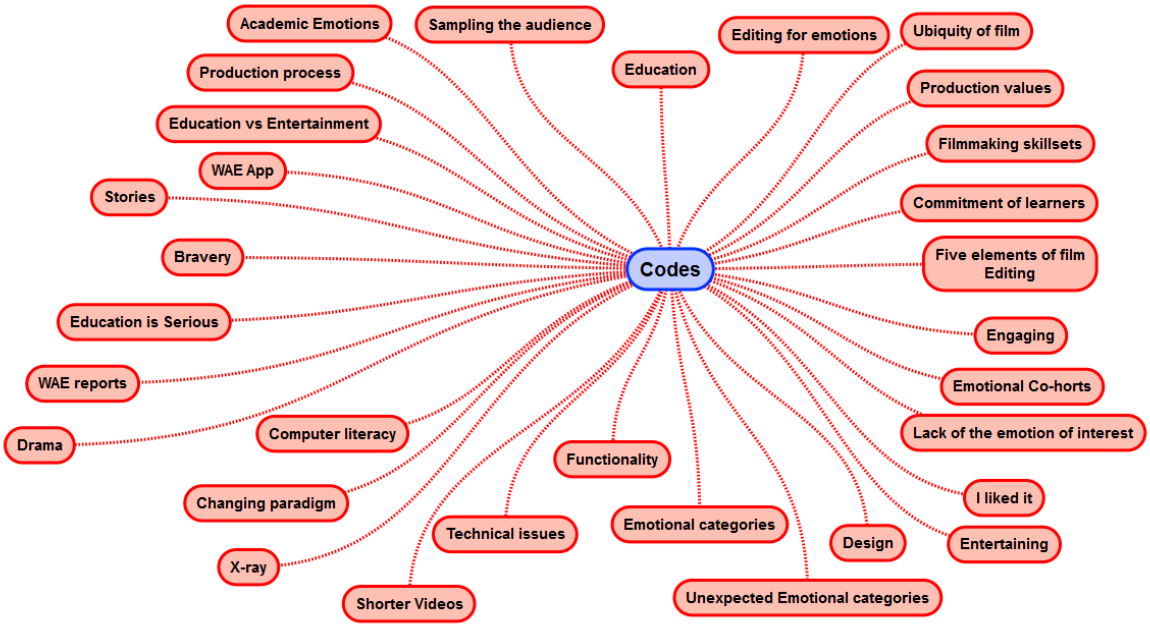
The interview respondents have been anonymised

Respondent / Questions	Shirley	Jemma	Mark	Lionel	Codes
1. What did you think of the WAE tool when you first saw it?	Yeah I liked it, I like all of it. As for the video I appreciated all of it, though I didn't understand all of it. Yeah I liked the Wheel. I was interested you did not have interested anywhere in there? SJH focused. I took focused to mean that but focussed to me is typically a stronger emotion than engaged or interested. So that was just an interesting thing! Really we are a science content producer..if anything we are moving currently moving into entertainment, edutainment of course you need to be entertaining to be engaging. I thought is was good, lack of interest or engaged, but otherwise I thought it was quite good for me personally. I the way I know myself when watching anything particularly education, I was a bit surprised that anything I would be watching would make me anxious, embarrassed, guilty, disgusted or disdainful, but I saw they were there and saw the full gamut of emotions. Was very interested to see that they were part of the experiment.	Have your trace on the screen.. Methuselah: Um, my first reaction colourful then noticed the emotions, have an issue with emoticons, suppose its about my culture and my age I see them as slightly frivolous. That is not a criticism of the process or the wheel itself it was just a knee jerk reaction to how its presented and I thought oooooohhh, it looks more fun and gamesy rather than academic. Then that's not necessarily a bad thing, when it comes to accessibility for different audiences. But having gone into it with some idea what its functionality my reaction was YEP OK I found it very easy to understand. Some of the functionality but it might have been my broadband but I found the click a little slow to respond, but am quite happy to accept that that's my problem because I did it at home. But anyway otherwise. It was fine, a little gamesy, frivolous might be a bit harsh, perhaps a little light might be a better euphemism and then I had a quick look at the different categories in each quadrant and its funny there were times I thought I am not quite sure and then when I go into it there were times I remember clicking on disdainful, not because I was necessarily disdainful but sort of unimpressed. Then again there were differing layers and it might have something to do with the cliché	OK.. I thought it is going to be interesting, and intrigued about how people can people can actually stop and rate their emotions. SJH Lots of prompts to elucidate a response Interesting emotions, added to the excitement, the way it actually worked. I think it worked alright,	When I first saw the WAE tool I was surprised at how colourful and engaging it was. I thought the range of emotional, while simple, they seemed to cover every range of emotion. The variation between feeling the emotion a little and feeling it a lot was helpful also.	I Like it! Lacked the emotion of inter Unexpected Emotions Edutainment Engaging Emotional Categories Technical issues Education is serious

The 32 codes I generated represented common patterns occurring in the data, I placed them into a Mindmap (Figure 34), affording me the opportunity to easily visualise any relationships between the

codes. During the coding process, I was acutely aware of my biases and was mindful to ensure my biases did not influence my coding or the codes generated.

Figure 34: Mindmap of codes generated from the interview data



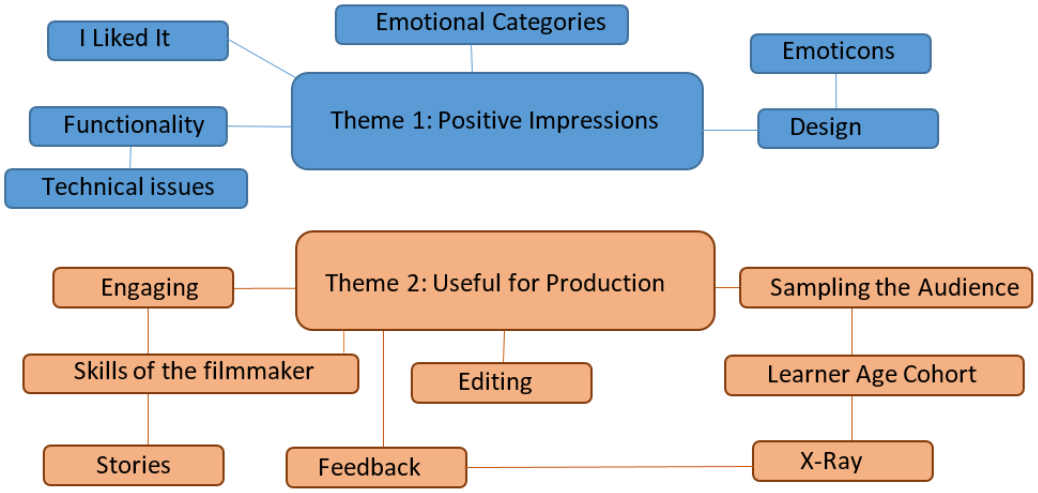
3.7.5. Thematic Analysis.

The next stage of analysis I undertook was to generate themes, by analysing codes that combine to represent something meaningful about the data (Braun & Clarke, 2006). This was a recursive process similar to generating the codes from the transcripts. I produced 3 *Mindmaps* containing prototype thematic maps as I sought to create meaningful themes. I continued this iterative process until no more major themes were apparent and the data was exhausted (Patton, 2002). The final thematic map and relevant supporting codes are shown in Figure 37. The themes generated were:

- Positive Impressions, and
- Useful for Production

Figure 35, shows the final thematic map, the relationship between the final codes and themes. The codes are not exclusive to each theme but are shown with the theme to which they are most closely aligned. I would argue these interrelationships demonstrate the flexibility of thematic analysis in capturing meaning from complex data rather than strictly coding and categorising for uniqueness (Braun & Clarke, 2006). The codes of 'x-ray and 'I liked it', are examples of the inductive analysis process in action because these codes emerged from the data codes and are not related to the questions asked (Braun & Clarke, 2006).

Figure 35: Relationship between the themes and codes



The thematic analysis undertaken produced two themes that represent the educational filmmaker's positive perceptions of the WAE app and how it can be used in their day to day practice as a production aid, these themes, are discussed in the next chapter.

3.8. Summary of datasets

The data sets used in this research project are presented in Table 13.

Table 13:

Summary of data sets

Sample	Method	Number
VET Learners	Survey	12
VET Learners and Educational Filmmakers	WAE app	17
Educational filmmakers	Interviews	4

3.9. Managing validity threats

Validity threats were managed by firstly understanding the nature of the threats to this study. Maxwell (2013), describes categories of validity threats, specific to this study are internal threats from my strong beliefs in the use of educational films and ecological threats from the lack of emotional content in the films used to explore the WAE app (Maxwell, 2013) and surveys completed without using the WAE app. I used the following strategies to reduce these threats

- Internal threats; I reduced the internal validity threat by keeping and analysing a reflexive journal - recording my thoughts as to how I was impacting the study and strategies to reduced

this impact during data collection, analysis and reporting (Kolb, 2012). How I used the journal during data gathering; coding and thematic analysis is discussed in the next section.

- Ecological threats were reduced by pre-testing the seven hospitality film clips for emotional content and validating the surveys by checking the WAE app report for completeness for each VET learner, by checking the data recorded by the WAE app against each VET learner that completed the survey.

I believe these strategies reduced the threats to the validity of this study.

3.10. The reflexive approach I used

My role in the research was one of an insider, as a working educational filmmaker I am aware of the problems faced by fellow educational filmmakers who I hope will use the WAE app. I believe the WAE app would provide valuable data for educational filmmakers to improve their learning films, enabling them to engage learners while helping to cue in their viewers the emotions that support learning. Therefore, it was paramount for me to ensure I was aware of how I was influencing this research. To achieve this awareness, I kept a reflexive section of my daily journal, to aid my data collection and analysis of the interviews. I was very aware that I needed to be cognisant of not influencing core aspects of the research to either empathising shared factors from my own experience or demoting any contrary views in my analysis and write up (Dwyer, 2009). I found it difficult when talking to other passionate educational filmmakers who liked the WAE app not to lead them. In fact, I made several notes to myself during the interviews to "just shut up and listen", "do not lead". It was especially hard to be objective when asking probing and follow-up questions. I found a reflexive approach to this research personally challenging when researching the WAE app in which I have invested so much time and energy.

3.11. Ethical approach

This research study received ethical approval from the Torrens University Australia (Torrens) Human Research Ethics Committee (HREC) on the 14th of September 2015. The approval reference was EAN 2015 09 (4). There were a number of ethical issues that needed to be addressed for this research study to proceed. Pat Thompson (2015) blogs of the specific ethical issues to be addressed by the researcher (Thompson, 2015). In this study, there was a slight possibility of an adverse response to emotions that an educational film clips might activate in the study's participants. With the mashup film I produced, this was likely the emotion of anxiety. However, the educational film mashup, was unlikely to produce intense emotional responses. It did not contain powerful, violent events such as those depicted on evening television news. To ameliorate this potential risk, the following harm reduction strategies were employed:

- The use of an informed consent form and information form for both VET learners and educational filmmakers prior to their recruitment as participants. The informed consent form advises prospective participants that they may experience some anxiety when viewing educational films;
- The educational film 'mashup' used to assess the WAE app was drawn from educational films publically available on YouTube and met YouTube's community guidelines, which are described in Appendix K. These guidelines exclude violent, sexual and other harmful content; and,
- Participants were asked to exclude themselves from the research if they were aware of any adverse reactions they might experience from the emotion of anxiety or have ever felt anxious because of watching the evening television news.

Ensuring the privacy and security of participants' responses was be achieved by the use of logon and password access to the WAE app and the survey. Moreover, data gathered by the WAE app was temporary in nature. The survey uses 'Google Forms', which are secured by my TUA Student account and uses the same logon and password. I believe this level of security provided the same degree of protection as any other data kept on any computer that is connected to the Internet.

3.12. Conclusion

The methodology and methods chosen in this study provided data to assist in answering the research questions and goals of this study. Details have been provided of the research design, methods used, the creation of the WAE app, pre-testing the survey and choice of educational film clips made to create the 'mashup' film. A rationale has been present for the methods of data gathering and analysis. Specific threats to the validity of this study have been addressed similarly with its unique ethical challenges. The methodology described and data collected has provided the evidence necessary to answer the research questions. These answers to these questions are presented in the next chapter.

CHAPTER FOUR –FINDINGS AND ANSWERS TO RESEARCH QUESTIONS

4.0 Introduction

This chapter presents the findings and interpretation of the analysis described in the previous chapter and answers the research questions. The methods used to assess the WAE app employed two different approaches, a quantitative approach to answer the first research question and a qualitative interpretive approach to answer the second research question. I present the findings and answer the research questions in a similar two-section approach.

4.1 Research question 1 - "Does the WAE app accurately capture the emotions adult learners self-report when watching an educational film?"

To answer the first research question, I first analysed the data recorded by the WAE app itself. I did this to make sure the 12 VET learners did self-report at every one of the 37 audio cue points embedded in the mashup film. These self-reports were accurately recorded and the WAE app generated a report. I then analysed the VET learner's responses to the statements in the online survey and used the findings from this analysis, plus the results generated by the WAE app to answer my first research question. I detail each step below and answer the first research question in the conclusion to this section.

4.1.1 The WAE app data collection.

To reduce the ecological validity threat of misrepresentation (Maxwell, 2013) by VET learners completing surveys without using the WAE app. I reviewed the data collected by the WAE app for the 12 VET learners by viewing the data files the WAE app generated from each participant. This data file is stored in comma separated value format (CSV) and able to be imported into Microsoft Excel for viewing. Table 14, shows an excerpt for the 12 VET learners for the first 4 cue points when viewing the mashup. The fields the WAE app uses to store data are the email address of a user, then the emotion reported at timed intervals and the level of activation: 0 for neutral emotion; 1 for *'a bit'*; 2 for *'quite a bit';* and 3 for *'a lot'*. The time in seconds and thousandth of a second is also recorded. This was the exact time the VET learner self-reported the selected academic emotion they were feeling when they were watching the mashup after hearing the audio cue signal to self-report their emotion using the app. The difference in times recorded is likely due to the VET learner locating the emotion and level of emotion they chose to self-report upon hearing the cue. Also, the start times are different due to the time the mashup video took to load and play which is dependent upon the quality of internet access the VET learner was using when they used the WAE app.

