How Does Collaborative Media Production on Tablets Enable and Foster Critical Thinking in Young Children?

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Declaration

I, Danielle Marie Melgoza Navarro, confirm that the work presented is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Abstract

The lack of critical thinking (CT) in education has been observed for over 30 years. Corporations feel recent college graduates are overall deficient in CT and collaborative problem solving – two qualities deemed the most valuable assets an employee can bring. This is because teaching and assessing CT is challenging; the absence of one, unifying CT paradigm being a contributing factor.

Student video production literature proposes to engage producers in CT – yet, the process of *how* this happens isn't clear.

This work involves a series of case studies in schools conducted across two projects: P1 in Mexico City, then P2 in London, UK. Both sought to identify, develop, and assess the CT process in six small groups of children aged 9-13 by them collaboratively producing a 5-minute video on iPads and iMovie. Compiled videos included images, music, and performed scenes about the topic of *media that influences body image, thoughts, and behaviour,* comprising content influential to them and their age group.

P1 explored methods to achieve these aims, using a CT framework based on Bloom's revised taxonomy and focusing on facilitating and identifying higher-order thinking skills (HOTS) in their productions. P2 was then informed by P1 and contained various developed methods, including a new, hypothesized model to analyse and evaluate CT in collaborative media production.

Employing qualitative content analysis, results indicate how engagement in CT can be developed and assessed through participants' collaborative productive practice, though facilitation is necessary.

This work suggests that co-researching a meaningful video topic that is personally significant to each participant in a heterogeneous group inspires the CT disposition to solve the successive problem-solving scenarios (PSS's) engendered by the productive practice itself, in which the promise of a future audience and due facilitation maintain the disposition to collectively make interdependent decisions by engaging in CT.

Impact

Existing critical thinking literature does not present a unified paradigm, and the CT process and its assessment methods are still being investigated. This thesis presents an experiment done with groups of children aged 9-13. Each group was assigned the subject of “media influence” to create their own unique videos using iPads, in an attempt to observe the process of CT in collaboration. This work encompassed two consecutive video projects, the second endeavouring to overcome the first’s limitations, and can therefore be a rich source of information for those wishing to conduct similar projects with young student producers.

This study develops a model for critical thinking using manifest and summative content analysis synthesizing previous definitions of CT in prominent literature. This model may be useful for educators and researchers wishing to identify the components at play in this type of thinking.

A quantitative and qualitative analysis of participants’ dialogue content during video production was developed using the model. This resulted in a coding system for CT applied to participant dialogue and actions that can be valuable for methods of analysis in critical thinking research.

The assessment procedures used on participants can also prove beneficial and of practical use for classroom teachers. The use of concept maps to quantify CT is illustrated, as is the use of participant-written reflections to track CT development. The integrated model, analysis and assessment methods allowed for identifying elements of the CT process and this may therefore be beneficial to those who seek to facilitate, identify, quantify, and assess CT in the classroom and in research. In particular, the observations across this work helped to better understand how CT happens in collaboration. This illustrated process may be helpful in collaborative learning and critical thinking studies, K-12 classrooms, and even vocational media/film schools.

The study also investigates the conditions necessary for critical thought. The research design’s use of iPads and iMovie along with an authentic subject in their lives can provide insight into how children using domestic mobile devices may think critically whilst creating personally meaningful content – this being particularly inspiring for classroom teachers seeking to embrace mobile device use rather than prohibit it. The subject of “media influence” is significant in today’s online world,

and pairing it with mobile devices in a supervised project can be valuable in media literacy disciplines across education and research.

This thesis is dedicated to my mother, Jessica:

22 March 1946 – 25 November 2016

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Chapter 1 Introduction

"Too often, we give children answers to remember rather than problems to solve."
– Roger Lewin, 1974

In light of Lewin's quote, let us consider the following two vignettes:

A preschool-aged child is watching Disney's Mickey Mouse Playhouse on television. The program asks the child in which box Minnie Mouse's red bow might fit in and is presented with three different-sized boxes, but only one of them is the same exact size as Minnie's bow. The child thinks for a moment, and mentally chooses the smallest box, which to his surprise, is wrong! Minnie's bow only fits in the box that is the same exact size as her bow. He can't help but then wonder: why can't the bow fit in the smallest box? Can't the bow be folded or stuffed inside the small box? What about the biggest box, couldn't the bow fit in there too? (Dewar, 2014).

A young student is working on a geometry software game at school, and is asked to choose the fish with the square body. She chooses a fish with a perfectly squared body; it has four corners and each side is the same length. When she selects this fish, she hears a beep of disapproval from the game: wrong! The fish she chose is actually a "diamond", not a square. This troubles her, as she wonders why her perception of a square would be considered wrong: according to the game, a square has four sides of equal length and four corners, and she chose a shape that had those qualities but that was rotated to one side. A square cannot be angled to one side? (Clements & Samara, 2000 as cited in Dewar, 2014).

These two vignettes are not hypothetical, but real learning accounts happening in the lives of children. By implying that there is an obviously correct answer, they both left the children with unanswered questions and more importantly, with the sensation of faulted thinking. This sensation can influence children to become acquiescent learners rather than questioning ones. Too often, we train children to remember the "right" answer rather than asking them to figure out the solution to a problem, and this type of education comes with implications.

Surveyed companies hiring recent college graduates feel that students are overall lacking abilities in critical thinking (CT) and team-based problem solving; these abilities regarded as the most important assets an employee can bring (Casner-Lotto & Barrington, 2006; Hart Research Associates, 2015).

However the lack of CT abilities in students is not a recent finding; it has been noted in education research over the last three decades (Flores, Matkin, Burbach, Quinn, & Harding, 2012; Gardiner, 1998; Hart Research Associates, 2015; Jones, 2010; Norris, 1985; Paul, 2004; Paul, Elder, & Bartell, 1997; Tsui, 1999; Wagner, 2014). This is largely because teaching and assessing for CT can be a challenging feat. Some argue that the lack of one, sole, unifying definition or paradigm of CT is where the challenge lies (Lipman, 1987; Mulnix, 2012; Pithers & Soden, 2000). This leaves teachers with a variety of taxonomies and "thinking skills" to follow in teaching and assessing for critical thought in curricula, but varying in their content and methods.

Others argue that CT skills cannot be taught directly, but rather need to be elicited in collaborative problem-based learning activities (Barzdžiukienė, Urbonienė, & Klimovienė, 2006; Distler, 2007; Karantzas et al., 2013; Kuech, 2004; Snyder & Snyder, 2008; Ten Dam & Volman, 2004). This perspective considers that CT emerges by interacting with others in the collective endeavour to find a solution to the posed problem – in other words, that CT and collaborative problem solving go hand in hand.

This work contends that collaborating on a group video on tablets provides a natural framework to teach CT to young children; tablets being a user-friendly, domestic and authentic medium that young children already engage with. Literature presents individual student video production as a platform for its producers to not only think critically about their production topic, but can afford opportunities for CT in the productive practice itself (Henderson et al., 2010; Schuck & Kearney, 2004; Silva, Johnson, King, & Sutherland, 2011). Participatory video methodology has observed how collaborating to produce a video promotes CT skills (Lunch & Lunch, 2006; White, 2003; Yang, 2013). Digital media

production and filmmaking projects have also explored how this platform promotes problem-solving and online researching skills in its participants (Bowden, 1991; Buckingham, 2013; Scheibe & Rogow, 2011; Silva et al., 2011). As a whole, it is posited that a collaborative media production project may afford a rich, CT experience to its participants.

Yet even though the literature claims that CT may be fostered by following certain thinking frameworks, or in student video projects, it still fails to distinguish what the process of CT actually *looks like* in collaborative video production, and how CT about the video's topic *develops* throughout production. Moreover, it hasn't observed this in tablet/mobile device collaborative production. Existing literature doesn't demonstrate how specific components of CT can be identified whilst groups produce: the identification of these being crucial to assess this process for the fostering and latter development of it.

Therefore, this research set out to answer the following questions, otherwise unclear in present literature:

- What exactly does CT *look like* in collaborative video production so that it may be identified, assessed and [hopefully] transferred to future projects?
- What aspects, tasks and activities of collaborative video media production on tablets foster critical thought?
- Finally, how does group video production enable young children to think critically about the topic they are producing their video on, and, how does their CT about the topic develop because of production?

This thesis is an exploration of CT in two group media projects with young children done on iPads and iMovie, but approached in distinct ways. As the Mexican National Council of Science and Technology commissioned this study, the first exploratory project (P1) was conducted in Mexico City with four small groups of children aged 9-13 who produced 5-12 minute group videos on iPads and iMovie about the influence of the media. P1 was guided by the thinking skills pyramid in Bloom's Revised Taxonomy of the Cognitive domain (Anderson, Krathwohl, & Bloom, 2001). There was a particular interest in the last three components

(*analyse*, *evaluate* and *create*) denoting the higher-order thinking skills (HOTS) associated with CT (Bradley, Thom, Hayes, & Hay, 2008; Cotton, 1991; Ennis, 1987; Gilbert & Dabbagh, 2005; Gokhale, 1995; Razmjoo & Kazempourfard, 2012; Stamenkovski & Zajkov, 2012). Bloom's taxonomy was used both by the participants to understand what engagement in CT might entail during their production, as well as a tool of analysis to identify, examine and assess CT in the data.

However, after reviewing the outcomes of the exploratory P1, it resulted in the development of various methods and the approach in defining and analysing CT, and a second young children's project (P2) was done in London – but with more informed methods and a new, different hypothesized CT model as a tool of analysis.

P1 was approached by directly facilitating participant critical thought and focusing on their collaborative videos and the videos' topic, and P2 focused only on CT during their *practice* of production – the former informing the latter. The hopes are that this work can serve as insight into future children's collaborative media production projects; whether the aim to produce is to educate children about the topic they're producing about, or afford them a rich experience in CT during their practice of collaborative video media production.

The organization of this thesis is as follows:

Chapter 2 considers critical thought in the context of western education: and a review of how it has been defined throughout the *Three Waves* of critical thinking (Paul, 1997) is presented in an attempt to understand what defines critical thought. In the latter part of this chapter, Bloom's revised taxonomy (Anderson et al., 2001) is offered as a cognitive framework of CT for the first project of this study.
Chapter 3 reviews socio-constructivist models of learning, with an aim to see how the different theoretical perspectives, structures and models of Collaborative Learning (CL) help make effective group projects. Cognitive Apprenticeship (CA) methods are considered here to be fundamental tools to the researcher/facilitator

in enabling visible thought processes. A discussion then follows about CL and CT, and then the role of the facilitator is highlighted.

Chapter 4 considers how participant-produced video and media projects may promote CT. Here, the Authentic Learning (AL) approach is discussed in light of student-produced video projects, and how the authentic tasks in video production may elicit critical engagement.

Chapter 5 then discusses the methodological approach as applied across both projects, but differentiates some methods used in each project's design and analysis.

Chapter 6 examines the exploratory P1 conducted in Mexico.

Chapter 7 explains the rationale behind the developments of methods and approaches resulting from P1, and how these informed the subsequent P2 in London.

Chapter 8 details P2 in London.

Chapter 9 discusses the process of how collaborative media production on tablets enables and fosters CT in light of this work, as well as the approaches in analysis of CT.

Chapter 10 presents the limitations of the research, and future directions are given for each.

Chapter 2 Critical thinking

"The unexamined life is not worth living"
– Socrates

'Critical thinking' (CT) is a phrase that has gained popularity in education throughout the last century. These two words stringed together in a book can be seen as early as 1910 in John Dewey's book written for teachers, *How We Think.* But the principles behind CT have existed since the time of Socrates, and the basic aim is still the same: "the pursuit of meaning and truth" (Elder & Paul, 1998; Paul & Elder, 2007; Wisdom & Leavitt, 2015).

Over the last thirty years, teaching students CT is progressively becoming a unifying objective amongst curriculum designers and educators (Arum & Roksa, 2011; Chaffee, 1992; Halpern, 2014; Lipman, 1987; Paul & Binker, 1990; Pithers & Soden, 2000; Spellings, 2006). Living in the fast-paced, digital information age and the increasing demands of employers hiring recent graduates are putting CT skills at the forefront of classroom education.

Exploratory models such as problem and inquiry-based learning and active learning have been examined in their capacities to teach high school and undergraduate students how to think critically (Karantzas et al., 2013; Ku, Ho, Hau, & Lai, 2014; Walker, 2003). Collaborative Learning models are also proposed to engage students in CT (Gokhale, 1995; Lai, 2011). Professional and vocational schools have likewise recognized the importance of CT (Benner, Sutphen, Leonard, & Day, 2010; Distler, 2007; Higgs, 2008; Youngblood & Beitz, 2001).

However as a whole, results from studies in Western education over the last three decades have demonstrated a lack of CT skills amongst primary and higher education students as well as their teachers (Casner-Lotto & Barrington, 2006; Flores et al., 2012; Gardiner, 1998; Hart Research Associates, 2015; Jones, 2010; Norris, 1985; Paul, 2004; Paul et al., 1997; Pithers & Soden, 2000; Tsui, 1999; Wagner, 2014).

There is expansive education literature on CT pointing to different methods to facilitate and assess it in the classroom (Bean, 2011; Bentley, 2014; Bowell & Kemp, 2014; Brookfield, 2013; Brookhart, 2010a; Choy & Oo, 2012; Crenshaw, 2010; Distler, 2007; Duron, Limbach, & Waugh, 2006; Fung, 2004; Groarke & Tindale, 2012; Halpern, 2002; Hannafin & Land, 1997; Nentl & Zietlow, 2008; Norris & Ennis, 1989; Reid & Anderson, 2012; Saadé, Morin, & Thomas, 2012; Şendağ & Odabaşı, 2009; Stoney & Oliver, 1999; Walker, 2003; Whiteley, 2014; Wisdom & Leavitt, 2015; Yang, Newby, & Bill, 2005a; Yang & Wu, 2012; Youngblood & Beitz, 2001).

Yet, it is still unclear what the best approaches might be because of the very abstract nature of critical thought. The absence of one, sole accepted definition of CT in education makes the shared aim of achieving it challenging. Identifying CT without knowing exactly what it is or what it might look like in practice makes matters unclear and undefined. Adding to this challenge, are ways to assess for CT when by and large, standardized tests as a means to assess students' learning have been the norm throughout most of Western education's history.

This chapter presents the history of CT in the Western context: how and why it has made its way into curricula. The *Three Waves* of the CT movement and its key proponents are also reviewed. Lastly, Bloom's revised taxonomy of the cognitive domain is examined as a thinking framework to define and assess CT and to identify higher-order thinking skills (HOTS) in education research.

2.1 Philosophies of critical thinking

A set of diverse disciplines has contributed to our present-day comprehension of CT, including philosophers, cognitive psychologists, and curriculum content specialists.

The early roots of CT date back at least to Socrates when he examined ideas and rhetoric from the powers that governed ancient Greece. He developed a method coined as "Socratic questioning" to interrogate the rationale behind unfounded statements made by authorities, before accepting them as ideas worth believing.

In this respect, CT and Socratic questioning both share a common goal: the "pursuit of meaning and truth" (Elder & Paul, 1998, p. 298). CT explains the mental process involved in this pursuit, and Socratic questioning aids in this process (Elder & Paul, 1998).

Plato and Aristotle followed Socrates' method of questioning, and the tradition of systematic questioning came into practice for all those who yearned to comprehend deeper realities. The middle ages saw thinkers such as Thomas Aquinas who engaged with his own works by regularly critiquing, considering and satisfying all criticisms of his concepts as an important phase in developing them. From the Renaissance, to the French Enlightenment, all the way up until the 19th century, CT was mainly kept within the realms of politics, art, science, sociology, and in scholarly circles.

It wasn't until the early 20th century in 1906 that Sumner's work in *Folkways* made an interesting critique to the present school system and its lack of CT in education curricula:

"Schools make persons all on one pattern, orthodoxy. School education, unless it is regulated by the best knowledge and good sense, will produce men and women who are all of one pattern, as if turned in a lathe" (Sumner, 2010, p. 631).

In his same work, Sumner then went further on to say:

"Education is good just so far as it produces well-developed critical faculty…Men educated in it cannot be stampeded. They are slow to believe... Education in the critical faculty is the only education of which it can be truly said that it makes good citizens" (Sumner, 2010, p. 634)

Building on Sumner's concepts, John Dewey came up with the notion of several modes of thought in his 1910 book written for teachers, *How We Think*. Dewey had a particular interest in the idea of "reflective thought", and outlined the criteria of reflection in four parts:

1 – "Reflection is a meaning-making process…"
2 – "[It] is a systematic, rigorous…[and] has roots in scientific inquiry"
3 – "Reflection needs to happen in community, in interaction with others"
4 – "[It] requires attitudes that value personal and intellectual growth of oneself and others"

Table 2.1 Dewey's four-part criteria of reflection

(Rodgers, 2002, p. 845)

However Dewey's idea of reflection is regarded as lacking a well-defined explanation of the purpose and process of reflection, and it isn't clear if teachers and educators have used Dewey's reflection philosophy in their practical approaches (Rodgers, 2002).

During this time at the turn of the 20th century, school teachers were mainly women who could read and write, but were in no way expected to lead critical discussions nor engage their students critically with subject material. Teaching was, and throughout most of history has been, a low paid and low pressure occupation for people who were otherwise unemployed (Paul, 1985). The *direct instruction* method (teacher-led lessons directed by the teacher where students learn by rote or memorization) (Engelmann & Carnine, 1982) and standardized tests were the unquestionable standard up until the late 20th century.

In the 1940's came Edward Glaser, who mounting on Dewey's notions of modes of thought, wrote *An Experiment in the Development of Critical Thinking*. He pioneered the notion of the "CT disposition", defining it as "an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experience" (Glaser, 1941, p. 5). This idea of the "CT disposition" was an elemental step in the history of CT in education: one that would keep resurfacing in later literature throughout the CT movement in the ongoing attempts to define the characteristics of critical thought. Later in 1964, Glaser co-authored *The Watson-Glaser Critical Thinking Appraisal* designed to assess the ability to understand and digest knowledge. This aptitude test has been widely used in graduate and professional settings, such as job recruitment and law firms.

2.2 The critical thinking *Waves* of Research: 1970's – present

Richard Paul best describes the CT movement as a series of *Three Waves* in research over the last 45 years (Paul, 1997). Each wave represents distinct research agendas of critical thought in segments of years, and its committed supporters in the literature. Principally, the waves illuminate how CT has developed and evolved in the literature over time (Huitt, 1998; Yıldırım & Özkahraman, 2011), but still does not present a clear-cut framework for CT.

A more comprehensive list of definitions of CT in the *Three Waves* is given in section 7.3, but the spirit and purpose of each wave of research is presented in what follows.

The first wave

First wave (1970-1982) research was concerned with formal and informal logical reasoning at the higher-education level. Professor Howard Kahane stated the usefulness of logic, rhetoric and reasoning in critically examining fallacies in newspaper media with his university students (Kahane, 1971). Though Kahane didn't outright define the term "critical thinking" in his literature, he pointed out that citizens who think critically would remain in a society free from the stronghold of the government and mass media influences, and posited that the use of rationale and logic were the way forward in critical thought (Walters, 1994). D'Angelo (1971) defined CT as skills used in problem solving, but also intuition and creativity. Siegel (1980) defined it as thinking that generates and seeks out good reasons, whilst McPeck (1981) coined it as the skill and propensity to engage in an activity with reflective scepticism, and that it requires knowledge of the subject.

The second wave

The second wave (1980-1993) brought about CT across the curriculum with an aim to integrate it across all education levels. It wasn't until the 1980's (during this period) that CT began to emerge in primary school curricula. This need arose when education reformers and researchers discovered that a few CT courses at the university level were not enough to develop students into "critical thinkers" (Paul, 1997). Paul (1997) describes this wave as a generally dispersed one, with various

proponents from distinct disciplines and backgrounds attempting to move away from the pure logic standpoint.

Albeit scattered in nature, the second wave brought in more subjective and emotional elements into the foreground of CT literature such as creativity, imagination and intuition. This is shown for example by the change of the CT definitions given by authors Scriven and Paul during this wave. In Scriven and Paul (1987) CT was defined as conceptualizing, applying, analysing, synthesizing, and/or evaluating information – all as a guide to belief and action. Then in Scriven and Paul (1992), the definition became: conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. Testifying to this shift in CT fundaments, Brookfield (1987), posited that it was "reflective scepticism" (1987, p. 5). This more "reflective" emergent trend on CT was also apparent in Mertes (1991): "…a conscious effort and deliberate process used to interpret or evaluate information and experiences with a set of reflective attitudes and abilities" (1991, p. 4), as well as in Norris (1985) and Chaffee (1992) who also foreground the reflection component in CT.

Beyond the reflective aspect which is somewhat personal, the second wave also introduced the need to consider the context, the information, and the evidences available as a fundamental component of the CT process (Facione, 1990; Kurfiss, 1988; Lipman, 1988; Tama, 1989; Watson & Glaser, 1991).

The third wave

The third wave (1990 – present), endeavours to integrate the perspectives of the first two waves to develop a theory of CT that is "rigorous and comprehensive" (Paul, 1997). It seeks to define the intellectual principles and standards that embody CT as applicable to both academic and non-academic spheres. It also aims to consider the role that emotion and values play in thinking and in the shaping of behaviour; thus incorporating empirical work of cognitive psychology in its theory. Another important objective is the development of efficient ways to assess CT (Paul, 1997).

Elder (2007) ruminated on the intellectual standards that embody third wave thinking: “CT is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way. Halpern (2002) also grounded CT in valuable thinking standards: “Thinking that is purposeful, reasoned, and goal oriented…” (2002, p. 8). Paul and Elder (2006b) said that CT is “the art of analysing and evaluating thinking with a view to improving it” (2006b, p. 4), bringing up the need to think about your own thinking. Also considering this, also Fischer and Spiker (2000) define CT as having metacognitive abilities. Mulnix (2012) presented CT as a “…commitment to using reason in the formulation of our beliefs” (2012, p. 471), giving CT a fundamental role in shaping our culture and society.

CT dispositions

After considering the developments of CT across the *Three Waves*, it is worth having a closer look into the dispositions deemed essential to thinking critically that have emerged from this. The CT dispositions can be viewed as habitual mindsets, or mental outlooks (Bailin, Case, Coombs, & Daniels, 1999; Beyer, 1995; Chaffee, 1992; Facione, 1990; Halpern, 2002; Kurfiss, 1988; Mertes, 1991; Norris & Ennis, 1989; Paul, 1992; Watson & Glaser, 1991). A synthesis of these demeanours is presented in Table 2.2.

Being fair and open-minded
Inclined to look for reason
Being inquisitive
Motivated to be well-informed
Being flexible
Being willing to accept different viewpoints

Table 2.2 Synthesis of CT dispositions

But these dispositions, along with the meanings of critical thought through the series of waves only confirm that the definitions of CT have been developed over time and are still evolving throughout the literature. As aforementioned, they still don’t give a clear framework of what to look for in participant CT in empirical work. How then, does one assess for CT in education research? How can cognitive [thought] processes be identified and evaluated in a classroom study? To answer

these questions, it was necessary to explore different cognitive frameworks used in studies examining CT, and choose one that would best fit in an education context.

2.3 Bloom's revised taxonomy and higher order thinking skills (HOTS)

In 1956, Benjamin Bloom and his colleagues produced one of the most popularly cited works in determining classroom-learning outcomes: The *Taxonomy of the Cognitive Domain*. This taxonomy was organized into a pyramid that identified six skill levels in successive order to achieve knowing in the learner.

Figure 2.1 depicts Bloom's 1956 Cognitive Domain vs. the 2001 Bloom's Revised Cognitive Domain.

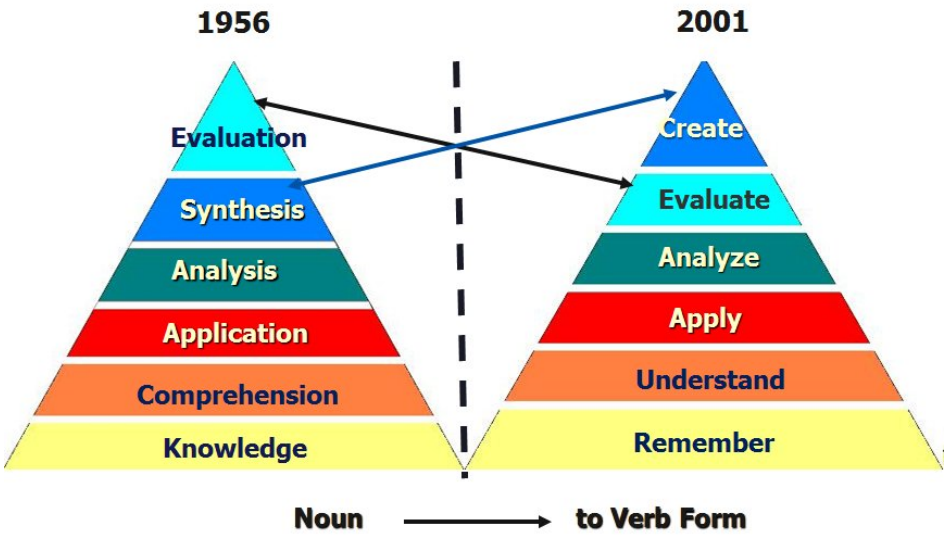


Figure 2.1 Bloom's 1956 Cognitive Domain Pyramid vs. 2001 Bloom's Revised Pyramid

(Image taken from: http://dreamlikechild.weebly.com/blooms-vs-andersonkrathwohl-taxonomy-revised.html)

The last 40 years of research have confirmed that the first four levels of Bloom's 1956 pyramid are an actual hierarchy (Huitt, 1998). For example, "knowing" (or "remembering") is a simpler skill than "understanding" (or "comprehension"), and is therefore classified below the skill of "understanding" (or "comprehension"). However, there were mixed reviews about the last two levels depicted in the 1956 version; researchers felt that "synthesis" and "evaluation" could be reversed, separated, or be of equal skill value (Seddon, 1978). Thus in the Anderson et al. (2001) revised pyramid, "synthesis" was swapped for "create", and "evaluation"

was kept, but put into the fifth level of cognitive skills. “Create” being the last and highest level, is now considered the generation of something new by way of synthesizing the experience gained with all the previous levels. The revised skill of “evaluation” has since then become foregrounded in the “CT” definitions of many authors (Chance, 1986; Ennis, 1992; Halpern, 1989; Hickey, 1990; Mayer & Goodchild, 1990; Mertes, 1991; Paul & Elder, 2006a; Scriven & Paul, 1987, 1992). In sum, the last three levels in the pyramid (*analyse, evaluate* and *create*) are the top levels of thinking in the hierarchy, and thus are regarded as *higher-order thinking skills* (HOTS) – the highest educational objectives of the cognitive domain (Anderson et al., 2001).

Thus in education research, the HOTS in Bloom’s revised taxonomy are associated with and considered to be essential components in CT (Bradley et al., 2008; Cotton, 1991; Ennis, 1987; Gilbert & Dabbagh, 2005; Gokhale, 1995; Razmjoo & Kazempourfard, 2012; Stamenkovski & Zajkov, 2012), and, in relationship to the transfer of knowledge. As the authors suggest, “When the goal of instruction is to promote transfer, objectives should include the cognitive processes associated with… Analyse, Evaluate and Create” (Anderson et al., 2001, p. 91).

As a whole, Bloom's taxonomy of the cognitive domain is regarded to be a fundamental element within the education community. Yet Bloom’s cognitive and affective domains continue to spark both insight and critique: insight for educators looking into the cognitive thought processes of their students, and critique for its linear fashion, vague definitions, and one-sided approach with an attempt to remain “neutral with respect to all educational values” (Richard, 1985, p. 526). Overall, it could be said that Bloom’s key findings in the cognitive domain were the linear accuracy of the first four skill levels, and the highly mentioned skill of “evaluation”; a skill that most authors in the CT movement agree is a true marker of critical thought.

However despite its limitations and [also] evolving quality, Bloom’s taxonomy (Anderson et al., 2001; Bloom et al., 1956) continues to be used in education research methodology to help understand achieved levels of cognition, and to

provide insight into the presence of HOTS (Bradley et al., 2008; Churches, 2009; Cotton, 1991; Crawford & Brown, 2002; Obenchain & Ives, 2006; Razmjoo & Kazempourfard, 2012; Stamenkovski & Zajkov, 2012).

Perhaps the best summation of how to identify CT in terms of levels of cognition is referring to the Garrison et al. (2001b) take on *cognitive presence.* According to the authors, "cognitive presence reflects higher-order knowledge acquisition and application, and is most associated with the literature and research related to CT" (2001b, p. 11). This suggests that the manifestation of higher-order thinking (HOTS) reveals cognitive presence, and that cognitive presence is connected to CT.

This made the search for HOTS an important part of this research: as this could signify cognitive presence and consequently, lead to the identification of CT. Thus, Bloom's revised taxonomy was considered a suitable framework to define, identify, analyse and assess CT in an education research context – with a specific aim to identify HOTS per the framework: *analysing, evaluating* and *creating*.

In this study, using a thinking framework like Bloom's would provide:

- A starting definition of what engagement in CT may look like
- What factors CT may involve
- The identification of initial markers of cognitive presence (HOTS) which lead to CT
- A way to analyse and assess thinking
- A starting point in the exploration of the critical thought process in a collaborative student project

Chapter 3 Socio-constructivist learning models

"What a child can do with assistance today
she will be able to do by herself tomorrow"
– Lev Vygotsky, 1978

Socio-constructivist learning models are based on the premise that learning takes place through social interactions, and seek to understand how subjective meaning becomes socially accepted meaning, or how it is *constructed socially*. This approach underlines that the whole of group meaning becomes worth more than the sum of its parts. As such, group communications take on a life of their own and develop in ways that cannot be foreseen by only accounting for individual members. The objective of this chapter is to present the socio-constructivist perspectives and social learning approaches that underpin this work. Here, Collaborative Learning (CL) is defined, its conditions for success delineated, and cooperation in collaboration is viewed as a student-centred approach promoting Social Interdependence. Collaboration's impact on learning is also deliberated – with a review into how this model promotes CT. Cognitive Apprenticeship (CA) is then considered as a useful social learning approach to facilitate visible thinking. Lastly, the role of the facilitator in enabling group interdependence and CT in collaborative structures is highlighted.

3.1 Social Constructivism

A great part of the research on collaboration is established in the work of Jean Piaget's stages in cognitive development (Piaget, 1964), and Lev Vygotsky's Zone of Proximal Development (ZPD) theory (Vygotsky, 1980). Though different in their natures, Piaget and Vygotsky both recognized the entwined individual and social facets of human development.

Piaget's stages describing children's cognitive progress and his idea of *cognitive conflict* are assumed by socio-constructivists, for example. According to Piaget, cognitive conflict emerges when an individual's present cognitive framework becomes challenged by new information or experiences, and a sense of discord is

felt within that individual (Wadsworth, 1996). As socio-constructivism indicates, cognitive conflict is essential for developmental progress, and is eased by social interaction with peers in the more advanced Piagetian stages in development. Cognitive conflicts therefore propel quality interactions as participants try and explain their knowledge, viewpoints, and suggestions to other group members in more articulate manners than usual (Limón, 2001; Webb, 1991). Heterogeneous groups are then crucial in Piagetian philosophy; as group members rely upon each other to have distinct knowledge, distinct philosophy frameworks, and diverse ways of interpreting these (Lai, 2011).

Vygotsky's socio-cultural perspective gave more significance to social communication in and of itself for bringing about individual cognitive change, instead of only being influenced by it. In this approach, social interaction is personalized, and arouses conceptual transformation in the individual as group members adopt new understandings. Vygotsky concurred with Piaget in the significance of mixed groups, because according to his theory, the Zone of Proximal Development (ZPD) is the span between what a learner can achieve independently and what they can achieve with the assistance of a more-abled other.

As a further matter, socio-constructivist models are proposed to foster CT (Ten Dam & Volman, 2004; Wang, Woo, & Zhao, 2009). Ten Dam and Volman (2004) address the need for a socio-constructivist approach of CT as an educational goal, and believe that "learning to think critically is an inherently social process" (2004, p. 372) viewing the learning of CT as an acquisition of "'critical competence" in participatory practice (2004, p. 372). Thus, the "competence" to participate critically is acquired through the need to engage in a meaningful social activity. Wang et al. (2009) build upon this notion of meaningful activities in socio-constructivist models, and suggest that discussion topics in interactive learning environments be meaningful and relevant to the students, but also debatable and provocative enough to set off differing views (Hung, Tan, & Chen, 2005 as cited in Wang, Woo, & Zhao 2009, p. 102).

In sum, the socio-constructivist lens views how learners construct knowledge and meaning together by way of interacting with one another. Participating in a meaningful activity promotes quality interactivity, engaging them in CT by way of reasoning and reflecting. Learners of varying levels bring unique contributions of knowledge, perspectives and socio-cultural experience to the group, stimulating cognitive growth within participants.

3.2 Social Interdependence

Research in the social sciences and education has offered theories to better understand how collaborative structures benefit learning. To better understand the psychology behind successful cooperation in group work, one of such theory is Social Interdependence (Deutsch, 1949). Since its conception over 65 years ago, a vast amount of research has been conducted indicating that the key to successful group structures is the alignment of goals amongst members. Once all members feel that their individual success is contingent upon the group's success, they have reached *positive interdependence:* meaning they are reliant upon each other to decision make and complete the group's mission, as opposed to competing with each other, or depending on the teacher/facilitator for learning and leadership (Johnson & Johnson, 2005; Munsinski, 1999).

Attaining positive interdependence is crucial to consider when determining the quality of a collaborative activity. Once members reach interdependence, they are able to immerse themselves in and reap the full benefits of collaborative structures: which entail working in a student-centered manner, having meaningful interactions, cooperating to problem solve, and being disposed to think critically (Johnson & Johnson, 2005; Kreijns, Kirschner, & Jochems, 2002; McCain, 2007; Smith, 1996). Furthermore, the importance of the facilitator is noted in reaching interdependence (Munsinski, 1999), and the ability to work alone once they have gained the needed experience (Brown et al., 1989).

3.3 Collaborative Learning

CL models are based on socio-constructivism (Jonassen, 1994; Jonassen, Peck, & Wilson, 1999; Maor, 2003; Roschelle, 1992). Instructors and policy reformers

have distinguished the capacity to collaborate as an important event in its own particular right, as opposed to simply a necessary skill to achieve something else. The National Curriculum in England requires schools by law to teach pupils in Key Stages 1 and 2 to participate in “collaborative conversations” as a Spoken language statutory requirement (“The national curriculum in England,” 2013, p. 17). In the US, the Common Core State Standards Initiative recently recognized “collaboration” as a core K-12 standard (“College and Career Readiness Anchor Standards for Speaking and Listening,” 2016). In addition, the Partnership for 21st Century Learning (P21) has renowned “collaboration” (along with CT) as one of the fundamental learning and innovation skills within their framework for higher education and workforce achievement (“Framework for 21st Century Learning,” 2007).

Despite these efforts in education, collaborative problem-solving and CT skills are still deficient in university graduates (Casner-Lotto & Barrington, 2006; Hart Research Associates, 2015), as implementing effective group structures in the classroom can be challenging. Teaching students how to collaborate to find a solution requires activities that provide a platform to collectively solve meaningful problems. It also requires a teacher/facilitator who can step in and out as needed, and who guides them from being teacher-reliant pupils to interdependent collaborators reliant upon each other (Munsinski, 1999). Finally, it necessitates ways to assess for collaboration quality, requiring distinct approaches from assessing individual pupil efforts.

Dillenbourg (1999) characterizes collaboration as “a situation in which two or more people learn or attempt to learn something together” (1999, p. 1). “Learning” is delineated as various types of scenarios: e.g., pupils studying together for a test, solving problems jointly where learning occurs because of the interactions, and others such as learning over a span of several years as a biological and/or cultural process.

Roschelle and Teasley (1995) define CL as a “mutual engagement of participants in a coordinated effort to solve a problem together” (1995, p. 70). Echoing group

goal alignment in Social Interdependence Theory (3.2) collaboration is “a continued attempt to construct and maintain a shared conception of a problem” (1995, p. 70). CL occurs inside a *joint problem space*, which is a shared knowledge network breeding meaningful interactions enabling problem solving by way of incorporating goals. The goal of collaboration is therefore for the members to interact whilst *relying* on each other to solve the problem (Andriessen, Baker, & Suthers, 2013; Barkley, Cross, & Major, 2014; Clare, 2015; Davidson & Major, 2014; Lai, 2011). In light of the joint problem space, 3.3.3 discusses the enhancement of CT in CL activities.

3.3.1 Conditions of a Collaborative Learning project

Collaboration models approach learning through a student-centered philosophy. As the responsibility to learn is on the students (instead of the teacher) and the ultimate goal is for them to rely on each other for learning (Panitz, 1999), several qualities make CL activities effective for this purpose. For example, each group member has access to the same tools, resources, and actions to complete the task. Task quality is also important; mundane and obvious tasks provide little opportunity to examine negotiation because there is no conflict (3.1) and therefore less opportunity to interact, to problem solve, and to learn from these. CL structures also provide common team goals instead of singular member goals; taking the pressure off to compete for individual learning achievements, and placing more emphasis on the collaboration and cooperation needed in order to learn (Mercer, 1996). The conditions in CL projects (e.g., the individual qualities of each member, the size and heterogeneity of the group, task features) (Lai, 2011) as well as a student-centered dynamic therefore determine the efficiency of collaboration.

In the present work, tasks entailing producing a collaborative video were considered to provide optimal conditions for CL, motivating the participants to meaningfully interact whilst working through collective problems together. Moreover, the unique qualities and background that each member brought were expected to play into their collaborative synergy as a group.

3.3.2 Interactional quality

The effort needed to construct shared knowledge therefore breeds quality interactions (Dillenbourg & Fischer, 2007). For instance, interactions stimulating sophisticated explanations enable learners to acquire principles essential to more practical procedures, and bring about learning that is applicable and transferrable to novel situations (Dansereau, 1988; Dillenbourg, Baker, Blaye, & O'Malley, 1996; Laal & Laal, 2012; Stahl, 2006; Van Boxtel, Van der Linden, & Kanselaar, 2000; Webb, 1991). Dansereau (1988) observed that the student explaining/clarifying a concept to another student is the one who benefits more from a group activity than the one hearing the explanation. Interacting socially thusly provokes verbal articulation of their understanding as group members try to make their thoughts understood to others, and students who give elaborate explanations improve their cognition of the concept (Dillenbourg et al., 1996; Fall, Webb, & Chudowsky, 2000; Kuech, 2004; Mercer, 1996; Tudge, 1992; Van Boxtel et al., 2000; Webb, 1991).

3.3.3 Collaborative Learning and critical thinking

There is considerable research linking collaboration to the development of CT (Bailin et al., 1999; Barzdžiukienė et al., 2006; Dudley, Davis, & McGrady, 2001; Garrison, Anderson, & Archer, 2001a; Gokhale, 1995; Heyman, 2008; Jeong, 2003; Karantzas et al., 2013; Lai, 2011; Nelson, 1994; Ngai, 2007; Sweet & Michaelsen, 2012; Thayer-Bacon, 2000; Whatley & Dyck, 1999). It is therefore worthwhile to observe what facets of CL structures are considered to promote CT.

Karantzas et al. (2013) reported on a CL study of undergraduate psychology students who underwent a problem-based tutorial program designed to enhance critical analysis and problem-solving skills. Students' change in these skills was assessed utilizing a multi-item, self-report instrument that measured critical analysis and problem-solving skills (2013, p. 39). The findings suggest that the engagement of collaborative and problem-based activities foster critical problem-solving skills and analysis.

Gokhale (1995) examined the effectiveness of learning individually versus learning collaboratively in enhancing drill and practice CT skills. Collaboration was defined

as the students working together towards a common goal, and the individual accountability of each member. The framework used to assess CT was based on Bloom's taxonomy of the cognitive domain. It was found that students who worked in collaboration did much better in the CT test than those who worked individually. CL provided opportunities to analyse, synthesize, and evaluate ideas cooperatively. Group interaction helped to learn experiences, argue their judgments, and reflect on them.

Dialogue and discussion emerge as popularly cited aspects in promoting CT in collaboration. Thayer-Bacon (2000) stress the importance of pupils' relationships with others more versed in experiences and topics in developing CT skills. Bailin et al. (1999) resonates that CT takes place whilst a person is thinking things through with others in dialogue and discussion; it lies in the *constructive* responses to the reasons and contributions others give, implying the respect and reassurance that needs to happen in CT-eliciting interactions. They also stress the importance of all people involved being able to participate in discussion, because if another doesn't have sufficient background knowledge on the topic, then that person won't be able to engage in CT – rather they will simply be getting information without engaging critically with it. Resounding the notion of having sufficient knowledge in a topic in order to think critically, Heyman (2008) offers that children as young as three years are able to decipher false from true statements, if they have enough knowledge and experience about them to make this evaluative distinction. For this reason, even older children often cannot engage in critical reasoning because they may lack the social experience needed to do so. The author suggests that more than actual age of a person, the *experience* around the topic is essential in engaging them in CT.

But it isn't just mere discussion that elicits CT in groups, rather having a common and meaningful topic to discuss. Collaborative activities that foster CT are structured by teachers and executed by students, and are comprised of three steps: "preparation, cognitive structuring and role structuring" (Nelson, 1994, p. 55). Preparation entails building a shared context by creating points of discussion that all students have some background knowledge in. Thus, a common topic to

all students is crucial to prepare the ground for CT. Cognitive structuring involves asking pupils questions or give them thinking models that are more "sophisticated" (1994, p. 55) than those used previously – facilitating an opportunity to discuss a meaningful topic on a higher level than normal. Role structuring allows all students to participate in a meaningful way, and to avoid conduct that is not helpful to group progress, e.g., turn taking, respecting others, ground rules of group, etc.

In online discussion, Garrison et al. (2001a) sought to assess critical discourse and CT in computer conferencing by looking for CT in the form of "cognitive presence" (2001a, p. 7). Cognitive presence was divided into four progressive phases: critical inquiry, exploration, and meaning construction, and resolution of dilemma. Content analysis assessed response rates in each phase: the first inquiry phase resulted in the least amount of responses, the second had the highest frequency (where people explored, shared insights, and gave relevant information) but had a lower rate in phase three of meaning construction, and the lowest in the fourth resolution phase. The latter lower rates were attributed to the challenge involved in reflecting and synthesizing information, and the computer-conferencing [virtual] medium not well-supporting resolution activities. This recommends that CL environments have problems resolved though "exploration, integration, and testing" (2001a, p. 7) and that interaction must be “synergistic" and well "coordinated” with facilitation (2001a, p. 7).

The creation of group simulations and hypothetical scenarios appear to be efficient methods in eliciting both effective collaboration and CT. Whatley and Dyck (2000) assigned supposed monetary fund development scenarios to international MBA students, and McGrady (2001) applied the creation of hypothetical stock portfolios with accounting students. Both studies found that pupils examined existing institutions and portfolios more critically after participating in simulations and scenarios, and transferred this experience to real-world application. Likewise, Jeffries (2005) proposed the use of collaborative simulations as a teaching strategy for problem solving and CT in the nursing field, and interestingly, the results revealed that the presence of the facilitator during simulations had a significant impact on learning. Barzdžiukienė et al. (2006) reported on foreign language

students who were assigned problematic scenarios for which they had to find solutions collaboratively. A framework for CT was created referencing the works of Bloom et al. (1956) and Ferrett (1997), including seven components: (1) clear issue identification (2) asking relevant questions (3) argument defence (4) pertinent viewpoint identification (5) analysis, synthesis, and decision making (6) critiquing and assimilating other views, and (7) articulating and communicating effectively (Barzdžiukienė et al., 2006, p. 80). Results suggested that participants who mastered CL activities such as creating group paragraphs, doing group presentations and performing group investigation excelled in CT also.

Here, an important point emerges around quality, collaborative interactions and CT. It appears that pupils with strong CT abilities and dispositions also tend to be the best collaborators (Lai, 2011). Bailin et al. (1999) stress the importance of "constructive" responses. Thayer-Bacon (2000) emphasizes dialoguing with more experienced others. As
Table 2.2 reveals, most CT dispositions are socially desirable outlooks for successful collaboration within a group.

It also appears that group size matters when it comes to providing opportunities for CT in collaboration. Sweet and Michaelson (2012) make an argument for small-group learning, termed Team-Based Learning (TBL), and posit that teachers employing TBL report high levels of CT engagement and retain these skills in subsequent projects. They advise that in order to allow all students equal and ample opportunities to participate and for quality assessment purposes, to keep teams to four participants.

As a whole, the literature establishes that CL structures provide a social, task-oriented platform upon which quality interactions about solving a common and meaningful problem take place – and in their endeavour to problem solve, participants engage in CT. It is also considered that for structural effectiveness, facilitation is needed, and group size should be kept to a minimum of four. Lastly, participant engagement in CT during collaboration is attributed to the disposition to think critically.

3.4 Cognitive Apprenticeship

Cognitive Apprenticeship (CA) is based on the socio-constructivist views of situated cognition theory, which views learning as inherently tied to genuine activity, context and culture (Lave, 1988). CA is used in collaborative studies to understand how group work activities can improve student cognition (Romeo, 2008, as cited in Holkner et al., 2008, p. 10; Stein, 1998). The CA approach is useful in revealing the [cognitive] thought processes of experts aiming to develop higher-order thinking in novices (Reynolds & Bonk, 1997; Tompkins, 2016; Tressel, 2014). The aim of the CA approach is therefore simply, *making thinking visible* (Collins et al., 1991). In making the expert's thought process visible to novices, it facilitates the development of this same thinking in them.

The CA model (Collins, Brown, & Holum, 1991; Collins, Brown, & Newman, 1987) has unified the instructional procedures in classic craft apprenticeship programs with the techniques of instruction in classrooms (Tompkins, 2016), and provides the following practical methods to facilitate students into expert thought processes:

Modelling: "Experts" (facilitators or mentors) demonstrate a task and its process clearly.

Coaching: Expert provides feedback and hints to novices.

Scaffolding: Supporting with just those things that the novice cannot do yet (i.e., within the ZPD, 3.1), and stepping out otherwise.

Articulation: Getting students to "articulate their knowledge, reasoning, or problem-solving process in a domain" (Collins et al., 1987, p. 482). Articulation helps novices to "think aloud" and demonstrates the expert's thinking aloud, all this permitting other classroom members to also hear thought processes. Articulation can be in the form of "inquiry" where the facilitator asks questions thinking aloud on behalf of student, and "critical student role" where a more-abled pupil monitors

others in problem-solving activities and assesses results (Collins et al., 1987, p. 482).

Reflection: Getting students to look back, evaluate their present performance, and look at how it may improve future-wise.

Exploration: Showing students how to conduct their own research, explore and formulate their own hypotheses. The facilitator may initially scaffold this.

CA suggests that novice learners must collaborate (or *interact*) with other more "expert" learners and learn to use whatever tools, objects or knowledge in authentic contexts that closely resemble the situations in which they will be applied (Lave & Wenger, 1991; Schell & Black, 1997). The experts guide novices through this process, modelling and scaffolding their thinking and practice, coaching them along, and then slowly withdrawing as the novice becomes more experienced and can carry on alone. These learned thought processes are therefore transferrable: students use the cognitive tools developed in the expert's situated domain *outside* of that domain as well (Brown et al., 1989).

Reynolds and Bonk (1997) view CA as a powerful educational approach for developing higher-order thinking in web-based instruction. The authors suggest web-based activities such as concept mapping, reflection logs, article reviews, and critiques and comparisons of Internet content to make CT visible. Experts and learning guides are available on the web providing opportunities for electronic mentoring projects, as novices receive feedback and support from experts. It is argued that as cognitive apprenticeships in focused areas proliferate on the web, it becomes crucial that web-based instructors also think more critically about their own web-based instructional content selection. In this regard, web-based cognitive apprenticeships engage both novice and experts alike in CT.

Tompkins (2016) highlights the time-constraint challenge of teaching library-researching skills to students in a one-shot session. She suggests the CA model to help simplify the thought process involved with library research and make it comprehensive for students of all levels. She argues that CA helps to "collapse"

(2016, p. 1) the library research critical thought process into one session, in explicit and simple ways that are comprehendible by all students. To collapse it, library research tutorials must first begin with a brief overview of the research process involved, then directly move to a hands-on session where students practice it themselves. The author shifted from a mainly lecture-driven atmosphere to a student-centred one that was “most effective for engaging students” critically (2016, p. 6).

CA is proposed to develop critical writing skills in students by using written prompts (Tressel, 2014). Expert writers’ cognitive processes were summed up as writing goals: 1) New idea generation 2) Existing idea improvement 3) Idea elaboration 4) Goal identification 5) Idea synthesis (Scardamalia & Bereiter, 1983; 1985 as cited in Tressel, 2014). A series of written prompts were then generated for each goal. For instance, to “generate a new idea”, a prompt saying, “An even better idea is… An important point I haven’t considered is… No one will have thought of…” Prompts were displayed in the classroom for all students to see whilst writing. A “think aloud” activity facilitating students to articulate what the prompts might look like in action whilst writing was conducted, then articulation was slowly withdrawn, but the prompts still kept up for reference. Findings suggested that once students become familiar with these CT processes, they no longer rely on prompts or cues and begin to write critically on their own.

In sum, the varying methods in CA are indicated to make cognitive processes visible. For example, concept maps, reflection logs, and media content critique can all help to see thought processes. Using written prompts can facilitate critical engagement with the topic, and “think aloud” activities can get pupils to articulate their thoughts. Modelling a CT disposition to the participants helps to make this type of thinking visible to them. CA is therefore considered a useful method to facilitate CT in this work as this research seeks to explore the CT process in students.

3.5 The role of the facilitator

The facilitator in a socio-constructivist model takes a step back from teaching and

creates a student-centred environment encouraging learner-to-learner interaction, sharing of tools, feelings, knowledge and experiences to construct new meanings together (Wadsworth, 1996). The facilitator consequently takes a more behind-the-scenes stance yet must still intervene if needed; as effective group work “obviously requires considerable support and intervention on the part of teachers” (Buckingham et al., 1995, p. 77 as cited in Potter, 2012, p. 67).

Facilitator-mediated student-centred group activities are proposed to develop CT (Cornelius-White, 2007; Distler, 2007; Duron et al., 2006; Estes, 2004; Felder & Brent, 1996; Havard, Du, & Olinzock, 2005; Motschnig-Pitrik & Holzinger, 2002; Yang et al., 2005a).

Both proponents of CA and CT argue that the facilitator’s role in “facilitating” CT is best approached by *modelling* this kind of thinking. Modelling a CT disposition results in more effective teaching of CT, and per the APA Delphi research, the “proper use of CT skills in the very process of instruction” is recommended (Facione, 1990, Recommendation 14, APA as cited in Facione and Facione, 1996, p. 133) . This comes as a welcome recommendation, as CT dispositions are likewise desirable outlooks for successful social interaction (3.3.3). Bouncing questions back to the participants encouraging their own critical thinking exemplifies modelling (Matthews, Cooper, Davidson, & Hawkes, 1995). Socratic-type and open-ended questions rouse inspiring group discussions, for instance (Elder & Paul, 1998; Golding, 2011; Overholser, 1993; Yang et al., 2005a). CA proponents offer that an expert [facilitator] model more difficult concepts to students, and as such, make their thinking visible to them (3.4). In this way, students develop cognition from a more skilled “other”. It is noted that in group work, this “other” can also be another more skilled participant (not just the facilitator).