Reviewing the data collected by the WAE app (WAE app Users Self-reports at Timed Intervals – Table 14) for the 12 VET learners allowed me to confirm that the WAE app did collect the VET learners self-reports for each of the 37 audio cues embedded into the mashup film. There was no ecological validity threat to this study from VET learners completing the survey without firstly using the WAE app.

Table 14:

WAE app Users Self-reports at Timed Intervals

	Cue point 1			Cue point 2			Cue point 3			Cue point 4		
Learner annon email	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp	Emotion	Weight	Timestamp
annon2@thewaetool.com	neutral	0	36.4299	anxious	2	69.187	disgusted	2	86.5143	disgusted	3	104.2339
annon3@thewaetoo.com	bored	1	19.5513	bored	1	50.389	frustrated	1	64.9866	disgusted	2	84.8374
class1@hotmail.com	feel-good	2	21.2863	calm	3	53.4115	bored	3	70.3787	feel-good	3	82.484
class23@gmail.com	amused	1	26.977	focused	2	57.4312	embarrass	1	69.6857	feel-good	1	87.9178
classr@gmail.com	calm	2	32.2282	calm	2	63.2059	relaxed	1	79.908	surprised	3	92.0522
class4@hotmail.com	calm	2	28.9227	disgusted	1	56.1987	feel-good	2	72.2563	disgusted	1	86.1608
class5@hotmail.com	bored	1	27.6732	bored	2	63.2378	feel-good	2	77.4509	disgusted	2	93.4586
class7@hotmail.com	calm	2	20.3476	disgusted	2	62.6745	bored	1	79.023	surprised	1	97.4389
class33@gmail.com	feel-good	1	24.5634	focused	3	59.0423	disgusted	2	81.5645	feel-good	1	97.004
class32@gmail.com	calm	1	18.9887	focused	2	54.8401	disgusted	2	69.9801	feel-good	1	87.4012
annon5@gmail.com	bored	2	26.4432	calm	1	62.5603	bored	1	77.4323	embarrass	2	83.4561
annon7@gmail.com	neutral	1	25.3326	disgusted	1	57.9834	frustrated	2	74.3498	disgusted	3	80.0503

4.1.2 Analysis of the survey data.

To answer the first research question, I also analysed the 12 VET learners' survey responses. The survey comprised of 16 statements to which the VET learners were asked to respond to by indicating on a Likert scale how much they "Strongly Disagree," "Disagree," "Agree," or "Strongly Agree" to each statement. Because a Likert scale is an ordinal scale, I could not use the statistic of the mean or standard deviation to describe the data. Therefore, following Bryman's (2007) recommendation of how to measure central tendency in likert survey responses, I calculated the mode (the most frequent response) and the median (the middle) response to the statements for each participant. Bryman (2007) also recommended using the percentage of a likert response to a statement as an aid to Likert data analysis which I adopted.

When creating the survey, I chose a four-point likert scale which disallows a neutral response forcing respondents to choose either a positive or negative answer (Clason & Dormody, 1994). In this case to either 'strongly agree' or 'agree' which is positive or 'strongly disagree' or 'disagree' which is negative. There is much debate over the advantages and disadvantages of odd or even scales (Tsang, 2012; Johns, 2010), however, forcing VET learners to make a choice with an even scale I felt would provide data that clearly either supported or did not support the survey's statements. For example, the first statement in the survey asks, "I believe the WAE app was easy to use," analysis of the VET learner's responses produced a median of "Agree" with 67% either agreeing or strongly agreeing. Analysing the likert survey data using the median provided me with the evidence I needed to

understand if the VET students believed the WAE app accurately captures the emotions they self-reported when watching an educational film.

4.1.3 Findings from the survey data.

This section presents the findings of the analysis of the survey responses. Table 15 summarises the responses to each statement and also reports the Median and Modal responses to each statement. I then present the analysis and findings to the responses of statements 1 to 9, which are statements focussing on the *usability* of the WAE app. Followed by the analysis and findings of statement 10 to 16 which are statements focussing on the *functionality* of the WAE app.

Table 15:

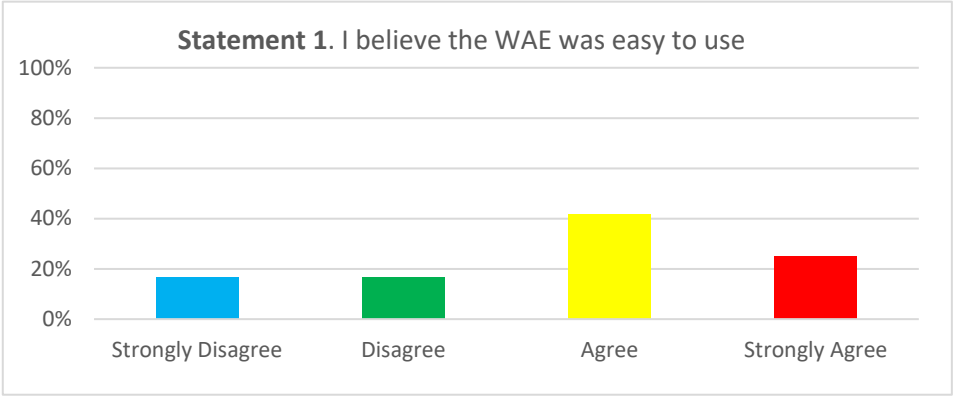
Summary of VET learners survey responses

Summary of VET learners survey responses						
Statements on using the WAE	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Median**	**Mode**
1. I believe the WAE was easy to use.	2 17%	2 17%	5 42%	3 25%	Agree	Agree
2. I believe that most people could easily use the WAE to record the emotions they feel when viewing an educational film.	1 8%	1 8%	7 58%	3 25%	Agree	Agree
3. I believe it was easy to record the emotion I felt when signalled to do so.	2 17%	0 0%	10 83%	0 0%	Agree	Agree
4. I found starting and stopping the WAE was easy.	0 0%	2 17%	6 50%	4 33%	Agree	Agree
5. I found generating the WAE report was easy.	0 0%	4 33%	8 67%	0 0%	Agree	Agree
6. I found the WAE very cumbersome to use.	1 8%	6 50%	5 42%	0 0%	Disagree	Disagree
7. I found the WAE unnecessarily complex.	2 17%	9 75%	1 8%	0 0%	Disagree	Disagree
8. It was easy for me to select the emotion I was feeling at the indicated signal.	0 0%	6 50%	6 50%	0 0%	Agree and Disagree	Agree and Disagree
9. I feel I need more training to use the WAE to report the emotions I feel.	1 8%	9 75%	2 17%	0 0%	Disagree	Disagree
Statements on the WAE's functionality	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Median**	**Mode**
10. I believe the sound used to signal when to report was not distracting	0 0%	3 25%	7 58%	2 17%	Agree	Agree
11. I believe the confirmation of my reporting by flashing a color was helpful	0 0%	2 17%	8 67%	2 17%	Agree	Agree
12. I believe the colours of the emotions helped me in locating the emotion I wanted to report.	1 8%	1 8%	8 67%	2 17%	Agree	Agree
13. I believe the emoticons were helpful in locating the emotion I wanted to report.	0 0%	3 25%	7 50%	2 17%	Agree	Agree
14. I felt the WAE accurately reported the emotions I recorded when signalled to do so.	0 0%	3 25%	9 75%	0 0%	Agree	Agree
15. I felt the WAE had all of the emotions that I needed to report as I watched the educational films.	0 0%	3 25%	9 75%	0 0%	Agree	Agree
16. I found the WAE report was easy to understand.	0 0%	3 25%	8 67%	1 8%	Agree	Agree

4.1.4 Findings from usability statements.

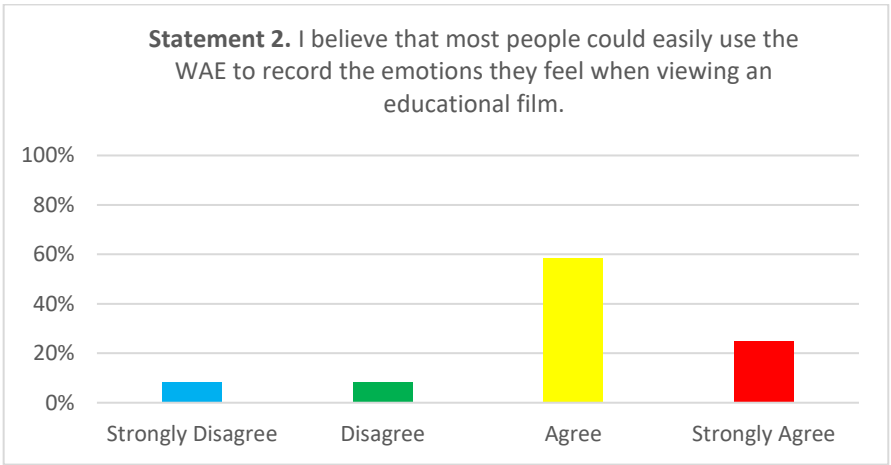
The responses to the first statement *I believe the WAE a was easy to use'* was supported. Forty two percent of VET learners chose 'Agree', 25% 'Strongly Agree' and 17% chose 'Disagree' and 17% 'Strongly Disagree' (Figure 36) respectively. The median and mode for statement 1 were 'Agree'.

Figure 36: Survey Statement 1



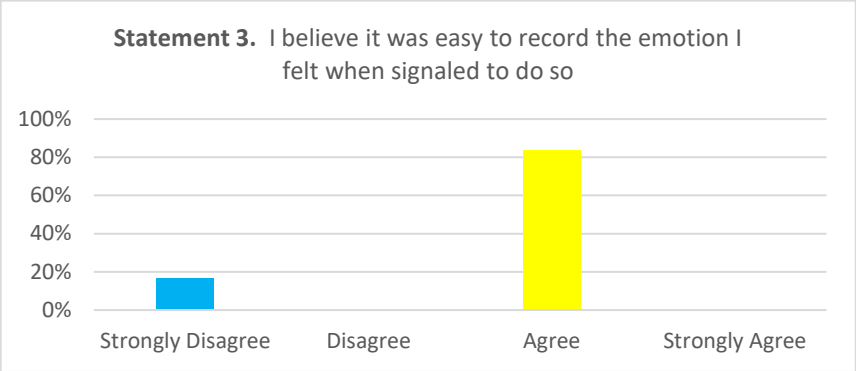
The second statement, *I believe that most people could easily use the WAE app to record the emotions they feel when viewing an educational film* was supported. Eighty three percent of VET respondents either 'Agreed', or 'Strongly Agreed' (Figure 37). The median answer and modal answer was agree.

Figure 37: Survey Statement 2



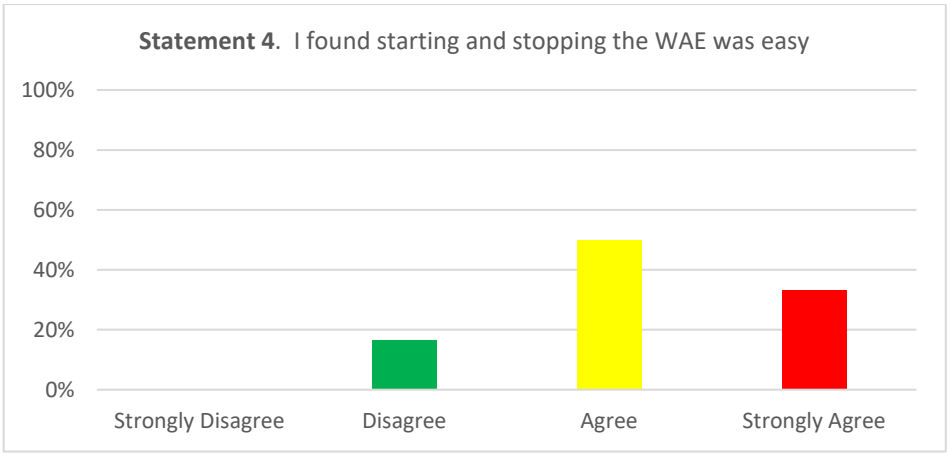
The third statement, '*I believe it was easy to record the emotion I felt when signalled to do so'* was supported. Eighty three percent of respondents chose 'Agree' and 17% chose 'Strongly Disagree'(Figure 38). The median answer and modal answer was agree.

Figure 38: Survey Statement 3



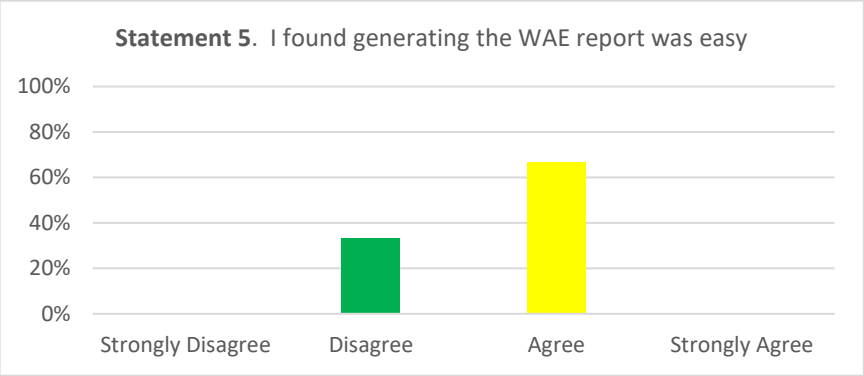
The fourth statement, *I found starting and stopping the WAE app was easy*, was supported. Eight three percent of respondents chose 'Agree' or 'Strongly Agree' and 17% chose 'Disagree' (Figure 39). The median and mode for this statement was 'Agree'.

Figure 39: Survey Statement 4



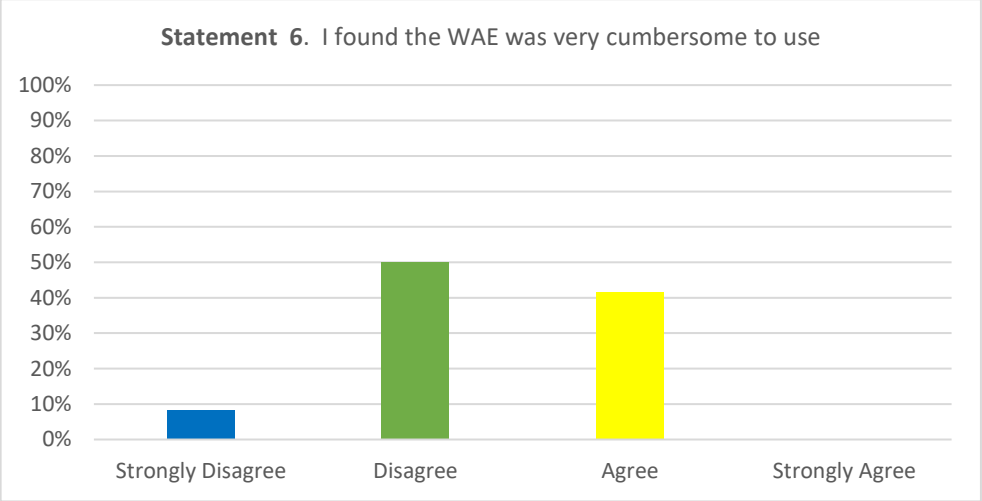
The fifth statement, *I found generating the WAE app report easy*, was supported with 67% of respondents chose 'Agree' and 33% chose 'Disagree' (Figure 40). The median and modes were 'Agree'.

Figure 40: Survey Statement 5



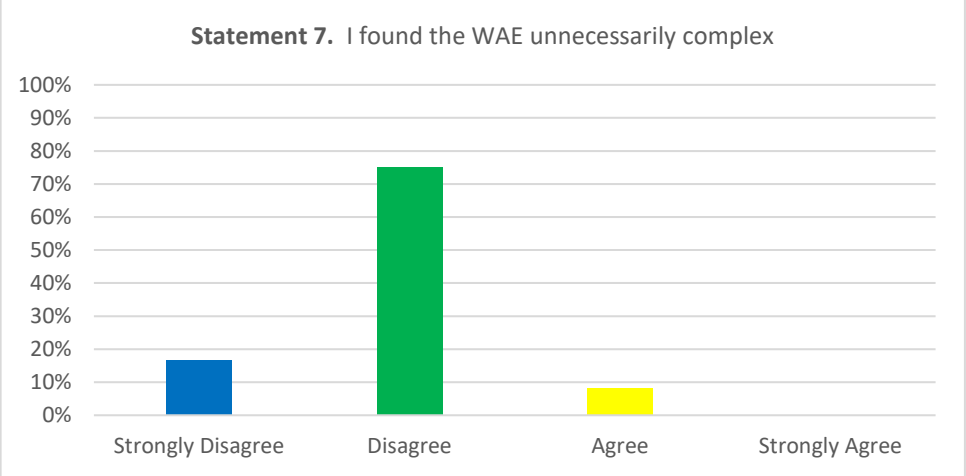
Statement six, *I found the WAE app very cumbersome to use*, produced a mixed response. Fifty percent of respondents chose 'Disagree', 42% chose 'Agree' and 8% chose 'Strongly Disagree' (Figure 41), therefore, this statement does lean towards disagree and needs further investigation.

Figure 41: Survey Statement 6



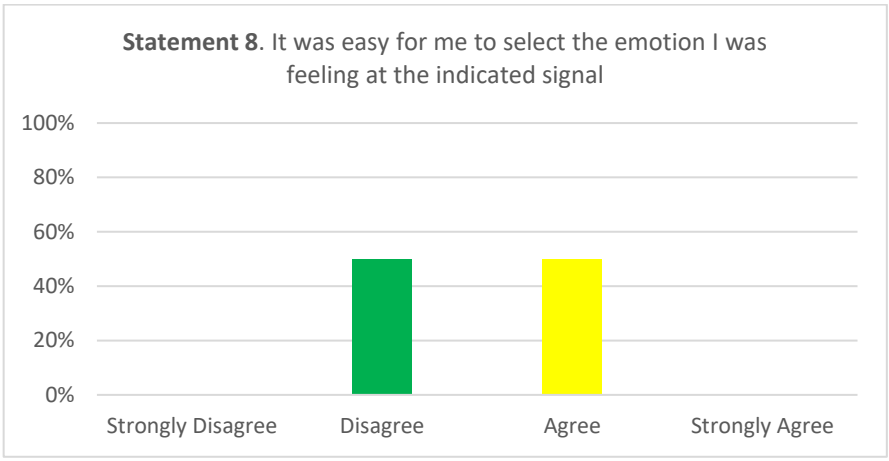
The seventh statement, *I found the WAE app unnecessarily complex* was not supported. Ninety two percent of respondents either chose to 'Disagree' or 'Strongly Disagree' (Figure 42). The median and modal answer was 'Disagree'.

Figure 42: Survey Statement 7



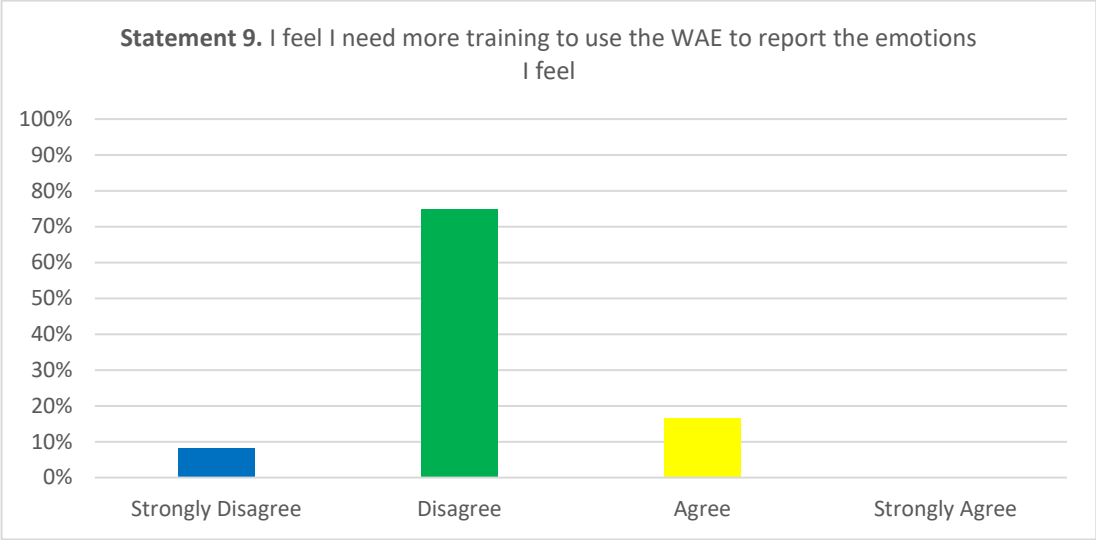
The responses to statement eight, *It was easy for me to select the emotion I was feeling at the indicated signal*, was evenly split between 'Agree' and 'Disagree'(Figure 43) therefore, this statement can neither be supported or not supported and requires further investigation.

Figure 43: Survey Statement 8



Statement nine, *I feel I need more training to use the WAE app to report the emotions I feel* was not supported. Seventy five percent responded with 'Disagree', 8% with 'Strongly Disagree' and 17% with 'Agree' (Figure 44). The median and modal answer was 'disagree'.

Figure 44: Survey Statement 9



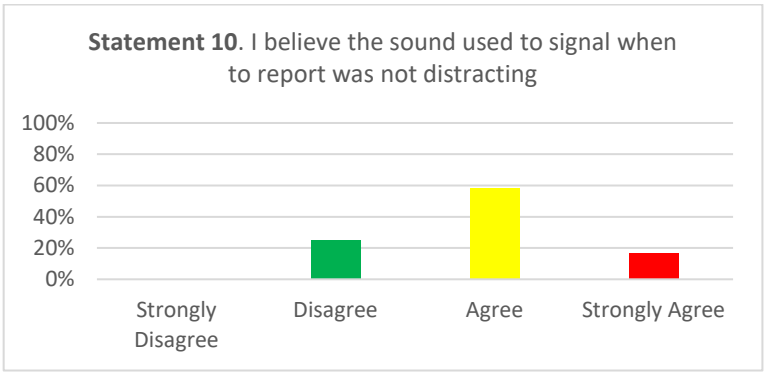
The finding from the *usability* section of the survey indicate the VET learners believed the WAE app was largely easy to use and allowed them to easily self-report their academic emotions when cued auditorially, as they watched the mashup film. However, the responses did highlight that further investigation is needed to understand why the responses to statements six, *I found the WAE app very cumbersome to use* and eight *It was easy for me to select the emotion I was feeling at the indicated signal* cannot be either supported or not supported or leant towards disagree. The responses to these statements suggest that the WAE app interface maybe difficult for some users and that some user may experience difficulty selecting emotions at different activation levels.

4.1.5 Findings from functionality statements.

The second part of the survey, *Statements on the WAE app's functionality* has 7 statements about the functionality of the WAE app.

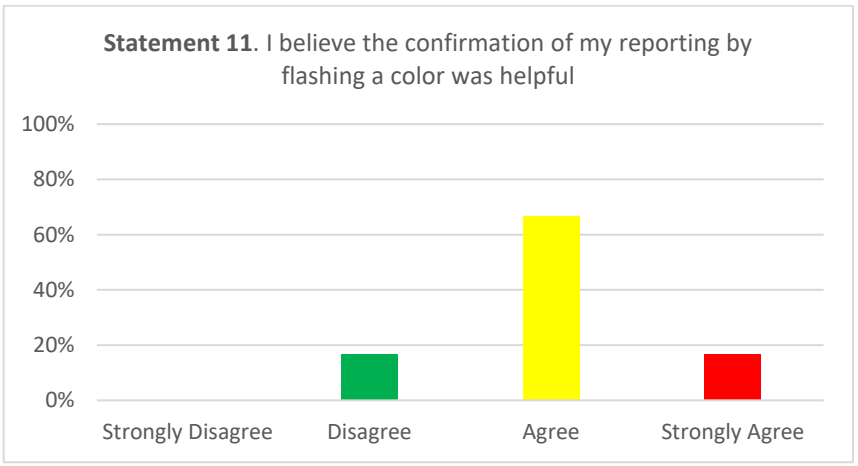
Statement 10, *I believe the sound used to signal when to report was not distracting*, was supported by VET respondents where 58% 'Agreed', 25% 'Disagreed' and 17% 'Strongly Agreed' (Figure 45). The median and modal answer was agree.

Figure 45: Survey Statement 10



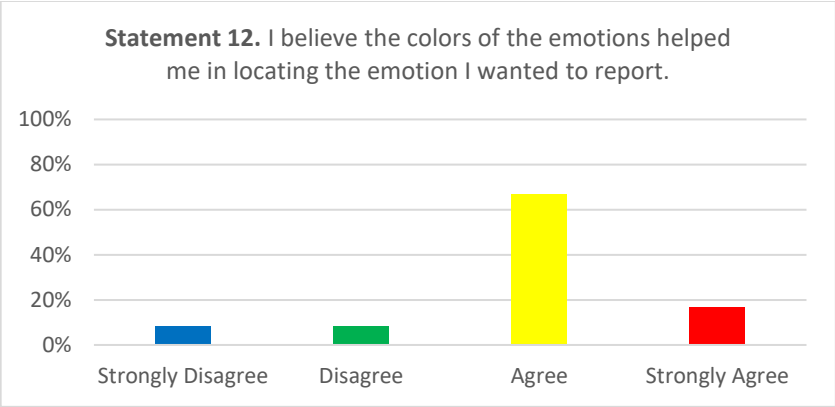
Statement 11, *I believe the confirmation of my reporting by flashing a colour was helpful* was supported. Sixty seven percent of respondents chose 'Agree', 17% 'Strongly Agree', and 17% either chose 'Disagree' or 'Strongly Disagree'(Figure 46). The median and modal answer was agree.

Figure 46: Survey Statement 11



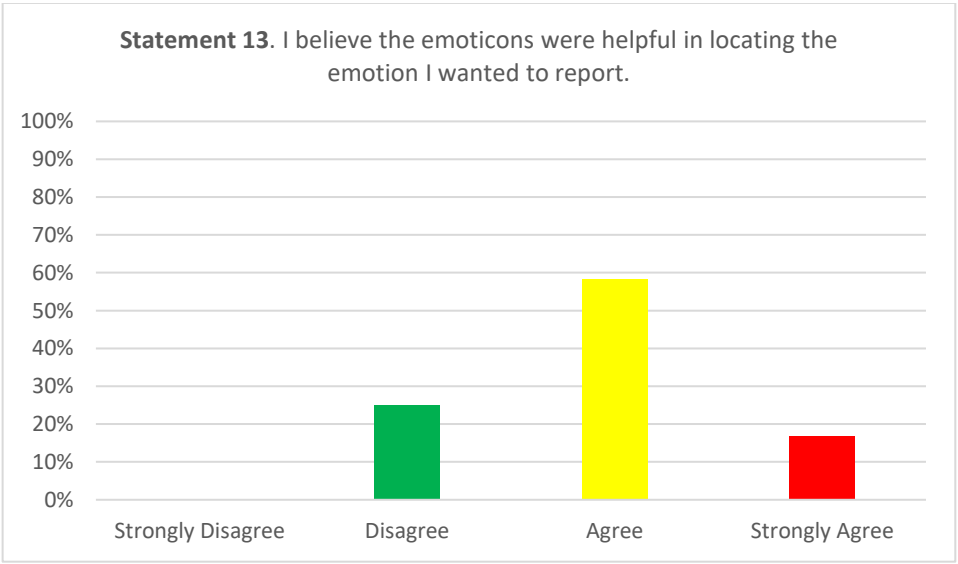
Statement 12, *I believe* the *colours of the emotions helped me in locating the emotion I wanted to report*, was supported with a strong response of 83% of VET learners chose 'Agee' or 'Strongly Agree' with the statement (Figure 47). The median and modal answer was agree.