In fact, this is the facilitator’s ultimate goal: for participants to rely on each other’s expertise interdependently (3.2). The teacher goes from conveyor of information to facilitator of group processes (Blaney et al., 1977). The facilitator’s role is characterized as an act of relinquishing control: "Getting rewards from controlling

students is replaced by getting rewards from releasing students" (Munsinski, 1999, p. 25). For example, rather than lecturing simple concepts, students can watch a video, research a website, or read a relevant article – allowing students to spend as much time they feel is needed to learn the content. Interactive group discussions can also be activity preparation. This respects and differentiates the abilities of each learner, guiding them towards interdependence (Munsinski, 1999). The student "has the need to know; the facilitator helps the learner become aware of this need to know and value learning (Knowles, 1990, as cited in Munsinski, 1999, p. 25). The facilitator therefore, exists to aid the students in recognizing the importance of their own scholarship.

Yet setting the stage for group interdependence often implies the facilitator stepping in more directly. Dillenbourg (1999) recommends that facilitators scaffold productive interactions by setting interactional rules (e.g., telling participants that everybody has to participate, asking more-abled ones to help less-abled ones, etc.). Furthermore, the facilitator also regulates and moderates interactions by “redirecting” and refocusing the group as needed (1999, p. 6). Lastly, the facilitator does provide hints – but never gives answers.

In a meta-analysis, 119 studies from 1948-2004 were synthesized including 355,325 students in learner-centred groups, with the only variable being teacher facilitation. One correlation that scored above average that was associated with the facilitated groups was “CT” (Cornelius-White, 2007). This highlights the significance of the facilitator-student relationship, and why it is important to look towards learner-centred facilitated activities to generate holistic, critical learning opportunities.

Under the guidance of a skilled facilitator, student participants in computer-mediated communication (CMC), reach higher levels of CT in web-based discussions (Havard et al., 2005; Yang, Newby, & Bill, 2005b). However, the facilitator must also know when to step out: more experienced online learners inspire less experienced ones, so facilitators need not step in if the construction of

meanings is progressive, generative, and democratic (Wickersham & Dooley, 2006).

All this considered, student-centred activities create opportunities for teachers to take on a facilitator role (rather than a lecturer). A facilitator differs from a teacher as the facilitator only intervenes and provides support when students need it. Facilitation promotes CT within the group and the ultimate goal of facilitation is for groups to reach interdependence: as reviewed, facilitator-assisted group work is essential to these ends.

Throughout the whole of this chapter, CL and CT have been presented to go hand-in-hand given there is an effective collaborative activity taking place with a common, meaningful problem to solve. Noteworthy is that the problems posed within this work's projects were *task-based problems*, postulated to stimulate cognitive growth (Pahl-Wostl, Mostert, & Tabara, 2008; Levine, Resnick, & Higgins, 1993 as cited in Palmgren-Neuvonen & Korkeamäki, 2014), rather than "interpersonal conflicts" which are considered detrimental and alienating (Wheelan, 2005 as cited in Palmgren-Neuvonen & Korkeamäki, 2014, p. 2). The facilitator would step in using CA methods facilitating within the ZPD (3.1), encouraging participants towards interdependence (3.2). Their interdependence was considered to elicit more quality interactions, fostering cognitive growth, which in turn would indicate engagement in CT. The idea was to provide opportunities for CT to take place naturally within the confines of a safe, classroom environment, and the CL structure was well suited for this purpose.

Chapter 4 Participant-produced video and media

"We live in a digital world,
but we're fairly analog creatures."
– Omar Ahmad, 2010

Media practices of the 21st century oblige that “all educated citizens are able to produce, consume and critique a range of multimodal media” (Smythe et al. 2016, p. 2). It is thus advocated that schools employ digital means with pupils to encourage print and multimodal literacies alike (Carrington & Robinson, 2009; Gee, 2013; Lotherington & Jenson, 2011, as cited in Smythe et al. 2016). Engaging students with authentic, digital media production equipment such as tablets to produce group videos and media montages offers a platform for them to critique and collaborate by researching online content, editing and making group decisions: hence it is considered a natural fit for the fostering of CT.

The potential of digital video (DV) and media production to enable a wide range of transferrable skills in students other than production itself has been observed. Video production is therefore a twofold experience: participants not only gain the technological skills of production, but also valuable skills in problem solving, organization, collaboration and CT (Adams, 1986; Asensio et al., 2006; Bowden, 1991; Buckingham et al., 1995; Levin, 1986; Lunch & Lunch, 2006; Reid, Burn, & Parker, 2002; Shewbridge & Berge, 2004; Silva et al., 2011; Tyner, 1994; White, 2003; Yang, 2013).

This chapter first reviews how video and media production is suggested to foster CT in its participant producers. Student video productions are then viewed in light of the Authentic Learning (AL) approach, helping to understand how the authentic activities of production may engage student participants in critical thought.

4.1 Video production and critical thought

There is existing literature suggesting that video production may support components of CT: in the form of reflection, problem solving skills, critical questioning, analysis, reasoning, creation and evaluation.

Participatory video, a branch of collaborative video production, has established a methodology based in action research in which its producer participants direct, produce, and disseminate their group video into their disadvantaged (and often unheard) communities with a message they want conveyed in order to promote social change (Blazek, 2016; Shaw, 2012).

White (2003) reported on a participatory video study where the participant producers were asked to fill out process evaluation forms to document and reflect upon their experience whilst producing videos collaboratively, and the majority of the participants reported having “developed critical-thinking skills” (2003, p. 246). The author offers that participatory video production is a tool that skills its producers not only in solving problems, but aids in the development of decision-making skills as well (White, 2003, p. 198). Lunch and Lunch (2006) review how various studies use participatory video to give a voice to marginalized groups, and how the participatory video process gives a sense of empowerment, enabling groups and disenfranchised communities to solve their own problems (Lunch & Lunch, 2006, p. 10). Though participatory video is only one type of collaborative video production methodology, it suggests that the act of working together to produce a group video around social issues relevant to its participant producers promotes critical thought (Lunch & Lunch, 2006; White, 2003; Yang, 2013).

It appears that students may think critically about their production *topic* whilst producing as well. Buckingham et al. (1995) offer that teaching children digital media production skills can enhance their critical-thinking abilities about the content they are producing, making them more critical consumers. Reporting on the experience of students in a TV production course, Levin (1986) also found that there is a close interconnection between video production and the ability to critically discern visual media. This may be because working with and handling visual media

gives students a chance to foster a critical understanding of what they are seeing (Adams, 1986). Drawing on this, the present research hypothesized that the participants would develop critical awareness and CT engagement with their production topic after having spent time producing it.

In one particular work titled *The Reel Girls Project*, it was revealed that an auto-biographical media production assignment about beauty ideals in the media allowed middle school girls to expose their issues on a different platform (film), and to reflect and critique mediated beauty ideals and images (Silva et al., 2011). Initially, students and faculty members from the University of North Carolina Wilmington prepped the girl participants in media literacy and filmmaking discourse. After submersion in these discourses and film production training, each participant individually-produced her own autobiographical short documentary about beauty ideals and the media as she saw it. Elements of reflective thought and critique about these issues were reportedly present all throughout their unique films, and the production of these allowed them to expose topics otherwise unexpressed (Silva et al., 2011). *The Reel Girls Project* serves as a starting point for the present work, as elements of critical thought were reportedly found in the girls' videos: if the engagement with media content fosters reflection and critical thought about the video's topic, this indicates that CT engagement occurs *during* their practice of production around such topics. This work would then take the next step to see *how* this happens during their productive practice, and in a group context.

Schuck and Kearney (2004) reported on the use of individually produced student DV's across five K-12 Australian schools. They found that there are three purposes (what the authors refer to as Modes) for student-produced videos:

Mode 1: DV is used as a communication tool to convey the students' message

Mode 2: DV is used a tool to observe and analyse thus enhancing the students' own observation and analytical skills surrounding a topic.

Mode 3: DV is used as a reflection tool to support students' reflection of their own learning (metacognitive skills).

Mode 3 was reportedly the most powerful in learning outcomes, though interestingly, the most rarely used mode in classroom projects. The authors also reported metacognitive skills such as students' reflection of their own work (Schuck & Kearny, 2004)

Hendersen et al. (2010) discuss the outcomes of a primary school that reported individual student DV production as an effective pedagogical strategy. Pupils each produced individual videos about poems, plays, commercials, scientific reports and other mediums found across curriculum. Moreover, the students' used recorded videos to analyse and observe phenomena for subjects in maths, science and social studies. However, the most compelling and influential use of student-produced videos reported was that of a "cyclical process of performance and reflection, significantly improving the quality of their own work" (Hendersen et al., 2010, p. 14), which draws upon Schuck and Kearney's (2004) *Mode 3*, respectively.

Yet, aside from just engaging with varying components of critical thought in the student production classroom, it also appears that these skills can be transferred to life outside.

Shewbridge and Berge (2004a) make an observation about the transferability of skills used in student video production:

"The goal of teaching [video] production should be to provide the analytical basis necessary to be informed consumers…eventually, this internal questioning [in video production] extends beyond the classroom as they become more critical consumers" (Shewbridge & Berge, 2004, p. 32)

It is therefore suggested that the systematic questioning that happens in the video production process eventually becomes habitual outside in other areas of life, thus creating a more systematically critical citizen overall.

On the same token, in her book about video in the classroom, Tyner (1994) agreed that “this habit of questioning information, developed through classroom practice, will create critically autonomous citizens” (1994, p. 26); thus, suggesting that questioning helps production students to think critically both during the production process as well as habitually, outside of the classroom in daily life.

So, it appears that the many facets of video and media production both at the technical level (such as working with the equipment) and the thematic level (such as filming around a certain topic) provide ample opportunities for individual participant producers to engage in CT whilst problem solving in production. Participatory video also emerges as a platform for its participant producers to engage in critical thinking. Moreover, the CT skills developed and systematically used around solving problems in video production begin to become “habitual”, and therefore become transferrable in other areas of life outside production.

4.2 Authentic Learning

A unifying theme that emerges throughout student production literature is that the real-world, authentic and naturally “seamless” (Burden & Kearney, 2016, p. 27) tasks in video production enable engagement in critical thought (Henderson et al., 2010; Kearney & Schuck, 2004; Shewbridge & Berge, 2004a). This premise underlines the Authentic Learning (AL) approach, aligned with constructivist values (Herrington & Oliver, 2000; Lombardi, 2007; Rule, 2006).

AL entails the use of situated, real-world simulations and scenarios (as similarly discussed in 3.3.3) in the contexts in which they are normally used, and these enable engagement in CT that is transferrable outside of the classroom.

Though it is agreed upon that authentic tasks give student learners relevant, real-world and meaningful experiences, what exactly establishes “authenticity” in

classroom tasks and how to compose them is still emerging (Radinsky, Bouillon, Lento & Gomez, 2001 as cited in Kearney & Schuck, 2006).

Barab, Squire, and Dueber (2000) posit that authenticity in classroom tasks "lies in the learner-perceived relations between practices they are carrying out and the use value of these practices" (2000, p. 38). This view puts authenticity dependent on the student perceptions of the tasks they're engaging with. CTGV (1990) (as cited in Kearney & Schuck, 2006, p. 190) hold that authentic tasks are 'life-like', requiring the making of decisions, solving problems and exposing pupils to real-world information.

However two helpful models of AL environments are proposed by Radinsky et al. (1998): (1) *simulation model* and (2) *participation model*. The first model immerses students in a classroom environment that *simulates* authentic, real-life activities, but is not "real" in the sense that the students engage in these hypothetically: in the safe and protected realm of the classroom and facilitator supervision. Still these activities must be rooted in authentic contexts; that is to say, they could be activities come across by real-world experts and practitioners in the field. The latter *participation model*, refers to student participation in the actual field of professional community practice: students in this model are authentically working on tasks in a real community outside of the classroom, thus learning the practice from the community itself.

Kearney and Schuck (2004, 2006) draw on the notion of an AL environment in their study of individually-produced student videos in five schools in Australia, and discuss how the authenticity in production projects enable components of critical thought. The authors reported a number of valuable learning outcomes across the five schools from engagement with the authentic tasks of production, such as and not limited to: critical literacies, questioning, and HOTS such as analysing and creating. One teacher in their study reported how authentic tasks in production prompted student producers to begin to "critically analyse films the world around them" (2004, p. 3). Students reported the ease of playing back footage immediately via the small camera screen to instantly evaluate it, and both students and their

teachers agreed that the tasks of production helped them learn about their learning (metacognition). Overall, the students reported reflecting on their own works, and developing skills in evaluation. Furthermore, that having a real, authentic audience to produce for injected more meaning into their videos, and motivated more scrutinous evaluation of their produced content for said audience.

Hendersen et al. (2010) reported various learning outcomes with the use of individually-produced student videos in a primary school in Australia, citing the most important aspect to be the “use of technology” to give pupils authentic contexts to develop cognitive skills (2010, p. 17). They also reported increased student autonomy, as the students reviewed and [with practice] edited their own work in autonomous fashion without the need of the teacher. Both students and teachers felt that this increased student autonomy developed reflective skills within students by way of working in authentic contexts. Furthermore, when pupils had the opportunity to present their works to other students, it made the activities more valued and consequently the student producers more reflective and critical of their productions.

Having an actual, authentic audience that will view the video in the future therefore emerges as a key factor in participant-producer projects, and can be a real source of motivation for students’ to become critical of their own work (Burn & Reed, 1999; Coleman, Neuhauser, & Vander Zwaag, 2004; Kearney & Schuck, 2004, 2006).

Shewbridge and Berge (2004) render useful the natural interest that students demonstrate for DV, and create authentic opportunities with production tasks in the classroom. The authors posit there is growing relevance of student video production to education at present, and the learning outcomes of integrating the authentic tasks involved in production in curriculum are increased engagement in CT and development of critical viewing skills. The authentic practices of taking control of visual media, handling it, managing it, producing and reproducing it provides opportunities to then gain a critical understanding of it (Adams, 1986, as cited in Shewbridge & Berge, 2004). Shewbridge and Berge (2004) therefore hold

that the authentic tasks of producing media are what enable students to critically view media subsequently.

In sum, the literature claims that individually-produced participant videos foster CT about the production topic as well as during production, making it a valuable activity for this research. In terms of collaboration, participatory video methodology offers a collaborative platform upon which to collaboratively problem solve. Lastly, the AL approach affords an understanding of how the authentic activities of video production may engage student producers in CT.

Yet, previous literature fails to show exactly *how* CT happens in *collaborative* video media production in young children; nor is the process clear on *how* CT about the video's topic develops throughout the production. For instance, what activities in production children are doing whilst they think critically, and how the CT process takes place during these, has not been observed. Also, how CT progresses during production and what aspects prompt this development, has not been researched either.

The aims of this work were thus to expand on this literature by answering precisely "how" these things might happen during a collaborative children's mobile media production project. Answering these questions would contribute to existing literature in Collaborative Learning, participant-produced media/video production, and critical thinking, by providing a detailed analysis of the process of *how* and what about young children's collaborative media projects foster CT, how development of CT about the video's topic happens during production, and possible ways to assess collaborative video projects for participant-producers' CT engagement. As a further matter, this work aimed to explore this through tablet production: a mobile, domestic medium considered relevant, authentic and attainable to young children.

Chapter 5 Methodological approach

“Remain firm about your goals,
but flexible about your methods”
- William Donohue, 1992

This chapter considers the approaches in methodology applied across this study. From here, the theoretical approaches to CT in student group video production as reviewed are underpinned to the present work. Next, a general overview of both projects’ designs is given, and the general sample of participants is discussed. Following this, how case studies may be performed in a rigorous manner is reviewed. Lastly, the analytical approach is examined across this research: the analysis of video-based data, qualitative content analysis, and the review of ethical considerations. To be noted is that some data collection methods and analytical tools for CT differed from P1 to P2. These differences are mentioned here for the sake of distinguishing some methods from project to project, but are discussed in greater detail in each project’s individual chapter, and in Chapter 7.

5.1 Theoretical approaches as applied to this work

Collaborative Learning approach

Social constructivism is a perspective that is fundamental to this research: that is, the idea that cognitive development and knowledge construction are inherently socio-interactional events. Socio-constructivist models are considered to best develop CT that is transferrable (3.1). Collaborative Learning (being a socio-constructivist model) was applied in this work in the form of a collaborative media production project, in line with the notion that, CL classroom structures develop CT (3.3.3).

The practice of collaborative video-making using a meaningful topic (3.3.3), including authentic tasks in production (4.2) such as brainstorming video themes, choosing footage and content together, as well as sharing experiences, and making collective decisions about what content will be produced is aligned with

socio-constructivist values (3.3). Each participant can potentially bring something unique to the production sessions: e.g., socio-cultural perspectives and knowledge experience, and these will potentially influence others' contributions along the way (3.1). Their group involvement in meaningful tasks can prompt them to become positively interdependent on one another, shifting from being initially dependent on the facilitator to later relying more on each other. Their growing interdependence was postulated to enable them to exchange progressively better interactions, as the group dynamic became more collaborative and aligned in goals. The progressing qualities of interaction as the group reached interdependence were what was considered to foster CT. Important to bear in mind was also the researcher's/facilitator's contribution (3.4). From a socio-constructivist lens, all are equal contributors to the new meaning and knowledge created (Steffe & Gale, 1995).

Cognitive Apprenticeship approach

The methods of CA (3.4) were drawn upon to make visible the [expert] facilitator's thought process involved in CT, and to this end facilitate it in the participants. Just the same, CA methods would make participant thought processes visible for research. So, it was understood that the critical thought process would necessarily have to be visible during production in order to facilitate it, identify it and analyse it. It simply wouldn't be possible to assess CT happening quietly inside the participants' heads, especially if there wasn't any indication, action or interaction following participants' long pauses of silent "thinking". Though critical thought can and does happen in silence (or inside one's head, respectively), for the collection of data in this study it was crucial that thoughts be voiced, reacted upon, interacted with, and be overall visible for research.

In order to facilitate this process, some aspects and methods of CA were then drawn upon. The following is a list of CA methods (Tompkins, 2016, in 3.4) as applied to this work.

Articulation, modelling, coaching:

The researcher/facilitator asked Socratic and open-ended questions (Elder & Paul, 1998; Golding, 2011; Overholser, 1993; Yang et al., 2005a in 3.5) to get participants brainstorming and thinking aloud. Modelling tasks, coaching for affirmation, articulating thought processes, and promoting support all provided a facilitative, communicative and collaborative environment visible for research.

Exploration and scaffolding:

Participants were scaffolded in those areas they had not learned yet (within their ZPD) like during their media content research for their video, facilitation with the iMovie app, or troubleshooting the iPad. In the same manner, more-abled participants were encouraged to scaffold less-experienced ones. To this end, facilitation was slowly withdrawn as the project progressed in the group's journey towards interdependence.

Reflection logs:

In P2, participants wrote end-of-session reflection logs (Reynolds & Bonk, 1997, in 3.4) in an effort to see their thoughts about their session: e.g., how working on a group video helped them engage critically with the video's topic. During their reflections, the participants were asked open-ended questions to inspire reflective thinking. Written reflections were postulated to make their thinking visible.

Concept mapping:

Participant-drawn concept maps (Reynolds & Bonk, 1997, in 3.4) were used in P2 to collect visible baseline and follow-up participant knowledge and thought processes. During these assessments, the participants were modelled, articulated and scaffolded through the process, encouraging thinking aloud.

CA to address time-constraint challenges:

Session time with participants during fieldwork is precious, and must be spent wisely to collect the data relevant to answer the research question. Since this work sought to examine their production work for their video, it was necessary to enable to participants to begin producing without valuable time spent on prior lessons in

production technique. Drawing upon aspects of CA allowed to “collapse” (Tompkins, 2016, in 3.4) otherwise difficult and time-consuming tutorials of the iPad, apps and other media production tools. Collapsing lessons potentially spent on storyboarding, for example, were made possible using the iMovie trailer template.

CA to engage participants critically with media content:

Keeping written prompts (Tressel, 2014, in 3.4) and relevant content images visible during production kept participants critically engaged with the content, on topic and on task – allowing rich and relevant data to be collected. For example, the CT disposition was first modelled by asking Socratic and open-ended questions about the video’s topic: getting the participants motivated to brainstorm ideas and think aloud, or during crucial moments when the production was stalling or stagnating. Once a critical discussion was established and objectives set, the group would begin to work together following these aligned goals. From then on, the facilitator would step in to foster more critical learning opportunities along the way, but at this point, the group was hypothesized to be interacting interdependently.

Because of the nature and scope of performing a study with groups of younger children, the time constraints, the handling of tablets, working through the apps, and the grasp of certain concepts, this work invariably necessitated facilitated supervision by the researcher. Without moderate facilitation, the participants might have been unable to create videos in the session times allotted, thus no significant data would have been collected. Though the role of the researcher/facilitator in the sessions was considered a crucial component for success (3.5) it was important to keep a balance between existing as a researcher and providing facilitation with some CA strategies – all with an aim not to teach, but rather to *provide opportunities to think critically*. This was an ongoing challenge throughout the entire study, but an endeavour that would hopefully provide visible moments of the critical thought process in collaborative video media production.

Authentic Learning approach

This work benefits from the *simulation model* (Radinsky et al., 1998 in 4.2). Young children are good candidates for simulated authentic tasks as they can gain real-world experience that can later be applicable to real-world contexts – yet in the comfort zone of a supervised classroom and with their classmates. The practices involved in producing a group video on iPads using iMovie about media content the participants presently engaged with, were anticipated to be valuable to children of this age group. Given children's present and widespread engagement with YouTube, this project was perceived as authentic and relevant to them.

By way of them producing around the authentic topic of "media influence", it was hypothesized they would go through an ongoing process of self-reflection by way of constantly viewing theirs and other group members' media content choices, and provoking engagement in CT throughout the production process. This would be similar to *Mode 3* (Schuck & Kearney, 2004, in 4.1) yet distinct as this research would observe the *collaborative* effort in video production (not individual).

The authentic and "seamless" task of immediately playing back footage on the iPad was considered to provide moments of critical thought through analysis and evaluation. What's more, the promise of a real audience eventually seeing their final videos (e.g., teachers, student participants in other schools, and academic community) was considered to motivate them to finish them to a standard they deemed appropriate for such audiences; thus providing moments of self-reflection and critical analysis (Kearney & Schuck, 2004; 2006 in 4.1).

Therefore, the use of this technology along with the meaningful and authentic context of "media influence" was considered to motivate the groups to work in autonomous and critical fashion because of the relevant topic, technology used, and collaborative context.

5.2 Research design

5.2.1 Overview

This work embodies a series of case studies performed in two different projects and cities. Within each city/project, there were multiple groups of participants divided by gender and age group.

The first project (P1) took place in Mexico, where two private schools participated: one primary school and another combined campus of primary students through high school. In the subsequent London project (P2), one publicly funded primary school participated. Both projects involved support from the school staff and teachers of the participants.

All sessions across both projects were planned with the same overarching aims: *to see if and how collaborative media production enabled CT, and, how the video's topic was critically thought about because of their engagement in production*. All sessions were designed to facilitate CT in the context of student video production activities and using the video's topic, *media influence on body image*. All sessions were structured so that each group could first co-research about the "media influence" topic whilst collecting and producing content with iPads in "pre-production" mode, and later compile their content together to produce one short 5-minute video on iMovie per group.

That being, each project had different methods and approaches in achieving this aim because the first project helped to inform the second.

The purpose of P1 was to explore the ways and methods in which CT could be fostered in student collaborative video production so that it could be identified for analysis in research. For example, one important concept from the CA framework (3.4) is the role of facilitation from the "expert". During P1, a simple idea was to articulate to the students what CT *involves*. This objective was to demonstrate (or *model* and *articulate*, respectively) how experts think critically so they could aim to do the same autonomously. For the demonstration of CT, Bloom's revised cognitive framework (Anderson et al., 2001) was directly used throughout P1, and

served a two-fold purpose: (1) as a guide to facilitate participant engagement in CT, with particular importance on the last three levels (HOTS) (2) as an assessment tool for the identification and analysis of CT in the data.

The completed group videos were a central focus in P1 – these were hypothesized to be a prime component in helping answer the research questions – and the design of this project reflected this. It was expected that each group's completed video would show their developing engagement with CT: the completed videos cross-examined with focus group data, observations during production, individual interviews and participant questionnaires, were hypothesized to provide answers to the research questions.

However, the design and approaches of using Bloom's revised taxonomy to facilitate CT in the sessions and for analysis, and making the completed video the focus of the study – were found to have issues that needed improvement. These resulted in a series of developed methods and approaches discussed in Chapter 7 – including a new CT framework – that was then only used for the analysis of data, and not for the participants to work with.

The aims of P2 were then to identify engagement in CT in the authentic activities of student group video production, and to see how critical thought about the video's topic developed because of their engagement in the production of it. So, instead of modelling CT, the second project took a more authentic approach: i.e., the basic act of participating in an authentic and mutually meaningful activity was hypothesized to generate critical competence (Ten Dam & Volman, 2004, in 3.1) in and of itself. Hence, in P2, the analytical focus was shifted to their activity during video production. The revised CT framework was used in the analysis of these production sessions, but was not disclosed to the participants.

5.2.2 General sample of participants

The participants were aged 9-13 and in a school setting. Table 5.1 delineates the criteria that helped to form the participant groups in each year level.

✓ Aged 9-13
✓ Has worked on iPads
✓ At least one member in each group has worked with iMovie
✓ Would like to participate in a collaborative project
✓ Is able to miss portions of class to participate in project
✓ Has demonstrated interest or curiosity in media and/or media aspects

Table 5.1 Participant criteria

It was preferred that they had experience with iPads as it would not be possible to spend session time teaching them how to use an iPad. It was noted that at least one group member had experience with iMovie, enabling more experienced iMovie users to help less experienced ones (if needed). It was important that the participants would sincerely like to work in a collaborative project, and that they understood the voluntary and cooperative aspect of it. Finally, though some students might have made great candidates for this project, they were behind in their studies and could not afford to miss class for an extracurricular study.

The group size was kept small (4-5 children) as it was considered to allow for more quality interactions and CT opportunities (Sweet & Michaelsen, 2012, in 3.3.3). In both projects, all participants and groups were selected with the help of their teachers.

5.2.3 Case studies

A case study is the study of a group over a period of time, and focuses on the development of the group, rather than its individual members (Yin, 2013). Case studies investigate a present phenomenon in its real-life environment, and provide a ground for applying ideas and allowance of methods (Soy, 2015). Across this work, each group represented a case in critical thinking. All the participant groups were assigned the same topic of *the influence of the media on body image, thinking and behaviours,* however this topic was simply a context. The expectation was that outside of this present work, CT might be fostered, identified and measured with *any* video topic, and the methods applied may render transferability and usefulness to other group video projects. More succinctly, the overall hope was that the

findings might be accessible for application to larger, formal studies seeking to enable, identify and measure CT in collaborative activities.

In order for a case study (or a series of case studies) under qualitative investigation to render credible, reliable, and most importantly, *transferrable* findings, there are a series of steps to take to ensure rigour in analysis (Lincoln & Guba, 1985). Whilst it is important to maintain a flexible and open stance, there are four strategies to ensure that rigour is in place.

Shaw et al. (2013) delineates a rigour framework by Lincoln and Guba (1985) reported in Table 5.2.

Approaches to rigour	Strategies
Credibility	Prolonged engagement and persistent observation. Triangulation. Peer debriefing. Member checking.
Dependability	Audit trail. Reflexivity.
Confirmability	Audit trail. Reflexivity
Transferability	Thick descriptions.

Table 5.2 Four strategies to assess rigour of case studies

(Image taken from Shaw, Houghton, Casey, & Murphy, 2013, p. 13)

“Credibility” can be achieved with consistent engagement and observation over time until no new data emerges, and saturation is reached (Shaw et al., 2013). In the present work, there was continuous engagement with the participants over prolonged periods of time in their school setting, on a weekly (sometimes more than once a week) basis.

“Triangulation” (the use of various methods to study the same phenomenon) may also increase credibility when the gathered data using different methods produces

consistent findings (Shaw et al., 2013). To triangulate the data, the “interpretation approach” (Chi, 1997, pp. 7–8) was achieved by producing quantitative results through MAXQDA 12 software, but interpreting these results *qualitatively*. This feature of qualitative interpretation on content analysis is also inherent in the method of qualitative content analysis (5.3.2) employed throughout this study.

Having an audit trail and maintaining reflexivity can achieve “dependability” and “confirmability”. An audit trail is simply a record of how decisions were made along the way, with a clear emphasis on *why*. Since the researcher was to be a component of her own research instrument, keeping a reflective account of the rationale, interests, and theoretical perspectives influencing the data collection and analysis was key to dependability (Shaw et al., 2013). For instance, written notes were meticulously taken during the fieldwork for cross-examination with the actual recorded data. A reflective diary was kept of each session supporting the more technical aforementioned notes, and a clear audit trail in the transcription software’s note system was established, ensuring that each decision in analysis was justified. Having a clear and traceable decision and reflexivity trail created a system upon which data was collected, reflected upon, analysed, cross-examined, and then confirmed.

“Transferability” relies on thick descriptions of the findings so that others can read them, make sense of them, and then transfer them to their own studies (Shaw et al., 2013; Whittemore, Chase, & Mandle, 2001). “A rich and vigorous presentation of the findings, with appropriate quotations, also enhances transferability” (Graneheim & Lundman, 2004 as cited in Shaw et al., 2013, p. 16). In this work, detailed accounts and images have been offered for the reader to draw their own conclusions, including descriptive, relevant examples of data presented. Such accounts may include direct quotes from the children for enhanced description of the events as experienced by the participants themselves.

Both projects focused on the group behaviours, discourse and content emerging during the activities of group video production. Once the content was identified in

the activities, it was possible to produce quantitative data that needed to be interpreted qualitatively.

Ultimately, the participants contributing to this data were the children and to some degree the researcher/facilitator; keeping in mind her own philosophical stance and approach given her unique experiences as a past primary school teacher now turned researcher. As noted, “cases are important for researchers’ own learning processes in developing the skills needed to do good research” (Flyvbjerg, 2006 p. 9).

5.3 Analytical approach

Analysing qualitative data

The lens through which the qualitative researcher analyses their data will inevitably be coloured with traces of their own theoretical perspectives, understandings, and, reflections of these. These inescapably subjective (yet scientific) interpretations of their data make qualitative researchers an intrinsic component of their own research (Corbin & Strauss, 2008). They are therefore considered “the primary instrument for data collection and analysis” (Merriam & Tisdell, 2015, p. 16), and as a result the data produced in qualitative studies is a sum of both participants and researcher. In the existing work, the researcher came from a primary school teaching background, teaching children in Mexico City for four years just prior to conducting this study. This naturally coloured the manner in which concepts were explored and related to one another, the ways in which data were gathered, and how the participants, their parents and teachers were approached. However, every endeavour was made to collect data that informed the research questions, and to analyse this data rigorously and grounded in research methods. There were adjustments of methods made along the way that helped the gathering of data in subsequent sessions to better answer the research questions. This adjustment and readjustment of methods in order to determine the best research design and methods is a normal part of exploratory studies (Shields & Rangarajan, 2013).

Qualitative research produces data that is not numerical, but rather texts, images, and audio/video recordings that cannot be simply quantified (Punch, 2013). This

process of interpreting verbal, physical, interactional behaviours and content data by employing rigorous analytical methods to produce empirical findings is what constitutes qualitative data analysis. The subjective nature of qualitative analysis lends itself to limitations in interpretations that are considered biased, and consequently, results that may be deemed non-replicable. However these limitations can be overcome by employing a mixed-methods approach in the analysis (Atieno, 2009; Chi, 1997; Dowling & Brown, 2012; Flick, 2009; Leech & Onwuegbuzie, 2007), allowing the triangulation of data (Shaw, Houghton, Casey, & Murphy, 2013).

5.3.1 Video data analysis

In the analysis of collected video data from field work, clips that are selected and cut from their larger corpuses (and consequently, their contexts) for deeper analysis can be conceptualized in diverse ways, depending on what purpose they have been chosen for. One concept in perceptual psychology that is useful for qualitative content analysis is understanding these selected clips as "*events*" (Zack & Tversky, 2001 as cited in Derry et al., 2010, p. 7). A recording is constituted of many such *events*, and these events can be broken down into *sub events*. Taking for instance, the event of producing a group video collaboratively in the present work: this event contained within it an array of sub events, and then further *micro-events* within. Sub events such as: a participant choosing footage for the video, another participant arguing for a video title they really like, or participants prepping to record a scene could then be (if applicable) broken down into micro events, which could then serve to focus on gestures used, body language, and mental states (Derry et al., 2010).

The selection of events is influenced partly by what the researcher perceives and partly by what is actually happening in the footage, and the researcher's interest drives what events and timescales should be selected for the study (Goldman-Segall, 1998; Leacock, 1973 as cited in Derry et al., 2010). Since the selection of events for both projects was driven by the search for CT, events were firstly sought where participants demonstrated any engagement with the CT components according to the respective CT framework and model used in each project.

Secondly, within these events there were sub events sought (in the form of discourse and actions) where each participant might display engagement in CT about the “influence of media”, or any indication of CT developing around this topic because of their engagement in collaborative video production. This data selection method was applied for all video-based data in both projects; the only difference between the two projects was their distinct analytical approaches to assess for CT.

According to Erickson, Green, Camilli and Elmore (2006) there are three distinct approaches that may be used in analysing textual data.

Type I – *Inductive*, whole-to-part approach
Type II – *Deductive*, part-to-whole approach
Type II – *Manifest* content approach

Table 5.3 Three types of approaches to data analysis (Erickson et al., 2006, pp. 183–186)

The “inductive approach” is recommended for research in which there are no presupposed theories or hypotheses, and applies a more grounded method. The “deductive approach” is utilized when there are specific events that are sought within the video data, and is applicable when the research is steered by an existent hypothesis, research questions or theories about these events. “Manifest content” is to analyse for a certain word, phrase, content/subject matter in textual material. It seeks certain, tangible, visible, explicit keywords or content in the data, and is considered the opposite of latent content which is more underlying and implicit (Erickson et al., 2006; Potter & Levine-Donnerstein, 1999).

The present work was approached deductively; there were presupposed theories and frameworks of CT that guided all stages of the research including the session designs (though these evolved as one study informed the next). The initial assumption that the CT phenomenon would manifest, could be fostered and then studied in collaborative video production facilitated the preliminary codes and categories to look for in the data.

For effective video-based data to be collected, the positioning of the camera in the room, tripods, hand-held moments, lighting, audio, and other factors that can affect the quality of the data collected must be accounted for (Jewitt, 2012; Knoblauch, Schnettler, Raab, & Soeffner, 2006). But collecting audible, visible, and effective quality video-based data is only half the battle. The data produced must contain clear moments of interaction and dialogue between participants during visible activities that can later be analysed when played back.

It was necessary to extract valuable information from the video-based data across both projects, and Figure 5.1 outlines how this was approached in phases.

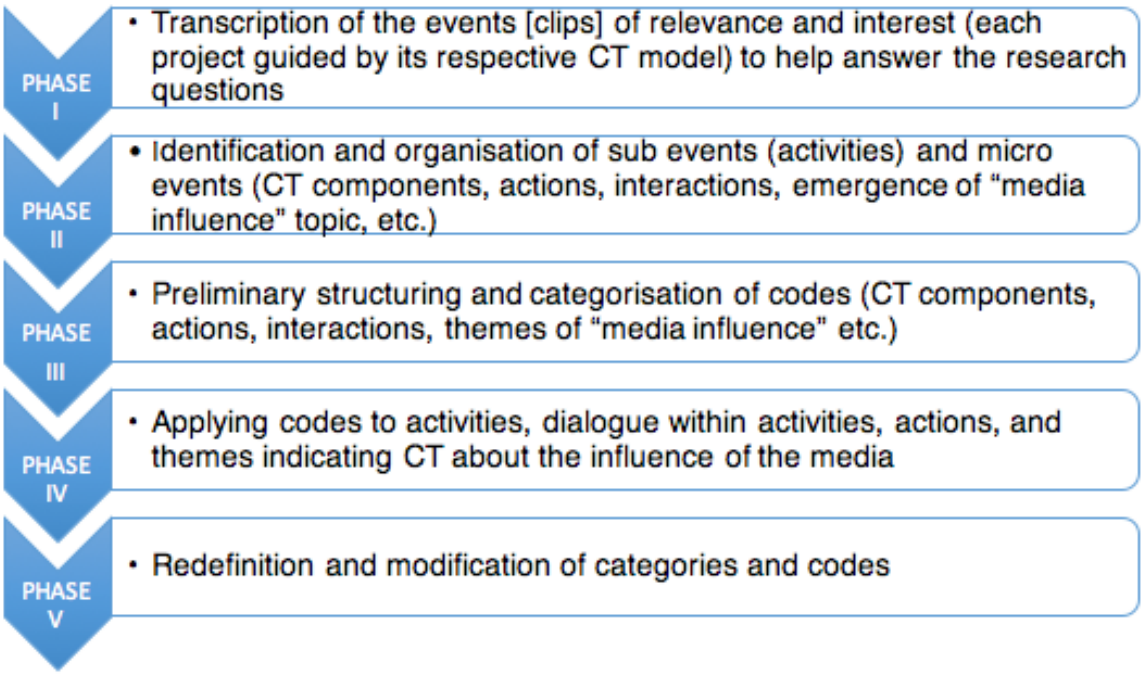


Figure 5.1 Five phases of video-based data analysis

The last two phases of Figure 5.1 were repeated several times until more rigorous guidelines began to emerge for the codes, and finally saturation was reached.

5.3.2 Qualitative content analysis

Figure 5.2 outlines the types of data sets collected and analysed across this research (more detailed accounts can be found in each project's chapter).

Figure 5.2 Overview of data sets analysed across both projects

These data were examined in order to answer the following questions:

1. How does collaborative video production enable and foster CT?
    a) What does CT *look like* in a collaborative video production project so that it may be identified and analysed?
    b) What aspects, tasks and activities of collaborative video media production foster critical thought?
2. How (if at all) does group video production enable young children to think critically about the topic they are producing their video on, and, how does their CT about the topic develop because of production?

To answer these questions using the data sets collected, qualitative content analysis (Hsieh & Shannon, 2005; Kohlbacher, 2006; Mayring, 2014; Schreier, 2014) was the most effective analytical approach. Qualitative content analysis is systematic, it reduces data, is flexible though guided by theory, integrates context and different materials, uses a category system, and integrates steps of quantitative analysis allowing for triangulation (Kohlbacher, 2006). The multi-use feature and reductive quality of qualitative content analysis made it a useful method to apply systematically across the board for the distinct data sets collected across this work.

It is important here to make the distinction between *classical* content analysis (a quantitative procedure of word counting and analysis of keyword frequencies) and *qualitative* content analysis. Qualitative content analysis enables textual data to be analysed beyond the more simplistic, quantitative word counting of classical

content analysis, looking deeper into latent themes, deriving rich descriptions of the data, whilst still applying the quantitative steps of analysis (Kohlbacher, 2006). Employing qualitative content analysis in case study research can ensure triangulation at two distinct levels: (1) the consolidation of material and evidence, usually collected by various methods (2) the integration of the qualitative and quantitative steps of analysis (Kohlbacher, 2006).

In the present work, the first level was achieved by gathering data using distinct and varying methods: for example across this study, focus groups, video-based production sessions, interviews and concept maps were varying methods. The second level was achieved by using this qualitative data to produce quantitative results; the data was assigned codes and categories qualitatively, but the results reproduced quantitatively. This can be done with transcription software, or processing the data electronically via computer to demonstrate more complex statistical evaluation (Mayring, 2014). Showing the rate of occurrences is of central importance to case studies, as it can demonstrate how “a certain case recurs in a similar form with a certain frequency” (Mayring, 2014, p. 41).

As a last measure of triangulation, the *interpretation approach* was applied: this entails interpreting quantitative results *qualitatively* (Chi, 1997, pp. 7–8). This cycle of mixed-methods during analysis ensured triangulation at various stages:

1. Using data from different materials and methods
2. Turning qualitative data into quantitative results
3. Interpreting the quantitative results with qualitative descriptions

Qualitative content analysis can be approached following a series of eight steps (Schreier, 2014, pp. 170–181). Each step is outlined below, followed by a description of how it was applied to the present work:

Step 1: Deciding on a research question

The main research question of this study was:

How does collaborative media production enable and foster CT in young children?

Step 2: Selecting material

To answer this question, it was necessary to select a suitable amount of material and only use material that reflected the full diversity of sources of data (Schreier, 2014). For instance, if there were multiple groups at one school, then it was necessary to select the group which best represented that school and context, and contained a suitable amount of data to answer the research question. If the data consisted of interviews from several different groups in schools, then it was necessary to select at least one interview from each group that acted as the best representative of that group. If within that group's data there were many sessions of production, then those sessions that best represented that group's production experience were selected and then transcribed into textual form.

Step 3: Building a coding frame

This involves structuring and generating categories from the selected material, defining these categories, and revision and expansion of the frame (Schreier, 2014). The present work approached this process of categorization deductively, and was guided by Bloom's cognitive framework in P1, and the new, hypothesized CT model in P2.

P1 in Mexico was guided by Bloom's revised taxonomy of the cognitive domain (Anderson et al., 2001, in 2.3) with a special focus on the last three levels which would denote HOTS (marked with an asterisk) associated with CT.

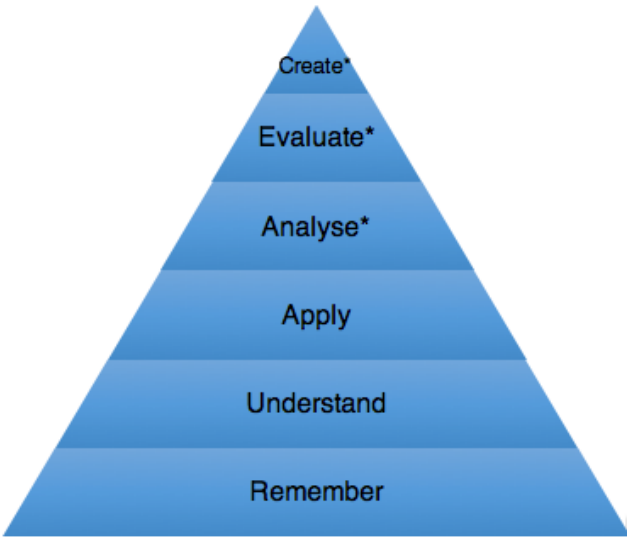


Figure 5.3 CT analytical framework in P1
(Anderson et al., 2001)

P2 in London was guided by a new, hypothesized CT model (7.3) and was not considered a taxonomy, rather a set of non-linear components.

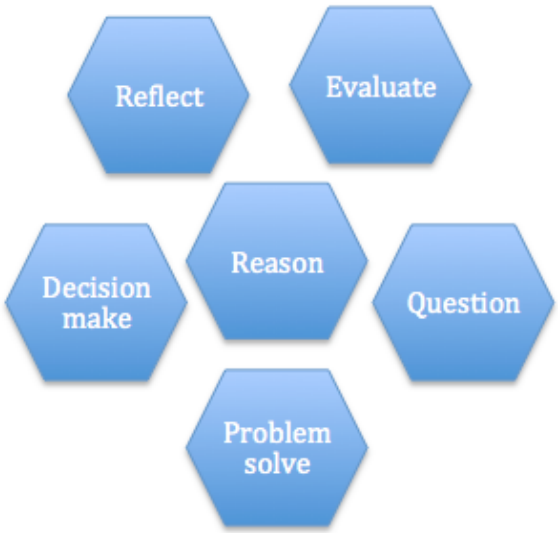


Figure 5.4 CT analytical model in P2

Both of these CT models guided the primary identification of a small number of categories where relevant data might be found during each project, and from there subcategories developed thus expanding the frame. This deductive-type approach is most relevant where research is driven by existing questions, theories or hypotheses about those events (Hsieh & Shannon, 2005). To ensure consistency in the coding scheme, a coding manual was developed that comprised the names

of categories, definitions, rules of coding and assignment of, and relevant examples (Weber, 1990; Zhang & Wildemuth, 2010). This coding manual was expected to develop and change according to new findings throughout the analysis, and was enhanced by reflective memos alongside the findings.

Step 4: Segmentation

This includes segmenting the material into units so that each unit fits into a category of the coding frame (Schreier, 2014). In the present work, all of the selected material was segmented and put into categories where it was clear exactly where one unit of text began and ended, and where the next emerged. This was possible by first transcribing the selections of interest and applying the categories over every part of the text.

Step 5: Trial coding

Trial coding involves what Schreier (2014) calls the "pilot phase" in coding (Schreier, 2014, p. 178). During this phase, material is again selected that best represents the different types of data so that most of the categories can be applied to it. During trial coding, the most relevant and representative materials and sources from each group were focused on. For instance, moments that denoted *remembering, understanding*, and *application* of concepts in P1 were noted. In P2, *decision making, reflecting* or *questioning* were noted. Then, those interesting moments were transcribed and the activity's start and finish were determined within the text's corpus by playing the recorded moment alongside the transcribed text for contextual support.

After, there was a reading of the entire transcript from start to finish and the text that on first impression, struck as the CT phenomenon taking place (Hsieh & Shannon, 2005, in 5.3.1), was highlighted. A next step was to identify the group whose sessions had the largest number of key moments, in order to have a good amount of data to work with.

Step 6: Evaluation and modifying the coding frame

Evaluation of the coding frame involves checking for consistency and validity (Schreier, 2014). The trial coding phase can happen one time with only a few changes made to the frame and then be ready to be applied to the main analysis, but sometimes a lot of changes are made during trial coding which implies the need to run a second trial. This is the process of evaluating and modifying the coding frame: that is, seeing if more trial coding runs are needed to modify the frame and doing this until no more changes are done to the frame.

Step 7: Main analysis

This is the step where all material is coded. Schreier (2014) recommends that the frame is trialled as much as needed to ensure that the coding frame is in place as once this step is reached, the frame can no longer be changed. Once coding consistency has been accomplished, the rules within the coding frame may be applied to any remaining text corpus that may need to be coded.

Schreier (2014) also advises to keep track of any coding inconsistencies, and writing memos in the transcription software next to inconsistencies accomplished this. Finally, during this phase the results are prepared so they can best serve to answer the research question(s) (Schreier, 2014).

Step 8: Presenting and interpreting the findings

According to Schreier (2014), qualitatively presenting the coding frame may suffice in presentation of findings, and illustrating it along with quotes. This can be achieved with text matrices or tables. In this qualitative manner the data may be examined for patterns and co-occurrences, and seeing the relations between categories and themes. Findings can also be presented in a quantitative style such as reporting co-occurrences between codes, percentages, and their frequencies. In the present work, findings from the focus groups, written reflections, concept maps, questionnaires, and interviews were presented via the coding frame in a textual manner (Schreier, 2014), alongside quotes and supporting qualitative descriptions in an effort to see patterns themes, relationships between categories and their co-occurrences. There were fewer data sets of these, and “reducing” them in quantitative fashion was not appropriate for their analysis or discussion of. Alternatively, data from the video-based production sessions were abundant and

lengthy, so to reduce it as much as possible yet still keep a rich description in the interpretation, it was reported quantitatively and interpreted qualitatively via the *interpretation approach* (Chi, 1997).

5.4 Ethical considerations

Working alongside human participants in case study research implies the need for a strict code of ethics to be adhered to in the collection, storing, analysis and publishing of data collected (Merriam, 1998).

The UCL/IOE Research Ethics Committee approved the present work before data was collected, and the BPS Code of Ethics was followed. Signed consent forms from all participant teachers, students and parents were obtained, and when methodological direction was modified during the fieldwork, written letters went home to inform the parents of the modified study's aims and how this may change the session activities. Furthermore, the researcher obtained a mandatory Disclosure and Barring Service (DBS) certificate that entailed a full criminal background check since she would be working with children. Pseudonyms were used for all participants in reporting the findings, and data were stored in a password-protected computer and storage drive. An oral presentation of the intended research was given to participating teachers, as well as all the children in their classrooms explaining the study, and answering all questions. Participation consent forms and leaflets were given for students and parents (Appendix A – Ethics).

The participant sessions were always done at the school and during school hours in an assigned classroom. No physical risks were ever posed to anyone involved; and any sensitive information relayed during the sessions that might imply a "mental or physical risk", or that alerted the researcher that a child might be in "danger" in any way was to be reported immediately and confidentially to the homeroom teacher. No monetary incentives were offered to schools nor participants; it was completely voluntary and as such, any participant could choose to withdraw from the study at any time (Dowling & Brown, 2012). Lastly, the findings were to be published for academic purposes only.

Chapter 6 Project 1: Mexico

6.1 Purpose and overview

This first exploratory project (P1) was performed during January – March 2015 in two private bilingual English/Spanish schools in Mexico City.

The researcher endeavoured to see how CT might be fostered and developed in a collaborative media production project, and, if and how the participants engaged in critical thought about the video's topic of "media influence" because of their production. Part of this research also involved exploring what methods best facilitated and enabled CT in student group production, as well as what methods of analysis were best for understanding, identifying and analysing CT in this context.

All participant groups produced videos around the topic of: *how the media perpetuates stereotypes, and how these and media content they engage with may influence their thoughts and behaviour.* Data was collected in the form of focus groups, exit questionnaires, individual exit interviews, and the creation of each group's own unique 5 – 20-minute video.

An exploratory stance was maintained throughout, always keeping an eye out for the best possible methods to answer the research questions to inform P2. That being, the researcher wasn't interested in *right* or *wrong* answers or interactions, rather seeing the *why* and *how* of each situation – keeping an open viewpoint to better understand the phenomenon of CT in collaborative video production.

This chapter is organized as follows: First, the school profiles and the selection process of the participants are detailed. Next, the methods are discussed; this considers the design, structure and aim of sessions, materials used, and iPad use. This is then followed by the analysis of relevant data sets, and the results are reported. A discussion then ensues about the results, and some conclusions are given. Finally, P1's limitations are considered and future directions are given in consideration of the developed methods to follow in P2.

6.2 School profiles and participant selection

Both participating schools in Mexico were part of a larger group of bilingual English/Spanish American private schools; hence, they were different “campuses” in distinct parts of the city, but part of the same umbrella institute. All children in this project spoke Spanish and English fluently.

The primary school was located in the south of Mexico City, with a population of 620 students (aged 6-12) and 37 teachers. The researcher had previously worked there; teaching English to students aged 7-11. The “middle school” was actually a combined campus comprising of primary through high school students and was located in the north of the city – it accommodated a total of 1,050 students (ages 6-17) and 120 teachers. For the purposes of this study, the latter school will be referred to as the “middle school”, and the former the “primary school”. As both schools were private, the general population of the students was considered affluent. The majority of the student population was of Mexican descent, but there existed some variations in backgrounds such as the children of expats.

The headmaster and teachers of each school determined the grade levels available to participate. This largely depended on term schedules, but also the suitability of the project’s concept for the varying ages. It was expressed to each school that they needed to be children at the primary and early middle school level (less than 14 years old) who were able to work on a collaborative video together on iPads and iMovie, and able to grasp the concept of “media influence on body image”. This would keep the participants in the younger range (and not in high school, for example).

The most available for research, and best-suited grade levels for this project were therefore grades 4 – 7, with participant candidates in the ranges of 9-13 years of age.

There were four participating teachers at the primary school. Two Spanish teachers, one teaching grade 6 (G6) with students aged 11-12, and the other teaching grade 4 (G4) with children aged 9-10, and two English teachers who

taught the same students. At the middle school, there were two participating English teachers: the grade 6 (G6AB) aged 11-12, and grade 7 (G7) aged 13-14.