Figure 47: Survey Statement 12



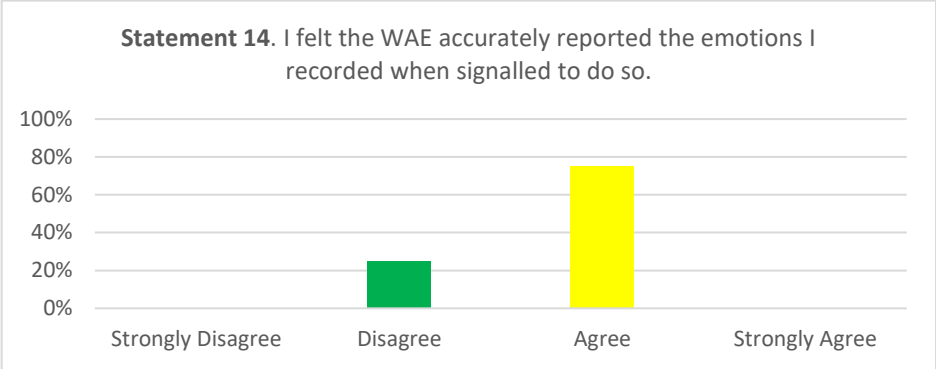
Statement 13, concerning the use of emoticons was supported, 67% of respondents chose to either 'Agree or 'Strongly Agree' and 25% chose to 'Disagree' with the statement *'I believe the emoticons were helpful in locating the emotion I wanted* to report' (Figure 48). The median and modal answer was agree.

Figure 48: Survey Statement 13



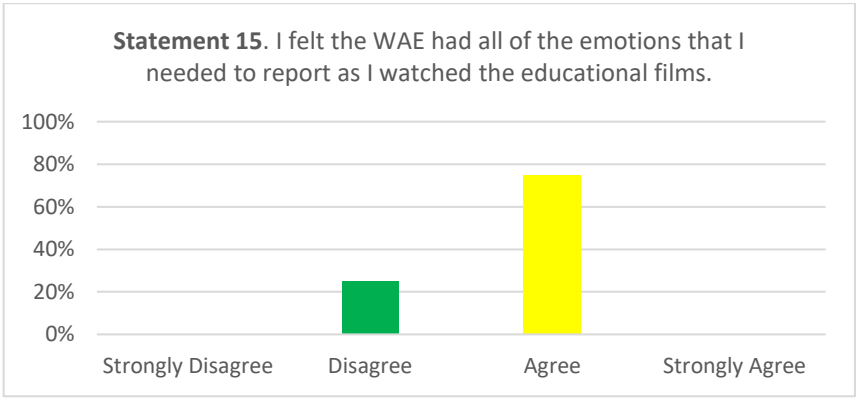
Statement 14, *I felt the WAE app accurately reported* the *emotions I recorded when signalled to do so* was supported with 75% chose to 'Agree' and 25% chose 'Disagree.' (Figure 49), the median and modal answer was agree.

Figure 49: Survey Statement 14



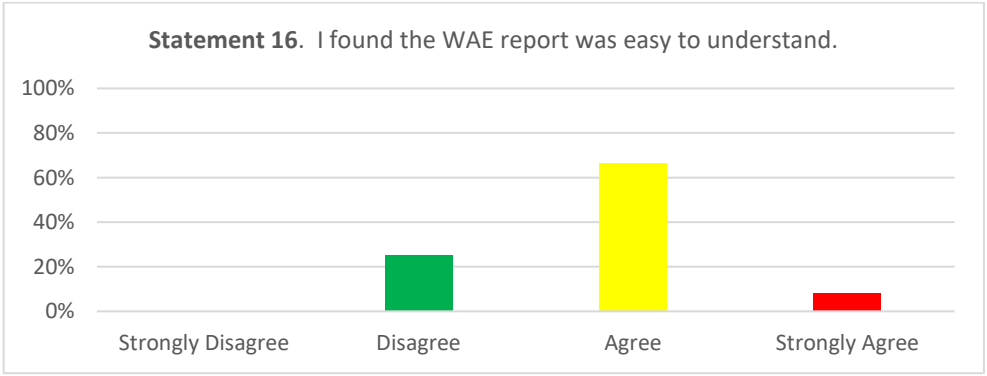
Statement 15, *I felt the WAE app had all of the emotions that I needed to report as I watched the educational films* was supported. Seventy five percent of respondents chose 'Agree' and 25% chose 'Disagree' (Figure 50), the median and modal answer was agree.

Figure 50: Survey Statement 14



Statement 16, *I found the WAE app report was easy to understand* was supported. Sixty seven percent of respondents chose 'Agree', 8% chose 'Strongly Agree' and 25% chose 'Disagree' (Figure 51), the median and modal answer was agree.

Figure 51: Survey Statement 16



The findings from the functionality section the of the survey statements 10 to 16, indicate the VET learners believed the WAE app functioned in the way it was designed to so. VET learners said the audio cue was not too distracting, the selected emotion and its level of activation flashing to confirm selection was helpful. The emoticons did help when selecting emotions and the WAE app accurately recorded their self-reported emotions. Respondents reported the WAE app had all of the emotions needed and that WAE report generated was easy to understand. Therefore, the analysis confirms the WAE app's functions as it was designed to and accurately recorded VET learners self-reported academic emotions.

4.2 Answer to the first research question

To answer the first research question, *"Does the WAE app accurately captures the emotions adult learners self-report when watching an educational film?,* I analysed the responses of the VET learners to the likert-type item statements after I checked the WAE app had been used by the VET learners to complete the survey. The survey was split into two parts, drawing from the findings of responses to part one, statements 1 to 9, indicated the VET learners believed the WAE app was easy to use. Although more investigation is needed to understand the responses to, how cumbersome the WAE app is to use (Statement 6) and how emotions are selected at the indicated signal (Statement 8).

The findings from part two of the survey indicated the VET learners believed the WAE app did function as was designed and does allow users to accurately self-report the academic emotions they felt at timed intervals when watching the mashup movie. Taken together, the findings largely suggest that the WAE app does accurately capture the academic emotions adult learners self-report when watching the mashup educational film designed for this study. The findings are important to consider in terms of this study, the WAE app was tested on a cohort of VET learners when watching an educational film, exactly the purpose and VET learners the WAE app was design for.

4.3 Research question 2 – 'What are educational filmmakers' perceptions on the extent the WAE app is useful in informing them in the production of educational films that activate emotions supportive of learning?'

The second research question was qualitative in nature. It sought to explore and understand the views of a small sample of four educational filmmakers after they had been exposed to and used the WAE app. To answer the question, I used the findings from a thematic analysis of their responses to the following seven interview questions:

1. *What did you think of the WAE app when you first saw it?*
2. *What do you think of the way the WAE app captures the emotions of learners?*
3. *Do you feel the WAE app's emotional categories are correctly aligned to the kinds of emotions filmmakers like yourself hope to activate during a film's production?*
4. *Do you think the WAE app report will help you in production planning? Explain*
5. *Do you believe the WAE app is a useful app for educational filmmakers? Explain*
6. *How could the WAE app fit into your production workflow?*
7. *How do you believe the WAE app could be improved?*

The thematic analysis yielded a number of data categories (codes), which I then placed into two central themes, which were:

1. Positive Impressions, and:
2. Useful for Production.

This section contains analysis of the themes - The quotations I use to illustrate the themes use the pseudonyms assigned during the transcription process, and answers the second research question.

4.3.1 Theme 1: Positive Impressions.

This theme explores the educational filmmakers positive impressions of the WAE app. Their responses to the interview questions were affirmative; they spoke enthusiastically in support of the WAE app and how they liked it. Lionel put it this way,

> "When I first saw the WAE app, tool I was surprised at how colourful and engaging it was. I believe for what it is used for the WAE app App is as simple and user-friendly as it can be…The layout and colours are used well." (20 October 2015, Lionel)

Shirley said, *"I liked it, I liked all of it!" she* also commented on the use of emoticons and the layout of the WAE app,

> "They definitely help giving you a visual cue, where you should be pointing that mouse. I think that is nice, and I thought the colours were right to. So they all checked out.. it was intuitive, certainly in terms of finding a position on the wheel it was intuitive." (2nd November, 2015, Shirley)

Mark commented on the emotional categories, "*Interesting emotions, added to the excitement, the way it actually worked. I think it worked allright."* Lionel also described his thoughts on the emotional categories,

> "I thought the range of emotions, while simple, they seemed to cover every range of emotion. The variation between feeling the emotion a little and feeling it a lot was helpful.. I believe filmmakers aim for a broader range of emotions that are very specific whereas the WAE app is very minimal. 'But, these are (in a wider sense) the main emotions filmmakers are trying to create." (20 October 2015, Lionel)

However, the educational filmmakers', experience of using the WAE app was also impacted by slight technical difficulties delaying the recording of their emotions.

> "I would hear the 'beep' and think what am I feeling now and realised I was taking one, two, three seconds to find the appropriate point then I'd click on it, there would be bit of a delay and sometimes click on it again because I was not sure it had actually registered." (20 October 2015, Lionel)

> "At times there was a slight delay, there was a delay but when there was a beep I was focussing on the feelings. Then went straight to the wheel so. It was not that bad. (20th October 2015, Mark)

I was relieved when conducting the interviews after investing so much time and intellectual energy in creating the WAE app, to received such positive feedback from my peers. The comments of Jemma and Shirley were very supportive of the WAE app,

> "Other than shouting out how I felt. I could not think of a quicker more concise way of doing it..It could be tweaked, it could be fined tuned but I think it's perfectly OK as it is at the moment.. I think it will be a good tool for filmmaker's full-stop! (14th October 2016, Jemma)

> Making films is really hard.. This should really be the film review of the future forget these critics. Set everybody up with an app bang bang the cinemas will love it." I'd love to hear more about this I think it is fascinating. It is certainly uncovering something made me think about, what I was viewing through that lens. I think it's fantastic!" (2 November 2015, Shirley)

The filmmakers were positive in regards to the WAE app. On interview they reported they liked it conceptually as well as its design, its purpose to report on academic emotions, the emotional categories and the use of emoticons. However, their experience was slightly impacted by technical glitches in self-reporting their academic emotions using the app, mirroring similar VET respondents' views reported on the survey.

4.3.2 Theme 2: Useful for Production.

When interviewed the educational filmmakers stated they believed that WAE app would be useful for their production workflows. Educational filmmaker and VET trainer Mark wanted to use the WAE app to assess how older and younger viewers respond to the emotional cues in his concept films. He was concerned about how different aged based cohorts might react and said,

> "The younger audience under 30 should react with intrigue and disgust. But what do these emotions do for older people who might be in the audience?...I can use the WAE app to test group A and test group B and compare". (20th October 2015, Mark)

Jemma talked about how the use of the WAE app could help reduce online learner boredom, by assessing for and editing out boring content she puts it this way:

> The tool would highlight where the maximum interest is. So instead of re-writing take out the parts that are dull. Not dismissing, presenting in a different way. Taking the audio / video out and as written text that students can read. Or a Q & A podcast for additional reading. That could be made available as well. Editing the script in post, changing the vision, presenting a six-minute piece in two-minute pieces. (14 October 2015, Jemma)

Shirley noted the WAE app itself also could provide useful feedback to filmmakers:

> "We would use it post production, we are confident in what we do rightly or wrongly so you have to put it out there. We would find it interesting once it's out there, doing an audit maybe every now and then particularly if we had a big response to a video or no response at all. But to see what it could tell us." (2 November 2015, Shirley)

Jemma believed the WAE app could be used as an editing tool by educational filmmakers. She put it this way:

> "What you have here is THE APP for editors...this is actually going to make sure that the cuts are of a good length. But that is just it; it is information it's bit like getting an X-ray for a doctor you have this added information, but you still have to make a diagnosis and determine a plan based upon the new information. So the skills of a filmmaker still need those years of being an assistant director or DP [Director of Photography] and be able to say they are losing interest but what can we do? It is not going to solve the problem, but it's going to help the filmmaker make the right decision. (14 October 2015, Jemma)

Overwhelmingly the filmmakers interviewed were keen to use the WAE app. On interview Shirley talked of her interest in the data the WAE app produces she stated:

> "I think it will be a good tool for filmmaker's full-stop..As a science organisation we are very interested in getting data like this (the WAE report).. I think something like this would give us an extra insight.. We would like to use the WAE app in post-production" (2 November 2015, Anon.)

Lionel puts it this way regarding using the WAE app data as production feedback:

> "During the scripting process and during editing I believe referring to the WAE app would be very valuable. Check in to see you haven't lost your way.to remind myself of how the content is coming across." (20 October 2015, Lionel)

The filmmakers interviewed were enthusiastic about the workflow production possibilities the WAE app could provide. They wanted to use it in their production workflows to assess the emotions their films activate in different aged audience cohorts, to edit out the academic emotion of boredom and get feedback from their future audiences. This theme has described the views of educational filmmakers towards using the WAE app in their practice.

4.4 Answer to the second research question

The themes outlined in this section provide evidence to answer the second research question:

> *What are educational filmmakers' perceptions on the extent the WAE app is useful in informing them in the production of educational films that activate emotions supportive of learning?*

I employed an inductive analysis approach which yielded several unexpected insights into the perceptions and beliefs of educational filmmakers towards the WAE app. Overwhelmingly they

liked it. They believed it was a useful tool for eliciting emotional feedback from their audiences. The liked the WAE report that gave them the opportunity to graphically see responses to the emotional cues embedded in their production. The also liked the WAE app as an editing tool to see how they were going in their workflow productions.

While the sample size of four filmmakers interviewed was small, I believe their views are important and need to be considered if the WAE app is to be used by educational filmmakers. I did not expect the WAE app to be liked and generate as much interest or support from the educational filmmakers sampled for this study. I was encouraged that they believed the WAE app can be of use in their production workflows. However, some aspects of the WAE app, how it interacts with users and emotional categories demand further investigation which I discuss in the next chapter.

4.5 Conclusion

In answering the research questions, I discovered that the WAE app while subject to minor technical difficulties, which I address in the next chapter, functioned as designed. It allowed academic emotions to be self-reported by VET learners and filmmakers when watching the mashup educational film. Educational filmmakers liked the WAE app and are keen to use it to help produce educational films.