Once signed child and parent consent forms came back to the teachers, the researcher went over the pool of applicants with each teacher in an effort to form the groups according to this work's participant criteria (5.2.2).

At the primary school, five boys were put together to form the G4 group, and four girls for the G6 group. At the middle school, four boys were grouped for the G7 group, and four girls in grade 6 to form the G6AB group. However, one girl participant opted out after the first focus group – so there ended up being three girls in G6AB.

6.3 Methods

6.3.1 iPads

The iMovie app was chosen for its easy-to-use movie template features and overall "kid-friendliness". Hence, the devices needed to be iPads or iPhones because the iMovie app can only be run on OS X.

The participants at the primary all brought their own devices (BYOD) with iMovie. The primary school offered loaner iPads, but were slightly older models and the children complained that they were "too slow". All teachers and parents were OK with the BYOD concept. The middle school participants had their own, assigned school iPad with iMovie that they could use for whatever work (in and out of school) they needed, so they used their school iPads. With the BYOD concept in place at both schools, all participants could work on the project's content both in and out of sessions (i.e., during the week and at home) depending on their motivation to do so. The researcher used her own iPad with iMovie to record all video-based data during the fieldwork, as well as to facilitate the use of iMovie throughout the project.

6.3.2 Design of sessions

English and Spanish

Even though all children were fully bilingual, both groups at the primary school expressed they preferred to perform the study in Spanish, so the study was conducted in Spanish. At the middle school, both groups felt entirely comfortable speaking only English so their sessions were in English.

"Stereotypes" context

With the help and suggestion of one of their teachers, it was explained to the participants from the project's start that the video's topic was about how the media perpetuates "stereotypes", and how these perpetuated "stereotypes" in the media may influence their body image, thoughts and behaviour. The "stereotypes" context was used because the direct translation from English to Spanish of this study's topic was otherwise confusing for the students and not understood.

Bloom's revised taxonomy

Bloom's revised taxonomy of the cognitive domain (Anderson et al., 2001) was presented in the pyramid form (Figure 5.3) to all participants and their teachers from the beginning of the project in an effort to explain the "CT" aspect of this work, and what was being sought in this study. The same pyramid was presented in Spanish to the participants at the primary.

Bloom's revised taxonomy therefore served a two-fold purpose in this project: (1) as a guide to facilitate participant engagement in CT, with particular importance on the last three levels (HOTS) (2) as an assessment tool for the identification and analysis of CT in the data. So, both researcher/facilitator and her participants interchangeably used Bloom's pyramid: both knowing what was being endeavoured and sought for in the project.

Session structure

Seven sessions were planned for all groups with one to two sessions per week, per group, dependent on availability. Session length ran from 20-75 minutes. As the same methods and design were applied at both schools during the fieldwork, Table 6.1 and Table 6.2 illustrate the sessions, methods and materials used to obtain the data.

Session	Activity	About	Purpose	Materials Used
1	Focus group	*What is CT?*	To get a baseline assessment of participants' awareness/understanding about CT.	• Researcher iPad to video record FG
	Focus group / Researcher presentation	*How do mediated stereotypes and content influence body image, thoughts and behaviour?*	To gain a baseline assessment of participants' awareness/understanding of mediated altered images, stereotypes, and beauty ideals, and influences of these on body image and perceptions, by researcher showing sample content, and discussing it.	• Researcher iPad to video record FG • Researcher computer to show sample media content of discussion
2	Present short videos	*CT for children*	To present participants two short videos on CT for children.	• Researcher computer to show YouTube videos
	Focus group / Researcher presentation	*How can Bloom's revised pyramid facilitate CT during this project?*	To get participants' to engage critically with Bloom's pyramid as a framework as a CT-facilitation tool by modelling it, discussing it, and having participants save Bloom's pyramid onto their iPads.	• Researcher iPad to video record FG • Researcher computer to show Bloom's pyramid • Participant iPads
	P-to-P produced interviews	*What media content influences my group members, and why?*	To understand others' influential media content and enable better integration of all members' contents, and to practice recording, saving this footage for later video compilation.	• Participant iPads • Researcher camera to take session pictures • Researcher-written prompt with information-gathering questions

Table 6.1 Mexico project sessions, design and materials – 1

3	Focus group / Participant presentation	*What kinds of media content perpetuate stereotypes and influence body image, thoughts and behaviour, and why?*	To evaluate their critical thought on content they engage with by having participants present to the group their media content of interest and discussing it.	• Researcher iPad to video record FG • Participant iPads with their saved media content of interest
4	Skit production	*How can mediated stereotypes and content influence body image, thoughts and behaviours?*	To develop and produce skits about influential media **using a prompt**, and save this footage for later compilation into group video	• Participant iPads • Researcher iPad to video record session • Paper + pen for prompt • Researcher notebook, pen
5	Skit production	*How can collaborative video production enable CT?*	To develop and produce skits about how collaborative video production can enable CT **referring to Bloom's pyramid** to facilitate if needed, and save this footage for later compilation into group video.	• Participant iPads • Researcher iPad to video record session • Researcher camera to take session pictures
6	Production of trailer / Group video completion	*How do mediated stereotypes influence body image, thoughts and behaviour?*	To produce on the iMovie app's trailer template, compile their saved footage onto trailer, and complete group video.	• Participant iPads • Researcher iPad to video record session • Researcher notebook, pen
Interview / Questionnaire	Individual exit interview / Exit Questionnaire	* *CT* * *Mediated content* * *Experiences in this project*	To get a follow up assessment of CT during the project, about the video's topic, and knowledge of the general experiences in the project.	• Researcher iPad to video record interviews • Researcher computer for participant completion of questionnaire on Word

Table 6.2 Mexico project sessions, design and materials – 2

The first session included an introduction to the study, stating its purpose, what it involved, going over some general ground rules of conduct, and each participant

creating their own pseudonym. As the materials sections of Table 6.1 and Table 6.2 depict, the sessions were planned to collect video-based data on focus groups, exit interviews and production activities by recording them on the researcher's iPad. To supplement this data there were also observation notes and photographs whilst they produced some footage. Their completed group videos provided more video-based data, and finally, the exit questionnaires were designed to provide an alternative method of data collection at the project's end.

6.3.3 Procedure

Focus groups (Session 1, 2, 3)

Each focus group was designed to explore and collect information about various aspects of this study: participants' understanding of "critical thinking", their critical engagement with the video's topic and with a CT framework during a group video project, as well as the actual types of media they personally engaged with regularly and found influential to them and their age group. Focus groups ran from 5-20 minutes. During the focus groups, they were asked various types of open-ended questions (Appendix B) to elicit their takes on each topic.

Session 1

The two focus groups during this session were to gain baseline assessments on participants' knowledge in CT, and their awareness and understanding of the influence of mediated content. The first focus group "*What is CT?"* was done without showing any kind of media content to gain participants' baseline perspectives on "CT" as a concept. The second focus group "*How do mediated stereotypes and content influence body image, thoughts and behaviour?"* was done by presenting them media content (Image 6.1 - Image 6.4) and was posed to gain a baseline assessment of participants' knowledge of mediated altered images, including stereotypes and notions of beauty that impact body image, thoughts and behaviour.

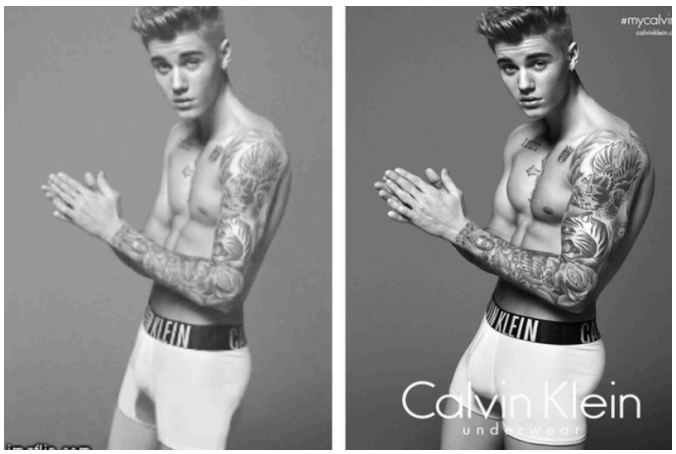


Image 6.1 Session 1 – Justin Bieber airbrushed comparison

Image 6.2 Session 1 – girl / boy stereotypes

Image 6.3 Session 1 – different size models

Image 6.4 Session 1 – Selena Gomez photo edit and image comparison

Session 2

To start, the participants were shown two short YouTube videos geared towards children produced by the The Foundation for Critical Thinking (Paul, Elder, & Nosich, n.d.):

1. *CT For Children – 1. Introduction*, (Elder, 2008a)
2. *CT For Children – 2. Three Kinds of Thinkers* (Elder, 2008b)

The animated videos briefly explain how children can practice to be critical thinkers, and pose a character called *"Fair-minded Fran*" (scripted by Linda Elder, president of the foundation) as the best kind of thinker: a CT role model.

In the video, *Fair-minded Fran* says she practices good thinking every day, and that "I always think for myself, but also think about others in a fair-minded way" (Elder, 2008b).

Image 6.5 "CT For Children" YouTube video

These videos were meant to model and articulate (3.4) some expert examples of critical thinking to the participants, and to this end facilitate it during their production and their handling of the video's topic. After watching the videos, they were asked what they thought about the videos' message, and a brief discussion about these took place.

Next, the participants were shown Bloom's revised taxonomy on the researcher's computer, and were shared the pyramid via Airdrop to save on their devices. This was followed by a focus group "*How can Bloom's taxonomy facilitate CT during this project?"* in order to engage participants with the taxonomy in the context of collaborative video production.

Image 6.6 G4 Session 2 – looking at Bloom's pyramid on computer and focus group discussion

After the Bloom's focus group, they then briefly interviewed each other about "influential media" and recorded each other's interviews on their devices. These were set up as "trial" participant-to-participant (p-to-p) interviews to practice interviewing and recording. They worked with lighting, background, sound, and recording issues. To guide their interviews they followed a researcher-written prompt with the following opening words as questions:
Who…? What…? Where…? When…? Why…? How…?

These information-gathering questions elicited both direct information as well as open-ended responses to gather the information needed from each other and promote engagement with CT about the interview topic. They put the prompt in a place where they could see it and asked the questions whilst interviewing each other. They saved their interview footage onto their devices to later compile it into their group video.

Image 6.7 G6 Session 2 – P-to-p interviewing with researcher-written prompt: *"Who? What? Where? When? Why? How?"*

At the end of Session 2, the participants left with the assignment to each bring in the mediated content that influenced them the most for discussion in Session 3.

Session 3

Session 3 consisted of a presentation and focus group discussion of the influential media content that they brought in saved on their iPads. The presentation and discussion about the influence of these images enabled to assess their CT engagement with their meaningful (3.1) and authentic (4.2) content. At the session's end, they left with the assignment to interview someone else (at school, in their community or home) about the same content they had each brought in and presented, and to bring back the footage saved on their iPads to the next session. They employed the previously-used information-gathering questions as a guide

during their outside interviews. This footage was meant to be used in the final videos.

Production activities (Session 4, 5, 6)

Sessions (4, 5, 6) were designed for the participants to develop, produce, compile and edit footage for their final video using the prior-saved footage from previous sessions. They worked on iMovie's trailer template as a guide. As a whole, this project's design was more focused on the *final artifact* (their group videos), than recording their actual time spent producing during the sessions. It was hypothesized that the cross-examination of their completed videos, exit interviews and questionnaires with the earlier focus groups, would help to answer the research questions.

Session 4

In session 4, after each of them briefly showed their outside interview footage to the group (without discussion, just showing), they then developed and performed some skits about the group's most influential media topics of interest. They were the same topics they had each presented during the last session, only they chose one or two topics per group as there wasn't enough time to do a skit about each participant's topic.

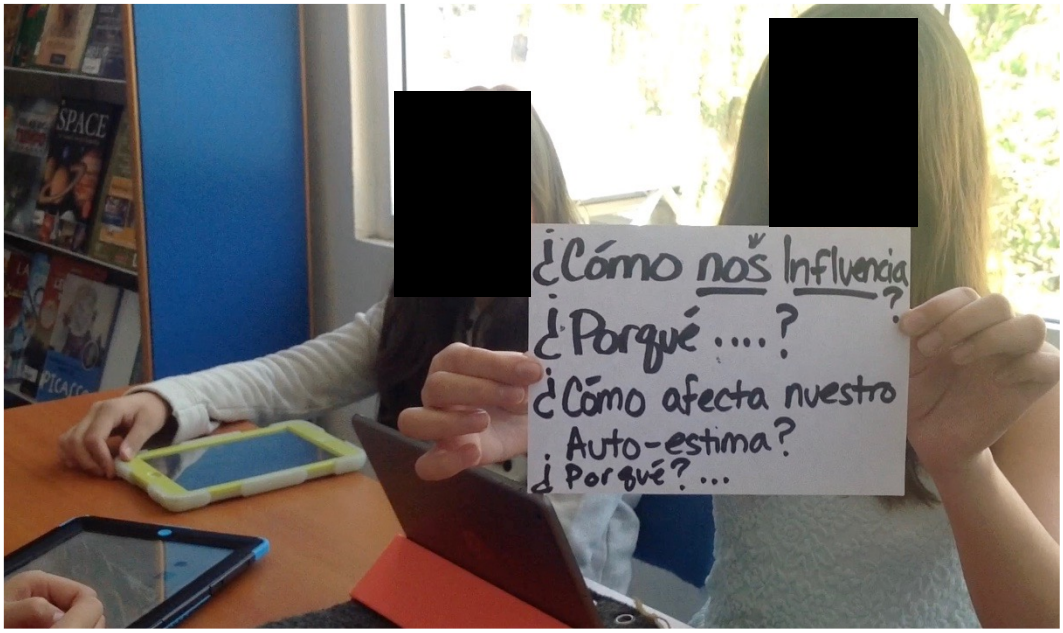


Image 6.8 G6 Session 4 – *Daniela* holding up written prompt to refer to whilst developing skits – *"How does this influence us? Why? How does this affect our self-esteem? Why?"*

They wrote a prompt on a piece of paper (Image 6.8) asking: *"How does this influence us? Why? How does this affect our self-esteem? Why?".* These questions were given to them by the researcher to write and served as a reference to expose these points in the scenes. They wrote down some basic points to structure their skit around the aims of the prompt, but all their dialogue was improvised whilst performing and recording. The participants recorded their skits on their devices, and saved them for later compilation into the group video.

Session 5

During session 5, each group recorded one more scene for their video to expose how making a student group video may foster CT. The scene had to expose the ways in which producing a group video can make children *think critically.* They were told they could refer to Bloom's revised taxonomy (Anderson et al., 2001) (with a particular focus on the last three levels of *analysing, evaluating* and *creating*) to help facilitate their productions (much like the written prompt), but only if needed. This activity was designed at the tail end of the project because it was expected that the participants would already have "experience" with collaborative video production, thus could talk about it creatively by producing a scene about it.

This activity was also expected to enhance reasoning and evaluating components. They saved these scenes onto their devices to later compile into the group video as with all previously produced material.

Session 6

This included the making of the trailer and compilation of the group video. All groups worked on iMovie's trailer template, allowing the template to guide them with the organization and structure of their video. The groups attached some of their produced media content and skits onto the trailer, giving their videos a real "movie-like" feel with a trailer introducing the video in the beginning, and their scenes and content after the trailer.

Image 6.9 G4 Session 6 - Working on trailer and final compilation of group video

Individual exit interview and questionnaire (Session 7)

This session was dedicated to the individual exit interview and questionnaire (Appendix B). The individual interview was conducted privately with the researcher only and video recorded. The questionnaire was also done in a private, individual manner on the researcher's computer on Word. Both questionnaires and interviews served as follow-up assessments about their understanding and engagement in CT, the media's influence on body image, how making a

collaborative video can help to learn about a topic and engage critically, and their overall experiences and learning from this project.

6.4 Analysis

Table 6.3 lists the data selected for the analysis of this project, and for what purposes it was selected.

Focus group: *What is CT?*
➢ **Purpose:** To gain their baseline knowledge on "CT" as a concept.
Focus group with researcher-presented sample media content: *How do mediated stereotypes and content influence body image, thoughts and behaviour?*
➢ **Purpose:** To obtain a baseline assessment of participants' knowledge about mediated altered images, including stereotypes and beauty ideals that impact body image, thoughts and behaviour.
Focus group with researcher-presented pyramid: *How can Bloom's revised pyramid facilitate CT?*
➢ **Purpose:** To engage participants with the taxonomy in the context of CT and collaborative production.
Focus group with participant-presented media content of interest: *What kinds of media content perpetuate stereotypes and influence body image, thoughts and behaviour, and why?*
➢ **Purpose:** To assess CT engagement with participant-brought mediated content.
Completed group videos
➢ **Purpose:** To assess development of CT throughout the project.
Exit questionnaires
➢ **Purpose:** To gain a follow-up assessment understandings and engagement in CT, the media's influence on body image, and their overall experiences and learning from this project.

Table 6.3 Data selected for analysis in P1

Firstly, all data was reviewed and the session videos played several times in search of events (Zack & Tversky, 2001, in 5.3.1) using a deductive approach, that is, looking for events that indicated understanding of, and engagement in CT.

Relevant data was organized and analysed in chronological fashion in order to see developments in participant engagement in critical thought (according to Bloom's

revised taxonomy). The focus was seeing developments in their *knowledge* and *understanding* of CT as a concept, in their *engagement* in CT, as well as engagement in critical thought about the video's "media influence" topic. Finally, critical engagement in their completed video was sought for, but with a special focus on the HOT, *Create*.

Table 6.4 illustrates the codes and their characteristics.

1. Remember	Stating, repeating, recalling, memorising, and listing knowledge
2. Understand	Explaining, describing, and recognising meaning and knowledge
3. Apply	Using previous knowledge to: give an example of, to use it, apply it
4. Analyse (HOT)	Breaking knowledge into parts in order to: compare, relate, organise, find, investigate
5. Evaluate (HOT)	Measuring, judging value and critiquing knowledge
6. Create (HOT)	Generating, innovating, designing, producing, inventing something NEW with knowledge gained

Table 6.4 Bloom's revised taxonomy code frame

(Anderson et al., 2001)

To code for developments in *knowledge* and *understanding*, relevant data was coded with the thinking component codes 1-3. The first three were considered good indicators that understanding and some knowledge existed about the topic.

To code for *engagement in CT*, component codes 4-6 were applied because these components are HOTS, and are observed as essential in the presence of CT (Brookhart, 2010b; Garrison, Anderson, & Archer, 1999; Garrison et al., 2001b; Lewis & Smith, 1993, in 2.3). The component of Create (HOT) was highlighted in green to give it extra weight as it is the highest level and ultimate objective in the taxonomy (Anderson et al., 2001).

Ergo, the presence of HOTS in the data signified engagement in CT.

6.5 Results

After reviewing a preliminary analysis of the data, there were some decisions taken about the selection of relevant, representative and suitable data for the focus of analysis (Schreier, 2014).

It was first recognized that the video-based data recorded during their productive activity (sessions 4-6) was not suitable or representative. Though the aim had been to walk around and video record them hand-held style whilst they performed activities, this made it challenging to follow their dynamic process. It was difficult to step in and facilitate as needed during their production whilst keeping the camera on them, providing for numerous lost moments of recorded activity. What's more, recording different group members on an iPad made their voices nearly inaudible, as only the nearest participant to the device could be well heard. All this being, the decision was made to use the observation notes taken during these sessions, but to omit this video-based data from the more focused analysis.

Then, after reviewing their exit interviews and questionnaires, it was seen that the answers in the interviews were very similar or the same [verbatim] responses they gave in their questionnaires. So, it was decided to only focus on the questionnaire data as this had their answers already in text form, ready for analysis.

Also during this preliminary review, it was observed that two groups had attended all sessions with their devices and thus richer, more complete and relevant data was collected from them:

- G6 at the primary school
- G7 at the middle school

G4 had a difficult time grasping the "body image" concept, and referred to toys like the Rubik's cube as influencing them. Though they were told they could expose things in the media that influenced their "thoughts and behaviour", it still seemed as though the "body image" part escaped them. They were also a very distracted and disorganized bunch, and had difficulty focusing and remembering to bring their

devices (e.g., they played video games during session times). G6AB seemed generally unmotivated once the project started, and one participant dropped out after the first focus group. They were absent during session days, and changed focus group topics to unrelated matters. All of this provided for little and irrelevant data collection on these two groups that would not help support this thesis.

G6 and G7 were therefore the groups selected for the detailed analysis.

6.5.1 Focus group: *What is critical thinking?*

The first focus group was to get a baseline assessment of the groups' *understanding* of the "critical thinking" term. It was therefore necessary to code the transcription dialogue (Appendix C) during this discussion that denoted their understanding in the form of descriptions, definitions and explanations of what CT meant to them. In G6, *Alexa* and *Daniela* both attempted to take guesses at the meaning of CT, but didn't understand what it meant, and G7 clearly responded that they "don't know". The two groups thus showed they had no baseline understanding of the meaning of "critical thinking".

6.5.2 Focus group with researcher-presented sample media content: *How do mediated stereotypes and content influence body image, thoughts and behaviour?*

The second focus group was to gain a baseline assessment of participants' *understanding* of and *critical engagement* with mediated images and the influence these have on body image and perceptions. The selected discussions for analysis (Appendix C) were around photo edited/altered celebrity images (Image 6.1 and Image 6.4).

Both groups' discussions portrayed that there were no spontaneous responses on behalf of the participants to the content in either group; i.e., they responded about the images only through researcher probing and facilitation. Hence, the researcher provoked a bit of participant engagement in Analysis (HOT) and Evaluation (HOT); but this was only in response to her inquiries. Notwithstanding, both groups had some understanding of what photo editing is, the differences between the real and

altered image, and recognized that Photoshop “made him look better” and “she looks very pretty” (see Appendix C for transcribed dialogue).

There was some indication of the media influencing their perception of beauty ideals in their responses, when *Renata* said that “She looks very pretty, and she doesn’t look like herself”– yet there was no indication of her understanding that she thought she looks “pretty” because of the beauty ideal that the media perpetuates. Then, *Jordan* said that Photoshop “made him look better, more muscular” a comment along the same lines as *Renata’s* – he looks “better” because perpetuated images in the media show fit, muscular and “manly” men as ideally beautiful.

Though both groups showed an understanding of the images being altered, with these responses it was difficult to assess their awareness or understanding of the influence these may have on body image, thoughts and behaviour. In other words, they only demonstrated signs of being influenced themselves with perpetuated beauty ideals in the media, but no critical “awareness” of this influence.

6.5.3 Focus group with researcher-presented pyramid: *How can Bloom’s revised pyramid facilitate critical thought?*

The third focus group was to get participants’ to engage critically with Bloom’s pyramid so that it may facilitate this type of thinking throughout the project. The discussion occurring when the participants were shown the pyramid is shown in Appendix C. However, aside from G7 applying previous knowledge to the present situation, it cannot be said that either group engaged critically with the pyramid.

6.5.4 Focus group with participant-presented media content of interest: *What kinds of media content perpetuate stereotypes and influence body image, thoughts and behaviour, and why?*

The previous sessions were not sufficient to understand if the participants were able to understand and engage critically with the media influences in their life. Their comments in the second focus groups were mainly limited to show an

understanding that the content had been altered and made to look “better”, but no indication of how critically aware they were of the media’s influence on them.
In session 3 however, the situation was different: each group member was asked to individually bring in the mediated content that *personally* influenced them the most for discussion.

The collages presented in Image 6.10 and Image 6.11 are compilations portraying the actual content each group brought in to present and discuss. They were asked for rationales and explanations of influence of the content, and specific examples of their thinking.

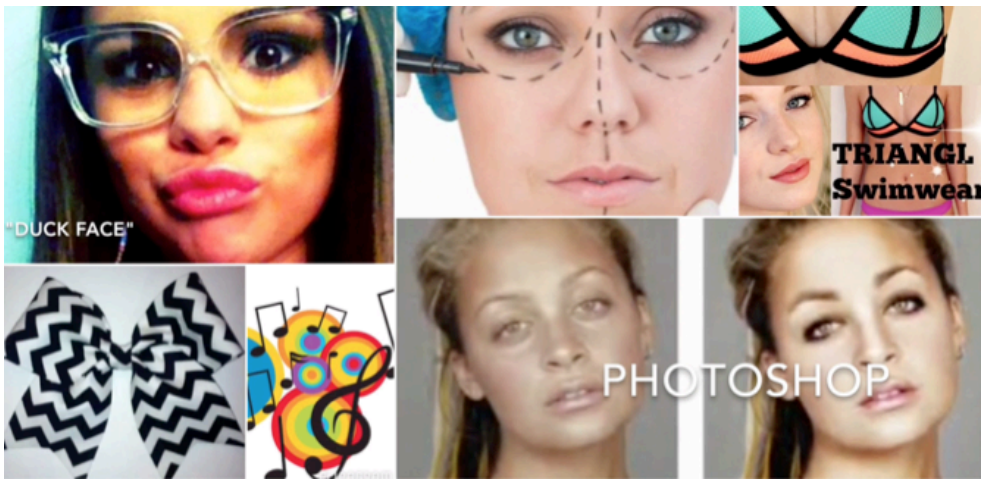


Image 6.10 G6 group – participant-presented media content of influence on body image, thoughts and behaviour

In G6, some girls presented multiple content, which is why there are six images. The top right of Image 6.10 shows Selena Gomez (a popular tween audience celebrity) making the “duck face”. The duck face involves pouting one’s mouth exaggeratedly resembling a sort of “duck”, and taking a picture like this and posting on the Instagram app. *Alexa* presented this as influential to body image because it was trending in her grade group. Directly to the right is a woman with pen marks on her face, about to go into plastic surgery. *Mariana* considered plastic surgery a product of body dissatisfaction because of media influence. The upper right corner depicts an image of Triangle Swimwear and of influence to *Daniela*, who mentioned it was trending at the school. The lower left hand corner shows a bow presented by *Mariana*, deemed as influential fashion currently trending with the girls at the

school and perpetuated by a YouTube channel. Next to the right of the bow, is an image of notes and music; *Alexa* considered music an influential aspect of the media on thoughts and behaviours. Finally, the lower right corner depicts an image of the before and after of Photoshop, brought by *Renata* [but considered by the whole group] to be an influential aspect in the media that affects body image, thoughts and behaviour.

Researcher: That is Photoshop?

Renata: Yes.

Researcher: Ok, and in your opinion, what do you think of that image of Nicole Ritchie?

Renata? What is her name?

Researcher: It's Nicole Ritchie.

Renata: Well, she looks much prettier here (points to right side of image with Nicole Ritchie photo edited) than in here (points to left side of image of non-edited version).

Researcher: And why?

Renata: Because of Photoshop.

Researcher: But why does she look much prettier? I know it's because of Photoshop, but-

Renata: Because they fixed her face, and put make-up on her.

Transcription 6.1 G6 Renata presenting "Photoshop"

As seen in Transcription 6.1, *Renata* understands and is aware that the woman has been photo edited and gives some judgment, or Evaluation (HOT) on the woman's looks by saying "she looks much prettier here…". After some probing, it is seen she understands that Photoshop is what made her "prettier", and that "prettier" is equivalent to putting "make-up on her". This comment denotes how the media can influence perceptions of beauty ideals in making young girls think that, prettier equals make-up, but more importantly, it shows how this influence on beauty perceptions is *not* something she is aware of.

Image 6.11 G7 – participant-presented media content of influence on body image, thoughts and behaviour

G7, being composed only of boys, presented a different take on media influence and awareness of it. The upper left corner of Image 6.11, shows an image of wrestlers brought by *Jordan* denoting the muscular "tough guy" influence these figures may have on young boys. The upper right corner shows models with various skin tones and ethnicities brought by *Benji* to represent how the media may portray different ethnic groups, and influence either feelings of tolerance, or racism. The lower left corner depicts a fit and shirtless man on a horse, with the slogan "Smell like a man, man. *Old Spice*" presented by *Luke* to characterize the ways in which advertising in media can influence boys' senses of "manliness". Finally, the lower right corner is an image of the video game *Grand Theft Auto* presented by *Diego* illustrating how violent video game media can influence young boys.

Transcription 6.2 is an excerpt of the dialogue taking place exemplifying *Jordan's* personal media content of influence.

Jordan: I did find some pictures about wrestlers, here (points to image on his iPad). You know they, the majority of them actually inject stuff to look tougher, and I did find a positive video about a guy doing exercise, like appropriately, like not too much exercise and with an actual trainer.

Researcher: And, did you find any names? Like any specific athletes that are positive or specific athletes that are negative influences?

Jordan: Yea, the majority of wrestlers are negative.

Researcher: The majority of are negative?

Jordan: Yea.

Researcher: Ok. Can you name one? Just like maybe one off the top of your head?

Jordan: All right so it was, Triple H.

Researcher: Ok, and who is he?

Jordan: He's a wrestler that looks really tough because he injects steroids.

Transcription 6.2 G7 Jordan presents "wrestlers"

Transcription 6.2 clearly indicates that *Jordan* engaged with his personal content critically. He showed an ability to understand, Analyse (HOT) and Evaluate (HOT) the messages transmitted by the wrestlers, the use of doping, and the negative influences these could have on men. Interestingly, he also mentioned a positive example of healthy exercising and behaviour in comparison to the negative one.

Image 6.12 G7 Session 3 – *Jordan* presenting "wrestlers" as influential media during focus group

6.5.5 Completed group videos

G6 produced a video called *Dancing through a project*, where they treated several themes: “hair bows”, “Photoshop”, “plastic surgery”, “duck face” and “music”. G7 produced a video called *The Image*, and treated themes such as “classism/racism”, “videogames”, “wrestlers” and mediated “manliness”. Both groups made a trailer using the iMovie trailer template and edited this trailer onto the beginning of their videos. They created titles of their own according to the groups’ themes, and recorded mini clips for insertion into the trailer following the template’s guide. All participants unanimously felt rushed and strained for time. All expressed wanting to have started on their trailer earlier, *before* their skit productions, so they could have time to build their video around the contents of their trailers.

The following is the selected content for analysis of each group’s video with a specific focus on the *Create (HOT)* component.

Grade 6 video

G6 skit produced using researcher-written prompt

G6’s video included skits about plastic surgery and Photoshop produced during session 4, and touched upon these topics in distinct ways.

Daniela: I don't want the photographer to Photoshop my picture, it doesn't look natural

Alexa: (in an emphatically pretentious way) But you will look *so much prettier* with Photoshop…

Daniela: That's not true, I don't look like that in real life.

Transcription 6.3 G6 "Photoshop" skit

Renata: Why don't you like how you are?

Daniela: Because I feel I am very ugly.

Renata: How do you think you are going to feel after the surgery?

Daniela: Better and prettier.

Transcription 6.4 G6 "Plastic Surgery" Skit

As illustrated in Transcription 6.4 *Daniela* doesn't want her image photo edited because "I don't look like that in real life". However *Alexa* advises (in a pretentious way) that she "will look *so much prettier*" once her image has been altered. This denotes engagement in CT about the Photoshop topic as they role-play about how they see others evaluating photo editing and altered images: the more "pretentious" types who want to look "pretty", and others who don't want to be photo edited and look "natural". They demonstrate a critical understanding of the influence photo-edited images may have on people, and how people may prefer to have their images edited to mediated standards of beauty. Moreover, their synthesis of gained knowledge about the video's topic to produce an original skit like this denotes the Create (HOT) level of thinking.

Image 6.13 G6 Session 4 - (Left to right) *Renata, Daniela* and *Mariana* performing skit about “plastic surgery”

Transcription 6.3 and Transcription 6.4 depict how they chose to expose the points in the written prompt they used for these skits. For instance, to expose how “plastic surgery” seen in the media can influence perceptions on body image, they included this dialogue to show someone feeling “ugly”, and “needing” plastic surgery to make them feel “prettier”. This scene indicates that the girls have taken in the information and knowledge gained about plastic surgery through them producing media content about it, hence have attained the Create (HOT) level also. With this learned experience and information they are “creating” something original with it – in their own words and context.

However, worth noting is that they did use the researcher-written prompt (Image 6.8) in developing both skits, and this may have facilitated their engagement in CT with this topic during their productions.

G6 skit produced and facilitated by Bloom's pyramid

G6's other skit was produced during session 5, and was about *how might collaborative video production enable CT?* The participants were told they could use Bloom's pyramid to facilitate some aspects, but did not have to if they didn't think they needed it. For instance, they could refer to varying levels of the pyramid to associate to things they did during production (e.g., Bloom's level of "evaluation" could help them refer to moments during editing, or selection of footage).

Image 6.14 G6 Session 5 – "Role-playing about Filmmaking" skit

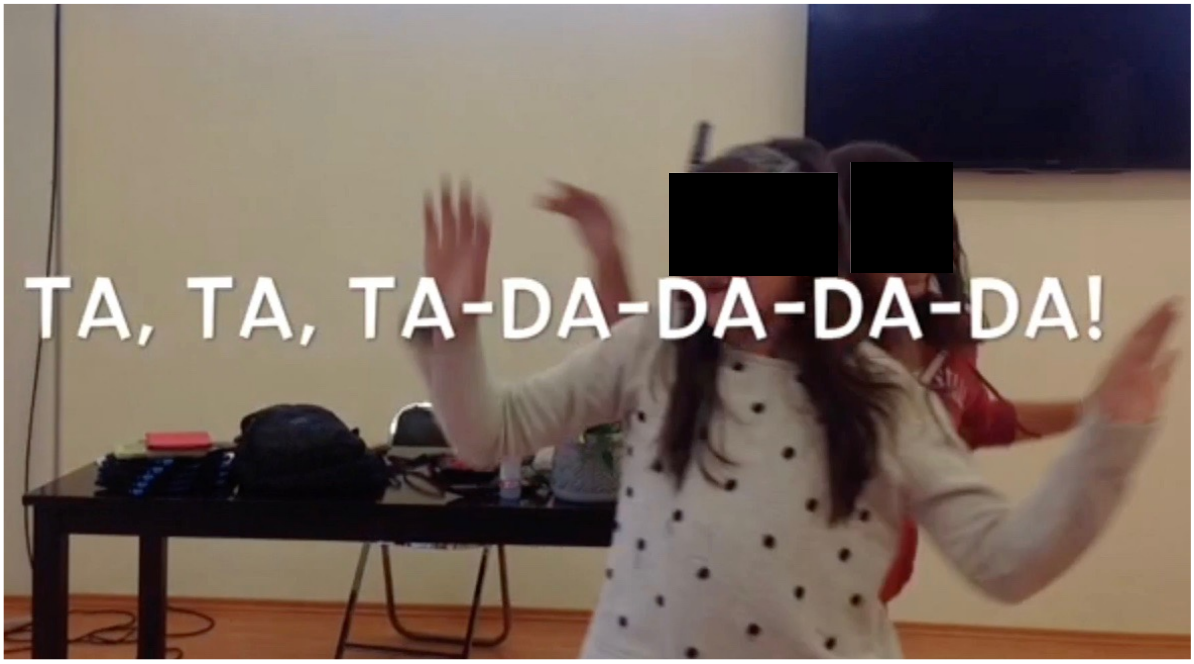


Image 6.15 G6 Session 5 – dance compiled into "Role-playing about Filmmaking" skit

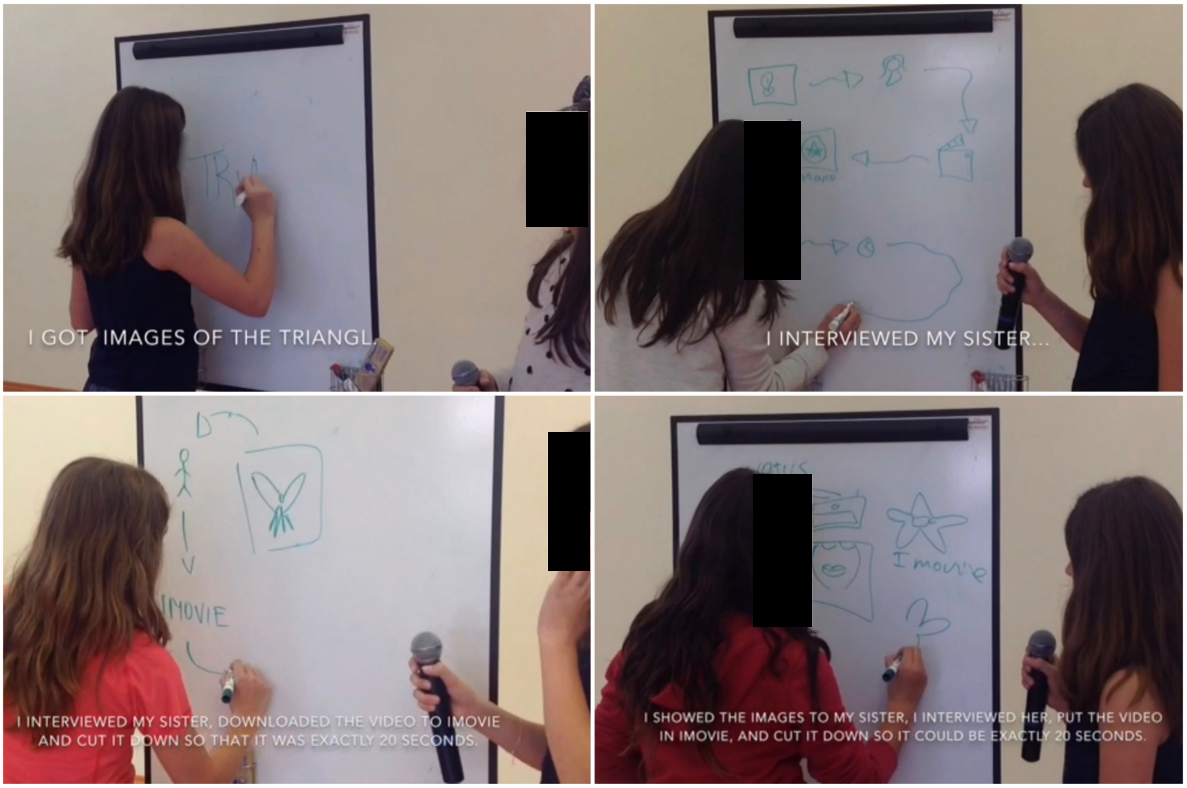


Image 6.16 G6 Session 5 - “Role-playing about Filmmaking" skit – participants switching roles and presenting each other’s video topics on whiteboard.

As depicted in Image 6.16, they did a whiteboard [literal] presentation of each other's steps taken to produce the video in this project, and for fun, compiled a dance into it. There was no "acting" involved, or even actual dialogue or "text". They used subtitles to show what they wanted to say, but it was just a description of the steps they had taken to produce the video. There was a dance cut into each of their "presentations", which can be considered a Create (HOT) component.

It can be surmised that this particular skit did not display much engagement in CT, or much creativity, as they quite literally stated what they had each already done/seen, but with no further analysis or evaluation of any sort. In short, they simply applied Bloom's taxonomy into what they had already done, kind of like a report, but lacked creating something innovative and new.

Grade 7 video

G7 skit produced using researcher-written prompt

G7 produced their skit around the influence that violent video games have on children.

Image 6.17 G7 - "Violent video games" skit

Luke – “Get down on the ground! Give me all your money! This is so cool!”

Also using the written prompt as a guide – *“How does this influence us? Why? How does this affect our self-esteem? Why?”* – G7 aimed to cover how glorified violence in video games can influence children to commit violent crimes. For instance Image 6.17 depicts how *Luke* is robbing *Jordan* in his shop with a firearm, and how he thinks “this is so cool” to do it just like in the video game. Later in the skit, *Luke* gets caught by the police and is sent to a juvenile detention centre.

Image 6.18 G7 Session 4 - "Violent video games" skit

Luke – " I shouldn't have done this. Now I'm in jail. This stinks!"

Luke going to "jail" was added in the skit to portray the extreme consequence of acting out violent video game fantasies in real life, and to expose to what extent video game violence can influence our thoughts, behaviours and self-esteem.

The content of this skit shows how they are able to engage critically and create something new with the violent video games topic. They go further than simply stating, reporting or applying the concept – they Create (HOT) something entirely new and innovative with it by designing their own story. However as with G6's "Plastic Surgery" skit, it can be gathered that using the researcher-written prompt may have played a part in facilitating this critical engagement in their production of the topic.

G7 skit produced and facilitated by Bloom's pyramid

The following is G7's rendition of their skit on *how collaborative video production may enable CT.* Like G6, they referred to Bloom's pyramid only at the beginning to develop some content, but did not use it later at all. This skit was titled *The Underdog* and was about a disenfranchised student from a poor neighbourhood who wants to get into an elite private school, but cannot afford it.

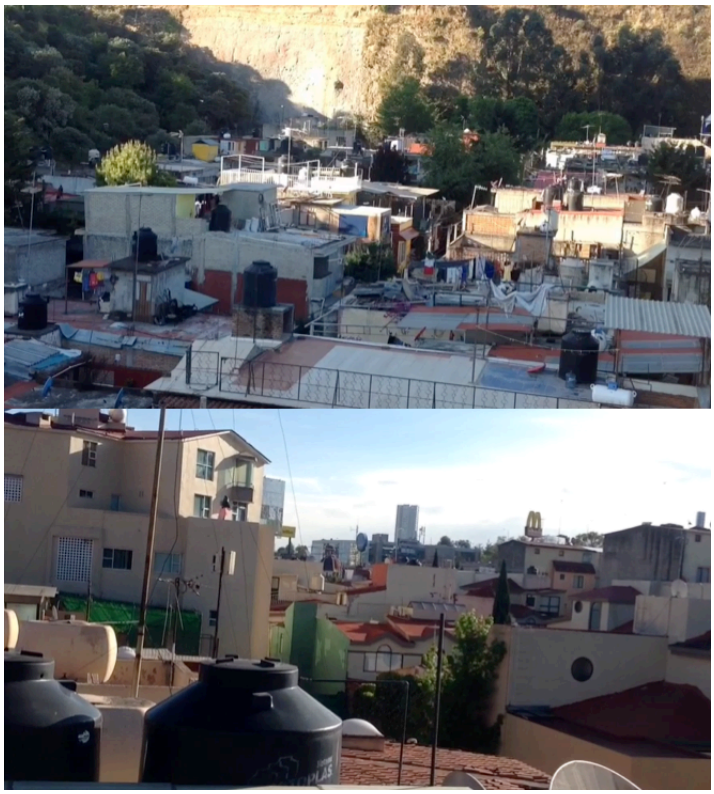


Image 6.19 G7 Two clips from the skit “The Underdog” showing the “poor” (top) neighborhood where the protagonist lives, and the “rich” (bottom) neighborhood of the school he aspires to attend

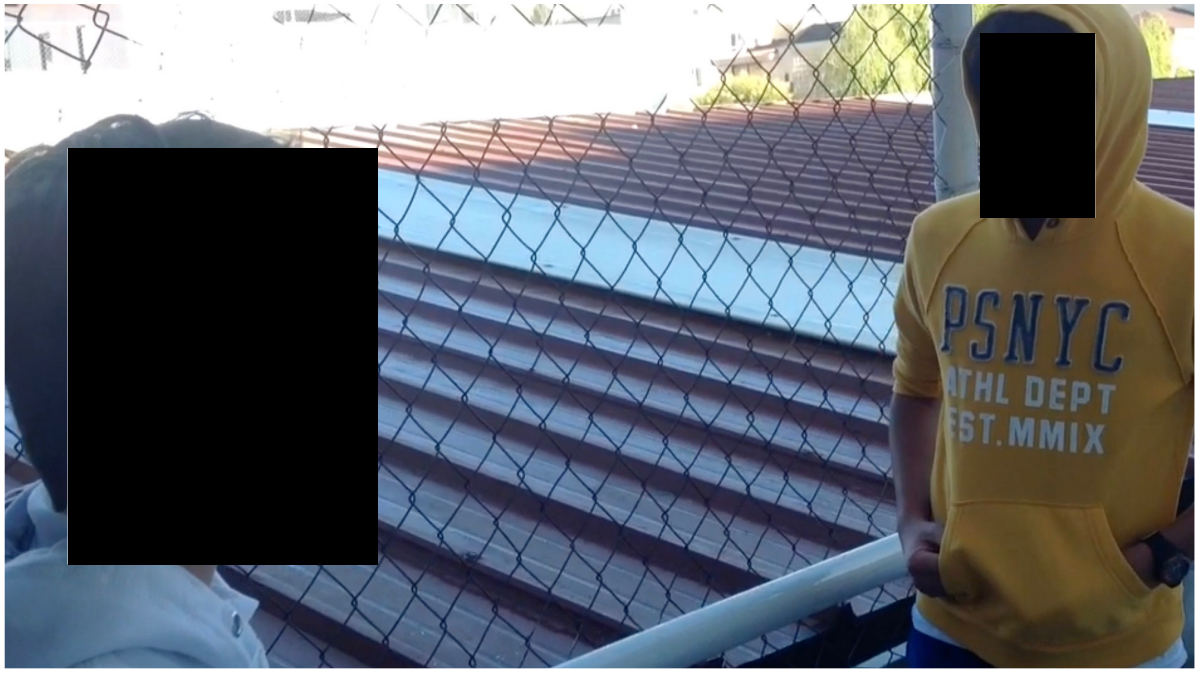


Image 6.20 G7 Session 5 - "The Underdog" skit –
Jordan – “That’s a good school. I want to be there.”

Jordan (the underdog protagonist) ends up going into the headmaster’s office to personally talk to him and ask him if there is any chance to get in to the elite school. When the headmaster sees that *Jordan* has satisfactory marks, he eventually agrees that “we can give you a scholarship”.

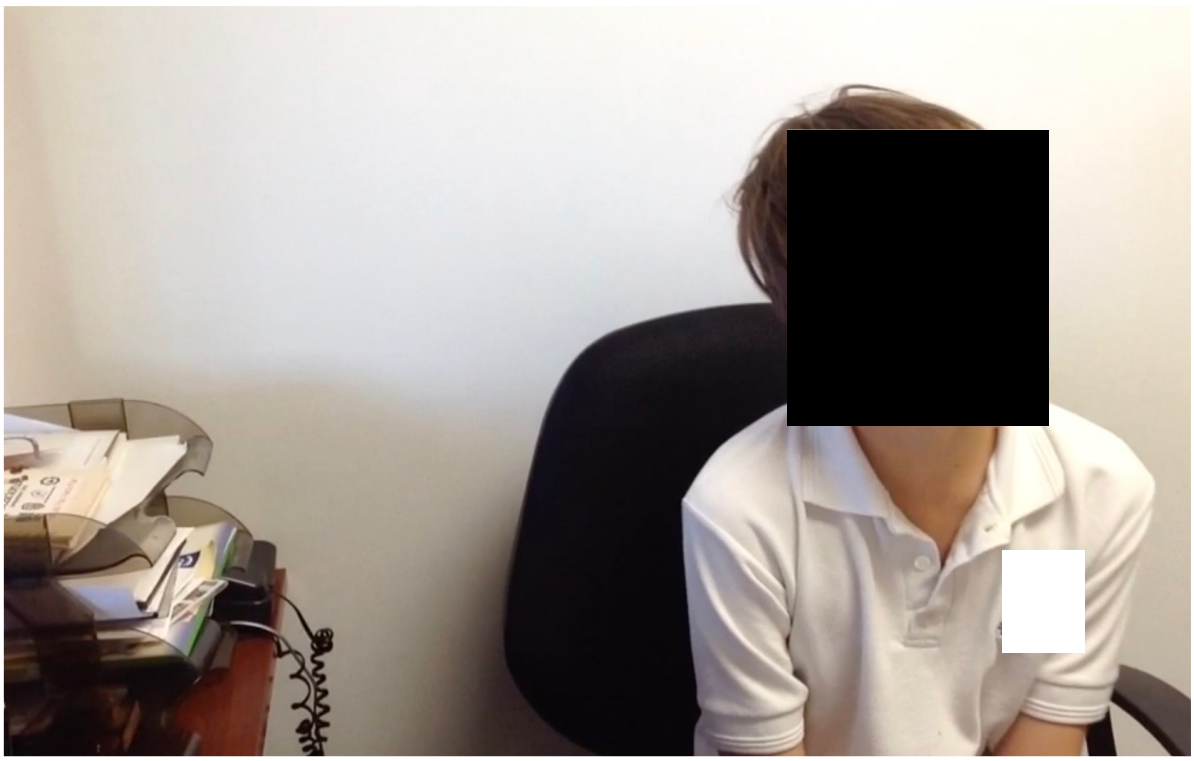


Image 6.21 G7 Session 5 - "The Underdog" skit – Benji – “Ok. I think that we can give you a test, and if you pass, we can give you a scholarship.”

The basic message was interpreted as: *if you persevere and educate yourself, you succeed*. However, unlike G6’s skit, this wasn’t a report about the process of collaborative video at all – it was meant for the child audiences of this video to view this scene and to *think critically because of it*. Hence, the meaningfulness (3.1; 3.2; 3.3) and authenticity (4.2) of the skit’s topic engaged them critically with it, as well as having an authentic audience to produce for (Burn & Reed, 1999; Coleman et al., 2004; Kearney & Schuck, 2004, 2006 in 4.2) motivated them to reflect on their content on deeper levels. The deeper socio-cultural and moral message that underlies this skit denotes high engagement with critical thought, and the engagement of all levels of the taxonomy including the Create (HOT) component.

For both groups, most skits were recorded and edited on the spot and during the session, but some participants took them home and edited them during the week during their spare time. This enabled them to add more effects to them like outside music, or simply polish them to a better standard than they would have during the limited time in the session. There were other elements compiled into them such as their trailers, p-to-p interviews, outside interviews, and supporting media content and images.

6.5.6 Exit questionnaire

An analysis of responses from the selected questions is reported in this section. As all groups were asked the same queries, both groups' answers have been put together under the corresponding questions.

Understanding of and critical engagement with the video's topic

The following questions were posed to assess understanding and critical engagement with the themes treated during the project. Responses with similar words or meanings are coloured the same. For the purposes of presentation of the findings, the code components are not highlighted as shown in Table 6.4, but rather discussed as they pertain to the responses.

To get their understandings of perpetuated stereotypes in the media, the first question (Transcription 6.5) addressed this.

1.) "In your own words… What is a cultural stereotype?"

Benji: A type of person from a different culture that is judged differently because of his background, skin colour, or culture. An example of this is the cultural stereotype of Mexicans and sombreros.

Diego: A stereotype is an untrue image of a person, country, or ethnicity created by the media.

Jordan: Is how people think about other countries or places.

Luke: A certain image that people have on different people from different cultures.

Daniela: A model or an example of something we see everyday. *Un modelo o un ejemplo de algo que vemos diario.*

Renata: The trends which influence us. *Es la moda que nos influencian en nosotros mismos*

Mariana: They are the trends which influence our image: *Son las modas que nos influencian en nuestra imagen*

Alexa: A cultural stereotype is something that can be trendy and is influencing you in a different way. *Un estereotipo cultural es algo que puede estar de moda y te influencia en una forma diferente.*

Transcription 6.5 Exit questionnaire *1.) "In your own words… What is a cultural stereotype?"*

G7 presents the cultural stereotypes as being an untrue/certain image of a person from different culture/countries/places. G6 gives similar responses amongst them, but present a stereotype as being a trend that influences them. These responses show more understanding of the concept by G7. Critical engagement is more difficult to assess, but the text highlighted in red shows judgment, which is considered to *Evaluate (HOT)*

Question 6 (Transcription 6.6) was asked to see if they could engage critically with the video's topic.

6.) "How do the images we see in the media influence how we view ourselves and our body image?"

Benji: The images that we see from the media make us believe that we have to look like those people and that the way we look now is wrong, not normal, or just lame.

Diego: It changes our perception of beauty, therefore how we should look and act

Jordan: The media constantly put images of how we are "supposed to see", so we start to think that way and we want to be like that.

Luke: They set a certain standard for us boys or girls (a muscular, pretty standard)

Daniela: They influence us because they are fashion and we want to see ourselves like these people. *Nos influencian por que son modas y nos queremos ver como esas personas.*

Renata: They make us want to see ourselves in this way. *Nos hacen querer ser de esa manera*

Mariana: They influences us because we want to see us in one way or another, because it is possible that you like the person or the thing you are looking at. *Nos influencian en querernos ver asi o aveces no, porque puede que sea una imagen que te guste como se ve la persona o cosa que estes viendo*

Alexa: Because it makes us think differently, because we can like what we see and therefore we will say "we want to look like this" because we will say "the picture looks good and I look bad", so I will use what they show. *Porque nos hacen pensar de una manera diferente, porque nos puede gustar lo que vemos y vamos a decir que yo me quiero ver así o se ve muy bien y yo no, entonces voy a usar lo que me enseñan ahí.*

Transcription 6.6 Exit questionnaire 6.) *"How do the images we see in the media influence how we view ourselves and our body image?"*

The responses to question 6 show that G7 perceived mediated images as influential because the media "make us believe that we have to look like..." "a certain standard for us boys or girls (a muscular, pretty standard)" by "constantly put[ting] images of how we are "supposed to see", and it "changes our perception of beauty". All the boys think that the media sets beauty standards and these influence how people want to be.

For G6, the media influences body image in that, "we can like what we see, because it is possible that you like the person or the thing you are looking at" and "we want to see us in one way or another…" and "They make us want to see ourselves in this way". It can be gathered by their comments that as a whole, G6 thinks mediated images can influence people because people like what they see in the media, and then want to look like that. In short, the influential mediated

content makes people like the images more than themselves and it influences them to change how they see themselves, because "we will say 'the picture looks good and I look bad', so I will use what they show".

Understanding of the term "critical thinking"

The second question (Transcription 6.7) asked directly about the concept of CT.

2.) "What does the term *critical thinking* mean to you?"

Benji: It means that you are thinking beyond the obvious and asking why, how, when etc, and not taking it for granted.

Diego: Thinking outside the box and being open to other ideas.

Jordan: To think deeply and really understanding.

Luke: To go beyond the point of normal thinking, getting deep in to the question.

Daniela: When you think about yourself and about the others. *Cuando piensas en ti y en los demás.*

Renata: When you think about you and about another person. *Es cuando piensas en ti y en otra persona.*

Mariana: That you are not only thinking about yourself but also about other people, and you put yourself in the shoes of other people. *Que no pienses solamente en ti sino también el las demás personas, ponerte en los zapatos de las demás personas*

Alexa: Critical thinking is the best way to think because you think for yourself but you also think about others. *El pensamiento crítico es la mejor forma de pensar, porque piensas en ti misma y también en los de más.*

Transcription 6.7 Exit questionnaire 2.) *"What does the term 'critical thinking' mean to you?"*

A similar outcome as what was shown in question 1 can be drawn for this direct question about CT. G7 demonstrated a good understanding of what it means to engage in CT competences. For example, both *Jordan* and *Luke* agree that it involves "deep" thinking. *Diego* and *Benji* both indicate that it's thinking "beyond/outside the obvious/the box". However, the answers from G6 are uniformly related to "think about yourself and about others" and do not go beyond this understanding.

Overall learning from the project

Question 3 (Transcription 6.8) generated some interesting responses about their overall learning of this project.

3.) "What have you learned during this project?"

Benji: How to think critically and how many different kinds of people are judged unfairly and are discriminated. It [production] is helpful for yourself and for the people that are watching it because you will learn a lot about the film´s topic and you also get to help other people learn in the process.

Diego: I have learned that media affects our perception of beauty and our body big time.

Jordan: I have learned to think critically, that body image makes us think how we are "supposed to be" and that it influences in a lot of different ways. [While making a video] you are actually living the things that people do and you understand why they do it and see how you can help in it.

Luke: Critical thinking, Teamwork, how people perceive us and how to use I movie. [To produce] you have to know more about the topic, and to know more about the topic, you have to do your research.

Daniela: How fashion influences us. *Como nos influencian las modas.* I feel like I think more critically now. *Siento que ahora pienso más criticamente.*

Renata: About cultural stereotypes. *Sobre los estereotipos culturales*

Mariana: I learned how to think critically and what are the cultural stereotypes. *He aprendido como pensar críticamente y que son los estereotipos culturales*

Alexa: I learned that there are things that influence you and make you think in a certain way, for example when we were shown a picture of Selena without makeup we could not recognize her and in another picture where she had makeup we knew who she was, therefore in this occasion we thought differently. *He aprendido que hay cosas que te influencian y te hacen pensar de cierta forma, por ejemplo cuando nos enseñaron una foto de Rihanna sin arreglar no la reconocimos y en una que estaba arreglada si sabíamos quien era, entonces ahí pensamos de otra forma.*

Transcription 6.8 Exit questionnaire 3.) *"What have you learned during this project?"*

When asked about their learning throughout their production, five participants mention they learned something about "influence/perception" of "media/body image" over themselves or people. Responses from *Alexa* and *Benji* show that they reflect about some themes they ran across during the project, such as *Benji's* topic of "racism/classism" he showed interest in during the focus groups. *Alexa* directly applies this to the Selena Gomez altered image that was discussed during the focus group, reflecting on this. *Renata*, *Daniela* and *Mariana* simply state/repeat they learned about the ["cultural stereotypes"] topic of the video. *Daniela* responds

that she feels like “I think more critically now” – but this is just a statement with no examples or further engagement with this concept. Similarly, *Mariana* also states she learned how to “think critically” too also with no further evidence of how or engagement. *Benji, Jordan, Luke* and all respond that they have learned to “think critically” but their responses are followed with examples and explanations of how they did so with the topic they produced. Finally *Benji’s* response shows he learned that making a movie is “helpful for yourself” but also for the “people watching it”.

6.6 Discussion and conclusion

6.6.1 Development of understanding and engagement with critical thinking as a concept

Grade 6

G6 showed some development in their understanding of CT also through the comparison of their responses to the questionnaire (Transcription 6.7) and the results of their first focus group (Appendix C). At the project’s end, they had some idea of what CT involves (as opposed to none at the beginning). Interestingly, all four participants equally said [in one way or another] that, to think critically is “*to think about yourself, and about others”.*

Given the homogeneity in their answers, it is difficult to tell whether this was their own [homogenous] thinking, or if they were all simply restating what *Fair-minded Fran* said in the “CT For Children” YouTube video they watched in session 2: “*I always think for myself, but also think about others in a fair-minded way”* (Elder, 2008b). Either way, they displayed homogenous perspectives about CT as a concept.

Hence, it can be concluded that G6 did gain some understanding about what CT may entail, but the results don’t really indicate a developed engagement with CT as a concept in their questionnaire responses, rather a homogenous notion of what was stated in the CT videos.

Grade 7

As shown in the results, both groups showed evolution with their understanding of CT as a concept across this project, though G7 displayed more engagement in CT overall. This is understood by the cross-examination of their answers of the first focus group to questions 2-3 of the questionnaire, and some aspects of their completed videos.

G7's response to question 2 of the questionnaire, "What does the term *'critical thinking'* mean to you?" shows a significantly better understanding of what CT is compared to the results of their first focus group (Appendix C) in which they only took guesses on what it might be and didn't know otherwise. They give responses that suggest "deeper" thinking and "going beyond the obvious" and "thinking outside the box". They also evidence their *engagement* in the concept of CT, like how Luke reflected on how he asked "why, how, when" questions (during their interviews) and associates this with CT.

Also in question 3 (Transcription 6.8) all the boys except for *Diego* state that they learned "critical thinking" during this project, indicating a uniform understanding that they [nearly] all learned about CT.

Therefore in conclusion, even though their answers in question 2-3 evidence a significantly better understanding and point to engagement in CT, exactly how they engaged in CT is not clear and the mechanisms of development are not known.

6.6.2 Developing engagement in critical thought about the video's topic

Nonetheless, in order to see both groups' evolution in critical engagement with the video topic, it is important to consider their responses starting from the baseline focus group, to their video content, and finally their responses in the questionnaire.

Grade 6

The second focus group (6.5.2) illustrated they had some understanding between original and altered images, and admitted that altering them makes people look "prettier". Yet it is difficult to tell whether or not they would have engaged critically

with this image if it wasn't for the researcher probing them for specific answers: e.g., "Researcher: She is edited, OK. And what else? Whatever comes to mind. *Renata,* what do you think? What is your opinion? How do you see her?" (Appendix C). It is only after this probing that *Renata* finally evaluates the image. Also, it is only after further investigation by being specifically asked, "what part do you think was edited?" that *Alexa* analyses and evaluates the image by saying: "So like they cut her face and they put it on another photo… Her face looks too small with that body".

G6's lack of initiative to engage critically without facilitation cannot be attributed to a disinterest or lack of "experience" (Heyman, 2008, in 3.3.3) in the topic: as seen in the transcription (Appendix C), they *all* know who Selena Gomez is and even use other images of her independently in their video (e.g., to show the "duck face", Image 6.10). The results and gathered observations concluded that their lack of engagement in CT without facilitation might have been due to their largely homogenous media tastes (Image 6.10) understandings of, and notions in media content and the project's topic, which at core, were not different enough to spark opposing views or critical discussion (Limón, 2001; Webb, 1991 in 3.1).

Similarly, in their "Photoshop" and "Plastic Surgery" skits they engaged critically with the topic and created something new – but only with the facilitative prompt. Therefore, how much engagement in CT happened on their own account during the skits is unknown. The only thing that is known is that (a) there was facilitation and prompting and (b) they engaged critically.

Their skit productions did not exemplify engagement in CT as they did not "create" (2.3) something original, nor was it innovative. Simply, it was a stated report of what they had already done. An interesting point here too, is that there wasn't a researcher-written prompt used in this skit. They looked to Bloom's pyramid to structure their skit (and actually used this structure); but the pyramid didn't have prompting, probing or open-ended questions like the researcher's prompt did in their other two skits. It can then be deduced that the researcher-written prompts *are* what helped G6 demonstrate engagement in CT about their produced topic.

Finally, gauging from their questionnaire answers in *3.) "What have you learned during this project?"* their answers as a whole are mainly limited to stating/repeating the topic of the video, with some reflecting on behalf of *Alexa* about how Selena Gomez's altered image made her think "differently". These answers can be interpreted as having gained a unified understanding of the video's topic, but it is difficult to say that they have evidently engaged critically with it.

So to conclude, the results indicate that G6 did not really engage critically with the topic without the written prompts during their skit production. How much engagement in CT happened on their own account is not evident, thus it is unknown. Their questionnaire responses point to the same conclusion. To find out if, how and to what extent they engaged critically with the topic, it was necessary to analyse their collaborative process during their productive activity, and assess baseline and follow-up levels of conceptual knowledge and critical engagement.

Grade 7

G7 presents a different level of developing engagement in CT across this project, but the recurrent researcher-facilitation factor re-emerges.

Their focus group discussion (6.5.2) around Justin Bieber's photo-edited image (Image 6.1) showed a basic understanding of altered images, but it was only after the researcher's searching questions that they evaluated and analysed the image. To be noted is that at this point the group didn't know why Justin Bieber's image was altered to "make him look better, more muscular". This is evident when the researcher asked the group: "Why would they do that? Make him look better, more muscular?" and after a prolonged silence *Jordan* responds, "I don't know" (see Appendix C for transcribed dialogue).

G7's two skits in their video both demonstrated engagement in HOTS and creation of something innovative and original, but the first one included the researcher-prompt factor. "The Underdog" skit however, was done without a researcher-written prompt. They had the possibility to look at Bloom's pyramid if they wished

or needed to, but they just briefly looked at it in the beginning and never referred to it again. In fact, their skits show no mention of any of Bloom's thinking skills, unlike G6's skit that actually did mention the skills during their whiteboard presentations. Whether or not they applied these latently is unknown, but their skit shows no signs of Bloom's taxonomy at all, neither structurally nor thematically. In fact, they created something entirely new and innovative with the skit's concept, keeping in mind their future audience, by making a video for kids to later view and "think critically".

Finally, G7's responses to questionnaire's *3.) "What have you learned during this project?"* shows elements of reflection and developed CT engagement with the video's topic. Nearly all mention how the media can "influence perception of beauty and our body", and that they learned to "think critically". *Jordan* also mentions that "body image makes us think how we are 'supposed to be'". It is interesting to map these responses to the first focus group and see how their knowledge of the influence of mediated images has gone from basic understanding and recognizing an altered image, to engaging with this topic on a more critical level. *Jordan* epitomizes this development with his "I don't know" response to Justin Bieber's altered image during the baseline focus group, to his response to question 3: **"**I have learned to think critically, that body image makes us think how we are "supposed to be" and that it influences in a lot of different ways". Interesting also, is that *Benji's* response about him learning that producing a video is not only "helpful for yourself" but also for the "people watching it", epitomizes this groups' purposeful spirit behind their movie: it suggests the intention of producing for a promised future audience.

In conclusion, G7 developed engagement in CT about the video's topic during production, with some prompt facilitation, but showed their own elements of creation, depth, reflection, meaning and purpose in their production without prompting. They began the project with a basic understanding of the video's topic, but their production ended with more critical engagement in it. Though this group demonstrated more developed levels of engagement with the topic than the other group, it is unclear why or how they got there. And like G6, it is challenging to tell

how much engagement was facilitated with the prompts, as it would be necessary to analyse their interactivity in production to tell.

6.6.3 Grade 6 and 7 videos: creativity, reflection, meaningfulness and purpose

Since their completed artifacts were to fulfil Bloom's last level *to create* (2.3), a central focus of analysis was the creative aspect. It was therefore sought to find elements that indicated something newly made and innovative ideas surrounding the topic – demonstrating things that were a product of their own creation. G6's video had some newly created, unforeseen elements such as some skits they developed, but the rest of the video's content lacked the creative aspect. Their video shows a linear presentation of their work: first all interviews are grouped together, then all skits from session 4, then skits from session 5. They didn't compile their footage according to themes, but simply as it occurred in chronological order during the project. It isn't to say that this way of structuring is wrong; simply, that it lacked creativity, reflection, personal meaningfulness, and a sense of purpose.

Alternatively, G7 compiled their video in a thematic arrangement, starting with the skit produced in session 5 about "classism/racism" and followed this with interviews on how lower classes in Mexico are depicted in the media or ignored altogether in advertisements, and how this influences people's perceptions of them.

G7's video had deeper and more reflective messages, and did demonstrate various moments of newly created material. The video gives a sense of "meaningfulness" (3.1; 3.2; 3.3) almost as if it was done with the purpose of teaching their audience about the influence the media has on perceptions. They included skits on classism, social inequality, the influence of video game violence on kids, and interviewed others on racism. They put these themes together so that the viewers could immerse themselves in one theme, then go to the next. Thus, they structured it in a more purposeful fashion. They made their interviewees reflect on how only "beautiful and upper class people" are seen in major fashion brand advertisements, and how this influences people to buy into this fashion. They took

the “stereotypes” context to a much deeper socio-cultural level, and reflected on how society is influenced by mediated content, such as how the media influences others to think of all Mexican men as hat-wearing, taco-eating and moustached men riding on donkeys. Thus, G7 evidently showed aspects of creation in their video, in the sense that they took the video’s topic and ran with it into new, unseen levels of perspectives during the project.

In conclusion, even though G7’s video portrays more creative aspects, the main difference between the G6 and G7 videos appeared to be the factor of reflection. G6’s video doesn’t lack depth, meaningfulness and a sense of purpose because it’s not “creative” enough. They could have “created something new” that was superficial and unplanned – would that have meant they engaged in CT? Probably not.

The defining distinction between the two group videos was therefore *reflection*.
G7 continuously reflects throughout their entire video: during their interviews, during their skits, during their trailer. Not just this, they engage the *viewer* in reflection because of it. The result is what is evidenced in their questionnaire responses, and their video. They were able to reflect upon the video’s topic because of the meaningfulness (Nelson, 1994, in 3.3.3) they found in it, and they presented this reflection purposefully and with intention in their video to engage the viewer in reflection as well.

6.6.4 Limitations and future directions

Challenge assessing critical thought with assessment methods

Though the focus groups and completed video appeared to stimulate some critical engagement, it was difficult to evaluate their development in CT just by looking at their focus group dialogue, exit questionnaires and completed videos.

The more participant-driven quality of the last focus group (6.5.4) inspired a chain of reaction of CT engagement in G7, for instance. *Benji* and *Diego* both carried their personally presented meaningful content about classism/racism and violent video from the focus group (Image 6.11) to their video (G7 in 6.5.5). This signifies

that the last focus group content inspired the subsequent video content, which then enabled CT engagement about the topic, ultimately.

Though their development and extent of CT is not “measurable” in their group video, both groups’ videos demonstrated some engagement in CT to different levels and in their own distinct ways. Like how they used reflective questioning to get others (their interviewees, for example) to think critically about the media’s influence. They also engaged in evaluation and analysis during editing, and making collaborative decisions about footage, and working through iMovie and troubleshooting the iPads – session observation notes point to this. Moreover, even though their video interviews and skit development were guided by the written prompts (and a skit with Bloom’s pyramid, to some degree), the result of this was still the same: engagement in CT. The exit questionnaire responses (e.g., G7 in 6.5.6) were useful in gathering this developed conceptual knowledge and more critical perspectives about the topic at the project’s end. So, in the end it was gathered that CT about the topic *did develop* because of their collaboration in video production – but it still didn’t answer the question of *how* or *to what extent.*

Therefore, the issue here was not a lack of CT engagement or development through collaborative video production, but rather the lack of relevant data to analyse the process and assess it *during their productive activity* to answer the question of “how”. Since the video footage of the production sessions was not of good quality, and since they sometimes worked outside of the sessions on their videos for interviews, gathering content, and editing, this “production activity” component was the missing piece for analysis. In the same respect, the focus groups, questionnaire and videos did not address the ‘how’ question either.

Therefore, approaching the research questions with these *methods* was what made answering them challenging.

The research question: *How does collaborative video production enable and foster CT in young children?* Was approached by focusing on the group’s development of CT around the video’s topic: the baseline focus groups, the presentation of

Bloom's pyramid to facilitate CT, the pre-production activities, the interviews and completed video all demonstrated there was development – but only of their understanding of CT as a concept, and engagement with the topic.

Beyond this, after seeing the results of the analysis it was apparent that data indicating their *activity, actions and interactivity and interdependence* in collaborative video production was a big missing component in analysing how they got there in the first place – from the first focus group to the completed video. Giving central focus to properly recording their productive practice with a camera, microphone and tripod was a necessity, as relying on session notes and photos were not enough.

Challenge presenting the "critical thinking" concept in a study about critical thinking

Rather than facilitating, the choice to start the project by presenting CT as a concept, with videos about it and Bloom's taxonomy as model for it has in some aspect complicated the studying of their CT engagement, and compromised the results.

G6 quite literally answered that to think critically means to: "to think about yourself, and about others" sounding eerily similar to "I always think for myself, but also think about others in a fair-minded way" – *Fair-minded Fran* (Elder, 2008b). Thus, modelling and coaching (Collins et al., 1987) Bloom's pyramid as an example of CT and using videos to explain the concept, made it difficult to establish if CT would happen naturally in collaborative video production alone. For example, G6 used and referred to Bloom's taxonomy in their "Role-playing about filmmaking" skit and used the pyramid quite literally, step by step in taxonomical form, to explain how making a student group video may foster CT. But using the taxonomy like this resulted in their skit actually being rather *uncreative*, and didn't facilitate critical engagement. Though G7 also had the opportunity to use Bloom's pyramid in "The Underdog" skit, there is no sign of them using it – and their skit did show engagement in reflection (Schuck and Kearney, 2004, in 4.1) and critical thought about wider, deeper, socio-cultural issues.

Thus, the results indicated that modelling the CT concept was not necessary in order to enable it, or even facilitate it. As seen, researcher-written prompts with reflective questions facilitated engagement with CT. It was redundant to explain the steps of CT, or give step-by-step examples of how one can engage in it: simply asking open-ended questions, facilitating when needed, and providing a meaningful activity (3.1) enabled it otherwise. In sum, using Bloom's taxonomy as a guide to facilitate HOTS or CT in the participants was unnecessary.

Difficulty with Bloom's framework as an analytical framework

Firstly, the HOTS present in Bloom's revised taxonomy were not enough to identify and analyse the *process* of CT in their production. The results suggest that reflection was the main difference between G6 and G7, but reflection is not part of Bloom's taxonomy, and therefore was never used as a CT component code in the analysis. Furthermore, the taxonomy's ultimate level of *Creation* lacks the depth and reflection qualities that seem to characterize CT. For instance, both groups "created" a video; but did both of their videos demonstrate the same levels of CT engagement? Can it be said that just because they both "created" something that they both equally engaged in critical thought? It does not seem likely, because even though they both "created" a video, G7 had richer levels of reflection in their content, denoting a purpose, meaningfulness, breadth and overall critical engagement in their production that G6 lacked. But the point here is: it was not possible to assess this reflection in their production with Bloom's revised taxonomy. In order to identify and analyse CT during their group production activity, a more informed CT framework was necessary, one that could be mapped to participant actions and interactions.

Group age and session plan

If the same methods were applied to G6 and G7, then why were there different results? Perhaps their age difference and session time lengths might have been contributing factors.

At the primary school, the students and teachers were spread thin on time and some sessions only lasted 20-30 minutes. These short sessions were the most

unproductive in terms of production, but served to see what could be added to the video in the following session, what worked and didn't. Even so, this implicated their video quality and perhaps their time to engage more critically in the production. For instance when time ran out with G6, one member would take the video home and work on it individually during the week. This outside editing didn't allow for the cooperative decision-making occurring in group structures (3.2), and limited the overall feel of the video to one member's perspective. More session time collaboratively producing and editing could have made their video more critically engaged and purposeful.

Alternatively at the middle school, the sessions usually ran at least one hour or more, thus providing for more quality production, co-researching, and engagement. G7 had the time to think things through a bit more, to edit cooperatively, make group decisions, and to generate and develop their ideas around their topic, such as recording a "poor" part of the neighbourhood and editing it with a "rich" part in "The Underdog" skit so the viewer could see the difference between the two. "Creating" (2.3) innovations like this, and the many socio-cultural levels (3.1) they reflected on, may have been attributed to their age difference but being that the groups were only one year apart, it is likely that their difference in session lengths may have played a bigger factor.

Also in terms of session planning, both groups would have benefitted from working on their trailer sooner in the sessions. This way, they could have an "outline" of their video structure before they began recording content for it.

BYOD and researcher iPad method

BYOD was not the best method for a children's research project. This was exemplified with G4, who forgot to bring their devices to session several times, and G6AB (who even using school-assigned iPads) also forgot to BYOD. Moreover, not everyone had the latest iPad model, so the older models slowed down the production. The practice of editing their videos outside of session was easy and natural for them as after all, it was on their own devices. Whilst this implied extra time for better video quality and sustained immersion in the video's topic from week

to week, it also implied that any media content on the tablet was at risk for loss. Finally, and most importantly, having the option to work on their video outside of session times compromised valuable “productive practice” information, as it was not possible to assess their process in production outside. Hence, BYOD was ultimately considered an ineffectual choice for a children’s video project seeking to analyse participants’ practice in production.

The method of using an iPad to record video-based data had some advantages, but mostly disadvantages. Using a researcher iPad gave this project a solidary feel: participants seeing the researcher also using an iPad made them feel more comfortable and confident, making the project seem unified in purpose. This was opposed to them posing or freezing up consciously during photographs, or whilst she wrote notes as they spoke or did something. So, the advantage was that since iPad use was expected in this project, it helped the researcher blend in as an integral part during sessions. The disadvantages were that the device alone was not enough to collect quality data for research. There were audio, formatting, system and data space issues that limited data collection and video quality. For these reasons, though using a researcher iPad alongside her participants created a more solidary and relaxed atmosphere, in hindsight it compromised the video-based data of their productive activity for further analysis.

Chapter 7 Development of methods and approaches

There were several new developments informed by the practice and results of P1, and the experience in Mexico raised a set of questions that were more specific.

Fundamental research question:

How does collaborative video production enable and foster CT in young children?

Sub questions raised as a result of P1:

How can CT be identified in participant interactions during their collaborative production activity?

What exactly are the participant producers doing whilst engaging in CT?

What features of, and how does their practice of production engage participants to think critically about the video's topic?

How can their development in CT about the video's topic be better assessed?

7.1 Organization

Session plan

Since P1 established that sessions shorter than one hour were not effective to carry out group activities, sessions of at least one hour or more were planned for P2. Also, since P1 demonstrated the participant need to the start trailer first (as opposed to after producing their skits), the trailer would be done before the skits.

Video data recording

In an effort to address better quality video-based data, a camera with a microphone and a tripod was integrated into the developed method. iPad use would therefore be only for the participants.

Provision of iPads

In order for each participant to have a fully functioning, updated tablet and to keep tablet content more controlled, they were to be provided their own assigned iPad with iMovie for use during sessions only.

Omission of CT presentation and written prompts during skits

To see what their own thinking looked like *because* of their collaborative productive practice and not influenced by the researcher (or other outside models), the presentation of a model to facilitate CT, and the researcher-written prompts were omitted from skit productions.

Of primary importance now, was to gain raw, undirected data produced by the participants without “leading” or “influencing” them to have to think about “CT” as a concept, or influence their own natural perceptions of “body image” with researcher examples. In short, if they were to think critically during their production, it needed to come about naturally from their participation in the activities. Likewise, if “body image” was to come up affected as a result of the topic of “media influence on the body image, thoughts and behaviour”, it needed to come about from the participants themselves – not from the researcher’s examples or own perspectives on these topics.

More focus on production activity

As P1’s results demonstrated the need to see what happened during their collaborative production, the developed approach placed an emphasis on their productive activity. All production sessions would therefore be video recorded from start to finish, with a focus on their activities taking place. This would help to answer the question of what the participants were doing whilst engaging in CT, address levels of positive interdependence (3.2) and what factors were at play.

The idea was that the group production vehicle and their meaningful film topic (media influence) may promote CT opportunities *organically*, without giving participants a taxonomy as a reference, as was the case in P1.

7.2 Assessment

7.2.1 Participant-drawn concept maps

After viewing the results from the questionnaires in P1, it was found that the numerous questions regarding how much the participants knew about CT and media literacy truly weren’t necessary to ask. If the study’s main purpose was to find out how media production enabled CT, then knowing the meaning of or the

term “CT” was not of importance at all. Moreover, the questionnaires didn’t really provide an assessment of their thought process.

The use of questionnaires was then omitted and individual participant-drawn concept maps were developed for P2 to gain baseline (before their production) and follow-up (after the video’s completion) levels of conceptual development and critical engagement in the video’s topic: *How does the media influence body image?* Having them each draw a concept map in an individual assessment was expected to provide a better insight into their thought process about the topic before and after production.

Facilitation was to be provided with their drawings by modelling and presenting a sample concept map of another unrelated subject, and participants would be asked open-ended questions to support the rumination of answers in their own maps, but never given direct answers, nor related examples, nor asked leading questions.

Adaptation of concept maps, criterion map and scoring system

According to Novak and Gowin (1984), concept map assessment scoring involves using a *criterion map* to compare to the student-made maps, and scoring the amount of propositions that are made by the student. A criterion map is “an expert map constructed by a group of experts in the domain” (Ornek & Saleh, 2012, p. 125) This expert panel can consist of teachers, researchers or assessors who provide a list of the most important aspects of the domain and thus create a “key-concept list” (2012, p. 126). With this list, each expert creates their own concept map, and then one main [criterion] concept map is created compiling all the expert maps together ensuring that at least 80% of the relationships mentioned in the expert maps are included in the resulting concept map (Ornek & Saleh, 2012).

The concept map-drawing and criterion map construction and scoring system in this work was an adaptation of Novak and Gowin (1984), Rye and Rubba (2002) and Ornek and Saleh (2012). Concept map-drawing is traditionally taught to the student in a separate lesson before they draw the formal version to be assessed (Novak & Gowin, 1984). The students are taught what a “preposition” and a

"concept" is, and are presented with a list of sample prepositions and concepts to teach them how to properly connect them on the map with lines. Due to session time constraints during the fieldwork schedule, it wasn't possible to set aside a special session to teach concept map drawing to the participants. Thus, a simpler version was carried out.

The criterion map and scoring system was designed prior to any data analysis to reduce bias, and considered one basic factor in each participant's map: *concepts*. The displays of relationships between each concept were simply considered the lines that connect the concepts to one another, instead of asking the participants to use "prepositions" to connect them, and these relationships were not scored – only the mentioned concepts.

Criterion map construction

Each expert drew a concept map in the style of a spider diagram, also known as a *spidergram*; this was the same exact type the participants would be asked to draw during their assessments. The spidergram was chosen for its use with children "as a brainstorming technique which avoided imposing adult-defined categories" (Punch, 2002, p. 53). The principal theme went in the middle of the spidergram (or the spider "belly") and asked: *How does the media affect body image?*

The criterion map was therefore a synthesis of the concepts in the expert maps, and was constructed in the following manner:

Concepts: The researcher's identification of what top 10 concepts are **central concepts** to each aspect of the expert maps: (1) media (2) body image, and (3) how the media affects body image, thoughts, and behaviour. In addition, any number of remaining **teacher/expert concepts** relevant were included in the criterion map.

Scoring rubric

A scoring scheme similar to the one employed in the Rye and Rubba (2002) study of 17 eighth-grade physical science students was followed, but instead of using physical science concepts, the concepts relevant to this study were applied.

An approximation of the scoring rubric for *concepts* is as follows:

Scoring: Concepts in each participant map will be awarded 3, 2, or 1 point(s):

- *Three points* given for any of the 10 **central** concepts mentioned by the experts
- *Two points* given for the **remaining** teacher-expert concepts mentioned in the student map
- *One point* for any **external**, relevant concepts brought in by the participant.

As noted, any new relevant **external concepts** [not mentioned in the criterion map] that the participant mentions in the map that are "brought in" as a result of their understanding of the topic, were accounted for and counted as one point (Rye & Rubba, 2002).

7.2.2 Participant-written reflections

To address better assessment methods of their developing CT engagement throughout the project, end-of-session written reflections were also introduced in P2. This provided a collection of sequential reflections about (1) producing a collaborative video together and, (2) what CT engagement happened about the group video's topic (media influence, body image) because of their production. The reflections helped track the development of their conceptual knowledge and engagement in CT about these topics as the sessions carried on. They were promoted when necessary with open-ended, facilitative questions (Appendix B) as some participants needed help writing. The participants sat spaced out to enable private writing and not influence each other's responses, and wrote in their own Google doc on their assigned tablets.

7.2.3 Exit group interviews

Interviewing the group as a whole upon exiting the project was considered to provide an alternative “group” perspective as opposed to the other individual-style assessments to be carried out in P2. All things considered, the focus groups worked well during P1, so it was decided to keep this “focus group” aspect even if there was just one at the project’s end. These exit interviews would serve to gain information about what they learned as a group by collaborating in the project, and what activities they were participating in when they learned these things.

7.3 New, hypothesized critical thinking model

To gain a more unified, holistic framework of CT, it was necessary to go back into the literature. The most frequently used meanings of CT throughout the *Three Waves* (2.2) were then synthesized by means of *manifest content* analysis and *summative* content analysis (Hsieh & Shannon, 2005). All available textual definitions of CT by the most prominent contributors of the CT movement were identified, and the frequency of certain terms used repeatedly in their definitions was counted. These terms were then singled out and arranged by order of frequency used. However, there were certain repeated definitions, albeit mentioned in different manners: for these latent meanings that required closer context inspection, summative content analysis was applied.

The following section illustrates this synthesis of the various approaches of CT across the *Three Waves* (Paul, 1997), with an aim to provide the new, hypothesized CT model for P2.

The timeline of Figure 7.1 illustrates how within each wave, key contributors to the CT Movement define critical thought. Repeatedly mentioned characteristics are bold-faced in blue with some latent meanings alongside them.


1st wave: 1970-1982
Citizens who can think critically [are the] foundation of any society that wants to remain truly free - Kahane, 1971
Consists of problem solving, but also intuition and creativity - D'Angelo, 1971
Thinking that generates and seeks out good reasons - Siegel, 1980
Skill and propensity to engage in an activity with reflective skepticism...requires knowledge of the subject - McPeck, 1981
Second Wave: 1983 - 1993
To question constantly the ideas one encounters - Cornbleth, 1985
Assessing the views of other and one's own views according to acceptable standards of appraisal...[and] the disposition to think productively and critically - Norris, 1985
Reasonable, reflective thinking focused on deciding what to believe or do - Ennis, 1985
The capacity to ask pertinent questions and critique solutions without raising alternatives - Meyers, 1986
The ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems - Chance, 1986
Conceptualizing, applying, analyzing, synthesizing, and/or evaluating information...as a guide to belief and action - Scriven & Paul, 1987
"Reflective skepticism", and the ability to think and act differently based on critical questioning - Brookfield, 1987 p. 5
An investigation exploring a situation or problem to come to a conclusion that includes all available information thus making it justifiable - Kurfiss, 1988
1) relies upon criteria, 2) is self-correcting, and 3) is sensitive to context - Lipman, 1988
"Reasoning that demands adequate support for one's beliefs and unwillingness to be persuaded unless support is forthcoming" - Tama, 1989 p. 64
Purposeful thinking involved in problem solving, calculating likelihood and decision making, and includes an evaluation component - Halpern, 1989
"...the art of thinking about your thinking" - Paul, 1990 p. 32
Process of purposeful, self-regulated judgment [evaluation] giving consideration to evidence, contexts, concepts, methods and criteria - Facione, 1990
Analytical thinking for the purpose of evaluating what is read - Hickey, 1990
"...active, systematic process of understanding and evaluating arguments" - Mayer & Goodchild, 1990 p. 4

Figure 7.1 Timeline - CT across the *Three Waves* and most-mentioned characteristics

Synthesis of definitions of CT across the three waves

Table 7.1 presents the six most repeatedly mentioned terms whilst defining CT from the definitions in Figure 7.1 .

1. *[To use] Reason* (**cited 13 times**):
   (Beyer, 1995; Elder, 2007; R. Ennis, 1985; Fischer & Spiker, 2000; Halpern, 2002; Jones et al., 1995; Kompf & Bond, 2001; Mulnix, 2012; Scriven & Paul, 1992; H. Siegel, 1980; Tama, 1989; Watson & Glaser, 1991)

2. *Evaluate* (**cited eight times**):
   (Chance, 1986; P. A. Facione, 1990; Halpern, 1989; Hickey, 1990; Lipman, 2003; Mayer & Goodchild, 1990; Mertes, 1991; R. Paul & Elder, 2006a; Scriven & Paul, 1987, 1992)

3. *[Decision making] thinking that guides/supports beliefs or actions* (**cited eight times**):
   (Brookfield, 1987; R. Ennis, 1985; Halpern, 1989, 2002; Kompf & Bond, 2001; Kurfiss, 1988; Mulnix, 2012; Scriven & Paul, 1987, 1992; Tama, 1989; Watson & Glaser, 1991)

4. *Problem solve* (**cited seven times):**
   (Chance, 1986; D'Angelo, 1971; Halpern, 1989, 2002; Kompf & Bond, 2001; Kurfiss, 1988; Watson & Glaser, 1991)

5. *Reflect* (**cited six times):**
   (Brookfield, 1987; R. Ennis, 1985; Fischer & Spiker, 2000; Kompf & Bond, 2001; McPeck, 1981; Mertes, 1991)

6. *[To] Question* (**cited four times**):
   (Brookfield, 1987; Cornbleth, 1985; Fischer & Spiker, 2000; Meyers, 1986)

Table 7.1 Most-mentioned CT characteristics across *Three Waves* of CT

7.3.1 To Question

This defining characteristic goes back to the art of Socratic questioning (Furedy & Furedy, 1985; Overholser, 1993; Paul & Elder, 2007). Socratic questioning goes beyond simple questioning, as its purpose isn't to simply gather information, but to examine and discover meanings and evidence about a topic.

Socratic inquiry has long had intrinsic ties with critical thought, and more recently in the classroom, has been linked to CT in students (Anderson & Piro, 2014;

Greenwald & Quitadamo, 2014; Hew & Cheung, 2014; Lee, Kim, & Kim, 2014; Oyler & Romanelli, 2014; Whiteley, 2014). Socratic questions may be identified in dialogue by understanding what these questions seek from the responder.

To identify Socratic questions in dialogue, it is first necessary to know the difference between a Socratic and non-Socratic question. According to Sylvia and Barr (2010), the non-Socratic approach is likened to direct teaching, where a question is asked and a direct answer is given. The Socratic approach may answer a question with another question that prompts the original inquirer to try and answer their own query, or at least think about it in order to answer it, for example. Socratic questions are therefore open-ended questions that examine meaning, purpose, and probe deeper than direct questions (Jay, 2017; Paul & Elder, 2007). Socratic inquiry can happen naturally in conversation (denoting the yearn to explore how others think about a topic), or it can happen with one or several people who are trained in Socratic questioning (Sylvia & Barr, 2010).

However, what might Socratic questions look like in a classroom setting? In an attempt to guide teachers and facilitators, a taxonomy (Jay, 2017; Paul & Elder, 2007) of initially six (and now presently, 9) categories of Socratic questions has been designed.

1. Questions to clarify
2. Questions about purpose
3. Questions about the question
4. Questions about perspectives
5. Questions that examine assumptions
6. Questions that examine concepts
7. Questions that examine evidence
8. Questions that examine conclusions
9. Questions that examine consequences

Table 7.2 RW Paul's Taxonomy of Nine Types of Socratic Questions (Jay, 2017)

Table 7.2 indicates that Socratic questions seek to probe or find an indication (proof) of something – all in an endeavour to reach some truth. It also appears that the essence of Socratic questions lies in their ability to thought-provoke (not just elicit direct answers or simple pieces of information), making open-ended questions good candidates for Socratic inquiry.

Accordingly, the use of open-ended questions is widely practiced in assessing for critical thought in students (Barnett & Francis, 2012; Facione, 1991; Myrick & Yonge, 2002; Paul, 1992; Swart, 2010; Walsh & Paul, 1986; Yang et al., 2005b). In research, asking open-ended questions is also encouraged whilst conducting focus group sessions to gain more reflective responses from participants (Krueger & Casey, 2014; Liamputtong, 2013; Patton, 2005).

Yet, what about direct questions that simply require a “yes” or “no” response? Might these hold any CT weight in classroom contexts? According to Wiese (2010) direct questions serve two primary purposes: (1) to determine baseline understanding of a concept (2) to evaluate the pupil's proficiency in a subject (Wiese, 2010, p. 20). In a larger context, this may imply that direct questions are helpful in obtaining basic information about another’s understanding about a subject. Gathering information is certainly helpful to get a basic sense of something, and could be thought of as a fundamental step to *start* engagement in CT. And whilst direct questions are not deemed Socratic, it is useful to understand what roles direct questions might play in the moments leading up to deeper Socratic inquiries and the problem-solving process (Prawitz & Westerståhl, 2013; Sylvia & Barr, 2010; Treadwell, Dartnell, Travaglini, Staats, & Devinney, 2016; Wiese, 2010).

Thus in this work, it was considered useful to focus on Socratic and open-ended questions in participant dialogues as these have been linked with CT in the literature. Direct questions were also observed to differentiate and note any differences between these and more “critical” questions.

7.3.2 To Reason

The most-mentioned term to define CT across the *Three Waves* is to "reason" or use "reasoning" (Table 7.2). Interestingly, "logical reasoning" was at the forefront of the CT movement during the *First Wave* (section 2.2) but it differs from "reasoning" alone.

Logical reasoning is scientifically based, and follows specific rules for critical thought, such as a mathematical equation. *Logic* and *reasoning* were terms that by and large had been used in mathematics, but began to cross over into the philosophical arena during the *First Wave* (2.2).

However to deduce the process of CT down to simply "reasoning" would be an incomplete definition. Whilst the ability to reason and use rationale is certainly an important foundation in critical thought, critical thinkers must also be able to gather information, explain meanings (and argue for them), and possess an attitude (or disposition) that enables critical thought (Facione, 1998). Hence, though "reasoning" in CT does involve logic, it is far broader than following a set scientific formula to gain absolute proof; in fact, "reasoning" in critical thought rarely establishes absolute proof, but more so can be used to support a belief or a viewpoint.

With this in mind, "reasoning" in this work focused on the type of reasoning drawn out in CT literature; i.e., dialogues that visibly and logically support [argue for] a belief or viewpoint (Elder, 2007; Facione & Facione, 2007; Mulnix, 2012; Tama, 1989).

7.3.3 To Evaluate

To "evaluate" is a term that has garnered much attention throughout each of the waves, primarily because it is such a loaded term. Upon evaluating something, there may be socio-cultural, psychological, educational, and moral factors at play. Essentially, it can be very difficult to judge something or someone without some traces of these more subjective factors.

In evaluation, one judges and determines the worth of something, usually against a set standard of some sort. Dr. Linda Elder, a founding fellow at the Foundation for Critical Thinking gives her take on “evaluation”:

“…each one of us makes evaluative judgments every day. This is what humans do. The significant question is: how do we make these judgments? What standards do we use…? Do we decide in accordance with what we have always done, or what our friends would want us to do? Or do we use intellectual standards in evaluation, standards such as accuracy, relevance, depth, breadth, significance, logicalness and fairness?” (Elder, n/d)

According to Elder (n/d) the key to making a critical evaluation lies in using “intellectual standards” whilst forming judgments. And whilst just about anybody in the world can and does evaluate constantly throughout the day, these mundane evaluations do not a critical thinker make. In order to “evaluate critically” one must judge against fair, relevant, significant, and logical [intellectual] standards (Elder, n/d).

Keeping the Elder (n/d) notion of “evaluation” in mind, for the purposes of this work, evaluation was coded for in comments that showed judgments made against fair, relevant, logical criteria. It’s important to note that the participants were not taught how to make a skilled “critical” evaluation, so there were not expectancies of finding skilled, critical evaluations per Elder’s (n/d) intellectual standards. Notwithstanding, it was interesting to see how evaluation might be elicited by producing a group video about media influence.

7.3.4 To Reflect

The ability to “reflect” requires the much-mentioned CT “disposition” (Chaffee, 1992; Facione, 1990) or the critical thinker’s “attitude” (Chaffee, 1992; Mertes, 1991; Watson & Glaser, 1991). This is because in order to reflect, one must *want* to think more deeply about something, and involves the examination of one’s thoughts, or past events. Reflection at its finest can be challenging because not

every topic or past event is deemed worthy of reflection by everyone, which is why the skill of reflection is greatly helped by the *disposition* to reflect.

Though it may be a challenging skill to acquire, “reflection” is crucial to CT because it requires not only deep thoughts in one’s own contexts, but to also reflect on the thoughts, emotions, experiences and actions of others. Reflection can help inform future decisions and conclusions, and seeing others’ reflections can help people understand how they each see things, and why.

This is why reflective activities are now common-place in educative settings when developing and assessing CT (Bowlby, 2013; Choy & Oo, 2012; Kaplan & Olan, 2013; Myrick & Yonge, 2002; Odom, Shehane, Moore, & McKim, 2014; Sloffer, Dueber, & Duffy, 1999; Wang et al., 2009; Yang & Wu, 2012). In the same vein, digital educative technologies are seeking designs to encourage and support human reflection (Fleck & Fitzpatrick, 2010; Price, Rogers, Stanton, & Smith, 2003; Yukawa, 2006). The hopes are that the more students practice reflecting, the easier it will become for them to habitually reflect on any given topic – further honing the CT disposition. This disposition can be facilitated provided the right environment, support, and conditions that foster reflection are in place, and above all, to allow reflection to *develop* over time.

Yet, the definition of reflection varies widely, as reflection can serve many different purposes. In an attempt to synthesize the various definitions of reflection in the literature, Fleck and Fitzpatrick (2010) came up with five varying levels of reflection that progressively lead up to *critical reflection*. They are briefly outlined in Table 7.3 and as such, ultimately served to inform the new model.

R0 Description: Revisiting	Description or statement about events without further elaboration or explanation. Not reflective.
R1 Reflective Description: Revisiting with Explanation	Description including justification or reasons for action or interpretation, but in a reportive or descriptive way. No alternate explanations explored, limited analysis and no change of perspective.
R2 Dialogic Reflection: Exploring Relationships	A different level of thinking about [something]. Looking for relationships between pieces or experience of knowledge, evidence of cycles of interpreting and questioning, consideration of different explanations, hypothesis and other points of view.
R3 Transformative Reflection: Fundamental Change	Revisiting an event or knowledge with intent to re-organize and/or do something differently. Asking of fundamental questions and challenging personal assumptions leading to a change in practice or understanding.
R4 Critical Reflection: Wider Implications	Where social and ethical issues are taken into consideration. Generally considering the (much wider) picture.

Table 7.3 Fleck and Fitzpatrick (2010) “Levels of Reflection” (pp. 217–218)

Given Table 7.3, the question therein lies: *Can we say CT has been achieved if a student doesn’t reflect to the R4 level of critical reflection?* According to Fleck and Fitzpatrick (2010), reaching the R4 level “is reportedly very rare” (2010, p. 218). This is because this level of reflection requires taking into account social, political, and moral aspects that are far beyond the scope of the immediate situation. In fact, this final level is so rare in occurrence that often levels R3 and R4 are bound together as one under R3’s classification of the “transformative” type of reflection (Fleck & Fitzpatrick, 2010, p. 218).

Because of the rarity of the R4 type of critical reflection and its entwinement with R3, identifying both R3 and R4 types of reflection during the sessions served to inform if the “reflection” component of CT had taken place.

7.3.5 To Problem Solve

“Problem solving” in CT is not limited to mathematical or systematic operations, but involves working through the particulars of a problem to gain a solution. It is a

broad term that encompasses all the skills a critical thinker possesses to reach a solution and/or decision.

In an attempt to define the problem solving process, McCain (2007) (as cited in Kivunja, 2014, p. 87) suggests teaching a four-step process to enable students to solve real-world problems.

1. *Define*	the problem envisioned before starting work at it
2. *Design*	a plan for the solution of the conceptualised problem
3. *Do tackle*	a plan into action to solve the problem
4. *Debrief*	and review how well you have accomplished what you have set out to do

Table 7.4 McCain (2007) "4 D's of Problem Solving"

Yet, despite attempts such as this to outline the process of and skills needed for problem solving in education literature, there doesn't appear to be a set of guidelines explaining how to systematically solve problems in CT literature.

Most authors who mention "problem solving" whilst defining CT go about two ways of describing it: (1) those who say that in order to think critically, one must possess problem-solving skills, and (2) those who argue that CT *is* problem solving. They are different views in the sense that the former considers them separate entities (but reliant on each other), and the latter considers them one and the same.

For the supporters of the first view, CT is dependent upon problem solving, and vice-versa: (Barzdžiukienė et al., 2006; Bransford & Stein, 1993; D'Angelo, 1971; Halpern, 2002; Karantzas et al., 2013). Bransford and Stein (1993) contend that "problem solving is the general mechanism behind all thinking, including recall, [and] CT" (as cited in Collins, 2014, para. 9), so, problem solving is needed for CT. In the same camp (albeit worded a bit differently), Barzdžiukienė et al. (2006) believe that critical and creative thinking often operate together and "are vital to

problem solving" (2006, p. 81). Similarly, Facione & Facione (1993) suggest that "CT is the cognitive process that yields problem solving and decision making" (as cited in Karantzas et al., 2013, p. 3). Halpern (2002) says that CT is the kind of thinking "involved in solving problems" (2002, p. 8). For Halpern, CT is a *component* of problem solving. Equally, D'Angelo (1971) said that CT contains problem solving.

Then, there are those that posit that CT *is* problem solving. For these adherents, CT and problem solving are one and the same . Collins (2014) states that "CT is a matter of problem solving" and poses the question as an example, *"How well does Shakespeare develop this character?"* (2014, para. 9). This implies that in order for us to answer that question we innately need to critically evaluate Shakespeare's take on that character so we can solve/answer that question/problem. Thus, CT and problem solving are the same essential process that will provide the solution. Lim et al. (n.d.) claim that that problem-solving skills are higher-order critical-thinking skills. Kompf and Bond (2001) also define CT as "problem solving".

All this considered, this begs the next question: *Is the ability to solve a problem always indicative that CT has taken place?* Willingham (2008) provides some interesting insight into this. He discerns that if a student has already solved the same [or similar] problem before and the problem re-emerges, the second time does not require CT as the same, previously applied solution will simply be re-applied. Consequently, it is suggested that whilst assessing students for CT, only "novel" problems should be presented to engage them in the CT process (Willingham, 2008, p. 27–Appendix A).

Evidently, the intertwined definitions of critical thought and problem solving show the intrinsical tie they have with each other, and how one inevitably supports the other. With this, it can then be gathered that problem solving is a definite component of CT. Hence, to get a better idea of how problem solving takes place in collaborative video production, it was necessary to isolate problem-solving scenarios (PSS's). This meant that problem solving was treated distinctly from the other components mentioned in this model; i.e., PSS's would still be part of this

framework, but it would be considered a *process* containing the other CT components. This entailed noting where problems emerged and finished during the sessions, what other components/factors were at play within, and determining which were novel and repeated [old] problems.

7.3.6 Decision making

From the *Second Wave* and on, contributors of the movement agreed that CT is thinking that helps one to decide *what to believe or do*. This is because critical thought is meant to be fair, reasonable, logical and reflective so as to achieve the best possible decision or course of action (Elder, 2007). Using CT to believe and ultimately to take action upon that belief may be summed up in one phrase: *decision making.*

The process of decision making can be best described as a situation that requires choosing the most logical option from all the available options ("Cambridge English Dictionary," 2017). This implies that making a decision involves choosing from *two or more* options, therefore situations where only one option exists do not require CT. What's more, the decision-making process is widely defined as decisions which are made in *groups* ("Collins English Dictionary," 2017; "Dictionary.com," 2017; "Macmillan Dictionary," 2017; "Merriam-Webster," 2017).

However, it is important to understand that (like problem solving) decision making is different from the rest of the CT components in this model; in fact, it should also be apart from the others in the sense that, the other components *lead to decision making.*

For the purposes of this work, decision-making was identified as decisions that were made from choosing one of multiple options for and by the group. Isolating the decision making process (similar to problem solving) allowed for an analysis of the other CT components at play surrounding the decision.

The new conceptual framework's hypothesis

This section has identified six terms that are repeatedly mentioned in defining literature of CT, and are suggested as the components needed for the new, hypothesized conceptual framework of critical thought: *question, reason, reflect, evaluate, problem solve* and *decision make.*

Collaborative media production activities (e.g., brainstorming, choosing footage, recording, editing, etc.) showed promise in enabling opportunities to solve problems and engage in CT. For example, elaborate explanations on how to use pertinent apps may surge from participants who are more skilled in these, as they may need to teach and explain to others less skilled. The same goes for participants who are more adept with lighting or creating props; they would then have to teach those less proficient thus enhancing their experience whilst doing so. Working through these problems within the overarching problem of having to produce a video together within a certain time frame, was hypothesized to produce quality interactions that entail engagement in critical thought.

Chapter 8 Project 2: London

8.1 Purpose and overview

Project 2 (P2) in London took place during October – November 2015 in a public primary school in the south of London.