CHAPTER 5 – DISCUSSION AND CONCLUSION

5 Introduction

This chapter summarises the main findings and discusses the significance of the WAE app with regard to the practice of educational filmmakers, VET educators, K-12 students and teachers in Australian schools. I also discuss the limitations of this study, how I created an updated version of the WAE app called the AWE app from my experiences of using it in my practice as an educational filmmaker. I conclude this research study by remarking on the emergence of Virtual Reality (VR) as a learning environment, and how VR producers could benefit from an app designed to measure academic emotions, like the AWE app, activated in participants when journeying in virtual reality environments.

5.1 Main findings

I believe this is the first study to explore using academic emotions to both design an app and then test its application to uncover viewers' self-reported academic emotions when viewing an educational film. Prompted by research on academic emotions (Perkun, 1992) and scales used to measure emotions, the Expanded Positive and Negative Affective Schedule (PANAS-X) scale (Crawford & Henry, 2004) and the Differential Emotions Scale (DES) (Izard, 1977), two research questions emerged from the literature review and were the drivers for the research reported in this thesis. The research catalyst also arose from a problem I encountered as an educational filmmaker, I wanted to understand why some of my productions worked well and others flopped. I had a hunch that emotional engagement was important and this led me to research academic emotions. I worked diligently to understand the field of academic emotions and how an understanding of academic emotions could impact positively on the craft of filmmaking. This prompted me to first design a paper prototype data collection tool that I subsequently redesigned as the WAE app. Both were employed to uncover the academic emotions adult learners self-report when viewing an educational film. Research findings—coupled with filmmaker interest in the WAE app—unequivocally illustrate the WAE app does accurately capture the emotions adult learners self-report when watching an educational film. Findings also illustrate educational filmmakers believe the WAE app can potentially assist them in the producing educational films that activate the emotions believed to support learning.

5.2 The significance of the WAE app.

This section discusses the implications of the findings of this study for educational filmmakers, VET educators, school students and teachers. I start by revisiting how the WAE app can be used as a tool to aid understanding of student engagement.

Modern day measurement of student engagement is conducted through learning analytics where student's online interactions are logged as they use a Learning Management System (LMS). For instance, how often they post in a discussion forum, how much of a video they watch, the total amount of time logged on (Yasmin, 2013). These analytics show where there are problems they do not diagnose or provide the answer to why a student is disengaging at a certain point in time. The WAE app shows a possible reason, for instance, many students might be getting bored at a certain moment in a video presentation, disengaging from the learning content. The WAE app is a constructivist tool; it gives students a voice telling educational filmmakers where their productions are emotionally supporting learning or not. As opposed to an instructivist approach where content is created without seeking input from the students. The WAE app can sample different age based student cohorts, providing the opportunity to improve student engagement. For instance, the development of educational resources that are suitable for younger people, that will not bore them, might include content that will activate some negative emotions. Conversely the production of resources for older people that will activate more positive emotions keeping this cohort engaged with the learning content. The WAE app provides a 'diagnostic' approach to student engagement; students have a voice through the WAE app reports which can point to where editing is needed to ensure learning is supported and students are kept engaged.

5.2.1 Implications for educational filmmakers.

The significance of the WAE app for educational filmmakers is based upon its ability to inform filmmakers of the field of academic emotions and its use as a tool to critically evaluate productions for academic emotions that are believed to support learning. The results of which could be productions that are more engaging - not boring and support stated learning outcomes. The findings indicate the WAE app does work and facilitated viewers in reporting their emotions at timed intervals. It also informs educational filmmakers about academic emotions and provokes them to consider if their productions activate the emotions believed to support learning in student viewers. The long-term significance of the WAE app will be based on how popular a tool it may become to help filmmakers and others create and edit productions for those academic emotions believed to support learning. The popularity of the WAE app with the filmmakers interviewed as part of this study – they were keen to use the WAE app as a tool to critically evaluate their productions for academic emotions, suggests the WAE app will be used by educational filmmakers and have a positive impact on educational filmmaking.

5.2.2 Implications for VET educators.

The future directions of the VET sector was outlined in a report by Skills Australia, in 2011, called *Skills For Prosperity - A Roadmap For Vocational Education and Training*. This report is based on

9 broad themes and 10 recommendations for policy and practice. This study has relevance to the following recommendations:

- - completion rates: a contentious issue;
- - how engaged are VET learners?; and,
- - harnessing the learning opportunities of the digital age.

Skills Australia is very concerned with completion rates arguing the level of learner attrition would not be acceptable in any other educational setting (Skills Australia, 2011). This study has argued boredom with learning content is one of the reasons learner choose to discontinue a learning program. Using the WAE app on educational films used as learning content will highlight learner boredom - which leads to learners dropping out (Bonk & Khoo, 2014). The WAE app shows where boredom occurs so that VET educational producers can edit their productions to support academic emotions known to support learning. Moreover, VET educators often curate educational films and video as learning content because there is a paucity of VET focused educational films, and they do not have the time or skills to self-produce educational films (Skills Australia, 2011). They use sources such as YouTube clips to support the learning outcomes of a unit. Using the WAE app on such content provides a simple method of indicating if the curated content supports learning. The WAE app is a possible solution to the recommendation that NCVER "investigate and provide advice on the development of a new survey approach to measuring learner engagement more objectively" (p. 108).

Skills Australia is also concerned that VET learners do not have the same opportunities for developing their digital skills as school students who are taught the Technologies rationale of the Australian Curriculum. VETs primary role is to prepare learners for their chosen vocation by providing hard and soft skills. Today's work environment is increasingly becoming more digital where communication often occurs via user-generated video. The WAE app can help VET learners understand via feedback on their productions, how they should edit their productions to ensure boredom does not occur in their target audiences. Moreover, it can assist to "support teachers and trainers to develop the appropriate skills in using the tools to support high-quality learning experiences" (p. 113) by providing feedback on learning content. The WAE app was designed as a reaction to boring, disengaging VET content and as a tool to specifically meet the needs to VET educational filmmakers such as myself, it does meet the needs for those producing VET educational films and does meet some of the needs of the future VET sector.

5.2.3 Implications for K-12 students and teachers.

During the process of creating and presenting the WAE paper and app prototypes, it became apparent that schoolchildren could benefit from using them as classroom self and peer assessment tool for their digital productions. Both prototypes have been presented to three higher degree education research

seminars at Torrens University Australia, the 2015 Higher Education Research Conference Adelaide (HERGA) and at the 2014, 2015 and 2016 Australian Academic Research in Education (AARE) conferences held in Brisbane, Fremantle, and Melbourne respectively. At these seminars and conferences, the prototypes were presented, and audience members were invited to use the either the digital and paper versions to assess an educational film clip for its ability to activate academic emotions. What became apparent was the effectiveness of these tools to encourage discourse. Surprisingly, people sitting next to strangers started to discuss openly their emotional states, something that I believe would have been quite hard to achieve without the prototype. A number of seminar participants commented on how useful the WAE could be as a classroom tool. To this end, I have published the paper version as a creative commons image for use as a pedagogical classroom tool (Appendix N). It is anticipated students and teachers will use this tool for self and peer assessment to not only learn about the academic emotions believed to support learning, but also consider how their productions of film and other media can potentially trigger these emotions.

The WAE app can be used by schoolchildren and their teachers to critically evaluate their school-based educational films for their ability to cue different academic emotions in viewers. Many students come to school with mobile phones and tablets that provide unprecedented opportunities for them to use powerful and easily accessible cameras and editing software. The Digital Technologies rationale of the Australian Curriculum highlights the 'processes and production skills' students need to engage in to create digital solutions. These include defining, designing, implementing, evaluating and collaborating and managing from foundation to year 10. With the ubiquity of mobile technologies, children and young people are being encouraged to produce films and animations in their classrooms (Emert, 2014; Levido, 2014; Marsh, 2006; Valkanova, & Watts, 2007; Wohlend, 2013). If children and young people understand the emotions they want to activate in audiences, they can draw on the field of academic emotions to aid them when producing digital content that is effective in supporting the learning messages they intend to convey. The app can be used to sample peer's emotions when viewing/experiencing their productions, giving schoolchildren the opportunity to edit their productions, so they more successfully cue the emotions they want their audiences to experience.

5.3 Limitations of this research study

The research methods used in this study first focussed on understanding if the WAE app functioned as designed and if it did record accurately, the self-reported academic emotions of learners. Second, it uncovered educational filmmakers beliefs in regards to using the WAE app to assist them in producing educational films that can activate the academic emotions believed to support learning. The sample size of VET learners was suitable to discover the functionality of the WAE app. However, the sample size of the filmmakers was small. While I believe, I uncovered their beliefs a large sample size would be required for a further study. What was not investigated was the validity of the emotional

categories and their arrangements on the WAE design – on which the WAE app is based. I created the WAE design drawing on other studies and theories. I drew heavily from Pekruns et al., (2002) academic emotions and the filmic (Smith, 1999) emotions used in Scheafers et al. studies to create the superordinate and subordinate categories of the WAE app design (Schaefer, et al., 2010). Creating the design also drew upon empirical science of Plutchik's emotional colour wheel (Plutchik, 2001) for the colours and Craft, Chappell, and Walsh's (2014) C2learn Co-creativity wheel for the descriptors of the levels of activation. It is critical for me to recognise I am a filmmaker who in my filmmaking, used cinematic techniques to cue emotions as a storytelling aid. I am not a psychologist. The field of academic emotions is complex and contested and lies largely in the domain of psychology. I believe a study of the design of the WAE app by psychologists like Reinhard Pekrun or recognised experts in the field of academic emotions (e.g. Sidney D'Mello, Lisa Linnenbrink-Garcia, Anne Frenzel) is warranted.

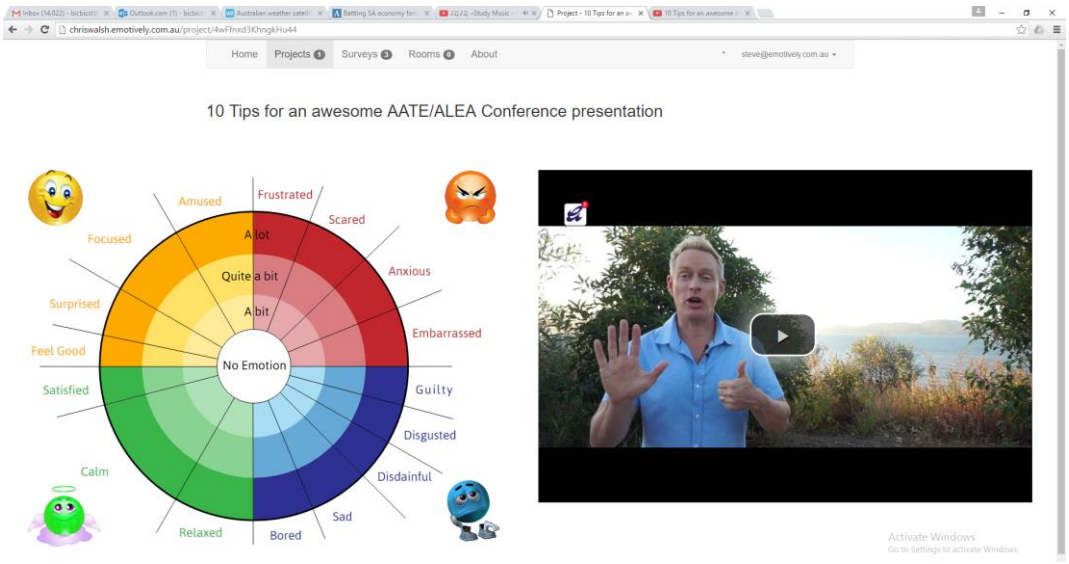
5.4 Technical challenges to be overcome

The feedback from the VET learners and educational filmmakers reported on in the findings chapter provides a list of 3 technical improvements needed to improve the experience of using the WAE app:

1. Increase the speed of the feedback to show what emotion and level of activation was self-reported,
2. Increase the speed of generating the WAE report, and
3. Windowing the WAE.

I changed the technical hosting of the WAE app to a dedicated server which improved the speed at which users were informed of their choice of selected emotion and level of activation. This change also improved the speed of generating the WAE report. I also reprogrammed the WAE app interface to remove the need to 'window' the WAE app alongside the educational film being used. Figure 52 shows this solution of the WAE app without windowing.

Figure 52: WAE app without windowing



Overcoming the technical challenges that have beset the WAE app will reduce technical disruptions to the user, helping to ensure accurate reporting of emotions and that the WAE app creates accurate reports that filmmakers and designers of media and multimodal text can use to self and peer assess their production.

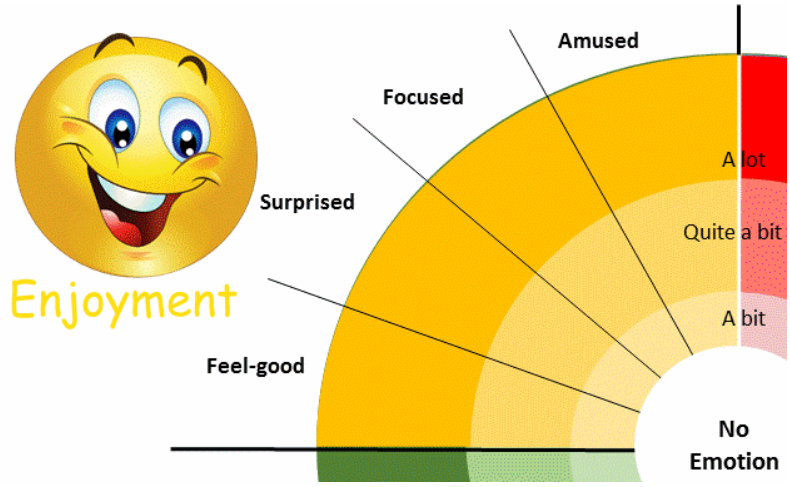
5.5 Future directions

This section explores my future plans for the WAE app prototype, including an updated Version 2 that I have already integrated into my film workflow production and my plan to make the WAE Version 2 app available for educators, students and laypeople through a creative commons license. I also explore missing emotions and what I viewed as a needed name change for the app from the Wheel of Academic Emotions (WAE) to the Academic Wheel of Emotions (AWE) by adding the positive activation emotion of awe. I also discuss how the new AWE app could be used in new and emerging augmented reality (AR) and virtual reality (VR) environments.