P2 set out to reach an unprecedented level of identification and assessment of critical thought during group mobile media production, one that was deeper and more detailed than before: during what activities and how do specific components of CT take place whilst participants collaborate on producing a group video on tablets? How can the CT process be identified in collaborative dialogue, actions and interactions during group production? Furthermore, what activities (what are they doing) in production whilst they are thinking critically about their production topic?

Data were collected in the form of individual baseline assessments with participant-drawn concept maps, video-based production sessions, written reflections, follow-up assessments with participant-drawn concept maps and exit group interviews.

P2 was a direct reworking of the exploratory P1 in Mexico; still aiming to answer the overarching research question, but utilizing distinct methods, approaches and a new, hypothesized CT framework to identify and analyse CT. That being, P2 did not use the new CT framework to directly facilitate CT in the participants as did P1 – rather, it was used strictly as a tool of analysis to identify how and when during the project the participants thought critically, and, to identify their CT engagement and development about the video's topic because of production. This shifted the focus from presenting CT as a concept, to solely focusing on examining CT in production, without leading participants into pre-conceived notions of critical thought.

This chapter is organized as follows: First, the school profile and selection of participants are discussed. After, the methods are reviewed and information is given about the new provision of iPads, the baseline and follow-up assessments,

and the design, structure and purpose of the sessions. Then, the process of analysis and coding of the selected data sets, approached with qualitative content analysis is explained. Ensuing are the reported results, a discussion about these, and then the conclusions.

8.2 School profile and selection of participants

The participating school housed a total student population of 420 children aged 5-12 years. The student population was more ethnically diverse than the schools in Mexico City, and with varying socio-economic backgrounds. Participants were a mix of British, African and Turkish backgrounds, but all born and raised in London.

Three teachers collaborated in the project's formation: two teaching year 6 (Y6), and one teaching year 5 (Y5). Hence, the groups available for research belonged to these teachers: years 5 and 6 of Key Stage 2.

All teachers were given leaflets and consent forms, and a description of the study was orally presented to all members of their classes. Child leaflets written in simple language, as well as child and parent consent forms were given to all students interested in participating (see Appendix A for all forms).

Once all interested students turned in consent forms, the teachers facilitated the selection of participants and formation of groups based on this work's participant criteria (5.2.2). It was agreed that the best candidates during *this* particular school term given the project's concept were female participants, as the male students of both groups were undertaking other projects and preparing for a school-wide play. Eight female participants aged 9-12 from a pool of 22 year 5 and 6 student participants were selected. Four participants were placed in the Y5 group (aged 9-10), and four participants in the Y6 group (aged 10-11).

8.3 Methods

8.3.1 iPads

Four participant iPads were provided, but since there were eight participants total, each participant was assigned an iPad (labelled a, b, c and d) and shared it with

another member from the different year group. As the plan was to work with each group separately, this allowed each participant to use her own device. The iPads were collected at the end of each session.

So the participants could easily find their project's content on their devices, a "Clapham" folder (Image 8.1) was set up on each iPad's home screen with pertinent applications already inside.

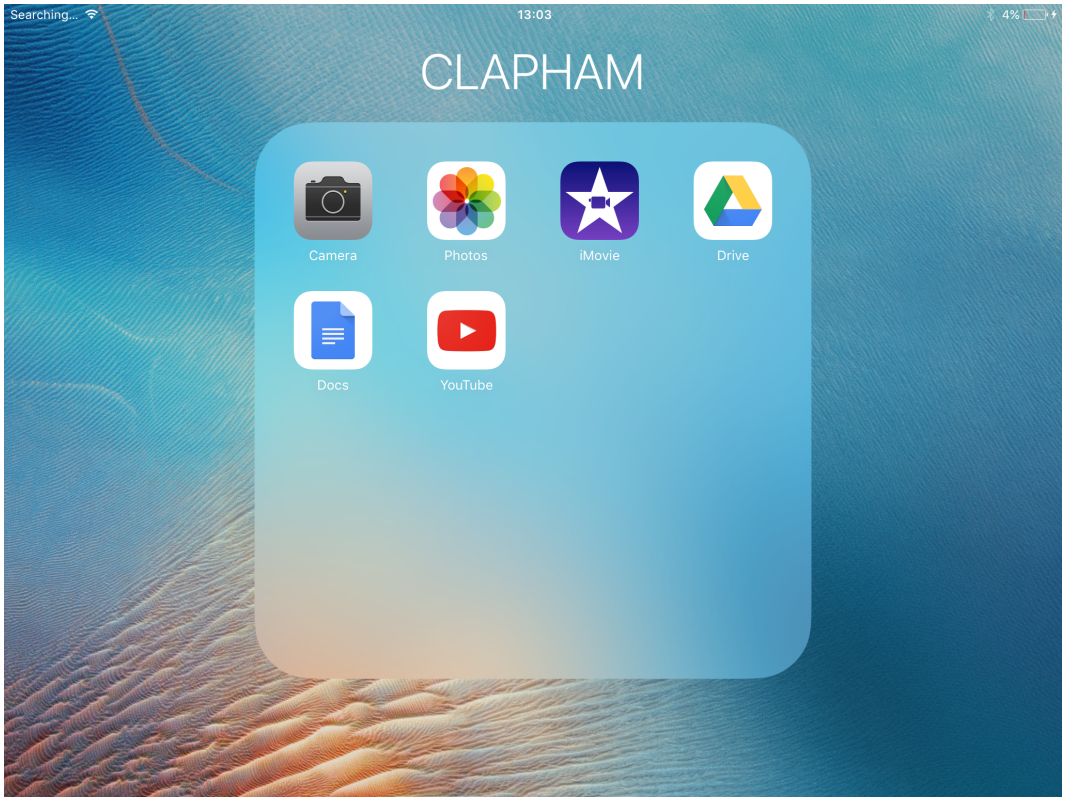


Image 8.1 Clapham folder on participant iPads

Inside the Photos app were designated albums (Image 8.2) where they saved images and videos.

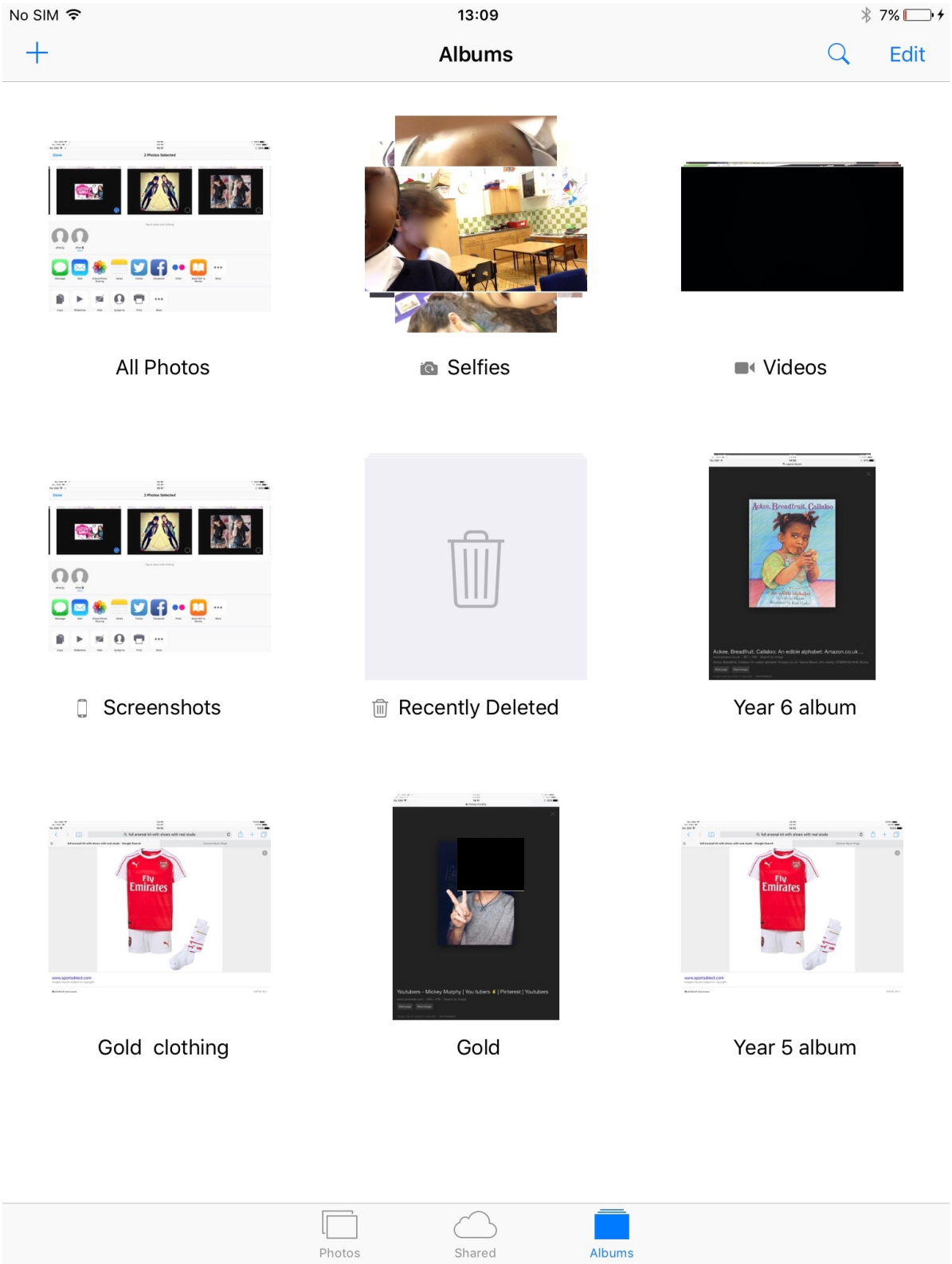


Image 8.2 Photos app folder on participant iPads

All iPads were enabled to communicate with each other via Airdrop (the Apple Bluetooth sharing feature), so the Y5 and Y6 albums were shared and synced across all devices. Each participant had her own personal album labelled with her

pseudonym (Image 8.2); these were not shared across the board and only resided on their assigned iPads.

Organizing the apps and screen layout of the iPads was useful in keeping things orderly, and common, shared albums separated by group, keeping all content controlled and data collected saved on the tablets was useful.

8.3.2 Design of sessions

The same methods, design and structure were applied for both participant groups. The sessions were designed around the group video's topic: *How does the media influence body image, thoughts and behaviour?* They included preliminary pre-production activities to enable topic immersion in participants, to understand what media content these groups regularly engaged with, and for participants to collect relevant footage for later compilation into their group video.

Nine sessions per group were planned across mid-October through late November. Sessions took place one to two times per week per group, and ran 60-75 minutes. The trailer was planned to start before skit production to facilitate groups with the general structure of their video. An overview of the sessions' design and materials is given in Table 8.1 and Table 8.2.

Baseline Concept Map Assessment	Participant-drawn concept map "spidergram" assessment	*How does the media we regularly engage with influence our body image, thoughts and behaviour?*	To get a baseline assessment of participants' engagement in CT about the video's topic.	• Smartphone to audio record dialogue during assessment • Researcher-drawn example concept map • White paper, coloured pens
1	"Post-it" note brainstorming media content	*What media do we regularly engage with, where do we see it, how often, and why?*	To introduce project, purpose and topic, and to understand what media content participants' regularly engage with.	• Researcher camera + tripod to record session • Post-it notes, coloured pens
2	"Screenshotting" and saving content to iPad	*What media content will we include in our video?*	To save images and video content of interest and save in designated iPad albums for later compilation into video.	• Researcher camera + tripod to record session • Participant iPads
3	P-to-P "Interviewing" and recording to save for later compilation into video	*What media content influences my group members, and why?*	For participants to understand other participants' influential media content and enable better integration of all members' contents, and to practice recording, saving this footage for later video compilation.	• Researcher camera + tripod to record session • Participant iPads • Researcher-written prompt with information-gathering interview questions
4	Trailer production	*How does the media we regularly engage with influence our body image, thoughts and behaviour?*	To produce the trailer for their video on the iMovie app's trailer template, this facilitating them with the video's general structure and content to include.	• Researcher camera + tripod to record session • Participant iPads

Table 8.1 London project sessions, design and materials – 1

5	Skit production	*How does the media we regularly engage with influence our body image, thoughts and behaviour?*	To develop and produce skits about influential media, and save this footage for later compilation into group video.	• Researcher camera + tripod to record session • Participant iPads
6	Skit production	*How does the media we regularly engage with influence our body image, thoughts and behaviour?*	To develop and produce skits about influential media, and save this footage for later compilation into group video.	• Researcher camera + tripod to record session • Participant iPads
7	Finishing production + group video completion	*How can our video best represent all our content and the topic?*	To compile their saved footage onto the trailer, and complete group video.	• Researcher camera + tripod to record session • Participant iPads
Follow-up Concept Map Assessment	…	*How does the media we regularly engage with influence our body image, thoughts and behaviour?*	To get a follow-up assessment of participants' engagement in CT about the video's topic.	• Researcher camera + tripod to record session • Participant iPad to show completed video for memory refreshment • Researcher-drawn example concept map • White paper, coloured pens
Exit Group Interview	…	*What did you learn in this project? How did you learn it? Closing thoughts? Improvements?*	To understand what they learned during the project and what they were doing (what activities) whilst they learned these things.	• Researcher camera + tripod to record session • Participant iPad to show completed video for memory refreshment

Table 8.2 Mexico project sessions, design and materials – 2

8.3.3 Procedure

Participant-drawn baseline concept map assessment

Before commencing any of the group sessions, a conceptual baseline assessment of how each participant thought influential media (games, channels, websites, apps, literature they interacted with regularly) may affect body image was gathered. This assessment was conducted with each participant privately and individually before any production work started.

They each were asked to draw a concept map with the topic: *How does media affect body image?* The concept map was to provide an initial view into their thought process about influential media, what they understood about body image, and any possible relationship between both.

They were modelled a sample concept map in the form of a "spidergram" about an unrelated topic: *"What are my favourite foods and why?"* (Figure 8.1), so they could see an example of how the researcher made her map, and consequently how to structure their own maps.

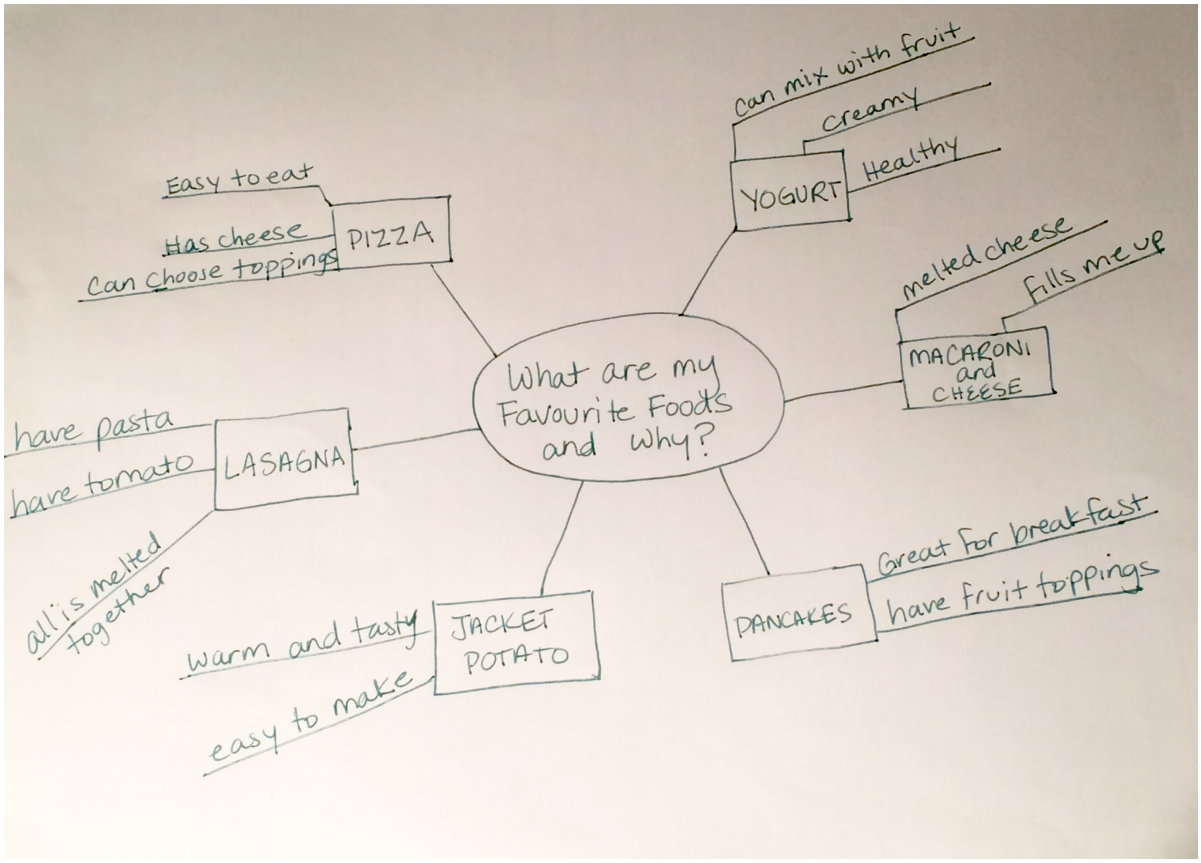


Figure 8.1 Sample spidergram modeled in assessment

They drew a big “spider belly” in the middle and inside it wrote the video’s topic question: *How does media affect body image?* It was explained that body image was “how a person perceives their body”. If they had trouble understanding the term “body image” or “perception” with relation to media influence, they were asked: “How does the media you interact with influence your thoughts about yourself, and how you act because of this?” So the term “body image” was understood as how a person perceives themselves but it was always connected to “thoughts and behaviours” because of these bodily “perceptions”.

Next, they drew as many spider legs stemming from the belly as they wished; each leg representing different “concepts” of media outlets they engaged with. They could then add spider feet, which were to serve as details and explanations of “how” or “why” that particular media concept/outlet was influential to body image.

Finally, they drew a circle around the things [concepts] in the media that they felt affected body image the most. Each participant was coached and articulated to complete each map through open-ended inquiry, facilitating thinking aloud (Collins et al., 1987, p. 482), but never given any suggestions, answers or asked leading questions. This was audio recorded (all dialogue between researcher and participant during entire length of assessment), and the spidergrams were collected as data.

Pre-production (Sessions 1 – 3)

The first three sessions were designed as pre-production sessions. Session 1 included general rules of conduct, aims of the project, creation of their own pseudonyms, and a "Post-it note" brainstorming session. During the Post-it note activity, the participants hand wrote the media they engaged with the most, for how long, on what outlet they saw the media, and why they engaged with it on as many sticky notes they wished to use. They were asked open-ended questions to facilitate this activity (e.g., *"How long do you watch this show? Where do you see this? Why do you watch it?"*), and were instructed to stick the notes in the middle of the table. Each participant used a different-coloured Post-it note pad. The notes were collected at the end and this session was video recorded.

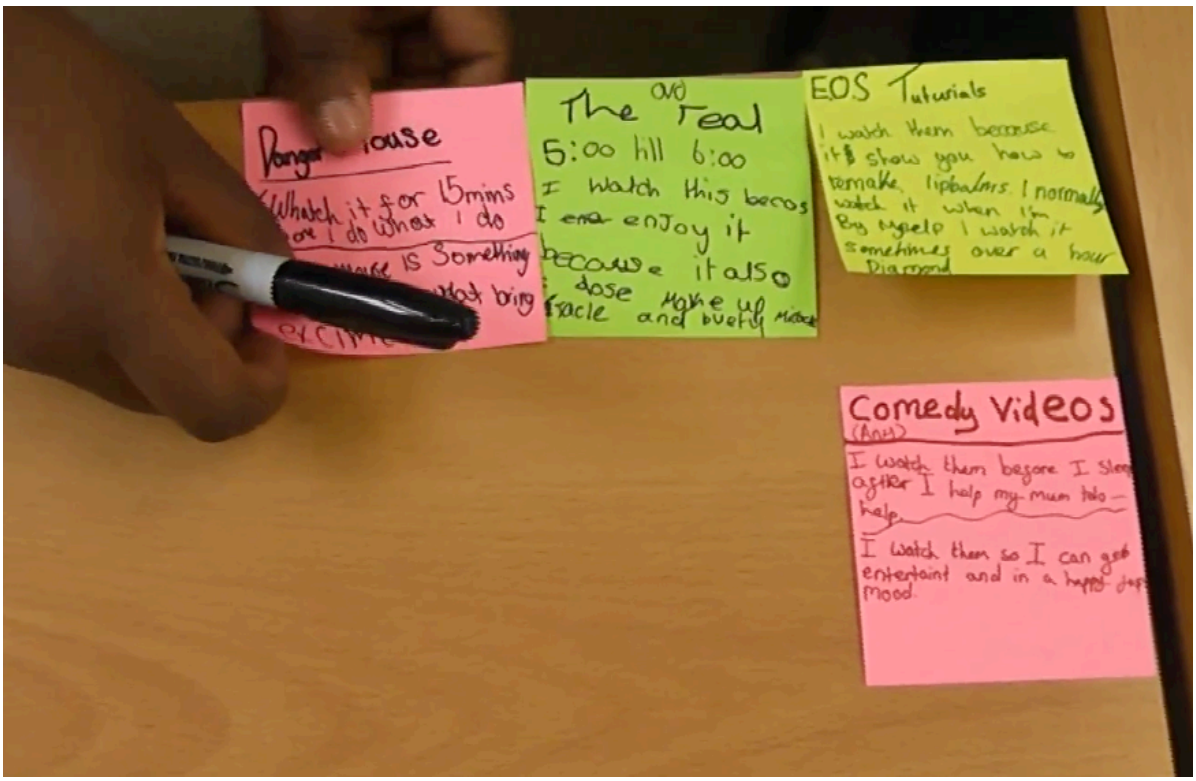


Image 8.3 Commencement of Post-it note activity (close up)

Session 2 was a “Screenshotting” session. They were asked to recall influential content they wrote in the previous week’s Post-it note activity and to search for this content on the web, taking screenshots of images and recording clips of videos. Each participant saved her screenshots and videos onto her personal album on her tablet for later video compilation, and as such, was collected in this manner. This session was video recorded.

Session 3, the “P-to-p interviewing” session, consisted of them interviewing each other about influential media they interacted with, and video recording their interviews. They were guided to use the same set of information-gathering questions during these interviews as in P1: *Who…? What…? Where…? When…? Why…? How…?* to help them gain both direct information and facilitate reflection and CT engagement with the topic. They saved this interview footage in their albums for later compilation. This session was video recorded.

Production (Sessions 4 – 7)

Sessions 4-7 were formal production sessions. Session 4 began with the trailer making on iMovie's trailer template. Sessions 5 and 6 involved the production of skits, but without any quantity of skits in mind, rather leaving this option open to the group. Session 7 was reserved for the completion of their video, including: any finishing touches, edits, and overall incorporation of their saved footage and content with the trailer. All produced content was saved onto their tablet albums, and all sessions were video recorded.

Participant-written reflections

Five minutes were reserved at the end of each session for them to write a short reflective paragraph about their thoughts on the session. Whilst they wrote, they were asked facilitative questions (Appendix B) about their collaborative production experience and the video's topic to elicit reflection. They wrote individually in a Google Doc on their own assigned iPads, and each participant had her own list of Google docs with her reflections inside.

Participant-drawn follow-up concept map assessment and exit group interview

These were designed to take place after the completion of their videos to get follow-up data on each individual participant, and exiting thoughts from the group as a whole. Both were video recorded.

First, the concept maps were conducted individually, then the group interview followed. The follow-up concept map assessment was conducted in the same exact fashion as the baseline, modelling the same sample facilitative spidergram (Figure 8.1), and asking the same question: *How does media affect body image?* The only difference was that for this follow-up map, each participant was shown the group's completed video before commencing. As this assessment took place one week after their last session, seeing their completed group video refreshed their memories on their content produced, and provided a follow-up conceptual understanding of each participant's perspective of the same topic *after* having collaboratively produced the video.

The researcher conducted the exit group interview with each group individually. It helped to understand what they had learnt throughout the project, and during what activities they learned these things in. Each group member initially went into their assigned iPads and briefly reviewed all content they uploaded onto their assigned personal albums, and group albums. The purpose of reviewing their production content was to inspire the discussion that ensued prompted by the questions (Appendix B) the researcher asked the group during the interview.

Both follow-up concept maps and exit interviews served as post-production data to cross-examine and triangulate with data from the production sessions and the baseline concept map assessments.

8.4 Analysis

The central objectives of analysis were to identify: (1) the activities within production (2) any [participant] actions happening within these activities (3) the six respective CT components in the new, hypothesized model (7.3.) taking place in the activities, and, (4) participant interdependent collaboration and the role of the facilitator in this.

This section first reviews the coding process to achieve these objectives, with a specific look into how activities, CT components, and interdependent collaboration were coded for in the video-based production sessions. After, the analysis of the concept map assessments, written reflections and exit group interviews is discussed.

8.4.1 Coding process

The number associated with a code in the MAXQDA 12 reporting system is the number of times the code is found in the dialogue – an example of this is shown in Figure 8.2. Each time a code is applied, it is called a “segment” in MAXQDA. The segment is applied over a certain number of paragraphs.

For consistency, a new paragraph was created every time a new participant intervened or if the same participant was taking a long pause between two

uncorrelated sentences (Figure 8.2). As a result, the number of paragraphs is in some aspect representative of the amount of dialogue occurring though it is not connected to a rigorous timing in seconds or minutes. In this way, each paragraph holds the same “value” and this allows for a quantitative analysis.

The analysis took on a mixed method’s approach; i.e., the codes were applied qualitatively, and MAXQDA 12 provided quantitative results from these codes.

The natural way MAXQDA 12 provides co-occurrence is through a mechanism of “intersections”. This means that it just counts how many times a segment intersects with another segment. As a result, the data produced by MAXQDA 12 with the option of the “Code Relations Browser”, does not take into account the length of the segment. This made it challenging to obtain quantitative information that was easy to use and meaningful to the context of this study.
Therefore, another approach was also considered. All coded segments (over 2800) were exported into an Excel file with MAXQDA 12’s option of the “Overview of coded segments”. Each line in the generated file corresponds to one coded segment. It indicates the nature of the code, the document of origin, and the paragraph where the segment begins and ends. This allowed computing a different type of intersection by using the programming software, MATLAB.

Let us consider an example in Figure 8.2, the coded segment “Refocusing (r2p)” extends from paragraph 102 to paragraph 104. Another code “DM-Hairstyle continuity extends from paragraph 97 to 103. The intersection is therefore 102-103 which takes the value of 2.

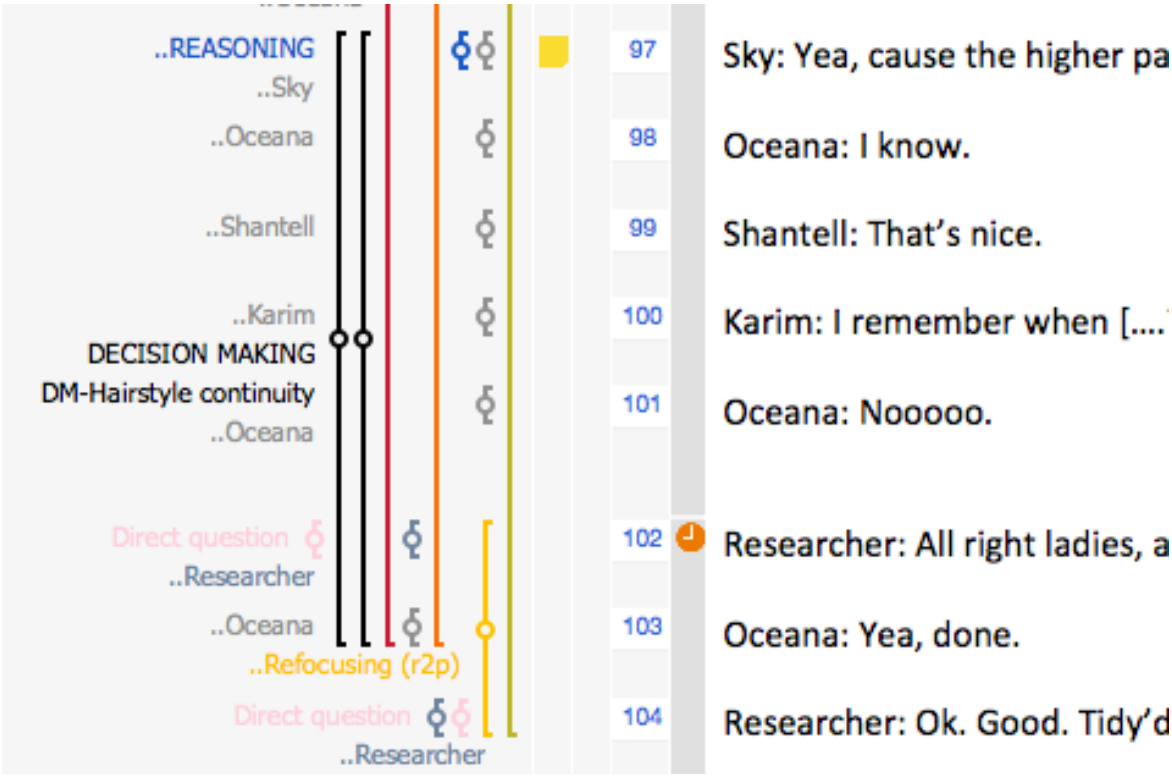


Figure 8.2 Example of coding with MAXQDA

It has to be noted that the code was applied on *text (dialogue) only*, so that thoughts or interior motives were not considered.

Given this process, the first objective was to identify when an activity during their practice of production started and ended, and to code the activity in its entirety with an activity name. Next, the participant actions/interactions taking place within that activity were coded with an action name – also taking into account the start and end of that action. Then, the six CT components taking place within these activities, actions, and interactions were identified and coded with a CT component code (if applicable), in the same fashion, coding the start and end of that component in its entirety. Lastly, to address the levels of interdependent collaborative production, it was necessary to code all types of group interactions (researcher included).

8.4.2 Coding activities

The first step was to evaluate the co-occurrence between some production activities and the CT components at play within them. This entailed seeing which activities (and participant actions within them) and CT components happened alongside each other.

In this respect, the concepts of “activity” and “action” were inextricably linked because an action always took place during a respective “activity”. Besides, coding for activities grounded all actions into a framework of “collaborative video production activities”, which would ultimately help to answer the question of: *How does collaborative video production enable and foster CT?*

The transcribed production session videos were watched repeatedly to see where events in the text activity emerged (Derry et al., 2010). Hence, it was an iterative process. Initially obvious activities were identified (shooting, editing, reviewing of footage) and after more rounds of coding, other types or branches of activities, actions and events emerged (Table 8.3).

For each activity, the code was applied over the entire extent of the text (start through end) where the activity took place creating a sort of vignette, and usually another activity (or vignette) directly ensued. Sometimes an activity enveloped a paragraph or an extensive dialogue of text, and other times it was no more than a sentence or two. For this reason, no matter how much text was involved in an activity, if the text was coded under a certain activity, it counted as *one* activity. The list of the activity codes used is presented in Table 8.3.

Code System	Segments	Length
Video Prod.	**227**	**1851**
Brainstorming	9	269
Trailer content	8	244
Media influences	1	25
Creation of props	2	42
Directing	77	450
Choosing shooter	7	35
Character-specific	14	89
Acting/movement	21	126
Scene design/light	3	24
Framing	15	67
Shot seq./shot plan	13	87
p2r - shoot/frame	4	22
Rehearsing	9	80
Shooting (action, cut)	30	64
Acting	17	22
Reviewing	42	389
Editing	18	283
Hair styling/ Character continuity	5	204
Ideas (content)	15	38
Ideas (shooting)	3	10
Screenshotting and Music Selection	**2**	**158**
Searching web (music vids + stills)	1	79
Ss. Stills	1	79
iPad Troubleshooting	**39**	**316**
Wifi/Network	1	1
iMovie	6	30
tripod	1	14
Siri	3	3
Hijacking (r2p)	5	23
Hijacking (p2p)	20	213
Airdropping	3	32

Table 8.3 Code system for activities

As Table 8.3 depicts, there are some large activities and their sub-activities within their activities, for instance “Directing (Choosing shooter)” is under the umbrella of “Video Prod.” In this example, “Directing” was considered an *activity* within the larger activity of video production and “Choosing shooter” was the *action* within this activity. These activities were categorized under the term “Video Prod.” because they happened mostly when the participants were actively producing their video.

In “Video Prod.”, the activity of “Directing” appeared to have a lot of different types of actions happening within. Some directing had to do with direction given to frame a scene with the camera, so it was coded with the action of “Directing (Framing)”. Another direction might have been geared towards directing another participant about the sequence of the shot or the plan of the shots; this was coded “Directing

(Shot seq./shot plan)". Overall, anytime a participant directed another participant in telling them what to do, it was coded as "Directing" and fell into any of the above-seen "action" types.

To give more examples: "Directing (Character-specific)" and "Directing (Acting/movement)" were both directions given pertaining to acting, but were slightly different. The former involved a participant telling another participant how to act according to her specific character, e.g., directing her to do a "cool pose" because she was supposed to be the "cool one"; making this type of direction very specific and character-driven. Yet the latter simply involved a direction given to act and move within a scene in general, for the sake of framing, timing and other technical aspects that were not character-specific issues. There were even times when participants directed the researcher and told her what to do; this type of directing was coded as "p2r" (participant to researcher) and in this particular instance fell under "Directing (p2r- shoot/frame)".

The other categories (Screenshotting and Music Selection, and iPad Troubleshooting) also happened during the sessions but involved other actions in production: e.g., searching for film content, taking still pictures, troubleshooting iMovie, or network issues, and so forth. More interestingly here, a new action code borne out of tablet use emerged: iPad "Hijacking". This code was applied to all instances where one participant (researcher included) interrupted another participant's iPad use by swiping, ticking or physically taking the iPad out of the other person's hands [and hijacking it] for their own use.

8.4.3 Coding for critical thinking components

Next, for a better look into where CT took place during the sessions, all relevant dialogues and moments were mapped to the corresponding CT component wherever applicable. This involved mapping the participants' (pseudonyms) and researcher's comments (and actions) to the varying CT components.

Figure 8.3 London participant pseudonyms

Table 8.4 exemplifies the memos used to identify what each of the CT components looked like in action during the sessions.

QUESTION (3 types) **[Socratic]** Questions to CLARIFY, about PURPOSE, about the QUESTION, about PERSPECTIVES, that examine ASSUMPTIONS, that examine CONCEPTS, that examine EVIDENCE, that examine CONCLUSIONS, that examine CONSEQUENCES **[Open-ended] not Socratic** *who *what *when *where *why *how **[Direct]** YES or NO
REASON Logically arguing for [supporting], giving a reason for a BELIEF, VIEWPOINT
EVALUATE Judge against FAIR, RELEVANT, LOGICAL standards. Judging quality or value.
REFLECT (R3/R4 types) (see **[R3]** REVISITING an event/knowledge to compare, re-organise, or to do differently in the present/future Asking QUESTIONS that challenge, change understanding or practice **[R4]** Social and ethical issues are considered. Much wider picture is considered.
PROBLEM SOLVE (2 types) **[NOVEL]** problem **[PAST]** problem
DECISION MAKE (for and by the group) Thinking and doing based on solution found. Choosing the best decision from several options. Decisions are supported by reason and logic.

Table 8.4 CT Components code memos used

Questioning

Coding for "Questioning" firstly involved singling out all questions made and then seeing if they fell into any of the three types coded for: (1) Socratic (2) Open ended (3) Direct (see section 7.3.1). The first two were considered to be linked to CT (7.3.1). Direct questions were also coded for differentiation.

Coding for "Direct" questions was the simplest, as the only criteria it had was that it elicited a "yes" or "no" response. Coding "Open-ended" questions was rather systematic in the sense that all questions that started with "who, what, when, where, why, how" were automatically "Open ended". However, to differentiate them from "Socratic" questions, it was important to determine if the open-ended question was simply trying to elicit basic information, or if it was examining meanings, purpose or had more of the probing qualities of Socratic inquiries (Jay, 2017; Paul & Elder, 2007).

For example, a question like, *"Miss, how do you save an image?"* was coded as "Open ended" because it elicited basic information of how to do something, and didn't require a *"yes"* or *"no"*. Another example of an "Open-ended" question might have been, *"Where should I save it?"* – again, this is asking for a simple answer – there was no probing, examining meanings, or questioning purposes (Jay, 2017; Paul & Elder, 2007). But these were different from say, *"Why doesn't it let me save it here, but let's me save it in the album?"*; this question is different from the latter as it probes the *reasons* behind the concept of the app, and therefore were coded as "Socratic".

Whilst coding for "Questioning", it was useful to refer to a list of actual examples of Socratic questions (McQuain, 2014). According to these examples, all Socratic questions are in fact open ended; even questions asking to clarify something are never direct. This guided in understanding the difference between a direct [non-Socratic] question to clarify that elicited a *"yes"* or *"no"* such as, *"Do you know what media is?",* versus, *"What do you mean by 'media'?"*. The former question would not be coded as Socratic because even though it asked to clarify whether or not the person knows what media is, it wasn't open ended and didn't ask what media

actually was – therefore, it was neither Socratic nor open ended; it was direct. The latter question would be coded as "Socratic" because it was asking for clarification of the meaning of 'media', and was open ended.

In another instance, a question like *"What hairstyle should I have?"* would be coded as "Open ended" because it asked for a specific hairstyle idea but, wasn't asking for clarification, nor examining purpose or perspectives (Table 7.2). Yet still, "Open-ended" questions were coded for as they hold CT weight and are associated with fostering critical thought (Barnett & Francis, 2012; Facione, 1991; Krueger & Casey, 2014; Liamputtong, 2013; Myrick & Yonge, 2002; Patton, 2005; Scriven & Paul, 1992; Swart, 2010; Walsh & Paul, 1986; Yang et al., 2005a).

Reasoning

Next, coding for "Reasoning" implicated searching for comments that denoted logical arguments and *reasons* for a belief or a viewpoint (7.3.2).

Usually "Reasoning" comments were in the form of explanations (justifications), and often (but not always) had the word *"because"* or *"but"* somewhere in the reasoning.

One of the challenges in coding for reasoning was to decipher between "Reasoning" and "Reflecting" comments. For instance, a comment such as *"She's meant to be the 'Bossy One' and she just smiled last time in her clip, so we're re-doing her clip so she can appear bossier this time around…"* may suggest both "reasoning" and "R3 reflection" because the participant is arguing her viewpoint logically, but she is also revisiting an event from the past in order to do things differently in the present. There were other instances such as this where a comment might have been coded with two or more components of CT, but in particular, it appeared that "Reasoning" and "Reflecting" often went hand in hand.

Evaluation

Coding for "Evaluation" concerned dialogue that judged the value of something, but it had to be a judgment against fair, relevant and logical criteria (7.3.3).

Numerous evaluative comments appeared when participants were reviewing footage. However, it was challenging to determine whether or not these evaluations were in fact “fair” or “logical” (Elder, 2007) because of the way the sessions were recorded: only the participants could be seen and heard making the comments, but not the actual footage they were looking at whilst making those comments. These are some technical limitations inherent in recording group video sessions, and have been accounted for during this analysis.

For example, some evaluative dialogues began with comments such as, *“I don’t like this”, “That looks good”, or “I appear smaller than everyone else here”.* An evaluative comment passed judgment on or about something, but it had to done in a relevant context or logical basis in order for it to be categorized as “Evaluating”. For instance, judicious comments made whilst participants were reviewing footage or comments after watching a scene unfold were coded as “Evaluating”, because they were judging against what they had just actually witnessed, and was therefore assumed relevant criteria that was logical and fair.

Generally, all comments and dialogues that indicated a moment where the participants were assessing the value of something against relevant and logical criteria and contexts (e.g., a title, a name, a character trait, an image, recorded footage, the manner in which another member worked) were coded as “Evaluating”.

Reflection

After, coding for “Reflection” involved seeking both R3 and R4 types of reflective comments (Table 8.4).

R3 types of comments appeared whilst the participants reviewed footage. A comment such as, “*I need to stand more to the side in the next one, see that? Because I wasn’t in frame…”* – would be coded as R3 because it was revisiting an event (a past shot) to reorganize or do differently in the present or future (the next shot). Another example of an R3 comment would be, “Miss, why do you record us? What are you going to do with this?”, because this comment was asking a question

that challenged the practice of the researcher (Fleck & Fitzpatrick, 2010, pp. 217–218).

Generally, any time a comment hinted at doing things differently in the present because of what had happened in the past, or compared a past to present event, or questioned/challenged understanding or change in practice – it was coded as an R3 reflection. The R4 type of reflection involving wider social, ethical and bigger picture issues was interesting to code for as it is considered a rare occurrence (7.3.4).

Problem-solving scenarios (PSS)

Coding for PSS's comprised of looking at entire sections of dialogue where *novel* and *past* problems arose that the participants worked through the particulars of. Both novel and past problems were coded to understand how and if CT worked within both new and old problems (see 7.3.5). The PSS was coded from the moment it emerged, throughout the entire solving process, and up until a solution was reached – hence the problem in its entirety was considered a PSS.

Whilst coding problems, simple one-off comments offering a suggestion e.g., *"You should try it standing up"* - but that didn't lead to an actual PSS – were not coded. Conversely, if the same comment was made but instead was followed with the participants standing up to try and work through the particulars of that problem, the entire segment was coded as a PSS.

The scenario-like quality of problem solving made coding for problems a more complex affair than simply trying to apply a code to a comment made, or even a small segment of dialogue. It required identifying and isolating the PSS process from start to finish, and seeing what other components and factors were at play within the PSS.

Decision making

Finally, coding for "Decision making" required there to be two or more participants selecting a decision from more than one option (7.3.6).

Trying to distinguish “Problem solving” from “Decision making” was challenging at first because within nearly every PSS, there appeared to be a decision made within. It was then important to differentiate decisions that were made by two or more participants (7.3.6) and not just quick individual decisions that didn’t affect the entire group. Using these parameters helped to narrow down the codes a bit, and not get lost in every single decision taken. During the coding process, the text indicating the moment where the decision was taken was highlighted and coded. Any surrounding evidence or reasoning behind it, and indications of the other available options [decisions] there were to choose from, were also noted.

8.4.4 Coding interdependent collaboration

The ultimate goal of collaborative/cooperative structures is for participants to reach interdependence (3.2) so it was of interest to see the differences in CT levels between interdependent vs. dependent [researcher-facilitated] moments, and what this might entail about group video production activity as a vehicle for interdependent collaboration.

Though the interest was in the *group* levels of participant interdependent collaboration (not the levels of each individual), it was essential to know when and who was speaking (or doing an action). All participants (including the researcher) were therefore coded to identify each in the data. This determined when activities were done interdependently by the participants, as opposed to when there was researcher facilitation involved [i.e., dependence]. To be noted here is that not all researcher text was geared towards facilitation; in fact, a lot of times the researcher spoke to reaffirm or answer a quick question, but not necessarily to step in and “facilitate”.

To address the interdependent collaboration aspect, a simple way to code the types of group interaction emerged: researcher-to-participant “r2p”, and participant-to-participant “p2p”. For example, the “Refocusing (r2p)” code was applied whenever the researcher called out the session time left, or quickly refocused them back on task. Alternatively, when a participant “refocused” another participant in the same fashion the “Refocusing (p2p)” code was applied.

The preliminary analysis of the videos also demonstrated that the participants were prone to getting distracted from the task, but could still be "collaborating" in interdependent fashion in their distraction (e.g., singing a song together, dancing, or taking "selfies" in irrelevant contexts unintended for video use). So, it was important to differentiate between moments of interdependent collaboration whilst being *focused* on their task vs. interdependent collaboration but being *distracted* from the task, and code these differently.

As Table 8.5 depicts, there were even moments where the researcher behaved in a distractive manner; and was coded, "Distract. Behave.(r)".

Code System	Segments	Length
Part.	1730	1730
Researcher	319	319
Oceana	349	349
Shantell	332	332
Sky	386	386
Karim	344	344
Grp. Interact.	102	423
Explain (p2p-due to absence)	5	46
Res. facilitation	45	235
Ideas (p2r- group agenda)	3	21
Refocusing (r2p)	17	26
Refocusing (p2p)	4	5
Distract. behav. (r)	5	9
Distract. behav. (p)	23	81

Table 8.5 Code system for group interaction

As Table 8.5 demonstrates, all codes under "Grp. Interact" denote some form of interaction between all participants during the activities. The "Res. facilitation" code represents moments where the researcher stepped into the activity to formally facilitate; such as to help troubleshoot iMovie, or when called upon by the group to help facilitate with decision making or any of the other CT components.

The other researcher-driven interaction codes (i.e., Refocusing (r2p) and Distract. behave. (r)), were quick moments of "refocusing" or one-word distractive comments, but not true facilitation in the activity.

8.4.5 Analysis of concept maps

The participant-drawn concept maps were scored against the top concepts mentioned in three expert maps (as discussed in 7.2.1) the researcher's, and two other teacher/experts in the fields of education and media. The synthesis of the top expert concepts under the three main aspects is presented in Table 8.6.

As aforesaid: only the mentioning of concepts during their assessments were given points due to lack of time to teach participants how to map prepositions to concepts to score "relationships" (7.2.1). Hence, it was considered superfluous to draw a criterion map displaying "relationships" to score against. The list of concepts in Table 8.6 was sufficient to use during scoring, and was considered the "criterion map".

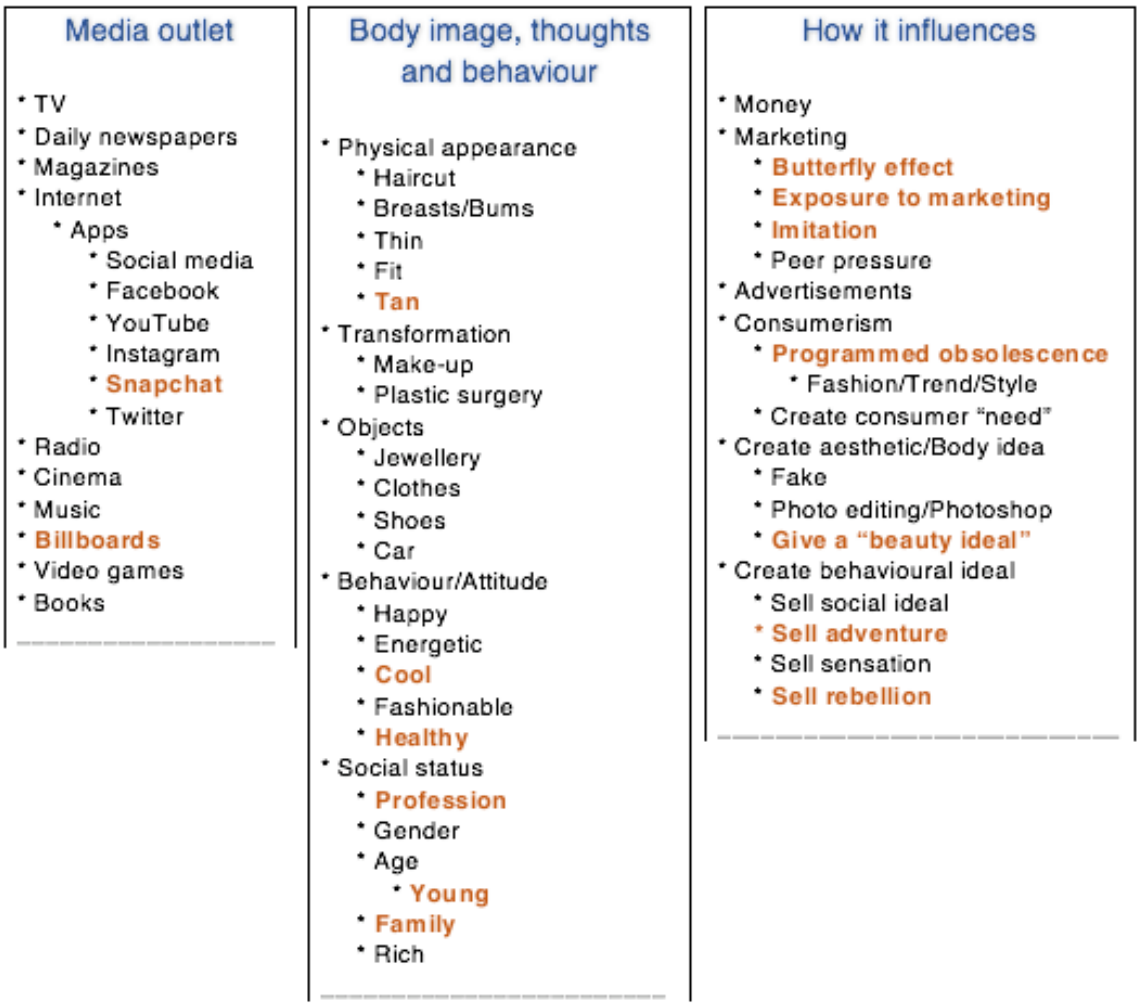


Table 8.6 Top Experts' Concepts List / Criterion Map

All the synthesised expert concepts are portrayed in Table 8.6 in *plain text*. After this step was taken, whatever concepts had not been fused together were considered "remaining" (Rye & Rubba, 2002) expert concepts, and are depicted in *orange text*.

Table 8.6 shows there were less than 10 central concepts brought in by each expert for each of the three aspects. This is evident as under each aspect there are less than 30 concepts and their sub-concepts. It was therefore not possible to synthesize the “top 10 concepts” of each expert first, and then see which remaining concepts were left to assign 2 points to per the aforementioned Scoring rubric.

To work with this actual information given, it was necessary to adjust this to a new adapted scoring scheme. To start, all expert concepts that meant the same thing were grouped as one. For example, “advertisements” and “commercials” became simply “advertisements”, and “fashion, trends, and style” were fused as “fashion/trend/style”. In doing this, some central concepts emerged (e.g., “Internet”) as well as their sub-concepts (e.g., “apps, social media, Facebook” etc.). These were organized accordingly, but each concept still stood alone (whether in a sub-category or not) in terms of scoring.

Scoring

The scoring guidelines then followed the same aforementioned rules in the Scoring rubric:

- *Three points* given for any of the [fused] **central** concepts (noted in *plain text* in Table 8.6)
- *Two points* given for the **remaining** teacher-expert concepts (noted in *orange text* in Table 8.6)
- *One point* for any **external**, relevant concepts brought in by the participant

Comparison of baseline and follow-up maps

The analytical strategy was to compare baseline and follow-up concept maps to analyse the participants’ knowledge and CT engagement about the video’s topic *before* their production, and *after*. To do this, the maps were analysed for the CT

components per Table 8.4 during this comparison, but the component codes were not given points; rather they were discussed qualitatively.

8.4.6 Analysis of participant-written reflections

The analytical focus of all reflections was to see their development of reflection as the sessions progressed on the following two themes: (1) about their **practice of producing a collaborative video** together, and, (2) about **the group video's topic** (media influence, body image). The "reflection" component was of prime interest to identify in their writing, per this project's CT component coding frame (Table 8.4).

R3 and R4 "Reflection" levels were coded, and the indicative text was highlighted and coloured distinctly for identification.

R3 Reflection Revisiting an event/knowledge to compare, re-organise, or to do differently in the present/future, and/or asking questions that challenge, change understanding or practice.
R4 Reflection Social and ethical issues are considered. Much wider picture is considered.
• Blue-coloured comments pertained to the practice of producing a collaborative video. • Red-coloured comments pertained to the group video's topic.

Table 8.7 Written reflection code frame

8.4.7 Analysis of exit group interview

The analytical focus of the exit interviews was to see (1) what **the group had learnt and engaged critically with throughout the project**, and, (2) **during what activities** they learnt these things in. This would serve to answer this project's more specific research questions about during what activities in group production they gained conceptual knowledge in and engaged with. To examine this, any dialogic text of their transcribed group interview indicating these things was coded for and analysed.

8.5 Results

8.5.1 Selection of focal data

After reviewing all material of both groups and performing some preliminary analysis of sessions 1 – 6, some decisions were taken on the selection of relevant focal data.

As a whole, it was challenging for the majority of Y5 to understand the concept of "media" and the "influence of the media on body image", and as a result, for them to produce a video as a group. *Gold, Sapphire* and *Diamond* did not understand the concept. *Crystal* had a basic understanding of how advertisements can affect people, but her group's inexperience with the topic left her alone during discussions. This created an environment of distraction between everyone except for *Crystal*, who found it frustrating and difficult to interact with her inexperienced and inattentive group members. This resulted in *Crystal* doing the majority of the production work whilst other members engaged in irrelevant diversions without knowing what to do for the video; e.g., playing hide and seek in school corridors, playing games on the iPads whilst *Crystal* worked on the video, etc. Y5's production experience was therefore mainly limited to *Crystal's* productive activity, as other members did not collaborate to help. In addition, two members were absent during session 6 for exams, making it more difficult to gauge their collaborative activity as a whole group.

Conversely, all Y6 participants showed a basic understanding of media influence and body image, and could engage with the topic more than Y5. Their basic conceptual understanding of the topic helped their group effort, resulting in Y6 spending more time actually producing collaboratively. Hence it was decided to focus on Y6's data only; since this work sought to examine CT during collaborative video production, it was more sensible to focus on the group that had actually spent more time in collaborative production activity.

Therefore, in what follows, the analysis process described in 8.4 is applied to the focal data of Y6.

Image 8.5 Y6 Participants: (left to right) *Sky, Oceana, Karim*, and *Shantell*

Focal data

For the focus of analysis, relevant and representative "events" (Zack & Tversky, 2001 as cited in Derry et al., 2010, p. 7) were selected and transcribed, and this textual data was organized into five types chronologically to note development in CT as the project progressed.

I.	Baseline concept map assessments
II.	Video-recorded group production sessions (4 – 6)
III.	Written reflections
IV.	Follow up concept map assessments
V.	Exit group interviews

Table 8.8 London focal data

Due to an unforeseen school trip involving both groups, session 5 was cancelled mid-study, so only six sessions were realized instead of the planned seven. This left three formal production sessions conducted, labelled "Production sessions 4 – 6".

The extent of the video-based data collected during Y6's production sessions is presented in Table 8.9.

Session	Activity	Duration
1	"Post-it notes"	0:31:48
2	"Screenshotting"	0:47:37
3	P2P "Interviewing"	0:20:37
4	"Trailer production"	0:29:08
5	"Trailer production"	1:02:11
6	"Trailer production"	0:54:30

Table 8.9 Y6 Sessions' duration of video-based data selected

After reviewing and transcribing all of Y6's video-based data, the decision was taken to focus on the formal production sessions 4 – 6. After carefully examining the introductory pre-production sessions 1 – 3, the impression was that the participants did not find purpose in these, nor the intention to use the footage collected to compile into their group video as planned in the design. The overall sensation was that they did not enjoy these first three sessions, and this affected their disposition to think critically (Table 2.2). In fact, the participants never used nor referred to any collected footage, content or activities done during sessions 1 – 3 in their video. Unlike the P1 groups who utilized their saved content from pre-production sessions for later compilation, P2 groups worked distinctly: they searched for their content on the spot, thought up spontaneous ideas as they produced, and recorded and edited as needed without using prior "saved" footage. At times, they also came to session having completely forgotten what their topic was or what they were doing in the study – all of this made any prior sessions almost useless in terms of collecting content progressively.

Another interesting point was that the lack of purpose, intention and overall disinterest in the pre-production sessions generated less rich PSS's. It isn't that there were not PSS's in these initial sessions; rather less of them, and the *quality*

of PSS's was far better for research during their more purposeful sessions 4 – 6 where they collaborated to make their video. Focusing on the sessions where they were actively *aiming to* produce their video was then considered of focal interest for this work.

As Table 8.9 shows, sessions 4-6 are all labelled "Trailer production". This is because the group only produced their trailer during these sessions, but did not manage to produce any skits or other content to incorporate into their video. Hence, their productive activity was the making of their trailer. Noteworthy here is that this was also the case with Y5; their formal production sessions were limited to their trailer-making only.

Y6's completed video trailer was not considered focal data for various reasons. The chief reason was that after the preliminary analysis of their production sessions and their trailer, it was observed that their *activity* in the production sessions had all the relevant and representative data of their making of the trailer already. Focusing on the sessions (4-6) and cross-examining these with all other accompanying data (including saved media content on their iPads) was of central interest. Another reason was that they didn't really finish the video (just the trailer), so it was not possible to analyse this as a representative and completed video artifact (Pantaleo, 2013). Finally, completed group videos had already been analysed and discussed in P1, but didn't tell much about their process (and extent) of engagement in collaborative production nor CT. So, it wasn't necessary to analyse their completed trailer to understand *what happened* during their production and *how* it helped them think critically – which was now the main objective for this project.

8.5.2 Participant-drawn concept map score comparison

This section discusses and interprets the results of Y6's scored concept maps (Appendix D). First, the resulting differences of the maps are presented. Then, an overview is given of the main changes across the participant maps, discussing emergent themes and CT components found within along with relevant supporting data. This is followed by a closer look comparing the two maps from one exemplary

participant. To support context and meaning, a collage of the most representative media content from the participant's iPad album is also presented, as well as some pertinent dialogue from the production sessions.

Score point differences between maps

Concept map score point comparison					
	Baseline	Follow-up	Score point difference	Total % increase	Number of new concepts mentioned in follow-up
Shantell	10	13	3	30%	6
Karim	14	21	7	50%	7
Oceana	6	26	20	333%	8
Sky	13	36	23	177%	10

Table 8.10 Concept map score point comparison

Table 8.10 demonstrates that there isn't much difference in scored points between *Shantell's* maps (3 points with a 30% increase), and that her follow-up map states six new concepts not aforementioned in the baseline. It also appears that *Karim's* two maps scored a difference of 7 points denoting a 50% increase, and her follow-up mentioned seven new concepts. A 20-point difference in scores is demonstrated from *Oceana's* maps (Figure 8.4), showing a 333% increase, and mentioning eight new concepts in the follow-up. Finally, *Sky's* maps show a score difference of 23 points between them, an increase of 177%, and the mentioning of 10 new concepts.

Overview of main changes across participant maps

Several themes stood out during the comparison across the participant maps, and are discussed as follows.

All participants mentioned entirely new concepts in their follow-ups, detailing content that could be traced back to the [saved iPad] content produced during sessions.

For instance, *Shantell* didn't re-mention any of her baseline concepts in her follow-up: everything mentioned in the latter map was completely new, suggesting that her participation in the production enabled her to generate an entirely new set of concepts about the video's topic. *Karim's* saved media content (Appendix D)

directly reflects the concepts she mentions in both her maps: e.g., her prominent concepts appear to be rebellion-driven, with “swearing” and “body language”. *Sky* mentioned the newest concepts in her follow-up map (10); and whilst some of these mapped to her own saved content, more interestingly, they more so alluded to *others’* saved media content and interactions/events during production.

All thought critically about YouTube content in the follow-up map.

Shantell’s follow-up mentioned and “[R3] Reflected” about YouTube content; Bob Marley made *her* “feel strong”, how *You Can’t Do It Like Me* made *her* “want to dance” during sessions, and how Lauren Hill made *her “want to sing”.* Karim mapped how “Music” and “Swearing” can influence body image and “make us look cool” in her follow-up, denoting a more personal “[R3] Reflection” about herself. Sky’s follow-up map “[R3] Reflected” about how YouTube videos affect “body image”.

All engaged in “Reasoning” and “[R3]/[R4] Reflection” components about various concepts in their follow-up maps.

Shantell’s saved iPad album content (Appendix D) signified that several of the follow-up map mentions were personal “[R3] Reflections” of her own past experiences (e.g., “Lauren Hill”, “Bob Marley”). Though *Karim’s* baseline map does denote some components of “Reasoning” and “[R3] Reflection” regarding how a YouTube personality “swears and makes me wanna swear”, her follow-up map states exactly how YouTube can be influential in this context; by creating “communication styles” that can influence people’s “body language” and the “language you use”, conveying “Reasoning” in this rationalization. *Sky’s* baseline map indicated various “Reasoning” explanations under her concepts, yet these concepts were more related to “influencing factors” in the media, rather than mentioning actual media outlets and how these affect body image, thoughts and behaviour. In a more detailed manner, *Sky’s* follow-up denotes “Reasoning” and both “[R3]/[R4] Reflection” about produced content, and about events that took place during production sessions.

All demonstrated more specificity about concepts in the follow-up map.

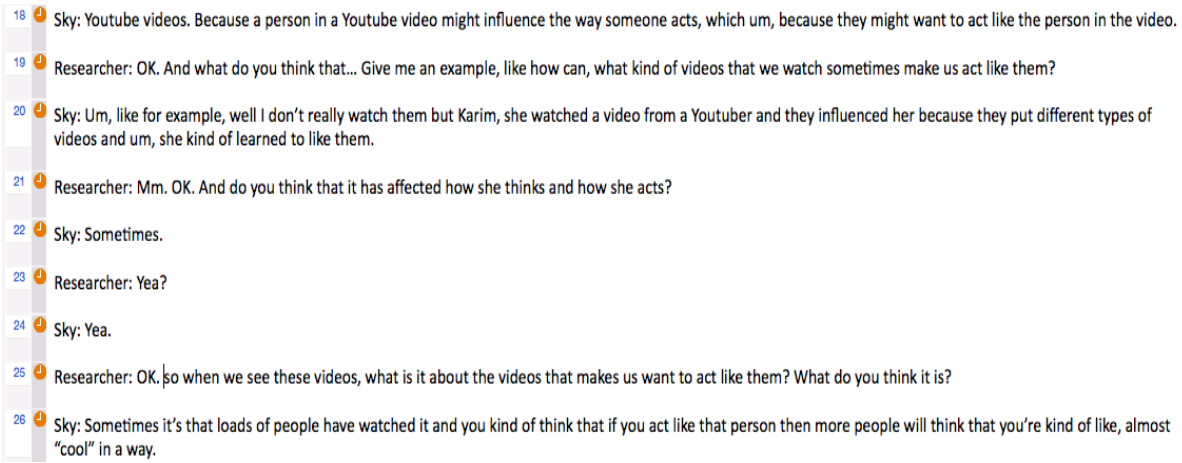
Shantell's follow-up map mentioned how "video games" influence girls to "dress up pretty", and influence them to "want to be a movie star" (e.g., "*Games for Girls*") – more specifically addressing how the media affects body image in comparison to the scant examples in her first map– which didn't reach those levels of critical engagement with the topic. Whilst Karim's driving concepts remain "YouTube" and "Sell rebellion" by "swearing" throughout both maps, her follow-up map shows more specificity in each concept, mapping precisely how YouTube videos influence "body language". Though Sky's baseline map mentioned the "Create consumer 'need'" concept, her follow-up map gave concrete examples of how this happens in video games: e.g., "*Friv",* in modelling "TV shows", and "models in magazines".

***Shantell, Oceana* and *Sky* all indicated in their follow-up maps that other group members' presented media content during production made them think critically.**

Shantell's "*Games for Girls*" map mention directly maps to *Sky's* follow-up map mention about playing games where you dress up virtual girls, indicating "[R4] Reflection" about the content *Sky* presented during production. *Oceana's* follow-up map (Figure 8.4) mentioning the "Photoshop" and "Magazines" concepts is directly tied to the presentation/discussion she had with Sky during Session 6, which inspired her latter "[R4] Reflection" about these on her map.

However, a prime illustration of how exposure to other members' content promoted CT is exemplified with various components of *Sky's* follow-up map. For example, she mentioned how on *Friv* (online game) there are "some games [that] might affect body image because it could be to put make-up on a person and then dress them a certain way…" *Friv* was media content that *Shantell* produced (see Appendix D), and as aforementioned, *Shantell* thought critically about *Sky's* presented online games mentioning those in her map (respectively). *Sky* also mentioned how there are some TV shows "about a person who wants to be a model" that could influence body image, thoughts and behaviour. This modelling-themed TV show (*The Face*) was actually *Oceana's* presented media content. Finally, though no participant names were mentioned in any concept maps, *Sky* stated that "a person in a YouTube video might affect the way one thinks or acts… because they might want

to act like the person in the video": this is a direct "[R4] Reflection" about what she learnt about her group member *Karim* during production. This is evident in Transcription 8.1. as the dialogue between her and the researcher whilst she was drawing her follow-up map is examined.



18 Sky: Youtube videos. Because a person in a Youtube video might influence the way someone acts, which um, because they might want to act like the person in the video.

19 Researcher: OK. And what do you think that... Give me an example, like how can, what kind of videos that we watch sometimes make us act like them?

20 Sky: Um, like for example, well I don't really watch them but Karim, she watched a video from a Youtuber and they influenced her because they put different types of videos and um, she kind of learned to like them.

21 Researcher: Mm. OK. And do you think that it has affected how she thinks and how she acts?

22 Sky: Sometimes.

23 Researcher: Yea?

24 Sky: Yea.

25 Researcher: OK. so when we see these videos, what is it about the videos that makes us want to act like them? What do you think it is?

26 Sky: Sometimes it's that loads of people have watched it and you kind of think that if you act like that person then more people will think that you're kind of like, almost "cool" in a way.

Transcription 8.1 Sky follow-up assessment transcript excerpt

In paragraph 20 of Transcription 8.1, *Sky* makes a direct reference to "*Karim,* [she] watched a video from a YouTuber and they influenced her because they put different types of videos and, she learned to like them".

Sky also goes on to say in paragraph 26 that:

"Sometimes it's that loads of people have watched it and you kind of think that if you act like that person then more people will think that you're kind of like, almost 'cool' in a way".

Her mentioning that people will think you're "cool" if you act like a person in a viral video on YouTube alludes to *Karim's* concept of how "swearing" in "music makes us look cool" in *Karim's* follow-up map. More directly, it refers to *Karim's* "the cool one" character persona she created during their trailer production (Transcription 8.7).

Exemplary comparison of "Oceana's" maps

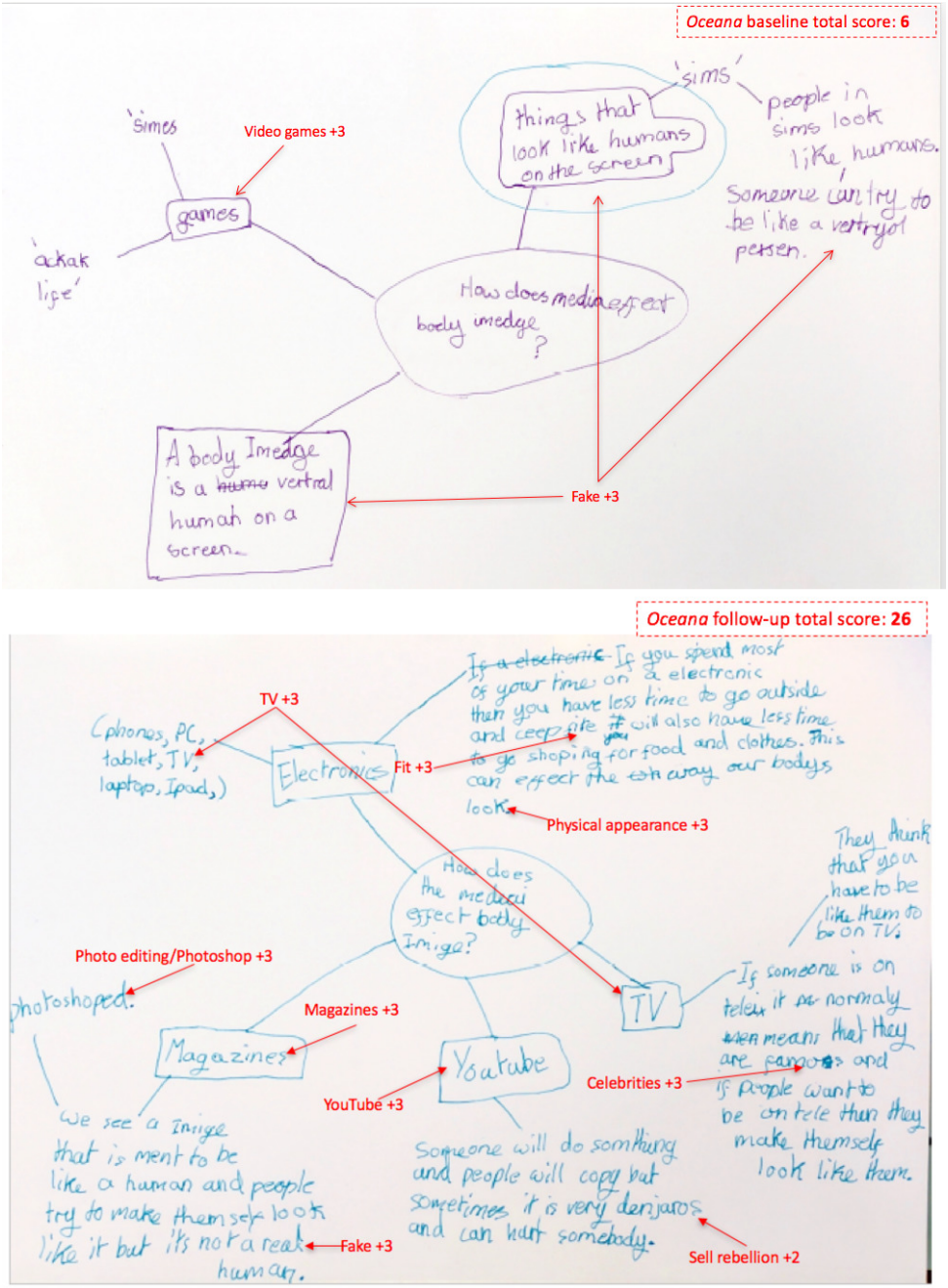


Figure 8.4 *Oceana* concept maps comparison: baseline (top) and follow-up (bottom)

Baseline map

As depicted in Figure 8.4, *Oceana's* baseline map received a score of 6. This lower-end score can be attributed to her focus on one basic media concept: gaming media. Her baseline illustrates that virtual reality is generally what influences *Oceana's* body image, thoughts and behaviour. The spider leg "games" has some clear examples of virtual reality games stemming from it ("Sims", "Akaka"). This

concept received a score of three points and was linked to the expert-mentioned concept of “Video games”.

The spider leg “Things that look like humans on the screen” was linked to the expert concept of “Fake” because it was interpreted that if a screen image “looks like” a human but it isn’t real, then it is “fake”. Her mentioning of “Sims” – a game where one can choose their own body shape, colour and appearance whilst acting in virtual “fake” worlds with other players, supports this interpretation.

So, it appears that she perceived that these games and virtual “fake” humans could affect body image because as one of her spider feet explains, “people in Sims look like humans”, and it could affect thoughts and behaviour because “someone can try to be like a virtual person”. Mainly, it looked as though Oceana viewed “body image” to be influenced by a fake “virtual human on a screen”.

Follow-up map

Figure 8.4 displays *Oceana’s* follow-up map score of 26. *Oceana* had various expert central concept mentions that scored her three points each: “TV, Fit, Physical appearance, Photo editing/Photoshop, Magazines, YouTube, Fake and Celebrities”.

Her notion of “rebellion” was distinct from *Karim’s* however, as she considered that the media sells rebellion on YouTube videos showing people doing “dangerous” things, and this could influence people to “hurt somebody” (as opposed to “swearing”).

Oceana also mentioned that the over usage of electronic media could lead to “have less time to go outside and keep fit” thus affecting “the way our body looks”. This earned her three points for mentioning the expert “Fit” central concept and three more for suggesting how this could influence another expert central concept: “Physical appearance”.

Comparison

There is a notable difference in conceptual change and development, and with this more engagement in CT by “Reasoning” and “[R3] Reflection” in the concepts *Oceana* mentions in her follow-up map.

In her baseline map, Oceana’s comment about gaming media affecting people’s body image because “someone can try to be like a virtual person”, implies “Reasoning” as she is logically supporting her belief/viewpoint, but all her other comments in this initial map are simply statements and don’t indicate CT engagement.

Her follow-up map now goes beyond her initial “gaming media” focus, mentioning “Photo editing/Photoshop” and people in “Magazines” may not be “real humans”. She mentions the influence of “TV” and suggests how televised “Celebrities” can be seen as influential and their audiences want to “make themselves look like them” – a “Reflection” on a new concept that she did not mention in her baseline map. Moreover, she even goes a bit deeper into the use of “Electronics” than she did in the baseline, mentioning that it can be detrimental to your health and “Physical appearance” to spend too much time on electronics at home and “have less time to go outside and keep fit”.

Oceana’s representative media content saved on her iPad album (Image 8.6) echoes some of these new mentions in her follow-up, but also keeps some of her original influential media concept of online gaming stated in the baseline map.

Image 8.6 *Oceana's* iPad album – collage of representative media content

Image 8.6 displays two images of models on the catwalk, two images of MMOG's (Massively Multiplayer Online Game), an image of a necklace, and finally, an image of the modelling-themed reality television series *The Face*.

However, to understand how and during what activity in collaborative production the concept of "PhotoShopped" models in "Magazines" affecting body image developed from *Oceana's* initial "virtual reality" take on body image, it is useful to see some dialogue during session 6.

233 Oceana: I think that especially like because models, even though they look like this in magazines they don't actually look like that. They just do on the computer, make themselves the body, you know? Like they could make a person look like whatever they wanted on the screen, but when someone would try to look like them which is actually really, really unhealthy, which they shouldn't do, because that isn't a natural size for women to be.

234 Sky: Yea, I agree. They influence people but it's not a good thing nearly, like they eat one meal a day, that's really tiny, just to get skinny, and then sometimes..

235 Oceana: But that isn't a real body size of a natural woman.

236 Sky: And sometimes they could get really ill and then...

237 Oceana: Sometimes there could even be death because like some people wearing really, really, really skinny corsets to make their body look like this image on the screen that this image isn't actually what people look like.

238 Sky: Like if they wore something really tight, they could even not-

239 Oceana: They squished everything, yea.

240 Sky: Not be able to breathe properly.

241 Oceana: Yea I don't think it's a good thing. I don't mind the fact that you model, but I don't think it's a good thing when on the computer you make them look different to how they actually are.

Transcription 8.2 Session 6 – Oceana and Sky present a talk about Photoshop and thin models

This chat (Transcription 8.2) between *Oceana* and *Sky* took place right after they had been searching the web for images of "models on the catwalk" during Session 6. *Oceana* had mentioned she wanted to add a bit in the video about how models can influence girls' body images, so her and *Sky* began to look for images they could present in their video, and once they found these images they presented this chat, video recorded by *Karim*. The purpose was to add the images and recorded chat into the video. Both *Sky* and *Oceana* "Reason" and "Evaluate" on how altered images of extremely thin models can be unhealthy for both the models trying to be thin during this chat, and how their audiences looking at their altered photos may aim to achieve an unrealistic body, "because that isn't a natural size for women to be".

So, it can be gathered that this concept development began for *Oceana* around the time when her and *Sky* started their web researching activity for "models on the catwalk". Their critical dialogue about it enabled *Oceana* to then look back on this discussion and on the images of models she had saved onto her album, and then to "[R4] Reflect" on these in her follow-up map under her "Photoshop" and "Magazines" concepts.

The comparison of both maps across the participants enabled the researcher to see how their productive experience along with other members' presented content engaged them in CT about the projects' concepts, and the extent of their conceptual growth. It was possible to track this development and to see *during what production activities* CT took place in by mapping their map mentions to their iPad content albums, and specific events and dialogues that took place during sessions. The results indicate that YouTube played a significant role as a media content source, but being exposed to a heterogeneous (3.1; 3.3.1) mix of media content during production was what enabled them to think critically about this content.

8.5.3 Video production sessions 4 – 6

This section presents and discusses the results of the analysed production sessions. First, the group interaction is examined in each session in order to see what activities fostered more interdependent collaboration and the role of the facilitator in this. Next, the problem/decision pattern highlights the emergent pattern that took shape during analysis, and how problems and decisions were isolated per this work's PSS (7.3.5) and decision-making (7.3.6) hypotheses. After, CT engagement in selected PSS's is examined in detail. Finally, each production activity is looked at exclusively to see how the CT components were at play within them.

8.5.3.1 Group interaction

This section presents the results of each session's activities and group interaction codes to see when the participants collaborated more interdependently, and the role of the facilitator in this (3.4). Each session is displayed in table format depicting its "codeline" (MAXQDA 12's code overview). The codelines in these tables represent the group interaction codes, and the coded activities (and actions within). The group interaction codes can be found at the top of the table, sectioned off for differentiation, and are labelled as the types of interactivity happening during the sessions. The codes below these are all activity codes depicting the activity type. Seeing these codes all running in parallel with each other helps to determine how

they played together during different times in the sessions, aims to provide a narrative picture of how the sessions progressed.

Each session was split in two for presentation purposes (i.e., the “starting half” and “ending half”), as it was not possible to show a whole session in its entirety in a visible manner.

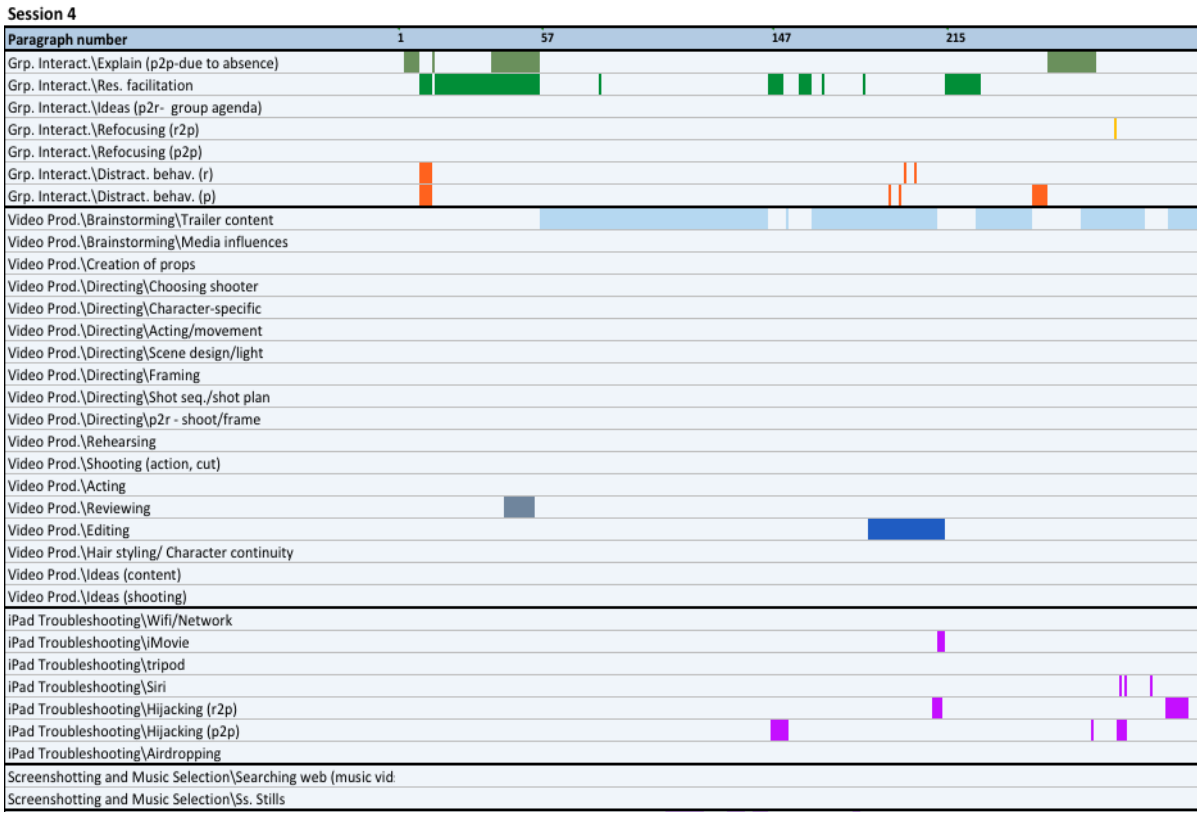


Table 8.11 Session 4 (starting half) activity/interaction codeline

During the start of the session 4, one can see that at the top, “Grp. Interact.\Res. facilitation” (coloured in green), depicts how much formal facilitation is happening directly in parallel to the activities and other group interaction codes (Grp. Interact) taking place.

For example, there was a lot of “Grp. Interact.\Res. facilitation” at the beginning of the session between paragraph numbers 1 – 57 (noted at the top) during an explanation (coded as Grp. Interact.\ Explain (p2p-due to absence) from *Shantell* to *Oceana* about how to use iMovie because *Oceana* was absent the previous session: the other participants didn’t understand *Shantell* either, so the researcher needed to step in to facilitate her explanation.

It can also be seen that there was some distractive behaviour on behalf of both researcher and participants (Grp. Interact.\Distract. behave.(r) and Grp. Interact.\Distract. behave.(p)) during *Shantell's* explanation.

Soon after at paragraph 57, we see the commencing of the "Video Prod.\Brainstorming\Trailer content" activity depicted in light blue. At this activity's start, there is a sharp drop in facilitation and no other group interaction codes appear.

The "Video Prod.\Reviewing activity" (coloured in dark grey) likewise required "Grp. Interact.\Res. facilitation", as did the "Video Prod.\Editing" activity. The "Video Prod.\Editing" activity actually shows up with various other codes in parallel: "Video Prod.\Brainstorming/Trailer content, Grp. Interact.\Res. facilitation, Grp. Interact.\Distract. behav. (r), Grp. Interact.\Distract. behave. (p), iPad Troubleshooting\iPad Hijacking (r2p)" and "iPad Troubleshooting\iMovie".

It appears they also had some iMovie issues they were working through during editing (iPad Troubleshooting\iMovie). During this time, the researcher stepped in to help with iMovie (iPad Troubleshooting\iPad Hijacking (r2p)) – these two iPad activities are represented in fuchsia and can be seen in parallel around paragraph 215.

The ending half of session 4 in Table 8.12 depicts more interdependent collaboration than the respective session's first half.

Table 8.12 Session 4 (ending half) activity/interaction codeline

There was very little distractive behaviour and minimal facilitation during this last half of session 4 (Table 8.12). Here, the participants were focused on shooting (Video Prod.\Shooting (action, cut)) and acting (Video Prod.\Acting). It can also be seen that systematic reviewing “Video Prod.\Reviewing” clearly took place right after shooting and acting. However, it seems that “Video Prod.\Editing” (coloured in cobalt blue) only took place for a short time in the middle, and one longer time at the end.

Towards the end, we see they immerse themselves in hairstyling for character continuity (Video Prod.\Hairstyling/ Character Continuity), but they stop this activity to review the footage right after shooting it, only to pick up the hairstyling once again after they’ve reviewed the footage.

Next, we can see the starting half of Session 5’s codeline in Table 8.13.

Table 8.13 Session 5 (starting half) activity/interaction codeline

Session 5 started (Table 8.13) with no facilitation, and indicates the participants got straight to work on shooting, acting and reviewing footage, with some directing about their specific character and some general acting and movement.

The hairstyling activity happened again for a long time (roughly between paragraph's 36 – 115) and during this time, there was some participant distractive behaviour (Grp. Interact.\Distract. behave. (p)), refocusing by the researcher (Grp. Interact.\Refocusing (r2p)), and some researcher facilitation. Overall, the long hairstyling activity seemed to provoke the most surging of overlapping group interaction codes thus breaking up the interdependent quality they started this session with.

Then, right between paragraph 171 – 231 (and even a bit beyond), there was once again a long period without any facilitation, refocusing or distractive codes surging.

The end of Session 5 paints a far different picture in Table 8.14.

Table 8.14 Session 5 (ending half) activity/interaction codeline

There was much more facilitation and even some participant distractive behaviour (Grp. Interact.\Distract. behave. (p)) (Table 8.14). The overlapping codes in video production of "Directing\Acting/movement, Directing\Scene design/light, Directing\Shot seq./shot plan", and "iPad Troubleshooting\Hijacking (p2p)" seemed to provoke the largest amount of surging researcher facilitation.

In particular, the end of this session had quite a bit of iPad troubleshooting: in the form of participant-to-participant iPad hijacking and manipulating a tripod trying to fit it on the tablet. It can be deduced that, the tablet hijacking was done so one participant could review the footage on another's tablet, as the fuchsia-coloured "iPad Troubleshooting\Hijacking (p2p)" code is directly in parallel with the dark grey "Video Prod.\Reviewing" code.

Moving on, the start of Session 6 is exhibited in Table 8.15.

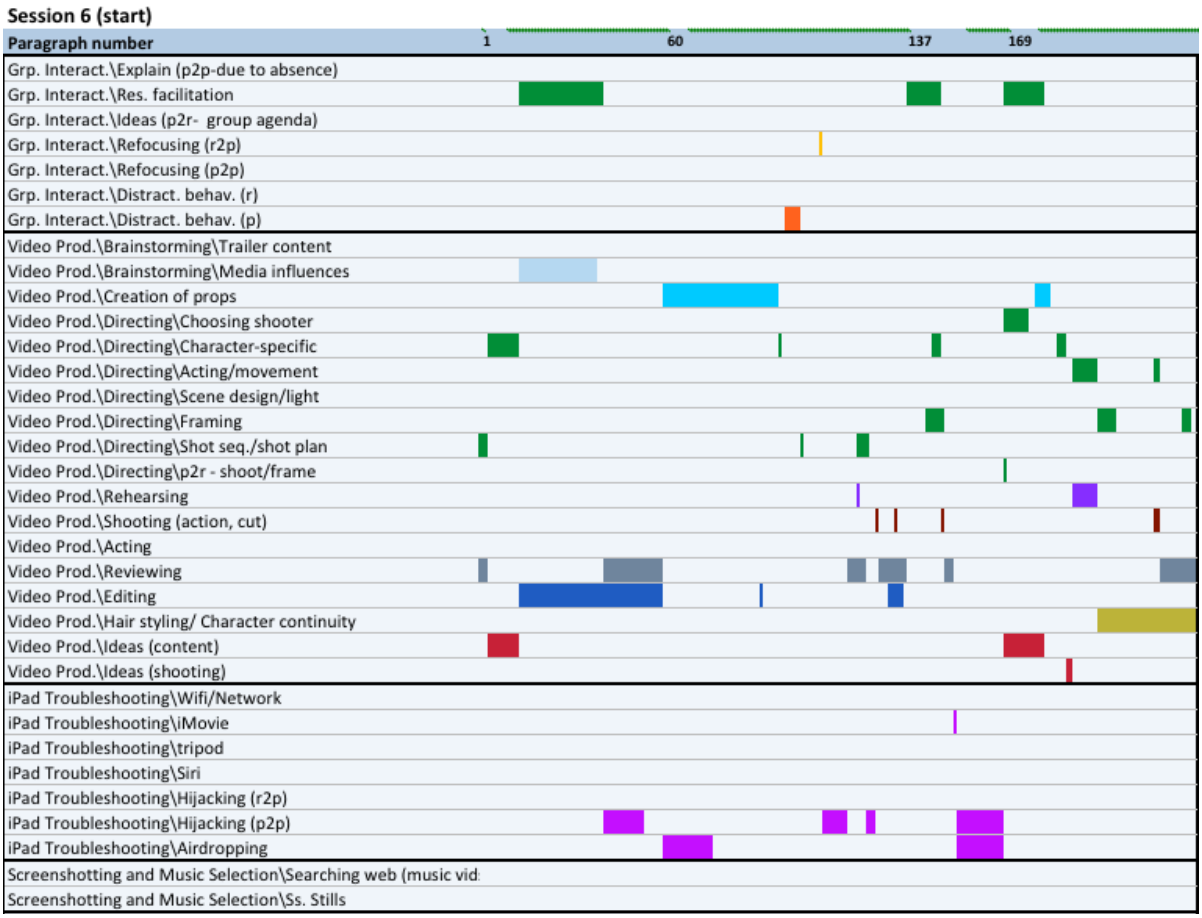


Table 8.15 Session 6 (starting half) activity/interaction codeline

Session 6 began (Table 8.15) with facilitation during a brainstorming discussion about “influential media” (Video Prod.\Brainstorming\Media influences). The researcher initiated this discussion to remind the participants about the video’s topic because they came to session having completely forgotten what it was – an occurrence that happened more than once during this project. However, after this facilitation they worked well interdependently. After this, there was a stretch without facilitation codes involved. Some editing (coded in cobalt blue) took place whilst they brainstormed about the ways the media influences people, and some iPad Hijacking between each other. There was a bit of participant distractive behaviour in the middle (coded in bright orange) but they worked well in an interdependent manner on their creation of props.

The end of Session 6 is illustrated in Table 8.16.

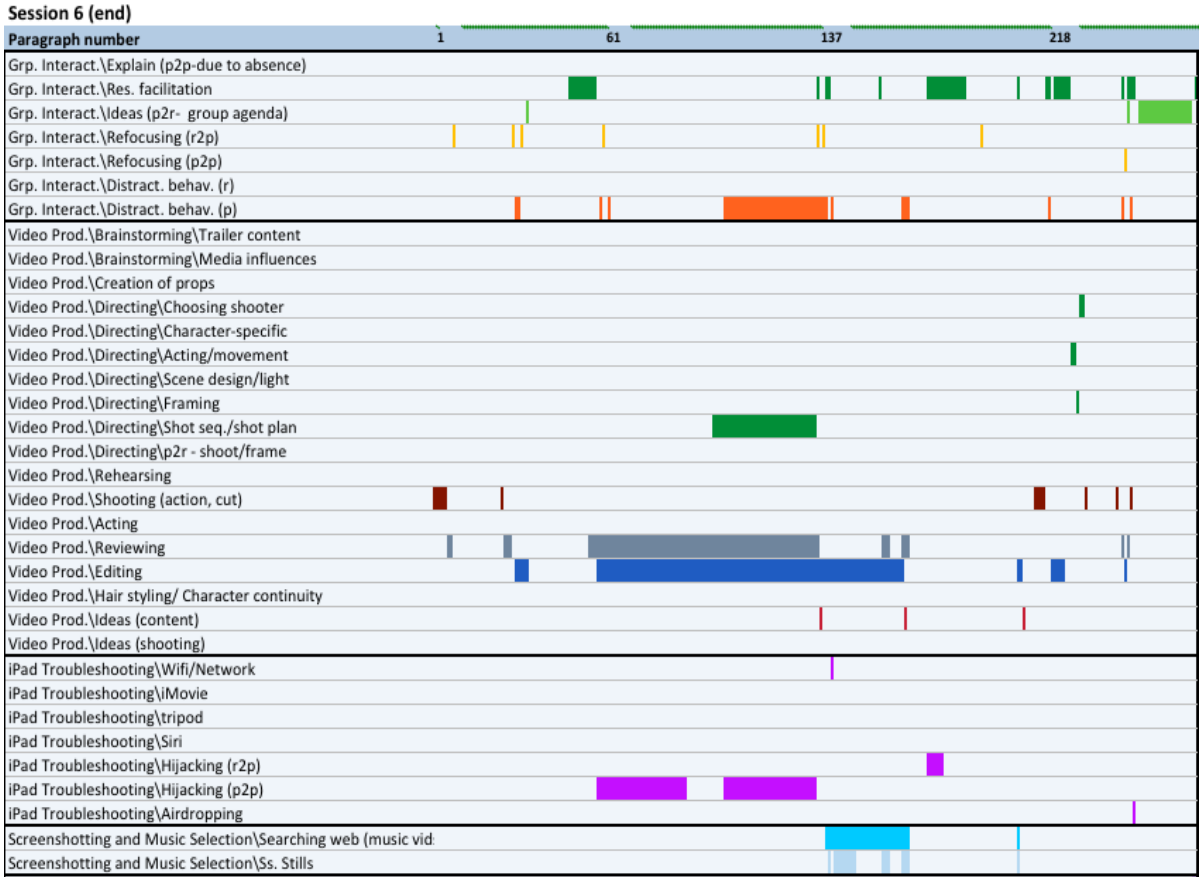
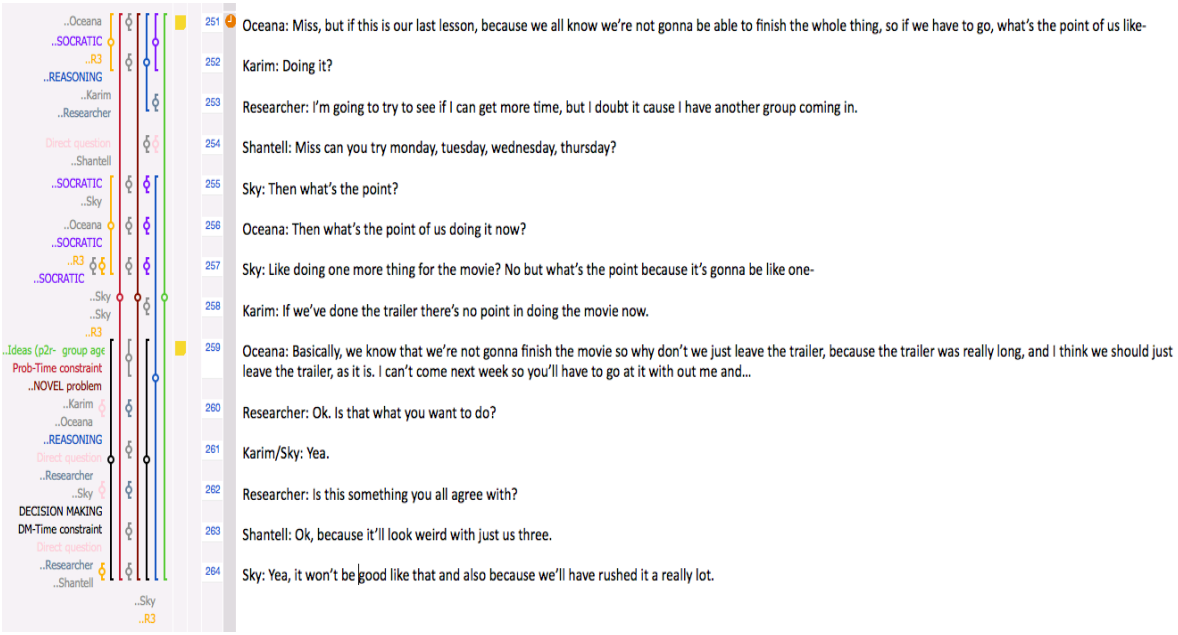


Table 8.16 Session 6 (ending half) activity/interaction codeline

The last leg of the last production session before finishing their video (Table 8.16) shows considerable participant distractive behaviour during some directing of shot sequence planning, reviewing, and editing. iPad “hijacking” also happened during this time. There is some researcher-to-participant refocusing at the end of this distractive behaviour, but it keeps coming back in fragments until the near end. Naturally, a huge portion was dedicated to reviewing their final footage and editing it.

Yet, the most interesting part of session 6’s end is the last stretch of discussion dedicated towards some critical ideas (Grp. Interact.\Ideas (p2r- group agenda) the participants shared regarding their video’s final agenda. This is particularly interesting because there was no formal facilitation during this discussion, and a closer look into the dialogue (Transcription 8.3) demonstrates interdependent qualities within the group.



Transcription 8.3 Participant discussion demonstrating "interdependence"

Transcription 8.3 reveals a participant-driven discussion demonstrating a true collective desire to finish the video in the best manner possible, and most importantly: *as a group.* They all agree to "leave the trailer as it is" because if "we've done the trailer there's no point in doing the movie now" because "we all know we're not gonna be able to finish the whole thing". Since *Oceana* cannot "come next week", the group concurs to finish it as a trailer only "because it'll look weird with just us three". These comments indicate that they equate their personal success with the group's success (3.2), denoting social interdependence. It is also noted that there are bouts of "R3 Reflections", some "Reasoning" and "Socratic" questions whilst they discuss this, suggesting that in their aims to align their group goals interdependently, they engaged in CT.

8.5.3.2 The problem/decision pattern

As discussed in 7.3, the new proposed CT model suggests that decisions require a host of CT components at work enveloped within a PSS. This section highlights a pattern that emerged in the analysis echoing this notion. Figure 8.5 depicts the codeline for all novel and past problems and all decisions taken throughout Sessions 4 – 6. Novel problems are coded in **red**, past problems in **orange**, and decisions in **black**.

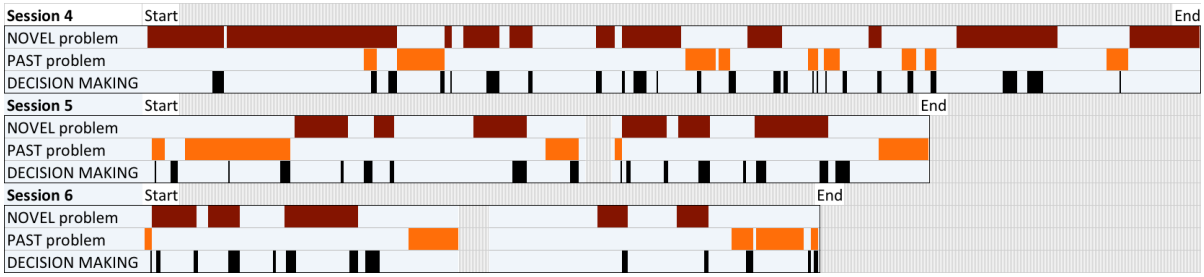


Figure 8.5 Codeline of problem/decision pattern over sessions 4 – 6

The problem/decision pattern (albeit condensed for presentation purposes) reveals a starting point where a problem starts, and an ending point with a decision [usually] at the end. Addressing the novel and past problem theory that novel problems engender more engagement in CT (refer to Willingham, 2008, in 7.3.5), this pattern suggests novel PSS's stimulate more decision making within them, as most novel PSS's indicate a decision made within whereas not all past problems do. However, there were more novel PSS's than past ones, increasing their probability of some decision being made within them. To understand the factors at play within problems and their decisions, it was then decided to isolate this pattern and examine individual PSS's more closely.

Each PSS and its corresponding decision were then given its own unique name in order to differentiate them on the MAXQDA 12 software.

Table 8.17 illustrates each problem and decision made with the names given.

Code System	Segments	Length	Code System	Segments	Length
PROBLEM-SOLVING SCENARIO	**49**	**1113**	**DECISION MAKING**	**57**	**237**
NOVEL problem	27	716	DM-Wide shot	2	3
PAST problem	22	397	DM-Wide shot w/time constraints	1	6
Prob-Add character traits to names	1	14	DM-Dirty shot	2	2
Prob-Assigning groups	1	8	DM-Lighting scene	3	6
Prob-Assigning shooting turns	2	8	DM-Ind. shot w/time constraints	2	8
Prob-Background choose	1	16	DM-Assigning shooting turns	2	7
Prob-Bad shot retake	1	6	DM-Directing character movement	1	6
Prob-Camera mode	1	24	DM-Prop making	2	9
Prob-Camera/Photo mode troubleshoot	3	29	DM-Still shot taking	1	3
Prob-Choosing trailer content	2	34	DM-Perspective issues	2	13
Prob-Directing character movement	1	43	DM-Assigning groups	1	4
Prob-Dirty shot	1	24	DM-Editing clips	2	4
Prob-Editing clips	3	63	DM-Choosing trailer content	2	10
Prob-Fit names in template slots	1	48	DM-Getting into character	2	2
Prob-Girls absent explain	1	53	DM-Time constraint	3	18
Prob-Hairstyle continuity	3	137	DM-Hair/Char/Cont. retake	2	12
Prob-Ind. shot w/time constraints	2	22	DM-Hairstyle continuity	4	19
Prob-Lighting scene	2	31	DM-add character traits to names	1	1
Prob-Movie title choose	1	118	DM-White tab in clip	2	2
Prob-Movie title disagreement	1	33	DM-Approving shot, keep	7	30
Prob-Name arrangement in template	1	25	DM-Bad shot retake	7	17
Prob-Oceana still not understanding	1	9	DM-Camera/Photo mode	4	11
Prob-Perspective issues	2	42	DM-shooting another participant	3	11
Prob-Prop making	2	71	DM-Shooting camera reversed	3	6
Prob-Shooting another participant	2	23	DM-Background choose	1	3
Prob-Shooting camera reversed	2	34	DM-Studio name choose	1	9
Prob-Spellcheck troubleshoot	1	5	DM-Spellcheck troubleshoot	1	1
Prob-Still shot taking	1	22	DM-Oceana still not understanding	1	4
Prob-Studio name choose	1	25	DM-Girls absent explain	1	8
Prob-Time constraint	3	52	DM-Movie title choose	1	6
Prob-White tab in clip	1	9	DM-Movie title disagreement	1	3
Prob-White tab in clip troubleshoot	1	8			
Prob-Wide shot	2	14			
Prob-Wide shot w/time constraints	2	23			

Table 8.17 Code system for problems and decisions

Sometimes there were PSS's enveloping much dialogue that showed great qualities of a rich problem, yet no solution was found within. These problems were coded with a name (Table 8.17) – but lacked a corresponding decision with the same name. Other times there were spontaneous decisions made during a non-problematic event, and these decisions were coded with a name, but with no matching problem. At a quick glance, Table 8.17 shows this mismatched quality: 57 decisions, yet only 49 problems.

8.5.3.3 Problem-solving scenarios (PSS's)

Nonetheless, separating problems by "scenarios" and naming them was useful to see during what activities they happened in, and how CT played into these PSS's. It was also of interest to see if there truly were differences in CT levels between novel and past problems (7.3.5).

The participants, other activities, CT codes and interaction codes involved – were all included in the PSS. The researcher was coded in a different shade of grey to differentiate her text.

"Perspective Issues" PSS

Table 8.18 illustrates the sequence of codes coming into play during the novel PSS of "Perspective Issues" during session 5.

This PSS concerned the participants trying to get their bodies to fit into the frame of the tablet's camera (or screen) without some of them looking bigger, smaller, or blocking each other within the frame. This was done whilst the iPad's camera was reversed so they could record a clip with all of them in frame at the same time.