5.5.1 The missing emotion of awe.

A defining feature of the prototype WAE app design is its academic emotional categories, the superordinate categories drawn from Pekruns et al. (2002) academic emotions and the subordinate emotions drawn from the empirically validated tools of the PANAS-X and amended DES scales used in Schaefer et al.'s (2010) study of emotion elucidating film clips. The superordinate academic emotions categories is further broken down into those emotions associated with enjoyment from Schaefer's et al.'s (2010) study. For instance, the academic emotion of Enjoyment is broken down into Amused, Focused, Surprised and Feel-good (Figure. 53).

Figure 53: Emotion of Enjoyment



The only challenge to these categories and their arrangement has been semantic, for instance, one of the WAE app categories is 'focused' and two of the filmmakers interviewed – Shirley and Lionel preferred the word 'interested' instead. I have not changed the categories from those I originally chose because I believe it is important for the WAE emotional categories to be based on those used in accepted empirical tools – those superordinate emotional categories of academic emotions (Pekrun et al., 2002) and the subordinate emotional categories used in Scheafer et al's. (2010) study of emotions activated by film which drew from the PANAS and DES scales.

However, the WAE design is unbalanced due to its reliance on the negatively biassed PANAS-X and DES scale – there are more negative than positive emotional categories. Scheafer et al. (2010) discussed how this issue might be impacting on their research where "a common bias in emotion research in favour of negative emotions" (p. 4). I did not set out to find another positive emotion, however, as I continued to study the craft of filmmaking during this research study I began to reflect critically upon what I strive for when creating an opening sequence in a film. What emotion am I trying to achieve or expect to experience when watching a film's opening scene? Importantly would I try to cue this emotion in an educational film? The answer to these questions became clear when I was asked to help produce a promotional production for BABSEACLE, an NGO that works to foster access to justice across Asia, in Thailand in January 2016 for their Trio for Justice. From my experience, to engage an audience I needed to provide a big opening that would garner interest to keep them viewing. Turning up on the day of the event, I discovered a professional drone pilot with his professional drone equipped with a cinema quality camera practising filming. The footage from the drone was *awesome*. It took my breath away (Figure 54), leading me to think more carefully about the emotion of *awe*.

Figure 54: A still from the awesome drone footage

Keltner & Haidt (2003) describe awe this way;

> "In the upper reaches of pleasure and on the boundary of fear, is the little-studied emotion – Awe. Awe is felt about diverse events and objects, from waterfalls to childbirth to scenes of devastation. Awe is central to the experience of religion, politics, nature and art. Fleeting and rare, experiences of awe can change the course of a life in profound and permanent ways."

Shiota, Keltner & Mossman (2007) talk of awe's ability to overwhelm "awe is defined as an emotional response to perceptually vast stimuli that overwhelm current mental structures, yet facilitate attempts at accommodation". Awe is a powerful transporting emotion that filmmakers cue in audiences and has interesting has cognitive effects;

> "Analyses revealed that these changes in decision making and well-being were due to awe's ability to alter the subjective experience of time. Experiences of awe bring people into the present moment, and being in the present moment underlies awe's capacity to adjust time perception, influence decisions, and make life feel more satisfying than it would otherwise." (Rudd, Vohs & Aaker, 2012).

I believe awe to be a positive emotion and act in a similar manner to the academic emotions of anger/frustration – a small level of activation supports learning while a larger level of activation does not (Pekrun et al., 2002). Awe can also act to bring people into the moment. An educational

filmmaker might cue the emotion of awe at the beginning of a film to bring learners into the moment helping to reduce the affect of any carry over emotions from their daily lives. However, cuing too much awe can lead to audiences being cognitively overwhelmed in a similar manner to what happens to users when entering virtual reality environments (Jensen, 2016). The events and scenes that can activate the emotion of awe are already part of a filmmaker's toolbox when creating a narrative film. Keltner & Haint (2003) talk of a five awe experiences:

1. Threat, from characters and natural scenes;
2. Beauty, from people and scenes;
3. Ability, perceptions of exceptional ability, talent and skill;
4. Virtue, people who display virtues or strength of character trigger an awe state of 'elevation'; and
5. Supernatural causality, perceptions of a god or other supernatural entity is manifesting" (p. 306).

However, activating the emotion of awe is becoming easier with technological advances such as camera drones and virtual reality 360-degree cameras now cheaply available, allowing beautiful, awesome scenes to be part of modest productions. Therefore, I believe the emotion of awe, is a positive activating emotion – supporting learning, at low levels of activation and a positive deactivating emotion – not supporting learning, at high levels. Critically, awe is missing from the paper WAE and WAE app prototypes.

5.5.2 A new taxonomy of Academic Emotions for new digital learning environments.

Increasingly education is delivered in online environments and learning content is now often video based. The theory of academic emotions (Pekrun et al., 2002) was formulated for a face-to-face real-time classroom age. I believe the Pekruns et al., (2002) taxonomy of academic emotions needs to be re-thought for the digital age as such I propose a new taxonomy of digital academic emotions that draws from the research conducted in this study. This taxonomy shows the relationship between the superordinate academic emotions and subordinate emotions that are activated by digital content those emotions from the WAE with the addition of the emotions of awe and serene. I have argued in the previous section why awe should be included in a new taxonomy and I have placed it as a positive activating emotion that is subordinate to the academic emotion of enjoyment. To provide further balance to the wheel, I reviewed the emotions contained in Schaefer's et al., (2010) study on which the subordinate emotions of the WAE are based and added in the positive de-activating emotion of *Serene*, Table 16 shows the new taxonomy.

Table 16:

New taxonomy of Academic Emotions for new digital learning environments

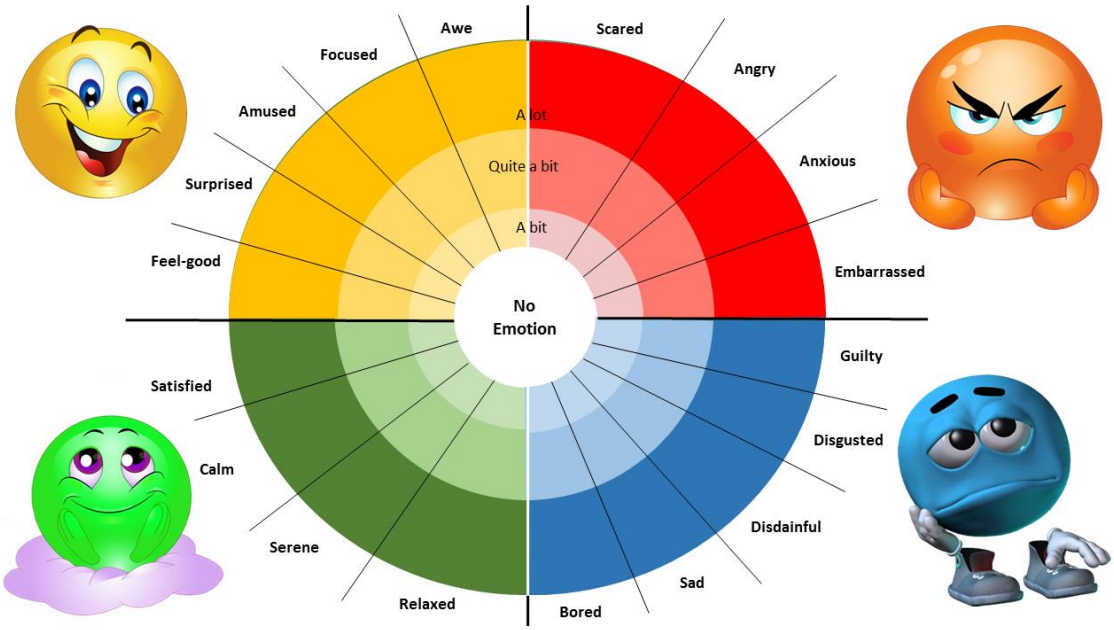
	Positive[a]		Negative[b]	
Activity focus				
	Activating	De-activating	Activating	De-activating
Superordinate	Enjoyment	Relaxation	Anger / Frustration	Bored
Subordinate	Awe	Satisfied	Anger	Guilty
	Feel good	Calm	Scared	Disgusted
	Surprised	Relaxed	Anxious	Disdainful
	Focussed	Serene	Embarrassed	Sad
	Amused			Bored
	[a]Positive, pleasant emotion		[b]Negative, unpleasant emotion	

These academic emotions are those experienced during the activity of learning from digital learning content. I believe this new taxonomy based on an expanded understanding of academic emotions is timely with educators increasingly using digital learning content in situations such as blended learning to deliver educational content.

5.5.3 Rethinking organisation of emotions on the WAE prototypes.

Adding in the emotion of the awe to the WAE required me to rethink the organisation of emotions on the WAE. Awe is an emotion that exists between the emotions of fear and pleasure. Keltner & Haidt (2003) describe awe's relationship to other emotions, "in the upper reaches of pleasure and on the boundary of fear, is the little-studied emotion of awe". Therefore, I placed awe on the boundary of the superordinate emotion of Enjoyment and Anger/Frustration. I also swapped the placement of the subordinate emotions of angry and scared, and the emotions of amused and focused so that awe is on the boundary of focused and scared. I believe this is appropriate because of awe's relationship with fear (Ketlner & Haidt, 2003), and focused - how awe can focus an individual on the present moment (Rudd, Vohs & Aaker, 2012). To place the emotion of serene I consulted Schaefer's et al., (2010) study which shows this emotion is similar to relaxed and calm. Therefore I placed serene between these emotions. Introducing and re-arranging the emotional categories on the WAE design creates a Version 2 (Figure. 55) which is more balanced between positive and negative emotions and includes the emotion of awe and serene.

Figure 55: The WAE version 2.0



Unfortunately, empirically investigating awe and its effect on learning is outside of the scope of this study. However, including the emotion of awe in the WAE is timely with its ability to bring us into the present moment away from the ubiquitous 'digital now'. Abha Dawesa's 'digital now' is a place "where the internet is warping both space and time…. far from the present… where I am absent from it, but so are you" (Dawesa, 2013) and the increasingly popularity of augmented and virtual reality educational environments, which due to their immersive nature can cue the emotion of awe (Jensen, 2016). I argue by activating the emotion of awe in a learning production learners will be brought into the present, rescuing them from their 'digital now' and help them focus on learning messages. Therefore awe has a place on Version 2 of the WAE, which I have decided to call the *Academic Wheel of Emotions (AWE).*

5.5.4 The AWE app.

The AWE app now includes the emotion of awe. With the updated emotional categories, I believe the AWE app be used in present and future augmented reality (AR) and virtual reality (VR) learning environments, which are often labelled disruptive. For example, the emerging educational environment of AR and VR is disruptive to educational filmmakers because AR and VR educational film producers are required to co-create learning experiences (Jensen, 2016). VR also specifically disrupts the users because the experience entering a VR world can be quite challenging and overwhelming.

> The first-time people put on the Oculus headset (Oculus, 2012), we often see what we call "VR Face," (Figure. 56) an open face smile and a "wow." When you look around, you quickly get it, and it's powerful. I've been a gamer and technologist my whole life, and there was nothing like seeing this for the first time. You are fully immersed in the experience through sight and sound, and you are disconnected from the real world. Most people often don't even realise they are making this face (Jensen, 2016).

Figure 56: VR face (Jensen, 2016).

The overwhelming nature of the VR experience—similar to the positive activating emotion of awe—risks cognitively overloading users, so they do not always enjoy the VR experience or find it hard to focus on given learning objectives or outcomes. The techniques of 'onboarding' users have been adopted from the computer gaming paradigm to help reduce this risk. Users are onboarded by familiarising themselves with the sensory devices that isolate them from the physical world, then gently introduced to the VR world, (Jensen, 2016). The AWE app could be used to understand learners' self-reported academic emotions triggered by cinematic techniques employed in educational VR environments. The AWE app can possibly be an add-in to a VR environment self-reporting where users actually virtually 'touch' their self-reported academic emotions in the virtual reality. Figure 57 shows how the AWE app could be overlayed into a VR session, using the VR movie, *Standing in the Middle of a Meteor Crater* (Manly, 2016).

Figure 57: The WAE app VR overlay

In this section, I have described how I have updated the WAE app to the AWE app by drawing upon my practice as an educational filmmaker, research into the emotion of awe and from the theories outlined in the literature review chapter. As part of this process I have also suggested a new stance to aid understanding academic emotions activated by digital learning environments. This stance will need to be researched more thoroughly as part of a larger study. I have also discussed how the AWE app might be used in the disruptive environment of VR.

5.6 Conclusion

As a practising educational filmmaker I have used the WAE app initially and now the AWE app as tools for educational filmmaking. Creating content and editing it using feedback from these apps requires a practice of storyboarding scenes and editing for academic emotions. This approach is quite different from traditional storyboarding and editing. I experienced this difference when producing and using the WAE app on a small educational film I was producing for an BABSEACLE in Yangon, Myanmar in November 2015. When I reviewed a the WAE app report from an individual, it said the individual reported boredom halfway through an interview that was second in a sequence of four interviews. I needed to edit the production to try and activate other academic emotions that would re-engage the viewer and keep them watching, such as enjoyment or anger/frustration. When reviewing the third interview, I noticed, the interviewee started to stutter slightly, usually as a professional editor, I would cut out stuttering, and any other distractions. In this case, the stutter I believe provided an emotional cue. I watched as others in the office, re-engaged with the interviewee, they were willing her on, willing her to complete her sentence. The stutter I believe was cuing some frustration in the audience, frustration is a negative activating emotion. They were being drawn out of boredom and re-

engaging. Therefore, I left the stutter in, a completely different approach to my normal editing approach.

Using the AWE app on another production, I created in March 2016 for a politician's election campaign demonstrated exactly how it can be used to garner feedback and detail where edits are needed. The production *'Rebecca 4 Sturt'* (Hall, 2016) was targeted at mature female voters, who make up a significant cohort in the target electorate. The AWE app was used to collect feedback from a sample of 17 mature aged females and I grouped together their AWE reports to discover where edit points were needed to keep viewers in an emotionally supported learning state, especially when the main learning message was delivered at the end. Using the AWE app with a real world projects has helped me understand how my filmmaking practice has changed. My creative vision for productions now includes activating those academic emotions believed to support learning.