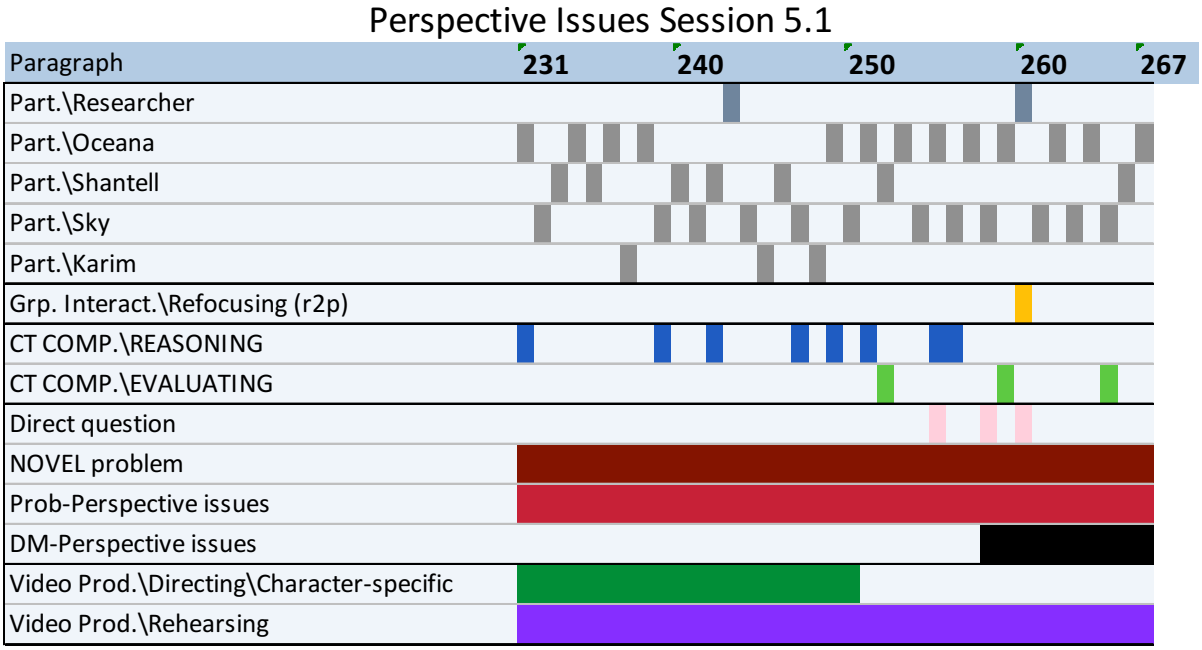


Table 8.18 "Perspective Issues" PSS

Table 8.18 shows how they were directing each other on their specific characters ("Video Prod.\Directing\Character-specific") whilst collectively problem solving. It also appears they were rehearsing their characters ("Video Prod.\Rehearsing") the whole time, and that mostly "Reasoning" and "Evaluation" took place whilst figuring this out. There was some quick researcher refocusing around paragraph 260, but mostly, this PSS appeared to elicit interdependence. Some "Direct questions" and

"Evaluation" towards the end appeared to play into their final "Decision-making" ("DM-Perspective issues").

Transcription 8.4 "Perspective Issues" decision-making dialogue and codes

A closer look into their dialogue (Transcription 8.4) illustrates how their collective decision-making process started with *Sky* asking a "Direct" question and gesturing/showing *Shantell* how to move within the frame so she wouldn't look bigger than everyone else. The "Evaluating" codes can be seen as applied to *Oceana's* and *Sky's* comments about looking "weird" or "small". In the end, *Shantell* is satisfied with their suggestions about how to position herself within frame, and the decision is made to start recording ("All right. Press it. Press it").

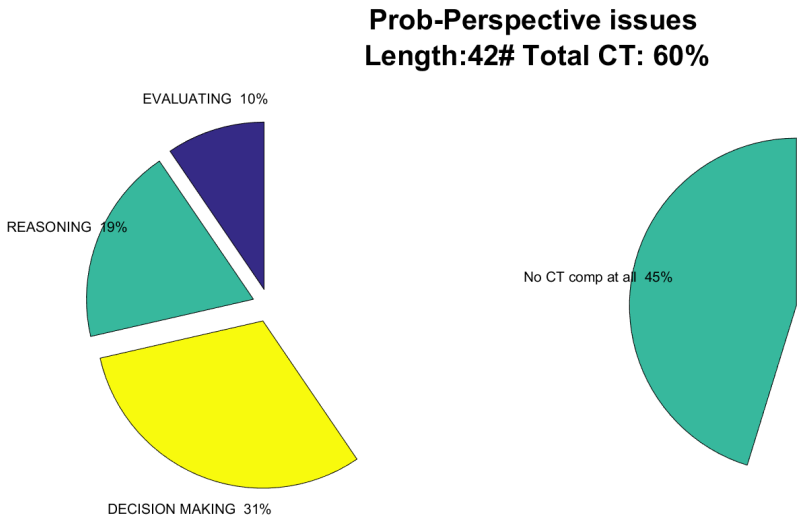


Figure 8.6 CT in "Perspective Issues" PSS

Figure 8.6 illustrates the percentages of the CT components present in “Perspective Issues”. It shows that 42 paragraphs were coded with this PSS and that 45% of these paragraphs did not contain any CT component codes. Over the remaining 55%, three CT codes were applied. Even though there was only 55% remaining of this activity with CT codes, due to some code overlapping the percentage was actually 60%.

“Decision-making” was the largest component at 31%, followed by “Reasoning” and “Evaluating”. This indicates that there was a good amount of dialogue around their collective decision-making.

“Dirty Shot” PSS

The novel PSS “Dirty Shot” (Table 8.19) involved *Sky* accidentally coming out in the recorded clip, thus ruining the clip with her presence in the background.

Dirty Shot (Session 4)

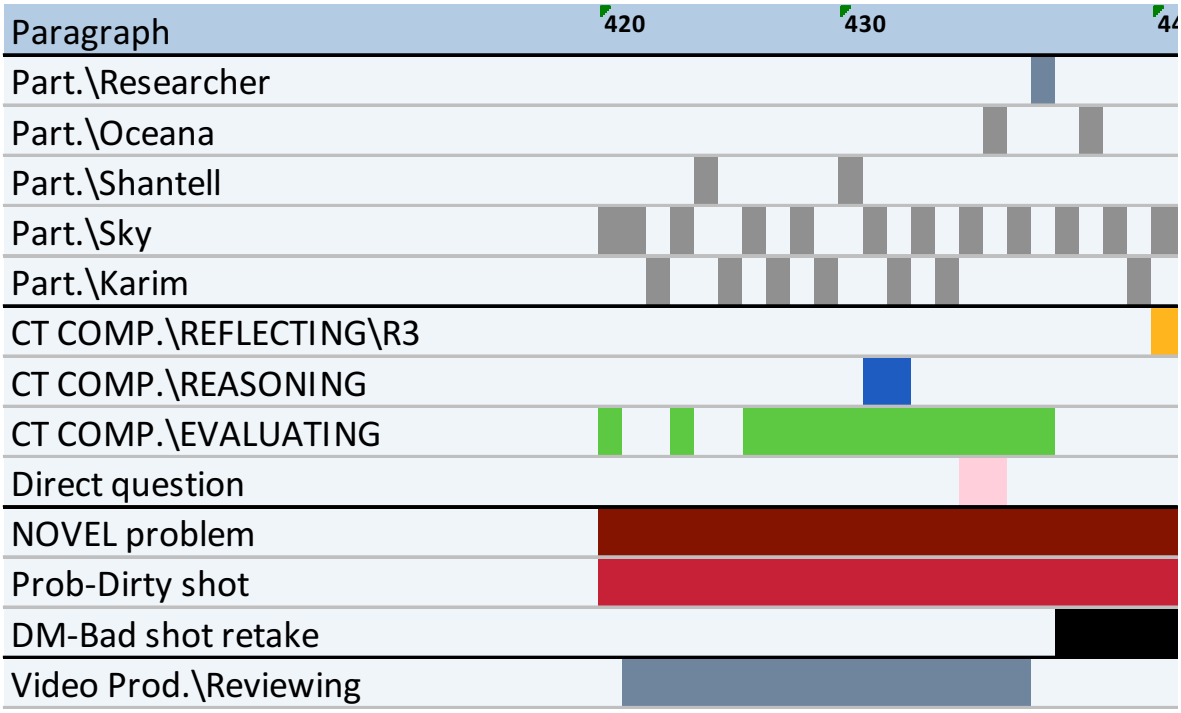


Table 8.19 "Dirty Shot" PSS

The corresponding decision made for the “Dirty Shot” PSS (Table 8.19) was “DM-Bad shot retake” because the decision was to retake the shot in this particular instance. There were other instances however, when there was an old (or repeated) “Dirty Shot” PSS with no decision to retake it. In this particular PSS, it was observed that there was a lot of “Evaluating” directly in parallel with reviewing of the footage, a bit of “Reasoning” in the midst of the problem, and at the end, some R3 “Reflecting” during their decision making.

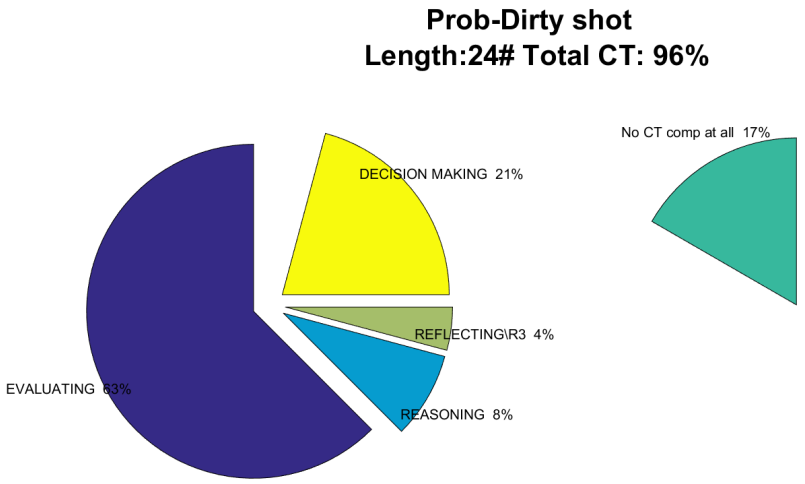
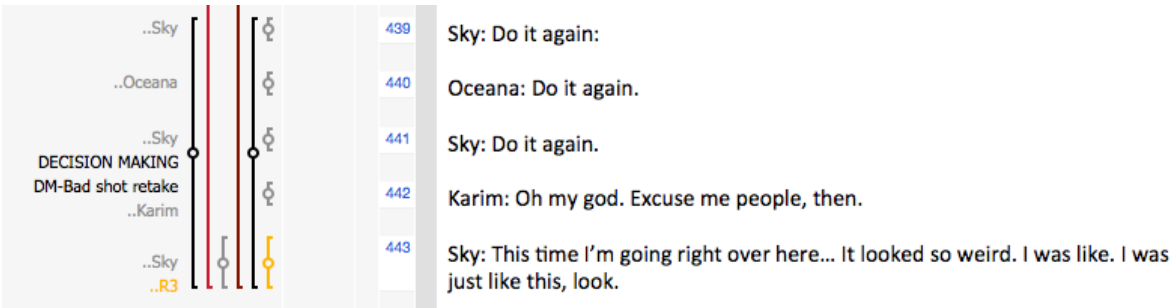


Figure 8.7 CT in "Dirty Shot" PSS

Figure 8.7 shows the “Evaluation” component amounted to 63% in this PSS – likely due to the participants evaluating whether or not to keep the footage whilst reviewing it. The “Reflecting R3” component was a very small amount at 4%, but interestingly, Table 8.19 demonstrates the reflection happens at the end directly in parallel with the decision made.

The dialogue around this decision (Transcription 8.5) illuminates how this happened. Sky’s comment at the end indicates that in the future, she would consciously move out of the way and stand elsewhere because “it looked so weird” and then she shows another participant how she saw herself on the screen (“I was like. I was like this, look.”) Her consciousness of herself and saying she will do things differently in the future because of a past mistake indicated “R3 Reflection”.



Transcription 8.5 "Dirty Shot" Decision-making dialogue and codes

“Name Arrangement in Template” and “Add Character Traits to Name” PSS’s

Transcription 8.6 and Transcription 8.7 present the dialogues and codes applied during these two back-to-back PSS’s.

Transcription 8.6 "Name arrangement in template" PSS and Decision-making dialogue and codes

Table 8.20 presents the sequence, and exemplifies how PSS’s happen successively in collaborative media production on iPads and iMovie, but more importantly, how CT engagement about the video’s topic can take place naturally during production. They are both novel problems, and only “Add Character Traits to Names” was resolved with a decision.

Transcription 8.7 "Add Character Traits to Names" PSS and Decision-making dialogue and codes

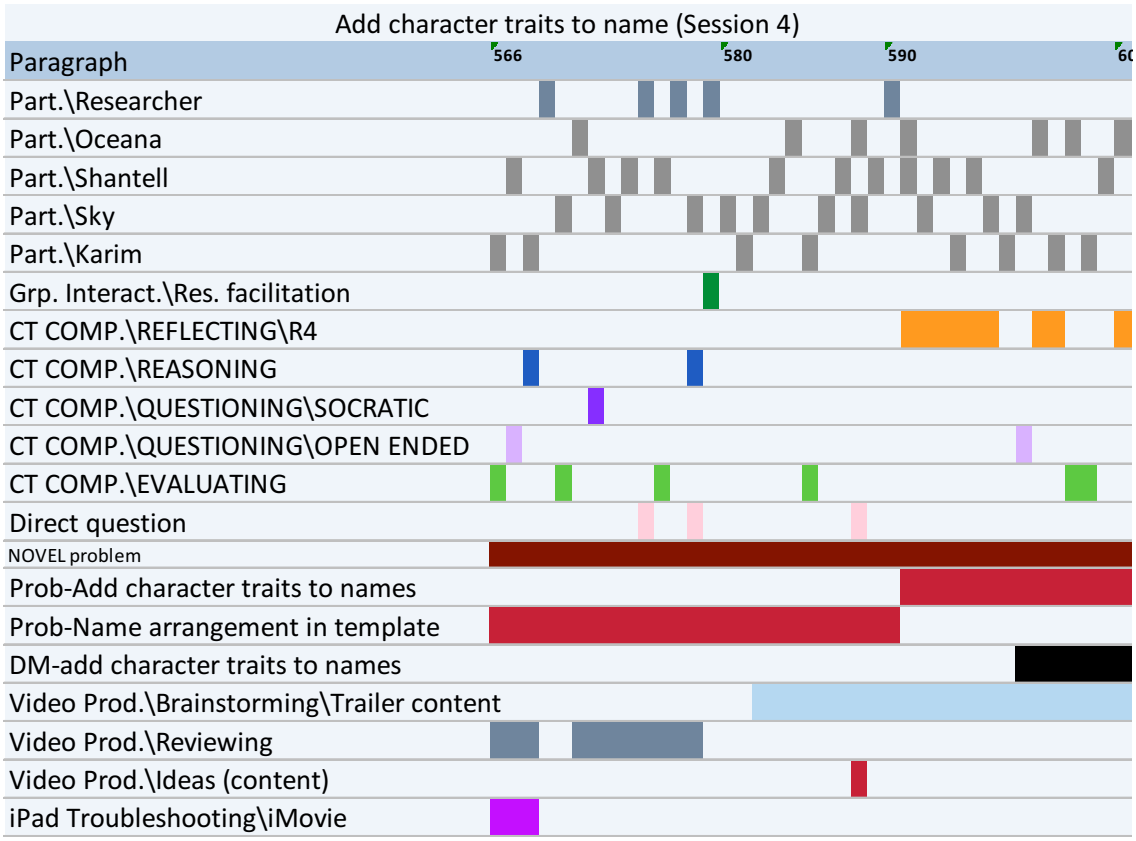


Table 8.20 "Name Arrangement in Template" and "Add Character Traits to Name" PSS

Transcription 8.6 concerned *Karim* realizing that they had not followed the title/name arrangement of the iMovie template correctly, so their clip titles did not correspond with the participant featured in the clips.

Figure 8.8 shows the CT component amounts in this PSS.

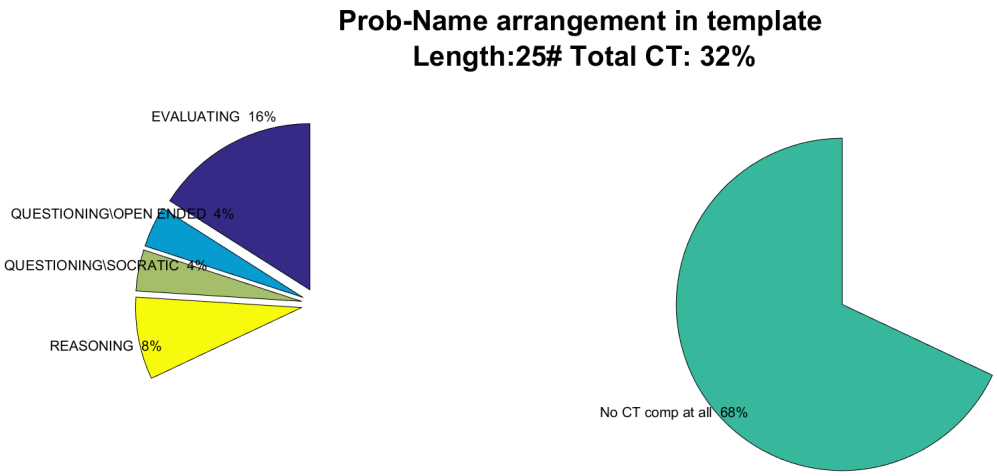


Figure 8.8 "Name Arrangement in Template"

It is noted there were some "Open-ended" and "Socratic" questions, "Reasoning", and some "Evaluating", but 68% of this PSS was not coded with CT components. No decision was reached because the group's focus was completely shifted by *Oceana*, who changed the subject mid-problem with a "Direct" question eliciting a new idea (Video Prod.\Ideas (content)) and engendering a new PSS: to instead figure out what *character traits* to add to their names in the template titles rather than adhering to the ones the template suggested. It can be surmised that they then came to a decision of what character traits to each give themselves.

There are a lot of factors at play here, including some researcher text right at the start of the new PSS and the "R4 Reflection", but the CT component of interest here is that long stretch of "R4 Reflection" taking place at the end. As pictured in Figure 8.9, "R4 Reflection" represented 64% of this PSS.

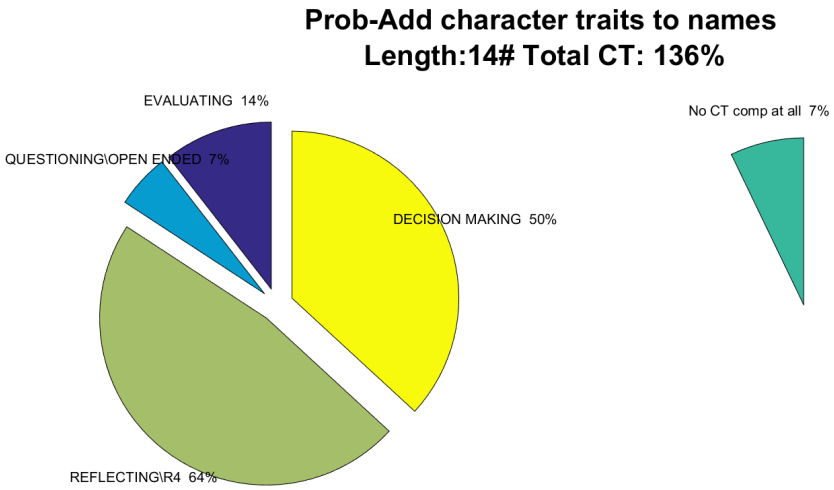


Figure 8.9 CT in "Add Character Traits to Names" PSS

However, for a closer inspection into how this reflection took place and what it was about, it is interesting to look at the dialogue encasing this entire PSS and its decision in Transcription 8.7. It portrays how CT engagement about the video's topic comes about naturally and rather subtly during group production in the form of "R4 Reflection".

It is seen that *Oceana* initiates this new PSS at Paragraph 588 in Transcription 8.7 when she states her new idea: "Oh wait, are you ready? 'Meet *Sky*: The Bossy One" – We could do like that." Following this dialogue along, the researcher's comment appears non-facilitative, rather a simple "Oh yea" in affirmation. After, *Oceana* keeps going with her idea, engages the whole group into it, and completely shifts the focus into a new PSS. Yet, the most interesting part is her reflective comment on paragraph 591 that incites "R4 Reflection" from everyone else successively: "… cause normally in a group, there's one person that normally is the coolest. She'd be 'The Cool One' [to *Karim*]". This provokes "R4 Reflection" in *Sky* who immediately responds "The Shy One" – referring to her own, natural shyness, but going beyond this and associating it with the prototypical "Shy one" often found in mediated social circles. Then *Karim* and *Shantell* follow suit, each reflecting about their own inherent "bossy" and "cool" personality traits.

Oceana is implying how in stereotypical social groups seen in the media, there are normally "types" of people: the "cool one", the "bossy one", and the "pretty" one.

Since their video topic was about how *media can influence body image*, *Oceana* is making direct references to the video's topic of the influence of the media: "You know how there's always, that pretty one"…

This indicates that the video topic's meaningfulness resonates in all of them, as each participant looks into herself and tries to fit her personality into a mediated stereotypical categorical "type" of person to satisfy the topic's purpose. This example shows how one participant's reflective idea can quickly change one PSS into another during collaborative video production, provoking a successive yet subtle train of engagement in reflection amongst the group in an effort to fulfil the aims of the video's meaningful topic.

8.5.3.4 Co-occurrence of critical thinking component codes with activities

Next of interest was to see the average occurrence of each CT component in every activity coded, without any reference to a specific PSS. The average occurrence was computed by dividing the number of intersections of an activity and a CT component, by the number of times the activity was coded. Results are shown in Table 8.21.

	Code System	R3	R4	REASONING	SOCRATIC	OPEN ENDED	EVALUATING	SUM CT	Direct question
Video. Prod	Brainstorming	0,1	0,1	3,0	0,9	2,1	0,8	**7,0**	3,0
	Creation of props	0,0	0,0	3,0	1,0	2,5	1,5	**8,0**	4,0
	Directing	0,1	0,0	0,4	0,1	0,2	0,2	1,0	0,3
	Rehearsing	0,0	0,0	0,5	0,0	0,1	0,3	**0,9**	0,4
	Shooting (action, cut)	0,0	0,0	0,0	0,0	0,0	0,0	**0,1**	0,0
	Acting	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0
	Reviewing	0,1	0,0	0,5	0,2	0,2	0,8	**1,9**	0,5
	Editing	0,2	0,2	0,9	0,4	0,8	0,4	**2,9**	1,2
	Hair styling/ Character continuity	0,8	0,0	3,0	1,8	1,4	2,4	**9,4**	5,6
	Ideas (content)	0,1	0,0	0,6	0,0	0,6	0,1	1,5	0,8
	Ideas (shooting)	0,0	0,0	0,3	0,0	0,0	0,0	**0,3**	0,7
iPad Troubleshooting		0,1	0,0	0,7	0,1	0,5	0,3	1,7	0,8
Screenshotting and Music Selection		0,3	0,3	0,0	0,3	1,1	0,7	**2,7**	0,0

Table 8.21 Average occurence of a CT component in an activity

For better visibility, the lowest numbers have been coloured in **blue**, the mid-range numbers in **orange**, the highest numbers in **red**, and the sum of CT (SUM CT) in **bold text**.

Interestingly, the “Hairstyling/ Character continuity” activity code fostered a lot of “Reasoning” and more expectedly, quite a bit of “Evaluating”. This hairstyling activity had the highest SUM CT score of all the activities.

However, in order to see what the CT components looked like in each whole activity across the three sessions, pie graphs for each activity were plotted using MATLAB. The following are the graphs showing the applicable CT components in each activity, and a brief discussion below each graph.

CT in “Brainstorming”

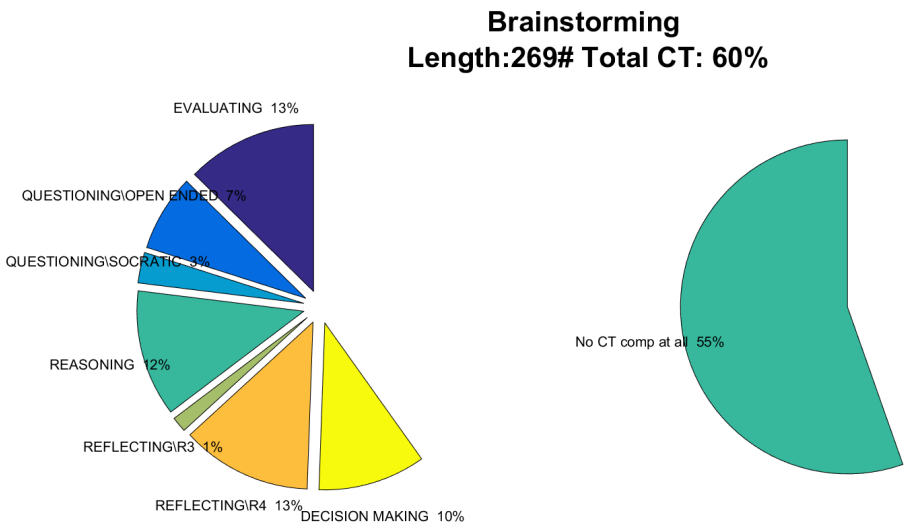


Figure 8.10 CT in Brainstorming activity

Figure 8.10 demonstrates that 269 paragraphs were coded with “Brainstorming”. Within “Brainstorming”, 55% of paragraphs did not contain any CT component codes at all. Over the remaining 45%, seven CT codes were applied; seeing that for these particular graphs, “Socratic” and “Open ended” questions were taken apart as were the two different types of “[R3]/[R4] Reflections”. So, even though there was only 45% remaining of this activity with CT codes, due to some code overlapping the percentage produced by the software was actually 59% (rounded up to 60%)

- Evaluating 13%
- Questioning 10%
- Reasoning 12%

- Reflecting 14%
- Decision making 10%

59% ≈ **60%**

CT in "Creation of Props"

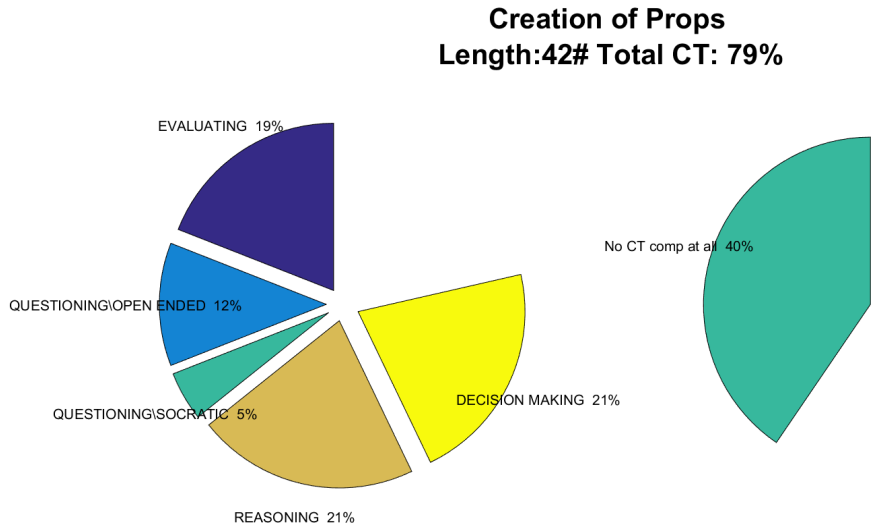


Figure 8.11 CT in Creation of Props activity

"Creation of Props" (Figure 8.11) was coded over much less text (only 42 paragraphs), meaning the activity length over all was short with respect to "Brainstorming", for example. But the total length of CT codes spread apart within this activity represented 79%. This indicates that this activity, albeit relatively short, had a lot of CT codes applied to it suggesting that it well enabled CT.

Interestingly, except for "Reflecting" which is absent in this activity, all CT components (joining both types of "Questioning" together) represent around 20%. This indicates that "Creation of Props" apparently promotes a more or less even distribution of CT components across the activity.

CT in "Directing"

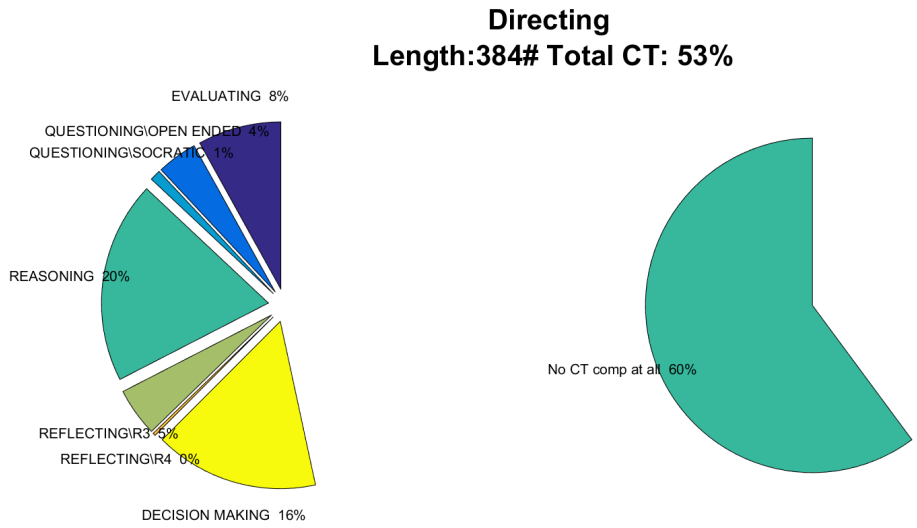


Figure 8.12 CT in Directing activity

"Directing" (Figure 8.12) in this project, was evidently a very prominent activity in video production with a length of 384 paragraphs coded. We can see that the main CT component present in "Directing" is "Reasoning", but there is almost no "Reflecting" at all. Quite a bit of "Decision making" happened during this activity also, as would be expected from a "Directing" activity.

CT in "Editing"

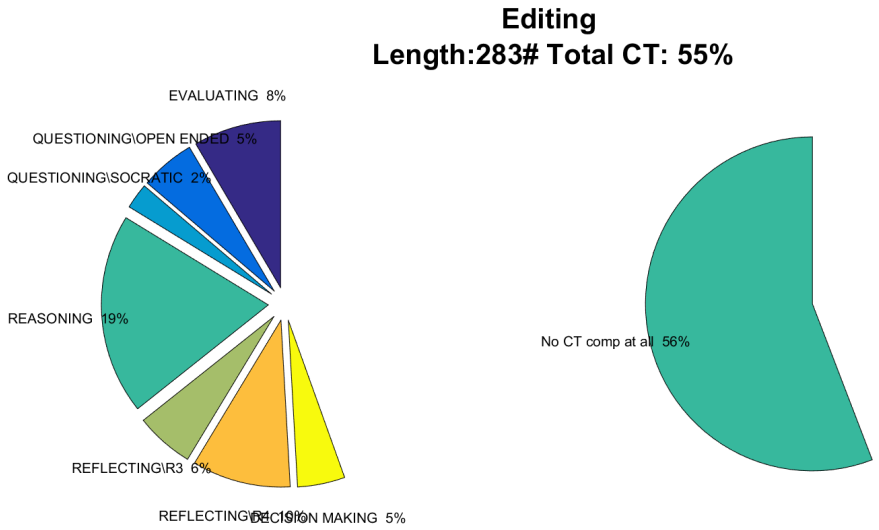


Figure 8.13 CT in Editing actvity

Figure 8.13 portrays the CT components at play during "Editing". This also was one of the main activities (283 paragraphs coded). "Editing" seemed to enable a lot of "Reasoning" codes and quite a bit of R4 "Reflection". There was nearly an

even amount of segments that were coded with CT (55%), and segments with no CT codes at all (56%). This may account for the fact that usually during “Editing”, the participants were *silently* editing; and only spoken text was transcribed and coded. If there was a big activity happening in the background with very little talking taking place, then invariably there were less codes applied during the silence for the lack of text to apply them to. This is one of the limitations of applying codes over dialogue; it is challenging to interpret silence otherwise.

CT in “Screenshotting”

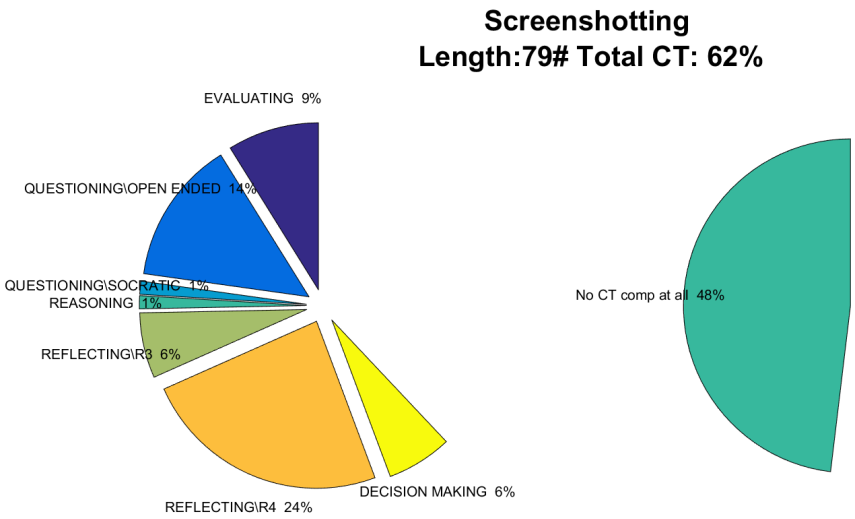


Figure 8.14 CT in Screenshotting activity

Anytime the participants searched the web and screenshot images for their video’s content, it was considered a “Screenshotting” activity. “Screenshotting” is therefore strictly a tablet-based video production activity. It is however worth mentioning because it happens quite a lot, but of course the length of the activity is very short (Figure 8.14).

The most interesting part of this result is the amount of “Reflecting” it generated. “Reflecting” nearly happened half of the time the participants were “Screenshotting”; moreover, it was the more rare, “R4 Reflection” implying reflecting about wider, social issues and contexts (Fleck & Fitzpatrick, 2010). On the other hand, only 1% of “Reasoning” happened, and only 6% of “Decision making”.

CT in "Rehearsing, Acting, and Shooting"

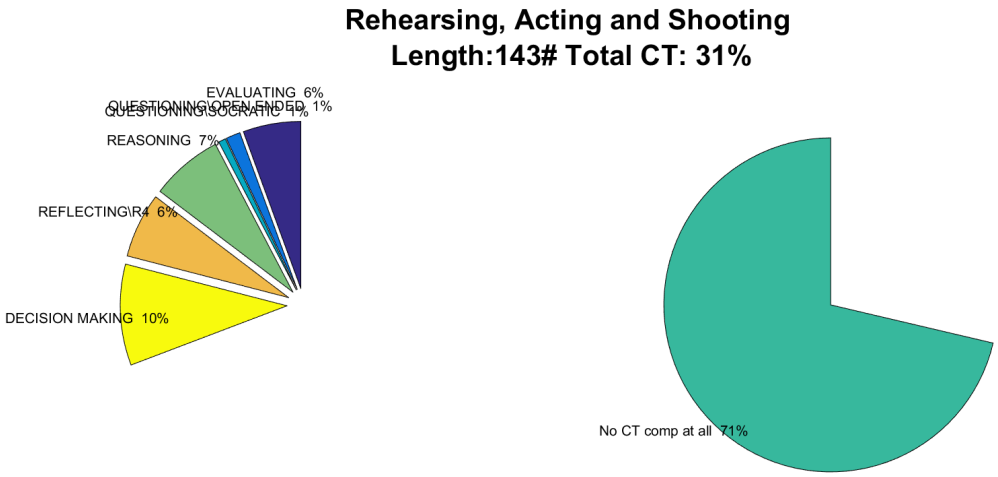


Figure 8.15 CT in Rehearsing, Acting and Shooting activities

It appears that "Rehearsing, Acting and Shooting" (Figure 8.15) did not produce a lot of CT codes. 71% of these activities presented no CT at all, and "Decision making" at only 10% was the highest component.

This is likely due to a couple of factors. The first is that these activities did not require a lot of problem solving, as each participant mostly acted as she wished, rehearsed without problems, and the moments during shooting footage were quiet and non-problematic. This is different than say, right after they shot footage, when they began reviewing or editing that same footage. Secondly, the nature of the video they produced using the iMovie template may also attribute the low CT score: they were non-dialogical clips with music over the footage (like a music video) so their acting in their clips had to be mainly physical expressions, gestures and movements which can be challenging to interpret and code for CT. "Rehearsing" posed the same issue; silent rehearsing and only bodily movements, and of course, "Shooting" in a silent manner (as is usually the case whilst someone shoots a video) inhibited CT codes from being generated. Sometimes there were moments of evaluation, reasoning and reflection during these activities; but it was when the participants were receiving advises and feedback on their performance from other members – yet this was not exactly considered *solving a collective problem*.

But all of this only indicates that shooting a video where the acting is purely physical is difficult to code and analyse for CT – not that the shooter or actor had little to no engagement in CT during these activities. That being, it is easier to identify CT in production when there is spoken text along with actions to analyse.

CT in "iPad Troubleshooting"

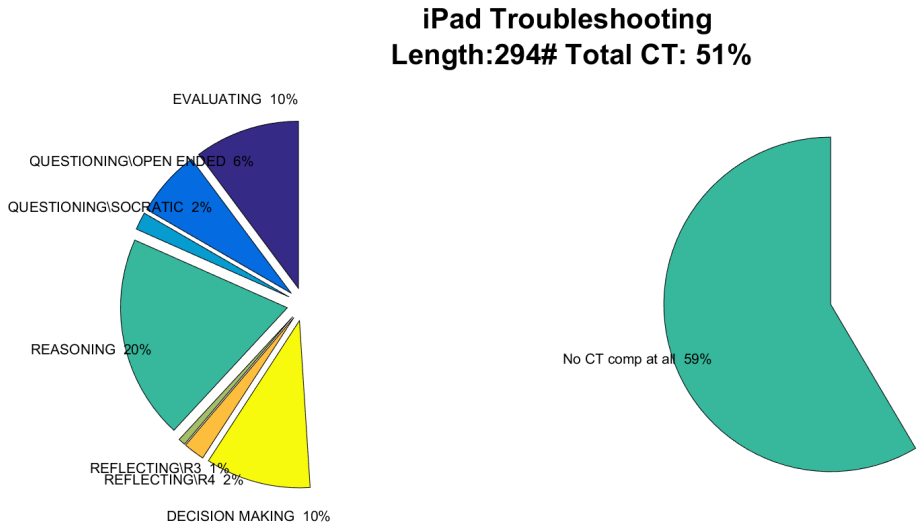


Figure 8.16 CT in iPad Troubleshooting activities

Figure 8.16 presents another activity born out of tablet-driven video production: "iPad Troubleshooting". This activity implicated the participants trying to solve an issue with the tablet, e.g., trying to fit the iPad onto a tripod, or solving any issue with an app (e.g., iMovie), or them "Hijacking" the iPad from another participant to try and solve the tablet issue themselves. iPad Troubleshooting appeared to be a good, mid-sized activity throughout the project with a lot of "Reasoning". It shows that whilst they were troubleshooting they also engaged in "Evaluating" and enabled them to do "Decision making". It was decided to code for this activity due to the amount of time spent working through the particulars of using a tablet to produce a video, and the many facets that came along with it.

Overall, it was helpful to see how the CT components played into each of the video production activities because this ultimately aided in seeing which activities fostered the most CT moments and what factors were at play. Even though the limitation of silent moments that were not coded versus the text that was coded

existed, it was still possible to get a sense of which activities promoted good amounts of CT in this project by looking at each activity individually.

8.5.4 Written reflections and exit group interview findings

Participant-written reflections (Sessions 4 – 6)

This section imparts and discusses the findings of the participant-written reflections (refer to reflections in Appendix D). Initially, the overall findings of the four Y6 participants are considered. This is followed by an exemplary participant's (*Sky's*) reflection log to illustrate coding, analysis, and interpreted findings.

Overall findings across Y6 reflection logs

The comments written in sessions 4-5 were geared towards the practice of producing a group video. *Karim* and *Sky* both "R3 Reflected" about making a collaborative video: e.g., *Karim* suggests that before doing this [group video], she did not know it would be "really hard and not as easy as it looks". *Shantell* and *Oceana* did comment about the video's topic referring to "super models in magazines" not being real and making a new "personality by acting like someone I'm not" for the video's topic. Though it's difficult to tell if *Shantell* mentioned the models as a result of session 4 or 5, we can clearly see that *Oceana* mentioned the video's topic in session 5 as she labelled her reflections according to the session. So, it was found that session 4's comments were limited to reflections about their productive practice, and it appears that session 5 brought about a reflective comment about the video's topic as a result of having participated in session 4.

The session 6 reflection logs represent nearly an even amount of production practice comments versus video topic comments, but have slightly more text about the video's topic. What is most interesting however, is the amount of "R4 Reflection" coded in their comments, and noting that all of these "R4 Reflections" are about the video's topic. *Karim* commented that her group members loved jewellery, and particularly, that the "media influences that a lot". She also listed the different media outlets and content that her group members are influenced by: "*Oceana* is influenced by Daisy's…*Sky* is influenced by My Little Pony". But her

linking of the "media" in influencing her group members "a lot" in their love of jewellery denotes "R4 Reflection", entailing the consideration of the much wider [social] picture in the contemplation. It implies that before this project she did not connect their love of jewellery to the media's influence, moreover, she may have not ever learned that they "love jewellery" and "My Little Pony", or "Daisy's" if it wasn't for this project. *Karim's* comments largely suggest that she learned about her group mates' influential media content, and was able to make that connection between this and how it influences their tastes. *Oceana* also "R4 Reflects" mentioning "how others can be influenced by the media" and gives specific examples, "newspaper, modelling, YouTube, and mainly just the Internet" – all wider, social connections. *Oceana* wrote that she liked "working with the other girls and seeing their point of view on the media". This infers that like *Karim* and *Sky*, she too learned about her group member's tastes by way of collaboratively producing about this video topic. As a whole, session 6's reflections imply critical engagement with the video's topic because of their productive experience in prior sessions.

Exemplary analysis of "Sky's" reflection log

Written reflections were coded and analysed using the prior-mentioned coding frame (8.4.6). This is provided again below (Table 8.22) for reference whilst reading the following findings.

R3 Reflection Revisiting an event/knowledge to compare, re-organise, or to do differently in the present/future, and/or asking questions that challenge, change understanding or practice.
R4 Reflection Social and ethical issues are considered. Much wider picture is considered.
• Blue-coloured comments pertained to the practice of producing a collaborative video. • Red-coloured comments pertained to the group video's topic.

Table 8.22 Written reflection coding frame

Figure 8.17 displays Sky's reflection log, copied directly from her Google doc. Reflections for sessions 4-5 were both done during session 5.

"Sky" Written reflection log

Sessions 4-5

I learned how to AirDrop and that we have to organise carefully and that when making a movie you really have to work together. When we were making the trailer I got used to timing the videos and how to make a picture look like a selfie when it wasn't actually a selfie.

Session 6

I have learned lots in the sessions that we (Dani and me) have been together. The thing I think was the most important part was learning how to, almost cope with one another. We had quite a few moments where we were angry/annoyed at each other and managed to get better at avoiding this

I really liked learning about the others (Shantell, Karim and Oceana) and what media actually is. I didn't know what it was and how much it influenced people until these lessons started. A few examples;

It changes the way people want to look (models in magazines)

It might make you want to learn/do different things (some people might want to be like famous people)

I think the only thing that I didn't like was the beginning when we wrote the things on paper individually. Apart from this, I enjoyed everything very very much!!!

Figure 8.17 *Sky's* written reflection log

Sky's comments in sessions 4-5 (Figure 8.17) are limited to her productive practice: e.g., "I learned how to Airdrop…timing the videos…" etc. Her "R3 Reflection" echoes this production experience: "you have to organise carefully…you really have to work together". This "[R3] Reflection" indicates that she has revisited her past [inexperienced] production knowledge and compared it with the present [more practiced] production experience, and it has changed her perspective for her future group productive practice.

In session 6, *Sky* writes that she "liked learning about the others…and what media actually is…and how much it influenced people". Only *Sky* went a bit more into detail, mentioning that "it changes the way people want to look" and it might make a person "want to learn/do different things". These more detailed comments denote "R4 Reflection" in that she makes social and wider picture connections by giving

specific examples like “models in magazines” and “famous people”. *Sky* also showed a more personal “R3 Reflection” about the practice of production when she commented: “we were angry at each other and managed to get better at avoiding this”. This comment indicates that she has revisited those earlier sessions when they got angry at each other, and compared them to later sessions when they “managed to get better at avoiding this” – all in an effort to learn “how to almost cope with one another”.

As a whole, the development of their reflections indicate that during the earlier production sessions they “R3 Reflected” more on their practice of production, and the last session had more “R4 Reflection” comments about the video’s topic. These findings suggest that once they were able to master the art of collaboratively producing together through progressively gained productive experience (i.e., reach social interdependence), they were able to “[R3]/[R4] Reflect” on the video’s topic more (instead of just production technicalities).

8.5.5 Exit group interview

The following are the segments of text during their exit group interview. This section discusses the analysis of this text which was coded on two distinct levels: (1) what they learned (2) what activities in collaborative production they learned these things in.

Sky: It was fun, and I learned lots of things about her, her, and her.
Karim: What did you learn about me, huh huh huh huh? **Oceana:** You like *KSI*.
Sky: Yea, I learned that about her [*Karim*]. I learned about her [*Oceana*] that she knows the *I’m Blue* song which I totally did not know.
Oceana: I learned how to Airdrop on an iPad. I also learned how body image, like affects… Wait no… media affects body image.
Sky: I [learned that] I like the same as *Oceana*.
Karim: And then she [*Shantell*] likes My Little Pony, and she [*Oceana*] likes My Little Pony, and she [*Sky*] likes My Little Pony.
Shantell: So, I’ve learned that *Sky* loves “Uptown Funk”… And that she [*Oceana*] loves *I’m Blue*.

Transcription 8.8 Exit group interview: "What did you learn?" – Segment 1

Transcription 8.8 illustrates that their responses to “What did you learn?” are mostly referring to them learning about each other’s media content they presented during the project. *Oceana* mentions that “I learned to Airdrop on an iPad” and does make a specific reference to learning that “media affects body image”, but beyond this, all participant responses are saying that they learned about each other’s tastes in media content.

Oceana: Because we got to put our personalities inside the trailer.
Shantell: Inside of our trailer so we know how each of us are cause you know how we did our trailer and we did the “Bossy one”? And those are the real us because I’m sometimes the “Bossy one”, she’s [*Oceana*] the “Giggly one”, she’s [*Sky*] like the “Pretty one”, and *Karim’s* actually like the “Cool one”.
Sky: So can I say what I was going to say? What I was going to say is kind of a bit far back, but when *Oceana* said that people… No wait, it was, how did we learn about each other? I thought that it was because when we downloaded the images and put them into the trailer, we saw each other’s images and then asked them about it like, Karim asked me, “You like *My Little Pony?!*”
Researcher: So you learned about each other through the media images that you chose? **Sky/Shantell/Oceana:** Yea. **Sky:** That’s what I’m trying to say…

Transcription 8.9 Exit group interview: *"How did you learn that? Where did you learn that?"* – Segment 2

Transcription 8.9 shows how the participants responded to the more specific question of, “How did you learn about each other? Where in the project did you learn that?”. Their comments all indicate that they learned about each other by way of two distinct collaborative video production activities: **(1) By creating their own personalities and “acting” them out during their trailer production (2) By downloading their influential media content for the trailer and discussing their choices with each other.**

Oceana: Oh, people copy the media… People copy the media a lot. On the screen.

Oceana: If there was picture of a woman, and it's being made into this weird, woman thing. Then people will try to copy it and it will affect their body because that's not the normal size for somebody to do that.

Oceana: Well like, on a magazine you might see a woman and she looks like, oh my god, like so pretty or whatever, but the thing is-

Sky: So skinny…

Oceana: Yea! but the thing is, is that they just make you look like that on the computer, so they like cut bits out-

Sky: Photoshop it…

Oceana: Yea, Photoshop and then people try to copy that to make themselves look like that but they don't realize that's not a normal size-

Sky: Natural…

Oceana: That's not natural.

Sky: Human beings aren't meant to be like that.

Oceana: So they try to make every single woman be like that by letting other people copy it. If you see what I'm saying?

Transcription 8.10 Exit group interview: *"How did you learn that? Why do you think that?"* – Segment 3

Transcription 8.10 shows how *Oceana* and *Sky* responded to the question of "How did you learn that media affects body image? Why do you think that?" As seen both participants refer to "Photoshop" in "magazines" influencing how people want to look because they "try to copy that to make themselves look like that…"

8.6 Discussion and conclusions

The following section discusses and concludes the results of P2. To begin, engagement in CT during the sessions is examined in light of the activities in video production. After, interdependent collaboration during the sessions is addressed: with a look into all the factors surrounding moments where they collaborated in a positive interdependent manner. Following this are conclusions about the problem/decision pattern, PSS's, and factors at play during problem solving. Then,

their critical engagement in the video's theme topic of "media influence" is discussed: here we see if there was conceptual change of this from baseline to follow-up, how much, and what may have influenced this change. As a last topic of discussion, what the participants learned overall in this project and during what activities in collaborative media production is revealed.

8.6.1 Critical thought during tablet video production activities

It was concluded that "Hairstyling/ Character continuity", "Creation of props" and "Brainstorming" had the highest sum of CT codes appearing inside them (Table 8.21), but it is interesting to examine the varying factors surrounding this.

The "Hairstyling/ Character continuity" activity had five long segments of dialogue coded over 204 paragraphs. This entails that each time this activity took place, it was over long-lasting segments of dialogue (i.e., long discussions). Moreover, their personal desire to look good whilst playing their characters was an impetus to be extra critical about how they appeared on camera – hence abundant interactions concerning their need to play a meaningful character in their video. However, it should also be noted that, during their long dialogues surrounding hairstyling, other activities happened in parallel in the background. For instance, whilst they hair styled, they also edited, brainstormed and troubleshot the iPad (Table 8.12) – all activities also denoting CT engagement.

So, some participants were hairstyling each other whilst others were reviewing footage (likely evaluating it) (Table 8.13). Hence, it made it challenging to know just how much CT activity "Hairstyling/ Character continuity" truly generated on its own without the influence of other activities in the background. This was difficult to separate due to the "seamless" nature of video production (Burden & Kearney, 2016, in 4.2), in that activities can happen continuously and in parallel with one another and even influence each other in terms of thinking and interactions.

Alternatively, "Creation of Props" had just two long segments coded in a total of 42 paragraphs, entailing it was also a continuous activity, but 79% of this activity was coded with CT components making it heavy with CT engagement. Whilst they

created props the participants mainly thought of ideas themselves and used whatever resources they could find in the room. This prompted them to become engrossed in trying to make something suitable or that worked for the scene they were about to shoot. It elicited CT because they openly discussed the purpose of the prop using “Reasoning” and “Socratic” questions and provided “Evaluative” feedback on each other’s props.

The “Brainstorming” activity (Table 8.11) also generated a lot of CT engagement, and is worth examining because even though it did have moments with other activities running in parallel alongside it, there was a long stretch of “Brainstorming” with little to no other activities in parallel. During this particular brainstorming event, the participants were mostly giving their undivided attention to this activity alone. There are small spurts of other activities such as troubleshooting the iPad that surge intermittently alongside “Brainstorming”, but as a whole, this activity is clean in terms of outside CT influence from others. The participants were brainstorming for initial content to put in their trailer and this was at the start of their first production session, so taking into account these factors, they were paying close attention to how to structure their video, how it would be named, titled and what it would be about. It was therefore concluded that their authentic (4.2) interest in the content of their trailer and their contribution to its initial formation was meaningful (3.1) enough to sustain their [mostly] undivided attention to this “Brainstorming” event.

The more quality interactions there are in CL structures, the more CT is likely to happen (Gokhale, 1995, in 3.3.3), and it can be said this was true for the above-mentioned activities: they all had increased levels of CT due to the interaction amount took place (long segments of dialogue whilst activity was happening). The other activities running in parallel made it challenging to determine just *how much* CT engagement each activity contained on its own. However, knowing this might not be possible in a seamless, paralleled-activity framework such as collaborative media production – we can only look at other interactive factors and determine how the *process* took place.

8.6.2 Interdependent collaboration

One of the analytical aims of this project was to determine what activities and factors in collaborative video production prompted more positive interdependence (3.2) in the group, and whilst acting interdependently how they engaged critically. A sequential view of the tables (section 8.5.3.1) illustrated that each session had moments of positive interdependence that were influenced by varying activities, and thus painted a narrative and progressive picture of how it happened. Furthermore, the pie graphs in 8.5.3.4 showed how each activity fared off in CT component codes applied, and how much.