I began this research journey as a frustrated filmmaker not knowing why one of my most highly produced and cinematic productions, *First Aid* (Hall & Press, 2013), was not a success. I now have an improved and more nuanced understanding. Through undertaking this research, I came to understand I was actually activating negative emotions that did not support learning in the target cohort of adult learners. The data collection tools I prototyped and designed—the WAE paper and app prototypes and the AWE app—and both apps' ability to generate reports indicating where learning is or is not supported in an educational film is novel. It will assist other educational filmmakers and diverse producers of digital content in creating content that supports learning and hopefully improves the quality of learning content across face-to-face and digital contexts.

The digital revolution and coming augmented and virtual reality educational revolution provides ample opportunities for educators to create immersive experiences that can encourage deep learning. This is particularly true if producers understand the importance of and how to activate academic emotions that support learning. The AWE app can assist educational filmmakers, teachers, students and laypeople in engaging in self and peer assessment of their digital content to understand whether it supports learning. It can also help VR educational producers understand the academic emotions their learners self-report so they can better manage the potentially awesomeness of VR educational experiences. This stage of my research journey is at an end, but how I engage diverse practitioners with the AWE app and my future film production in the disruptive environment of augmented reality and VR educational environments is just beginning. My contribution to educational filmmakers and more importantly students to assess their productions and discover academic emotions is the future planned creative commons edition of the AWE app. I hope they enjoy the challenges of content creation from the lens of academic emotions as much as I do.

APPENDICES

Appendix A

Comparison between emotional data capture methods

Method	Tools	Strengths	Weaknesses
Observation	Capture of changes to facial expression using photo/video Body language	Uninterrupted focus on stimuli by participants	Limited range of emotions able to be reported Not all emotions detected Limited ability to detect strength of emotions activated Not appropriate for groups
Bio-metric/ Physiological	Heart-rate monitoring Electroencephalography	Uninterrupted focus on stimuli by participants	Limited range of emotions able to be reported Not all emotions detected Limited ability to detect strength of emotions activated
Self-reporting during stimuli	Paper based	Easy to implement Ability to report on individuals as part of a group. Able to report on multiple emotional dimensions	The act of reporting the emotion might change the emotion being reported by focussing away from the stimulus
	Emotional slider – mechanical device	Formatting of reporting Reduces effect of the act of reporting interfering with emotions reported	Measures only valence and strength of the affect. Not suitable for Academic emotions that comprise of four broad emotions
	Onscreen capture via mouse position and or touchscreen	Relatively easy to implement Ease of use for multiple participants. Able to report on more than one emotional dimensions	If the tool is close to the onscreen stimuli could ameliorate the effects of emotions changing due to focussing away from the screen.

Appendix B

VET learner recruitment flyer

WANTED STUDY PARTICIPANTS

Do you get bored when undertaking online study?

Do you have 25 minutes to spare to participate for an online research project that aims to help educational filmmakers produce learning films that will help you learn and **NOT** be bored in class?

Do you have access to the internet and YouTube?

Are you over 25 years old, studying Hospitality and identify yourself as culturally Australian (for instance you might be born in Australia **or** have been in the country for more than a couple of years)?

If so I would love you to become a participant in my study. The study will involve watching seven Hospitality training films/clips and reporting how you feel while watching these films. You will then complete a questionnaire.

Participants in this study will receive my thanks and be part of helping to improve the quality of educational films.

If you wish to participate, please email: stephen.hall@student.tua.edu.au for more information.

Appendix C

INFORMATION SHEET FOR VET LEARNERS

Name of Project: Wheel of Academic Emotions (WAE app)

Principal Investigator: **Stephen Hall**

Dear **Participant**

You are invited to take part in the study mentioned above. The study has been approved by Torrens University Australia Human Research Ethics Committee on __/__/__ (date) , with approval number …….

This study is designed to evaluate a new tool to help educational filmmakers produce films that emotional support learning in viewers. The tool is called the *Wheel of Academic Emotions* (WAE app) and is based upon a theory called Academic Emotions and the emotions experienced when watching a film. The tool is internet based and designed to be used on a big screen, so a laptop or desktop computer is required.

Put some sentences here that describe what they are going to do and what they may experience in using the tool.

Please ensure you read and sign the attached informed consent form. Then photograph it and email to Stephen.hall@student.tua.edu.au

Participant requirements	Please ensure you have access to a laptop or desktop computer with an internet browser and access to the internet. Also please ensure you meet the following; • Aged over 25 years old; • Studying Hospitality as a vocational subject; and, • Identify yourself as Australian by either birth or being a resident for at least three years
Participation	You are invited to take part in this research study, there are two tasks. Firstly, using an online tool, the WAE app, to report the emotions that you feel when watching a publically available YouTube playlist. Secondly, you will complete an online questionnaire to about your experience using the WAE app. To complete both tasks should take approximately take 35 minutes. The research activity will be conducted online
Confidentiality	Any information or personal details gathered in the course of the study will remain confidential. No individual will be identified by name in any publication of the results. All names will be replaced by pseudonym.

Consent	All participation is with consent and voluntary. You may withdraw at any time without explanation or prejudice.
Risk	Participants can expected to experience a number of different emotions including relaxation, enjoyment, boredom and anxiety when viewing the educational films. A low level of anxiety may be activated in participants as a results of a non-violent, non-sexual verbal conflict set in workplace scene. The educational films used in this study all meet the community guidelines of YouTube, and all are likely to meet the General standard of film classification. If you are aware of any adverse re-actions you might have to anxiety, please excuse yourself from this study. This includes if you feel anxious when watching the television evening news.
Recording of Information	The data gathered from you will be via your responses the educational film – as recorded by the WAE app tool and your responses to the survey.
Use of Information	The information collected from all participants will be summarised, and aggregated data will be used to report on research results. You will not be identified in any way. The research data will be utilised in publications, reports, conference presentations and Master's thesis.
Data Storage	The data will be stored in a locked cabinet for hardcopy document and password protected files in electronic format. Only the research team will have access to the research documents.
Project Contact	If you have any further question you can contact: Name: Stephen Hall Email: Stephen.hall@student.tua.edu.au Tel: 0450430321

Thank you for your interest and participation.

Yours sincerely

Stephen Hall

If you have any concerns regarding the ethical conduct of the study, please contact:
Simon Potts
Human Ethics Officer - Torrens University Australia
Level 1 Torrens Building
220 Victoria Square I Adelaide SA 5000 I Australia
GPO Box 2025 I Adelaide SA 5001 I Australia
Tel: +61 8 8113 7805
Email: ethics@tua.edu.au

Appendix D

INFORMED CONSENT FORM – VET LEARNERS

Name of Project: Wheel of Academic Emotions

I_____(name of participant) consent to participate in this project. I am older than 18 years of age. I have been provided with a written *Information Sheet for Participants* which provides information about the project and any questions I have asked have been answered to my satisfaction.

I acknowledge that:

- Taking part in this study is voluntary and with consent and that I can withdraw at any time without explanation or prejudice;
- That the information I provide will be kept strictly confidential through being protected with a logon and password during the data gathering process. Subsequently stored on a USB stick (and backup USB stick) in a locked filing cabinet; and
- That the data gathered for the research may be published using a pseudonym.

I consent to take part in this research which includes a questionnaire and using the WAE app that provided a print out of my self-reported emotions, at specific intervals, when viewing educational films

☐ Yes ☐ No

Name of Participant:…… Signature ……

Name of Researcher: Stephen Hall

Signature…….

Date:___/___/____

Please photograph and email to Stephen.hall@student.tua.edu.au

Appendix E

How to particpate in this study.

Thank you …….. for returning the *informed consent form* and choosing to participate in this study.

Please find attached a document showing you how to use the WAE app tool on you computer. Please follow the instructions and when you have completed watching the videos and using the WAE app. Please complete the questionnaire at this link Questionnaire

I will be in contact after I have completed the analysis of the questionnaire results so you can check and confirm your input.

Many thanks again

Stephen Hall

Appendix F

How to use the WAE app to self-report your emotions when viewing an educational film.

Introduction

The WAE app tool is a self-report tool that produces a printout showing when according to the theory of academic emotions (Pekrun, Frenzel, Goetz, & Perry, 2007) learning is or is not emotionally supported when viewing an educational film.

The steps to use the WEFE tool are:

Step 1: Load the YouTube playlist that contains the educational films.

Click on the following link:
https://www.youtube.com/playlist?list=PLux5bQwjLk2TEjNcZPPBFQPFiookhrhii

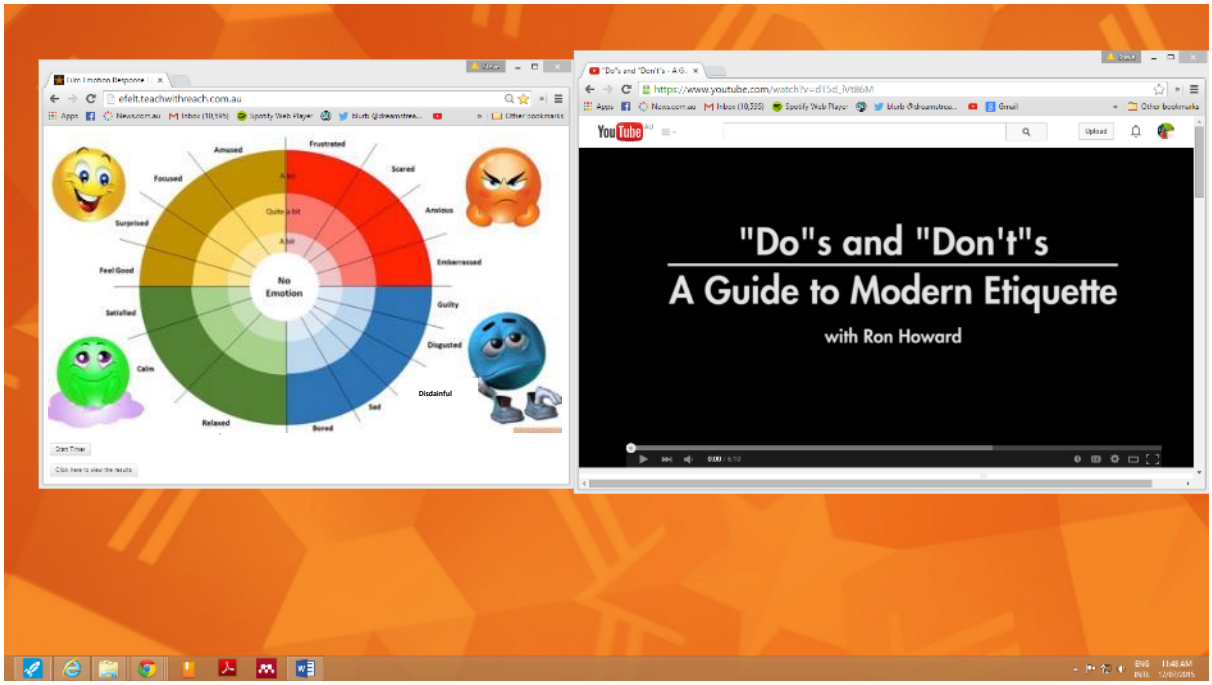
Step 2: Open another browser window.

For google Chrome, Internet Explorer and Firefox – us *Ctrl + N* to open a new window (for those using Macs, use *Cmd + N*

Load the WAE app tool into this window by clicking on the following link:
http://efelt.teachwithreach.com.au/

Step 3: Resize the windows to be alongside each other

Use the resizing window button to place the YouTube window and WEFE alongside each other. See the example below. You might wish to place the WEFE on the right hand side if you are right-handed.



Step 4: Using the WAE app

Start the YouTube film clip by pressing play on the YouTube window, then immediately start the WAE app tool by clicking on the 'Start Timer' button on the lower left hand corner in the WAE app window. See below.

When you hear a 'Beep' click on the segment that represents the emotion you feel and how strongly you feel that emotion or click on the *No Emotion* – if you do not feel any emotion. The WAE app will confirm your click by blinking RED at you. Continue to watch the film and reporting your emotion when you hear the BEEPS.

When the film finishes. Click on the button again to finish

Step 5: Your WAE app report

To access you WAE app report – Click on the button called – 'Click here to view results'. The WAE app report will be displayed, as well as a list of emotions you click. Where you were in an emotionally supported learning state, the graph will indicate above the centreline. Similarly, if the emotions you reported did support learning the graph will be below the centreline. Close the WAE app browser window when you have finished.

Appendix G

WAE app usability and functionality questionnaire

For each question below please select the word that best describes how you feel about the question. If you do not remember the emotions you reported please refer to your WAE app report.

Questions on using the WAE app	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I believe the WAE app was easy to use.				
2. I believe that most people could easily use the WAE app to record the emotions they feel when viewing an educational film.				
3. I believe it was easy to record the emotion I felt when signalled to do so.				
4. I found starting and stopping the WAE app was easy.				
5. I found generating the WAE app report was easy.				
6. I found the WAE app very cumbersome to use.				
7. I found the WAE app unnecessarily complex.				
8. It was easy for me to select the emotion I was feeling at the indicated signal.				
9. I feel I need more training to use the WAE app to report the emotions I feel.				
Questions on the WAE app's functionality	Strongly Disagree	Disagree	Agree	Strongly Agree
10. I believe the sound used to signal when to report was not distracting				
11. I believe the confirmation of my reporting by flashing a red color was helpful				
12. I believe the colors of the emotions helped me in locating the emotion I wanted to report.				
13. I believe the emoticons were helpful in locating the emotion I wanted to report.				
14. I felt the WAE app accurately reported the emotions I recorded when signalled to do so.				
15. I felt the WAE app had all of the emotions that I needed to report as I watched the educational films.				
16. I found the WAE app report was easy to understand.				

How do you think we could improve the WAE app? .....

.....

.....

Please complete the following demographic information

Your ethnicity: Age: Gender:

VET program you are studying?

Do you view educational films as part of your learning program? Please circle: Yes / No

If yes how many on average per unit of competence? Please circle: 1-2, 2-4, 4 or more

If you wish to be contacted for further discussion regarding the WAE app please provide your name and email address below. Your name and address will remain confidential

Name:

Email:

Appendix H

INFORMED CONSENT FORM – EDUCATIONAL FILMMAKERS

Name of Project: Educational Films

I_____(name of participant) consent to participate in this project. I am older than 18 years of age. I have been provided with a written *Information Sheet for Participants* which provides information about the project and any questions I have asked have been answered to my satisfaction.

I acknowledge that:

- Taking part in this study is voluntary and with consent and that I can withdraw at any time without explanation or prejudice;
- That the information I provide will be kept strictly confidential through being protected with a logon and password during the data gathering process. Subsequently stored on a USB stick (and backup USB stick) in a locked filing cabinet; and
- That the data gathered for the research may be published using a pseudonym.

I consent to take part in this research which includes an interview.	☐ Yes	☐ No
I consent for the use of screen and audio capture Software to be used to capture my responses to questions	☐ Yes	☐ No

Name of Participant:…… Signature ……

Name of Researcher: Stephen Hall

Signature…….

Date:___/___/____

Appendix I

INFORMATION SHEET FOR EDUCATIONAL FILMMAKERS

Name of Project: *Wheel of Academic Emotions*

Principal Investigator: **Stephen Hall**

Dear **Participant**

You are invited to take part in the above-mentioned study. The study has been approved by Torrens University Australia Human Research Ethics Committee on __/__/__ (date) , with approval number …….

This study is designed to evaluate a new tool to help educational filmmakers produce films that emotionally support learning in viewers. The tool is called the WAE app and it is based upon a theory called Academic Emotions and the emotions experienced when watching a film. The tool is Internet based and designed to be used on a big screen, so a laptop or desktop computer is required.

You need a para here that explains what you are inviting them to do with the tool

If the WAE app tool works, educational filmmakers should be able to, by using its output understand if the film techniques they use, activate the emotions known to support learning.

Participation	You are invited to take part in this research study, there are two tasks. Firstly, using an online tool, the WAE app, to report the emotions that you feel when watching a publically available YouTube playlist. Secondly, a Skype interview about your experience using the WAE app and how you might use this tool in your practice as an eduational filmmaker. To complete both tasks should take approximately take 55 minutes. The research activity will be conducted online
Confidentiality	Any information or personal details gathered in the course of the study will remain confidential. No individual will be identified by name in any publication of the results. All names will be replaced by pseudonym.
Consent	All participation is with consent and voluntary. You may withdraw at any time without explanation or prejudice.
Risk	Participants can expected to experience a number of different emotions including relaxation, enjoyment, boredom and

	anxiety when viewing the educational films. A low level of anxiety may be activated in participants as a results of a non-violent, non-sexual verbal conflict set in workplace scene. The educational films used in this study all meet the community guidelines of YouTube, and all are likely to meet the General standard of film classification. If you are aware of any adverse re-actions you might have to anxiety, please excuse yourself from this study. For instance if you experience anxiety when watching the television evening news
Recording of Information	The data gathered from you will be via your responses the educational film – as recorded by the WAE app tool and your responses to interview questions. The online interview will be recorded using screen capture software.
Use of Information	The information collected from all participants will be summarised, and aggregated data will be used to report on research results. You will not be identified in any way. The research data will be utilised in publications, reports, conference presentations and Master's thesis.
Data Storage	The data will be stored in a locked cabinet for hardcopy document and password protected files in electronic format. Only the research team will have access to the research documents.
Project Contact	If you have any further question you can contact: Name: Stephen Hall Email: Stephen.hall@student.tua.edu.au Tel: 0450430321

Thank you for your interest and participation.

Yours sincerely

Stephen Hall

If you have any concerns regarding the ethical conduct of the study, please contact:
Simon Potts
Human Ethics Officer
Torrens University Australia
Level 1 Torrens Building
220 Victoria Square I Adelaide SA 5000 I Australia
GPO Box 2025 I Adelaide SA 5001 I Australia
Tel: +61 8 8113 7805
Email: ethics@tua.edu.au

Appendix J

Questions for Educational filmmakers

1. *What did you think of the WAE app tool when you first saw it?*
2. *What do you think of the way the WAE app tool captures the emotions of learners?*
3. *Do you feel the WAE app's emotional categories are correctly aligned to the kinds of emotions filmmakers like yourself hope to activate during a film's production?*
4. *Do you think the WAE app report will help you in production planning? Explain*
5. *Do you believe the WAE app is a useful tool for educational filmmakers? Explain*
6. *How could the WAE app fit into your production workflow?*
7. *How do you believe the WAE app could be improved?*

Appendix K

YouTube community guidelines – July 2015

Don't cross the line

Here are some common-sense rules that'll help you steer clear of trouble. Please take these rules seriously and take them to heart. Don't try to look for loopholes or try to lawyer your way around the guidelines—just understand them and try to respect the spirit in which they were created.

Nudity or sexual content

YouTube is not for pornography or sexually explicit content. If this describes your video, even if it's a video of yourself, don't post it on YouTube. Also, be advised that we work closely with law enforcement and we report child exploitation. Learn more

Violent or graphic content

It's not okay to post violent or gory content that's primarily intended to be shocking, sensational, or disrespectful. If posting graphic content in a news or documentary context, please be mindful to provide enough information to help people understand what's going on in the video. Don't encourage others to commit specific acts of violence. Learn more

Hateful content

Our products are platforms for free expression. But we don't support content that promotes or condones violence against individuals or groups based on race or ethnic origin, religion, disability, gender, age, nationality, veteran status, or sexual orientation/gender identity, or whose primary purpose is inciting hatred on the basis of these core characteristics. This can be a delicate balancing act, but if the primary purpose is to attack a protected group, the content crosses the line. Learn more

Spam, misleading metadata, and scams

Everyone hates spam. Don't create misleading descriptions, tags, titles, or thumbnails in order to increase views. It's not okay to post large amounts of untargeted, unwanted or repetitive content, including comments and private messages. Learn more

Harmful or dangerous content

Don't post videos that encourage others to do things that might cause them to get badly hurt, especially kids. Videos showing such harmful or dangerous acts may get age-restricted or removed depending on their severity. Learn more

Copyright

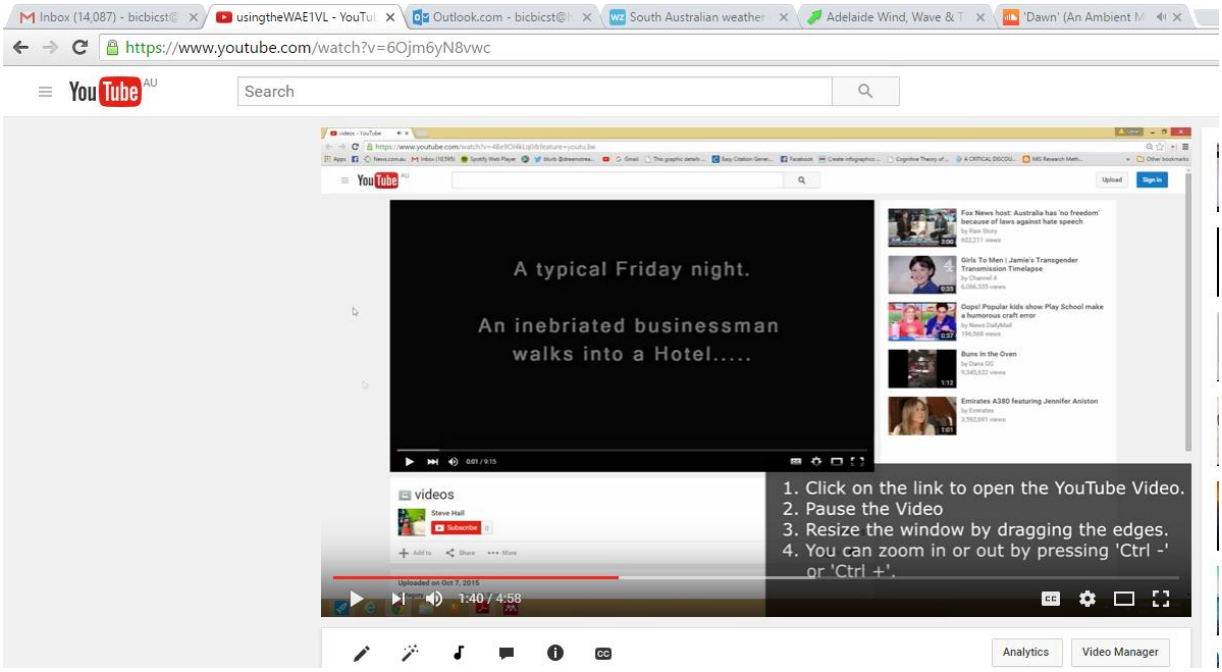
Respect copyright. Only upload videos that you made or that you're authorized to use. This means don't upload videos you didn't make, or use content in your videos that someone else owns the copyright to, such as music tracks, snippets of copyrighted programs, or videos made by other users, without necessary authorizations. Visit our Copyright Center for more information.

Threats

Things like predatory behavior, stalking, threats, harassment, intimidation, invading privacy, revealing other people's personal information, and inciting others to commit violent acts or to violate the Terms of Use are taken very seriously. Anyone caught doing these things may be permanently banned from YouTube. Learn more

Appendix L

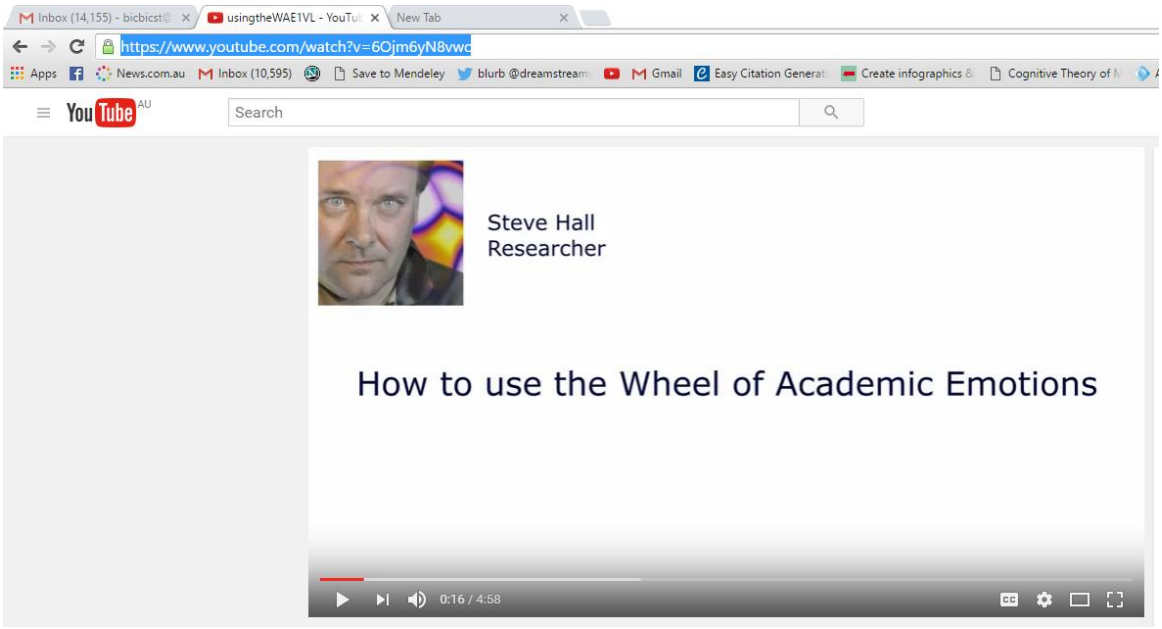
The tutorial on how to ‘window’



Appendix M

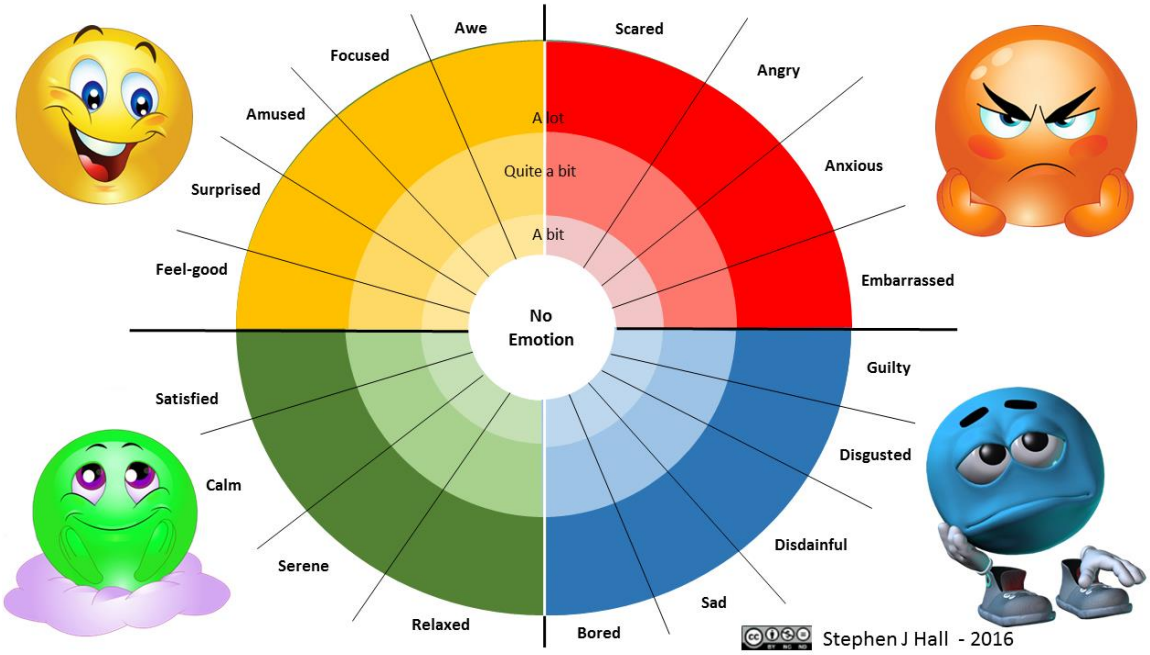
How to use the WAE app online tutorial

https://www.youtube.com/watch?v=6Ojm6yN8vwc



Appendix N

Creative commons image of the Academic Wheel of Emotions



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