The cross-examined results indicated that the top production activities prompting participants to work more interdependently as a group (without facilitation) were "Brainstorming" and "Creation of props", and that these two activities fared the highest scores in CT (8.5.3.4). Moreover, their very last group discussion (Transcription 8.3) during Session 6's end demonstrated they achieved social interdependence (3.2) and how they engaged critically.

During their first "Brainstorming" activity (Table 8.11), it was observed they worked well interdependently: they were engrossed in aligning their group video's goals (e.g., choosing ideas, titles, characters, settings), and these collective decisions required them to depend on each other without facilitation. Once their "Brainstorming" ended, back came the researcher facilitation (paragraph 147). Moreover, once they understood how to follow the iMovie trailer template with due facilitation (Table 8.11, paragraph 215), they were able to align their group video goals (3.2) during "Brainstorming" without much facilitation. Table 8.12 revealed that non-facilitated "Brainstorming occurred right after some systematic "Reviewing" and co-occurred with "Editing" – signifying how reviewing and editing (evaluating) their footage collaboratively prompted them to regroup themselves in brainstorming ideas about the goals and aims of their video. "Brainstorming" scored 60% in CT (Figure 8.10) making it one of the highest scoring activities in this work. It is surmised that because "Brainstorming" entailed explanations, interactions (3.3.2) and group alignment of goals (3.2) and purposes for the video, it was a breeding ground for the engagement of CT components. It was also a

dialogic activity that was easy to code and visible for research; unlike other more "silent" production activities (e.g., "Screenshotting", "Shooting").

It can then be concluded that even though the "Brainstorming" activity was ultimately effective at getting them to align group aims interdependently, the ease of following the iMovie template and the facilitation at the beginning, were helpful factors. It also helped that they had problems to solve (e.g., issues arising in getting their video started, editing and reviewing) which prompted them to "Brainstorm" interdependently.

At the beginning of session 6 there were a lot of activities overlapping that required no researcher assistance at all, including a large portion "Creation of props" (Table 8.15). Prop creation scored the highest sum of CT at 79% (Figure 8.11). Generally, this more creative activity absorbed them in their prop making, but it was not done in silence rather they interacted about the meaning and purpose of the prop in the context of their group video goals (3.2) whilst creating it. During their prop creation there were little to no other activities running in parallel (Table 8.15), and no facilitation at all. It was therefore concluded that "Creation of Props" was a solid interdependent production activity that generated a high amount of CT engagement in and of itself.

The group's last discussion (Transcription 8.3) observed during session 6 was exemplified to demonstrate how the group had achieved social interdependence (3.2) at the end of the project. This discussion showed they felt their individual success was contingent upon the group's success, and depended on each other for the completion of their video. They made a collective decision about their video's fate on their own accord taking responsibility as a group, denoting interdependence.

As a whole, sessions 4-6 painted a narrative picture portraying that facilitation helped in getting them started in unknown territories, but once they mastered these, they were able to mainly do them alone as a group. Hence, their gained experience aided them in attaining positive interdependence at the project's end, but the researcher's facilitation played a factor in this attainment. Both

“Brainstorming” and “Creation of Props” were linked to interdependence and also scored highly in CT. It was observed that these activities happened around circumstances that pertained to purpose, significance, meaning and goal alignment (3.1; 3.2; 3.3) – and these are thus considered contributing factors in their success.

8.6.3 PSS’s, activities within, and critical thinking

Isolating the problem/decision pattern and examining problems individually as encapsulated “scenarios” within the sessions was useful in reaching a number of conclusions.

The problem/decision pattern (Figure 8.5) concluded that novel problems produced more decisions. Every novel problem had a decision made somewhere within, and some past problems had no decisions made. The individual PSS tables (8.5.3.3) showed that the decision-making process always involved engagement in CT, particularly “R3/R4 Reflection” components. However, this project produced more novel PSS’s than past ones, increasing the probability of novel PSS’s to generate more decisions. So, it can be concluded that novel PSS’s are more *likely* to produce decisions, thus engaging the participants in more CT in novel problems, but past problems are also able to generate decision making, yet less likely to do so.

Though most of the activities embedded in tablet video production’s natural framework elicited successive PSS’s, it was through the *need* to problem solve and reach a group decision/solution that the CT components were put to work. For instance, within the PSS of “Add Character Traits to Names” (Table 8.20), it appeared that “Brainstorming” elicited a lot of “R4 Reflection”, along with some “Evaluation” and “Open-ended” questions eliciting some of that reflection. Likewise as a sole activity, “Brainstorming” (Figure 8.10) had a healthy amount of interplay of CT components (“Evaluating, Questioning, Reasoning, Reflecting and Decision making”), and 60% of the dialogue surrounding “Brainstorming” was coded with CT.

60% CT suggests that “Brainstorming” promoted a higher percentage of CT in comparison to other CT in activity scores, but it was necessary to see the dialogue (Transcription 8.7) surrounding this PSS to understand why. The participants were brainstorming character names for their video based on their own inherent personalities, and they were trying to match these up with personality “types” often seen in mediated social circles (e.g., “the pretty one”, and “the cool one” in the group). These were all personality types they likely have seen in TV shows, or mediated content that shows stereotypical social group “types”. In doing this comparison, they reflected upon their own personalities (and even each other’s) in an effort to represent themselves properly for their group video. All of this took thinking beyond their immediate context, to greater social spheres, and then connecting these back to their personal selves by introspection and “R4 Reflection”. Albeit this was all made possible through the act of “Brainstorming” (making this a great activity in production), the point here is: the *need to meaningfully name themselves* for their video meant a lot to them. It was important, it was personal, and it was meaningful. Therefore, the *meaningfulness* behind this created a *need* to solve this with the due attention it deserved, and consequently helps to answer the question of how personally “meaningful” activities in collaborative production enable CT.

Alternatively, it can be seen how in activities such as “Shooting, Acting” and “Rehearsing” that did not necessitate much problem solving in this project (just having to follow the iMovie template structure) there were fewer CT components at play (Figure 2.1). This brings to mind how the CT component levels may have been different in the results of another video project not done by following a tablet template, for example, where participants necessarily have to be more critical of others’ acting, or in their directing decisions, or during their camera shot composition in order to make a video.

Nonetheless, all this shows is that the *need* to collectively problem solve is what elicits CT: group video production just happens to have a natural framework of activities that promotes PSS’s successively.

8.6.4 Development of critical thought about topic

Results from the concept maps and written reflections gave some conclusions on participants' conceptual development of the topic of "media influence" throughout the project, their developed engagement in CT around these concepts, and an interesting correlation between these findings and their gained positive interdependence.

The concept maps were useful in making both their entry and exit conceptual thinking process visible and assessable in terms of depth and quantity. The comparison of their baseline and follow-up concept maps (8.5.2) showed increased conceptual development of "how the media affects body image, thoughts, and behaviour", with an average increase of 147.5%. A closer look into each participant's saved media content throughout production revealed that they were able to critically engage with this content in the follow-up map by way of "R3/R4 Reflection", "Reasoning" and "Evaluating". The findings concluded that the heterogeneous mix (3.1; 3.3.1) of participant-presented content found on YouTube was what enabled their engagement in CT about the video's topic.

The participant-written reflections were beneficial in gaining a sequential view of their developing critical engagement with the topic and perspectives in their productive efforts as a group, though facilitation was given during these (asking open-ended and Socratic questions) to inspire their writing. Their reflection findings (8.5.4) revealed that the first two production sessions rendered reflections mainly on technical aspects of collaborative production (i.e., challenges in working together, learning to use features of the tablet, and their productive experience). The last sessions demonstrated mostly reflections about the video's topic. So there was a progressive shift from reflection on the productive practice at first whilst they were learning to use the technology and to produce collaboratively, to reflection on the video's topic later when they had mastered the production equipment and group dynamic. This shift also speaks to their gained sense of interdependence exhibited during their last session's discussion (Transcription 8.3), where it is seen that they place their group's agenda first. With this it is concluded that along with

their gained ability to reflect about the video's topic latter in the project, came the gained sense of social interdependence.

8.6.5 Participant learning from this project

Results from the exit interview (8.5.5) gathered conclusions on how and during what activities CT engagement took place in, and the participants' collaborative learning experience overall.

The global response during their exit group interview was that **they learned about each other** and their tastes in media by **(1) by creating their own characters and dramatizing them in their trailer clips (2) by showing each other their media content of influence as they produced and discussed their choices with each other**.

For instance, during the group's exit interview they referred to their character names they created (e.g., "the cool one", "the pretty one", etc.) (Transcription 8.9). *Sky* gave a concrete example of how they learned about each other's content: "we saw each other's images and then asked about like, *Karim* asked me, 'You like *My Little Pony*!?'" As a case in point, *Karim* learned that *all* her group mates liked *My Little Pony* by seeing their downloaded content and asking them about it (Transcription 8.8).

Similarly, *Shantell* learned that "*Sky* loves Uptown Funk" and that *Oceana* "loves *I'm Blue*", making direct references to the videos that these participants chose as influential media content during the project. The group learning that *Karim* liked the YouTube channel *KSI* was because Karim presented this content as personally influential, and showed the group how the swear words influenced her "thoughts and behaviours".

Both *Oceana* and *Sky* mentioned that people are influenced by "magazines" because "Photoshop" can alter "a woman" to look "so skinny…and so pretty" and then people try to copy that… but that's not a normal size". Seeing *Oceana's* and *Sky's* session 6 discussion about "models on the catwalk" (Transcription 8.2) it is

seen where this learning came from. Both their interview responses (Transcription 8.10) and “the models on the catwalk” discussion (Transcription 8.2) make direct references to women, photo editing, thinness, unrealistic body/beauty ideals, and people being influenced by these images – suggesting it was during this time when they learned this.

So, it is concluded that how they learned about each other was by **acting out their characters (meaningful representations of themselves) throughout the production**, and how they learned about each other’s tastes in media content was by **showing each other their meaningful downloaded media content of influence and discussing these**. As a final point, during what activities in group production they learned how media affects body image was whilst they **co-researched about the video’s topic and had reflective discussions on it, with the intention of adding this content into their group video**.

Chapter 9 Discussion of the overall work

This chapter initially discusses the observed dynamic process of critical thinking in a collaborative media production project resulting from and in light of the empirical work across this thesis. This process has been drawn out in an effort to answer the overarching research question: *How does collaborative media production on tablets enable and foster CT?* Following this, a discussion about the analytical approaches and models used to examine CT in this thesis is initiated.

9.1 How does collaborative media production on tablets enable and foster critical thinking?

The gathered observations and conclusions across this work suggest that collaborative media production enables and fosters CT via a multifaceted process comprising some components that echo existing literature, and some derived uniquely from this work. This process is illustrated in Figure 9.1.

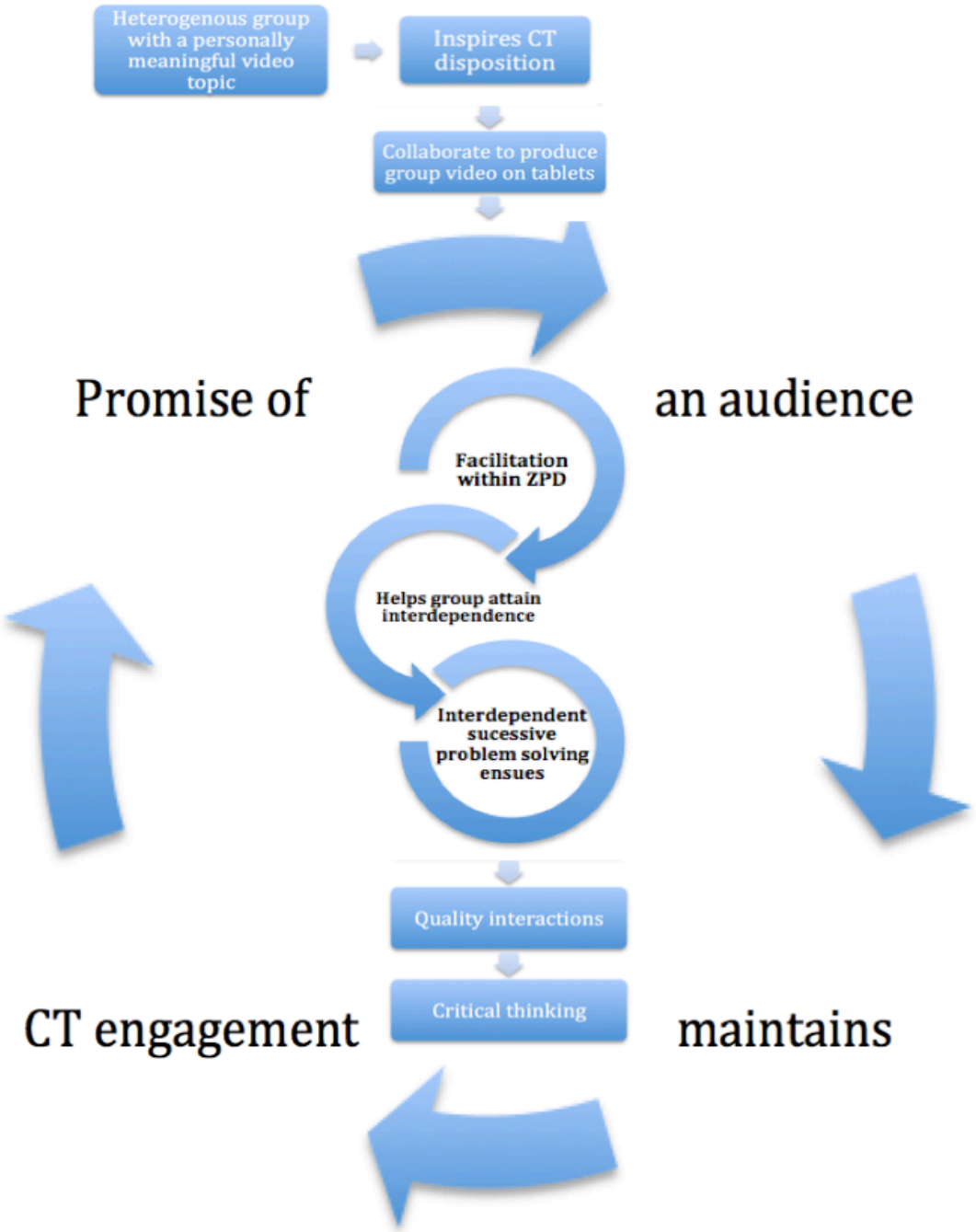


Figure 9.1 How collaborative media production on tablets enables and fosters CT

First, a heterogeneous group (Lai, 2011, in 3.1; 3.3.1) of participant producers is engaged with a common, meaningful topic (Nelson, 1994, in 3.3.3) of the video that is personally significant to each participant. This inspires a CT disposition (Table 2.2), with which they enter the production project. Once they start producing, the promise of a future audience (Burn & Reed, 1999; Coleman et al., 2004; Henderson et al., 2010; Kearney & Schuck, 2004, 2006, in 4.2) and due facilitation (Blaney et al., 1977; Munsinski, 1999, in 3.5) sustain a critical mindset and support

positive interdependence. This outlook sustains the CT disposition throughout necessary to solve the successive problem-solving scenarios engendered by the productive practice itself, in which decisions made collectively and interdependently must be made by engaging in CT.

In light of this process, this chapter discusses each of its facets in sequential order across both projects in this study, making references wherever this work concurs with existing literature, and making distinctions wherever this work offers unique contributions.

9.1.1 A personally meaningful topic in a heterogeneous group

Each analysed group in this research had different relationships with and takes on the media outlets they interacted with, but a unified observation was that the varying *personal* "meaningfulness" they found in the content was what engaged them critically with it. This brought the need to examine: (1) what a meaningful topic actually is in a group video project (2) how their meaningfulness around the topic affected the groups that were analysed (3) the efficacy of this particular work's topic, and (4) why a meaningful topic is fundamental to a group video project where the aim is to engage its participants in CT.

As reviewed in 3.3.3, Nelson (1994) observed that shared contexts and common points of discussion "prepare" groups with a collectively meaningful topic to discuss critically. This work has observed "meaningfulness" in the context of a video topic during collaborative production, and implies more scope than discussing shared perspectives or collective topics. This work suggests that a meaningful video topic is one that will keep the participants engaged throughout the production's entirety because of what it *means to them personally*. Granted, what it specifically means to each participant could be varying different things hence the implication, "full of meaning". Because a meaningful topic can mean so many things on distinct levels to each individual, in a heterogeneous group it can create internal cognitive conflicts (3.1) whilst they share each other's meanings about it. So really, it is the sheer "significance" of these meanings to each participant that keeps the group invested in a one meaningful topic – not necessarily the "meanings" themselves. A

meaningful video topic is therefore one that is universally loaded with varying meanings that are important to each participant, and these differing views may provoke internal cognitive conflicts amongst participants enabling critical engagement in a group setting; but it is the *personal significance* of the topic that sustains the collective interest in it.

P1's G6 relationship with their media content of influence was very peer-driven and lacked varying personal meaningfulness; their media trend likes and dislikes largely depended on what their year group was into at the moment, making their interests mainly homogeneous (a limitation discussed in 10.2). A more heterogeneous mix of participant media content may have prompted more cognitive conflict, and therefore more critical discussion around the topic (discussed in future directions, 10.1).

P1's G7 was unified as a group in that they respected each other's views and worked well together, but this group was more heterogeneous in their presented media content of choice for their video. These differing views provided for more depth and reflection in their production, prompted more critical discussions on it, and as they worked well together, they were able to compile their personally significant content well into one purposeful and *meaningful* video.

During P2 in London, it was observed that Y6 had varying tastes and takes on media influences and they had more culturally diverse backgrounds, but each child was comfortable with their own media identity (e.g., creating their own personal character name, "the cool one, the shy one…" etc.). They enjoyed sharing their personal differences with each other, breeding a more heterogeneous atmosphere with critical discussions and engagement.

The topic of "media influence" was a good one in that it provided a lot to think about on many levels, *but only to those heterogeneous groups who were ready grasp its concept* (a limitation discussed in 10.1). This goes back to the notion of the ZPD and Piaget's notion of cognitive conflict (3.1).

Therefore to conclude, this work uniquely proposes that a meaningful video topic that bears *personal significance* to each participant in a heterogeneous group setting is vital to a collaborative media production project where the aim is to develop CT.

9.1.2 Critical thinking disposition

The CT disposition (Table 2.2) is deemed necessary (Bailin, Case, Coombs, & Daniels, 1999; Beyer, 1995; Chaffee, 1992; Facione, 1990; Halpern, 2002; Kurfiss, 1988; Mertes, 1991; Norris & Ennis, 1989; Paul, 1992; Watson & Glaser, 1991) in this type of thinking. This work suggests that having a personally meaningful video topic and ensuring enough heterogeneity in the participant group are fundamental steps in inspiring a CT disposition to enter the project with.

At the end of this research it was gathered that perhaps it was not age itself that affected some groups' CT disposition and production capacity, rather it was their experience with (Heyman, 2008, in 3.3.3) and their basic grasp of the topic that enabled the CT disposition to begin with. For example, *Crystal* in London's Y5 group was aged 9 and had a basic understanding of the topic's concept and worked well on the video, albeit she worked alone mostly as her group members did not collaborate well. G4 in Mexico was aged 9-10 but all had a hard time concentrating because they weren't mentally ready for the topic's concept of body image, and this affected their motivation to produce the video. Both of these groups were aged similarly and even though most of these participants did not understand the topic, *Crystal* did, and was disposed to engage with the video's topic and motivated to produce. So, this work cannot conclude that age was a definite factor in initiating a CT disposition, rather that the individual experience around the topic contributed to it. It can be gathered that age will likely affect one's experience level in a concept, but as seen with *Crystal*, this is not always the case. Had both of these groups in Projects 1 and 2 chosen their own meaningful topic to all involved, perhaps they would have been more predisposed to think critically.

In sum, this work concurs with Heyman (2008) that the CT disposition is not age-driven, rather experience-driven.

9.1.3 The framework: collaborative media production on tablets

This research reiterates that video production is a "seamless" (Burden & Kearney, 2016, in 4.2) natural and authentic framework (Henderson et al., 2010; Kearney & Schuck, 2004; Shewbridge & Berge, 2004a, in 4.2) that enables CT engagement (4.1). However, this work has particularly observed this framework on mobile device production, and has distinctively observed that it isn't the activities themselves that enable it; rather the *need* (i.e., CT disposition) to solve the successive problems (PSS's in 8.5.3.3) entailed in group production to make collective decisions for the video. The framework itself provides all the opportunities and scenarios possible for this to happen. In other words, it is a breeding ground for CT so long as the necessity to solve the problems exists. This necessity comes about by having a meaningful group topic to begin with, and is directly allied with their individual CT disposition, so the "need" to problem solve is tied to each participant's personal investment with the topic.

The groups that demonstrated reflective engagement with the topic across this study (Mexico's G7 and London's Y6) also indicated they were conscious of who their audience was, and this motivated them to produce with more intention and purpose. For example, G7's completed video showed elements of being structured purposefully (6.6.3) for its audiences, and was made with the intention of critically engaging said audience (Image 6.21). *Benji* expressed this notion of a promised future audience in the exit questionnaire (Transcription 6.8) and his response embodied the driving force of his group. Y6 also produced with the intention of a future audience in mind – other children. They asked who would watch their video once completed and when they were told that possibly other child participants in similar studies, they fashioned a clip in their trailer titled, "*A story for the kids"* (Appendix D), with images of children watching movies and of kids in general. They wanted children to be able to relate to their movie, so they put extra thought into gathering meaningful images that best suited that audience to captivate them.

The "promise of a future audience" is a term uniquely coined from this observed research, and is entrenched in the video production framework. In individual participant video literature, an authentic audience is regarded as one of the driving

forces maintaining its producer critically invested in their content (Burn & Reed, 1999; Coleman, Neuhauser, & Vander Zwaag, 2004; Kearney & Schuck, 2004; 2006, in 4.2). When participant producers are aware that others will view their video, their endeavour to achieve a quality and purposeful production that conveys the message they intend to deliver is ever present throughout the entire production. This affects every selection of footage, every performed clip, every edition made. This research has exclusively observed the process of *how* [the manner in which] this "promise" engulfs collaborative production from the moment the group begins producing: how their intended audience is referenced upon during production, and kept in mind until the project's end.

9.1.4 The facilitator's role

The whole of this work resounds that the facilitator's role is crucial in terms of assisting with new activities within the ZPD (3.1), in moderating structure and interactions (Dillenbourg, 1999, in 3.5; Garrison et al., 2001a, in 3.3.3), in facilitating positive interdependence (Blaney et al., 1977; Munsinski, 1999, in 3.5), and enabling CT by modelling visible thinking (Facione & Facione, 1996; Matthews et al., 1995, in 3.5). However, this work uniquely observed *how* the researcher/facilitator role played out *during specific activities in collaborative video production on tablets* (8.6.1) in the context of interdependence.

All sessions were carefully designed to engage participants in co-researching first, and then production. They all contained methods that made participant thinking visible for research, as well as made the researcher/facilitator thinking visible in order to model CT to them. Though both projects observed this role, the facilitator's role was examined for correlations with group interdependence during P2 (8.5.3.1), and more uniquely during P2, the facilitator's role was observed during particular tablet production activities (8.6.1).

Both projects benefitted from increased levels of CT engagement from facilitation by using the methods of CA (3.4). The researcher-written prompt used in P1's G6 skits (6.5.5) was the variable involved in this group's CT engagement with the video topic. G7 also engaged critically with the use of a prompt in one of their skits (6.5.5).

Written prompts also helped P1 participants learn interviewing skills (Image 6.7). In London, the participant-written reflection logs were useful in gathering thoughts about their learning and thinking (8.5.4), and the concept maps made their conceptual thinking visible and aided in providing context for the myriad of media content saved on their iPads (8.5.2). Both projects benefitted from modelling of difficult tasks and concepts, scaffolding within the ZPD, and exploration work in co-researching their topic on the web. Articulation approaches were used to get them "thinking aloud" and Socratic and open-ended questions were asked throughout both projects during focus groups, assessments and production sessions. Using the iMovie trailer template app was beneficial for collapsing the production process for both groups as it allowed them to get straight to production right after a brief overview modelling how to use it.

In terms of facilitating structure and interactions in the context of a group video project, Mexico's G4 was difficult to contain, moreover it was challenging to explain the concept of body image to them without feeling like they were being led in a certain direction in thinking (i.e., being influenced by the researcher's concept of body image). G6 was the complete opposite in conduct: they worked diligently and acquiescingly. Yet, it was difficult to gauge how much of the video's topic they really did understand, or how much of it was just quite literally, just "agreement" (with each other and the researcher). London's Y6 was also full of intermittent distractions, as the distraction codes in the analysis showed (8.5.3.1). In fact, sometimes the London groups came to sessions having completely forgotten what the video topic was about (see session 6 in Table 8.15): a phenomenon believed to be due to them not taking their own tablets home thereby disabling them to sustain immersion in the topic (e.g., BYOD in Mexico, see 6.6.4). Limitations and future directions for these research design topics are given (10.2). In all regards, facilitation to refocus and moderate distractions in such instances was key.

In sum, the researcher/facilitator played a fundamental role in getting the group started and helping within the ZPD (3.1), but played a less-important [nearly non-existent] role during certain production activities (e.g., "Brainstorming" and "Creation of props" in 8.6.1). The researcher/facilitator moderated session

structure, distractions, interactions, modelled CT and facilitated interdependence; however there were some limitations, and future directions are offered (10.3).

9.1.5 Interdependent group problem solving

As group problem solving was not foregrounded into P1's analysis, only the conclusions in P2 can address this component more specifically. However, the overall experience across this research indicates that all the groups of analytical focus invariably problem-solved relying on each other in order to produce their videos. The extent of this for P1 is unknown, but the fact that they cooperated amongst themselves is known. They took footage home and worked on it on their own accord, they interviewed others outside the sessions, and coordinated with each other to edit and set tasks to get the video done. They helped each other with iMovie and their shared iPads when needed without needing to be told to do so. Even though how much of this happened and how is not known, the fact that it did happen remains unchanged.

Therefore, in the context of problem solving, this work's unique contribution was the examination of factors (e.g., interdependence, decision making) and extent of CT within the problem-solving scenarios (PSS's) embedded in group video production activities (8.6.3). The documented session notes and the observed experience through the whole of this research suggest that interdependent group problem solving and decision making *does* happen with a personally meaningful topic in place along with due facilitation in collaborative video production.

9.1.6 Critical thought in group video production

This research started as an exploration of CT that progressed into a more informed and specific examination into the cyclical and continuous process of problem solving and group interactions during collaborative media production on tablets. The lack of a unified CT paradigm in the literature made it challenging to start searching for it, but it also left open possibilities to explore different methods of facilitating, identifying and assessing it. In other words, it was necessary to go through the uncertainty of P1 in order to get to the specificity of P2. That being,

both projects revealed critical engagement in their production, but on distinct levels and modes.

The findings suggest that both G7 in P1 and Y6 in P2 engaged critically with media content and uniquely demonstrated *how* they developed this engagement because of their participation in this research. G7 responded in their exit questionnaire that they learned about how the media influences people and gave specific examples, for instance, Jordan reflected on the role-playing they did in their skits: *"you are actually living the things that people do and you understand why they do it",* (Transcription 6.8) – signifying what aspect of the project invoked reflection. Their video also pointed to reflection and critical engagement about the topic. These can be traced back to their initial focus group session before they produced (6.5.2), where the same participants only had a basic understanding of the topic.

In P2, Y6 had a 147% average increase in conceptual understanding of the topic because of their production on it (8.5.2). They showed elements of reflecting about each other and their collaborative experience in production (8.6.5). It was revealed that co-researching heterogeneous media content and discussing it, as well as acting out scenes for their video playing characters meaningful to their personas were what helped them reach CT engagement.

In conclusion, this research echoes that CT is what happens during quality interactions (3.3.2) in heterogeneous group (3.1) problem solving, but distinctively observes this in a collaborative video production on tablets, and recognizes that it must be a *personally significant* video topic to each individual. This work also distinctively proposes the process (Figure 9.1) of *how* CT happens in collaborative production through the effort to make collective decisions to bring solutions to the continuous problem-solving scenarios in group production, and this process is a unique contribution to existing CT literature as well as participant-producer video and media literature in its own right.

9.2 Analytical approaches and CT models employed in this work

The use of qualitative content analysis (5.3.2) provided a rigorous yet flexible approach to the varying data sets collected across this work, allowing triangulation with the quantitative steps of analysis integrated in its method (Kohlbacher, 2006, in 5.3.2). Both projects deductively sought for events (Zack & Tversky, 2001, in 5.3.1) in video footage that struck as the CT phenomenon taking place (Hsieh & Shannon, 2005, in 5.3.1), and both applied each of their respective CT framework and model components to these events, sub-events, and micro-events. However, each project's distinct framework and model, as well as data sets, summoned two entirely different analytical experiences.

The different CT models in each project are representative of this work's developing nature. As there isn't a formal CT paradigm in the literature (2.2), P1 began with Bloom's revised taxonomy (Anderson et al., 2001) as a framework to identify and analyze CT in empirical work in the context of an education research study (Gokhale, 1995, in 3.3.3). Bloom's pyramid provided a point of departure into the identification of HOTS in research (Bradley et al., 2008; Garrison et al., 2001a) as HOTS are considered signifyers of CT (2.3). In sum, the use of Bloom's revised taxonomy was simply a starting point in this work due to the absence of an otherwise straightforward CT framework in the literature, yet its initial use enabled the need to get more specific in P2, with a developed, more informed CT model and methods.

Though Bloom's taxonomy posed limitations (2.3), the methods to identify and assess CT development in P1 posed several shortcomings as well (6.6.4) This brings to mind the question if whether or not Bloom's taxonomy could have simply been applied to the more specifically analyzed production sessions in P2. The answer is that Bloom's framework would have still lacked "reflection", "problem solving" and "decision making" – all components in P2 which led to the deeper examination of personal, more "meaningful" reflections ("R3"), wider [social] picture reflections ("R4"), and the discovery of PSS's and decision making within. This isn't to say that PSS's would have been overlooked with Bloom's framework in P2, just that perhaps their detection might have been less straightforward without looking

for a “problem solving” component. The same can be said for “decision making” and “reflection”: looking for the former facilitated the problem/decision pattern (8.5.3.2), and seeking the latter enabled a closer examination into the different levels of reflection and their implications in participants’ CT engagement.

The more specific analytical aims in P2 led to the coding of every relevant production event’s dialogue with the new, hypothesized model’s CT components (7.3). This provided for a distinct coding experience than P1, where the majority of the dialogue came from assessments. Coding the dialogue around their productive practice enabled unpacking the problem-solving process, and this examination into PSS’s in the context of CT components was original in its class. Ultimately, these developments in analysis helped to more specifically address the research questions, “during what production activities” and *how* the process of CT engagement took place.

It has been surmised that the problem-solving process involving P2’s new framework came into play during group media production as illustrated in Figure 9.2.

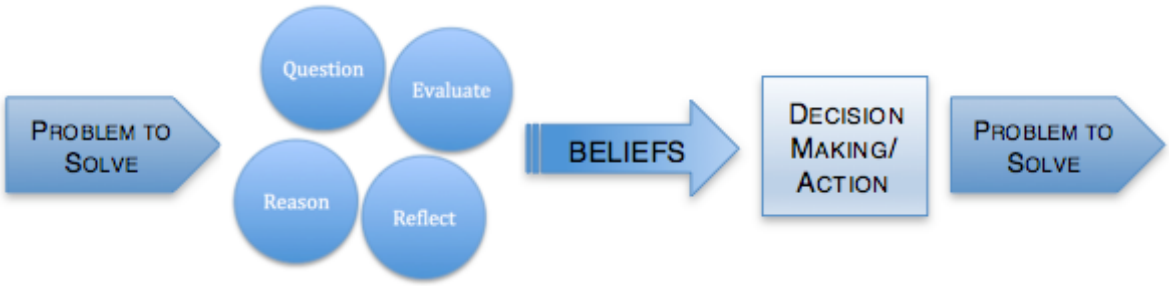


Figure 9.2 Problem-solving process and new CT model

Solving a problem may involve reflection, reasoning, questioning and evaluating in conjunction with each other (but in no particular order) which then leads to beliefs which subsequently guide a course of action (or a decision made) supported by these beliefs (7.3.6). Then, the process begins again with another problem to solve (Figure 9.2). This creates a thorough process of “thinking leading to doing” that can be traced back to any or all of the CT components working together to formulate a decision. The idea is that having the CT components at work whilst collectively making a decision enables the *best* decision to be made because the

beliefs (and ultimately the decisions made) will be supported by reason, logic, and relevant criteria. This problem-solving process was observed during P2's analysis, and serves as another unique contribution to help inform *Third Wave* CT literature.

Nonetheless, even though the development of approaches in the analysis of CT are one of the hallmarks of this thesis, there were still observed limitations in P2 which are discussed, and future directions given (10.5).

Chapter 10 Overall limitations and future directions

This final chapter addresses the overarching limitations of the whole work, and gives future directions directly below each point.

10.1 Meaningfulness of video's topic

Across this research, the topic of "media influence on body image, thoughts, and behaviours" was not meaningful to every group across this study, to such levels that it otherwise diverted their attention limiting their ability to work (e.g., G4 and G6AB in P1 and Y5 in P2). Observations indicated that this topic was not within these groups' ZPD (3.1), therefore their lack of experience (Heyman, 2008, in 3.3.3) with it bore no significant "meaning" (Nelson, 1994, in 3.3.3; Ten Dam & Volman, 2004, in 3.1) to them. As a result, they weren't ready to discuss the topic critically (Bailin et al., 1999, in 3.3.3), and consequently to engage critically with it. So, whilst it can be said that this work's overarching topic was meaningful to some, it was not meaningful to all.

Giving a meaningful topic

If the project must follow a certain assigned topic (e.g., water pollution in India) then it is advised to have the participant producers co-research the topic beforehand and find the aspects of it that strike them as most *personally* meaningful to them. If a precise topic doesn't have to be given to them, and the project's sole purpose is to elicit the CT process, then perhaps simply asking the children: "What problems of the world do you want to solve?" and allow the group to brainstorm and choose one problem that bears personal significance to each member is recommended. Asking each member to write down what they personally find meaningful about solving this problem would be helpful. They would then develop one video around this.

10.2 Research design

Group heterogeneity in video production projects

P1's G6 worked together brilliantly and acquiescingly, never questioned the project's aims nor argued about anything, and worked without qualms to finish their

video on time. They aimed to be unified in their media content choices, choosing content that was currently trending in their grade group (Image 6.10) – with little to no discussion nor sharing of perspectives. It was found that researcher probing and prompts were necessary to get any critical discussion from them (G6 in 6.6.2) and curiously, some questionnaire answers (G6 in 6.6.1) displayed homogenous perceptions. The predominant homogeneity in their group was surmised to have limited their ability to critically engage with the topic (6.6.3) and project's concept, as there wasn't enough cognitive conflict (3.1) around their media tastes nor personal perspectives to stimulate opposing views and critical discussion (Limón, 2001; Webb, 1991 in 3.1).

Directions for Heterogeneous group formation

Criteria must be clearly delineated to schools/teachers without sounding like certain participant "types" are being excluded; e.g., statements of what participant types the research *is* seeking, as opposed to what it's *not* seeking. The already-known differing views of each individual participant on the production's topic can be helpful; e.g., one participant only likes heavy metal music and another participant only likes hip-hop. The teachers and parents, to some extent, can bestow this information. A brief participant-candidate questionnaire asking specific questions about perspectives and tastes can also be useful. If the topic is not pre-set or individual views are not known, then a mix of genders, cultural backgrounds and age differences are recommended to increase likelihood of heterogeneity.

Session design for mobile device video production group projects

Both projects established that extensive "pre-production" session activities were not necessary, and can limit otherwise precious time spent actually producing (Group age and session plan in 6.6.4; Focal data in 8.5.1).

Suggestions for session design

One session of introduction and preparation should suffice, but not more is needed if they are following a video production template app. It is advised to start immediately with the trailer (if a trailer is planned) and let the app guide the process,

then facilitate as needed. They may co-research and gather content as they go along.

BYOD vs. supplying participant devices

P1 showed the challenges of participants bringing their own devices (BYOD in 6.6.4). P2 demonstrated the loss of attention to the video's topic from week to week, and their non-usage of previously saved media content towards their video believed to be due to participants not using their own tablets (8.5.1; Table 8.15). P2 fully disconnected from the project each week, unlike P1, who was able to stay with and edit this content around the clock. Notwithstanding, it has been concluded that BYOD presents more limitations than benefits in a children's research project.

Directions for mobile devices in a young children's video production project

In order to keep control of data, it is crucial to provide assigned iPads. Moreover, not every child will have access to or even own a mobile device, which may limit the study. Assigning devices means more time spent on re-explaining the topic every week, but it is a worthwhile endeavour. One helpful suggestion is to allow children to be spontaneous in their ideas and content selection, so long as it is within the concept's range. Mobile device culture can breed this air of spontaneity naturally in young children. Young participants using a borrowed device each week may come with a sense of "starting over" at every session, but this is normal behaviour that should be expected (even embraced), and time must therefore be allowed to refocus them back on the topic as needed.

10.3 Researcher facilitation

During fieldwork in children's group research projects, there is a fine line between letting the participants "be" and stepping in to facilitate course or action when distractions and interactional quality start to affect session status and data collection.

Being a group of children feeling privileged enough to participate in an exclusive study away from normal class time and teachers to produce on iPads was irresistibly distractive to the majority. Not understanding or finding

"meaningfulness" in the concept, and the fact that they were young children [prone to distraction], were sufficiently distractive factors. Distractions limited some groups' ability to work (e.g., G4 and G6AB in P1 and Y5 in P2), and became so common that P2's distraction codes became a foregrounding element. Interactional quality suffered in these groups, and as a result, relevant data were compromised.

Using CA methods (3.4), the researcher modelled CT (Facione & Facione, 1996; Matthews et al., 1995, in 3.5) to enable critical engagement, interactions (Dillenbourg, 1999, in 3.5) and interdependence (Blaney et al., 1977; Munsinski, 1999, in 3.5). Yet, this only helped those groups that found the topic personally meaningful, with sufficient experience in it (Heyman, 2008, in 3.3.3) to grasp the concept. Moreover, the facilitator's more direct interventions in P1 (e.g., presenting Bloom's pyramid and CT videos) were found to be a contributing factor in G6's eerily similar notion of CT, thereby limiting otherwise unadulterated participant perceptions.

Directions for facilitation

This work suggests facilitative CA methods in order to make thought processes visible in children's collaborative projects to see if/how they are engaging in CT. It is important to withdraw the facilitation as methodically as possible, i.e., try to limit it only to moments [concepts] within participants' ZPD, and when necessary for the collection of relevant, visible data. The researcher/facilitator must therefore embody a delicate balance of mediator of thought processes and interactions, a neutral observer, and data keeper. In children's projects, supervision is required, in fact they will expect it just as their teacher or any adult would supervise.

10.4 Assessment methods

It was concluded that P1's assessments were limited in gathering data about how CT happened in production and the extent of it, and P2's assessments addressed these limitations. P1's focus groups and exit questionnaire for example, did not give results about how their conceptual and CT development of the video's topic unfolded, what factors surrounded this, and the extent of development from start

to finish. P1's videos, albeit helpful for assessing depth and scope of CT engagement within the context of "creativity", did not answer the question of how and during what activities it happened in because their footage/content was kept in the participants' own iPads and therefore untraceable for research. Thus, the development of assessments from project to project was crucial in answering the research questions.

Suggestions for assessment

If the aim is to assess for engagement in and development of CT about a concept, then concept maps, written reflections, and focus groups around the topic are suggested with baselines and follow-ups. If there is time, teaching children how to draw relationships between prepositions and concepts (Novak & Gowin, 1984, in 7.2.1) is advisable, as this will provide the relationships between concepts and allow the scoring of these. If session time is limited (as in this research), then using the adaptation conducted in this work can provide conceptual growth, and critical development by analysing with a CT model. Written reflections at each session's end are useful to provide a more ongoing type of assessment to track individual participant development throughout production, and help pinpoint factors surrounding the development. Asking specific questions during focus groups is important, but taking care not to lead or influence participant thinking. For instance, asking Socratic and open-ended questions about the concept can gather whatever critical thoughts the group has to offer on the concept.

10.5 Analysis of critical thinking

As P1 didn't examine PSS's nor analyse participants' productive practice, it was limited in its ability to offer conclusions about the problem-solving process and CT engagement within. Hence this work is limited to P2's conclusions about the problem-solving process in production. Although every endeavour was made to address P1's shortcomings with developed methods and analysis, there were limitations in P2's analysis of CT: these are discussed and following are future directions for each.

Overall, this work only coded text and visible activity; but CT is more intricate than this as it is a "thought process" happening inside one's head. Facilitation and CA

methods enabled visible thinking, yet it was a catch 22: the very act of effective facilitation alongside CA approaches influenced participant CT levels, so it was difficult to tell how much they thought critically on their own without these facilitative factors.

In this respect, coding silence was difficult and coding thought processes occurring inside their heads (e.g., during editing, screenshotting, acting, and shooting) was impossible. Plus, it was challenging to video record [pan in] on all their tablet activity, whilst asking questions encouraging them to "think aloud" (3.4) without interrupting/distracting them from task (e.g., could not interrupt them to see how they were thinking whilst shooting). It was difficult to code these silent activities overall, and this posed limitation in gathering more detailed data about the critical thought process.

P2 then recognized the challenge of coding with the "seamless" nature (4.2) of video production activities. It was observed that various activities and thought processes could be going on in the background, e.g., two participants could be "reflecting" on the video's topic, whilst two others are "evaluating" whilst editing and reviewing. This made it challenging to know when an activity truly began or ended, thus limiting the ability to give more precise conclusions about the extent of CT in one whole activity without the influence/presence of other activities running in parallel.

Recommendations for analysis of the critical thought process

Using CA methods will invariably spike up participant CT levels in the results, but is necessary if the aim is to gather a *visible* thought process for research. One suggestion is to make a clear distinction between researcher-facilitated events, and events that did not include facilitation. Even though minimal facilitation will still gradually influence CT engagement as the group builds on shared meaning, sectioning off facilitated events for comparison with non-facilitated ones can provide for interesting analysis.

To address coding silent activities, it is recommended to note every silent activity in the session and ask participants open-ended questions about their thought processes during these particular silent activities immediately *after* every session (e.g., during a focus group, or written reflection). This can help to fill in these otherwise “silent activities” with useful data collected about what thoughts took place in them.

If the aim is to understand the thought process in each whole video/media production activity (e.g., shooting, editing, brainstorming) without the influence of other background activities, then it is recommended to conduct each activity separately and examine it in the context of PSS’s. For instance, the session could start with a brainstorming event for content and titles – enabling the clear marking of start and end to this activity. Then, a shooting event could ensue where problems about camera focusing, timing, device handling, and framing are observed. There could be various shots done during shooting for example, but it would be limited to participants’ video-recording only (i.e., no playback, or “reviewing”). Separating the activities as such may help to better understand the thought processes occurring in each, but it may pose other limitations such as the hindrance of creative flow and making the production session feel choppy and unnatural.

If the aim is to examine CT in video production as a whole activity, then embracing the continuous nature of it is essential. Asking very specific questions at the end of each session can help clarify participant thoughts and better serve to answer research questions, for a more practical example. Finally, as critical thought in children’s groups has been observed in this work to necessitate examination as a process, then approaching it as such considering the contributions of this thesis can help with its analysis.

10.6 Afterword

As an afterthought emerging from the reflection ensuing this work, it is worth mentioning how the situatedness of this particular research has impacted the

conclusions and therefore raised the tentativeness of the new, hypothesised CT model presented.

Firstly, this work took place in two very specific situations: (1) two private schools in Mexico City where the researcher was familiar with some of the students and teachers at the schools (2) a publicly funded south London school where the researcher was a complete stranger. These two entirely different research sites, along with the use of iPads (the Mexico schools being BYOD) and iMovie, the possibly different [cultural] interpretations of the "video topic", each group's take on what was "personally meaningful", and the teacher-turned-researcher herself (as a research instrument) – have all contributed to the overall conclusions emerging from this work. Situatedness, then, highlights the significance of noting that these conclusions are invariably a result of these particular research conditions, and that the scope of their reach may be limited to these situations. It also highlights the importance of researcher reflexivity; for example in this work, the researcher's previous teaching background coupled with her unique relationship with each participant and the distinct setting of each session, resulted in observations and interpretations that were shaped by these actual situations. It can therefore be said that the outcomes of this work are unique to this work's situation, and may be used as a point of reference or even inspiration, but are not absolute pretensions, nor universally applicable facts. The places, the researcher, the participants, the interactions and relationships within whatever unique situations the research might find itself in – must always be accounted for in the results.

As a following point, reflecting on the situatedness of this research has raised the awareness of the tentativeness of the new, hypothesized CT model presented. This model was a result of the researcher's driving aim to unify and to somehow devise a representation of this type of thinking. It was an attempt to use all resources at reach in critical thinking literature, and synthesise these to make a model for critical thinking that could be used in research. So, it was this work's particular situation and research questions that drove such an endeavour, and this model should be used tentatively within these contexts. Furthermore, this model could [and should] be refined as Third Wave literature evolves and grows, and as

future researchers bring forth their own driving questions to the forefront. For example, some questions pertinent to both research and practice might be:

- Questioning the role of emotion in critical thinking
- The role of video production in enhancing empathy
- Collaborative video as an instrument to media literacy
- The role of personal significance in group problem solving and social change
- Using mobile devices in team problem solving and classroom activities
- The role of metacognition in critical thinking

These are just some questions that could suitably follow this work, and where this thesis could provide some initial reference, insight, inspiration and ideas. Ultimately, what is paramount here is to *keep asking questions*, thus continuing the "pursuit of meaning and truth" (Elder & Paul, 1998; Paul & Elder, 2007; Wisdom & Leavitt, 2015), and and in doing so, continue to do our part in upholding the oldest-known principle of critical thought.

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Appendices

Appendix A – Ethics

This section contains all required forms and information sheets given to all schools, teachers, parents and participants throughout this work. Since all participating teachers in Mexico's Project 1 spoke Spanish (but not all spoke English) the teachers received written information about the project, and then signed and completed a consent form in Spanish. In London, all forms were in English as all teachers, participants and parents spoke English.

At the end of the researcher's oral presentation given to the entire classroom of the participant teacher, the researcher handed out information sheets and consent forms to all children (and their parents) interested in participating. They were then instructed to complete and return these to their teacher as soon as possible for consideration in the project.

Each consent form was tailored to the specific participant candidate. For example, teachers and parents received a consent form meant for adults, yet in clear, non-academic language so they could understand the scope and purposes of this study. Children received consent forms with much simpler explanations tailored towards young children, yet clearly explaining what they would be doing in the study.

Teacher information sheet – Project 1

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Información sobre esquema del Estudio

Este estudio es parte del proyecto de la investigación:
El Desarrollo del Pensamiento Crítico en Niños a través de La Producción Colaborativa de un Corto Metraje

Tema del corto: "La influencia de los medios en las percepciones del imágen corporal"

Danielle Marie Melgoza [redacted]

Este estudio se dedica a poder explorar y mejor identificar cómo se desarolla el pensamiento crítico en la producción colaborativa de un video, y cómo el tema del video puede entablar a niños en el pensamiento crítico.

A través de pláticas, entrevistas, encuestas y la creación de un corto metraje hecho en iMovie, los niños participantes compartirán sus experiencias sobre el tema del video, con el fin de mejor entender como hacer un corto en colaboración puede impactar su pensamiento crítico.

Los grupos serán entre 4-5 niños de la misma edad, y las sesiones serán de una hora.

Parte I.

Discusiones y preparativos: Sentados en un círculo se harán presentaciones y se abrirán los temas mencionados de una manera democrática y objetiva. Se establecen las reglas de conducta y respeto durante el estudio, y nuestra meta, que es crear un corto metraje en el iPad con iMovie colaborativamente. Delimitamos los temas con respecto a los contenidos en los medios que más nos influencian, y que más nos interesan trabajar en el corto, y exploramos las maneras en que los vamos a exponer de una manera efectiva.

Parte 2.

Producción del corto metraje. La meta es producir un corto/documental de 5 minutos que explore y exponga los temas sobresalientes.

Parte 3.

Discusiones finales, entrevistas:

¿Cómo afectan los medios nuestras percepciones sobre nuestro imágen corporal?
¿Como nos ayuda la producción colaborativa a pensar críticamente?
¿Qué aprendimos en éste proyecto?

Después de esta plática sigue una breve encuesta final.

Consent of participation – Project 1

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Información y Formulario de Autorización para Proyecto de Investigación

Tema: **Desarrollo del Pensamiento Crítico en Niños a Través de la Producción Colaborativa de un Cortometraje**

Objetivo/pregunta:	*¿De qué manera se desarrolla el pensamiento crítico en niños jóvenes a través de la producción colaborativa de un cortometraje sobre el análisis de la influencia mediática en el imagen corporal?*
Población y muestra:	Niños y niñas Edades: 9 a 13 Grado: de 4º a 8º (4-5 de cada grado) Maestros de grupo Inglés y Español
Metodología y análisis de resultados:	Enfoque mixto: en su mayoría cualitativo Técnicas de investigación: a) Encuesta: al grupo total de alumnos participantes (por escrito) b) Análisis de contenido: cortometrajes elaborados por los alumnos (grabaciones, edición y guía de cotejo) c) Observación: de los alumnos realizando su cortometraje (grabación, intervención de la investigadora en orientaciones mínimas y de reflexión). d) Entrevistas con los participantes
Lineamientos de la investigación:	• Autorización previa de los participantes (alumnos, padres de familia y maestros) • Conducción del estudio en español o inglés • Se utilizarán seudónimos (para todos los participantes) • Uso de iPads • La investigación no tiene el fin de emitir juicios críticos o de valor sino obtener una descripción del proceso que permita contestar la pregunta del estudio • Puesta en común (reflexión y seguimiento) por parte de la investigadora cuando surja algún tema que ponga en riesgo el bienestar del alumno participante; en comunicación constante con las autoridades (siguiendo el código de ética de la BPS, British Psychological Society) • Compromiso de los participantes hasta finalizar el estudio; sin embargo, si en algún punto no pueden continuar, pueden optar por salir del mismo sin consecuencia
Participación de: Maestros	• Autorización para que los alumnos participen en los espacios y tiempos programados con anticipación
Participación de: Alumnos	• Participar de manera voluntaria en las sesiones programadas. • Actitúd y conducta colaborativa durante las sesiones de trabajo • Elaboración de su cortometraje
Participación de: Padres de familia	• Permitir la participación de sus hijos • Permitir el acceso a Internet y el uso de dispositivos móviles (iPad o iPhone)

YO

(Nombre Completo)

En mi función de: ( ) alumna/o ( ) maestro/a ( ) padre de familia ( ) otra/o participante

Entiendo que puedo pedir información y hacer cualquier pregunta sobre este estudio en cualquier momento. Queda entendido que la investigadora, Danielle Marie Melgoza, usará los datos recolectados en publicaciones escritas, publicaciones de conferencias, y páginas de web para el propósito de este proyecto.

(Firma)	(Fecha de hoy)

(Fecha de nacimiento : (mes/día/año)

Gracias,

Danielle Marie Melgoza

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Child information sheet – Project 1

Leading education and social research
Institute of Education
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Investigadora: Danielle Marie Melgoza

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Información para Niños Participantes

Este proyecto es parte de la investigación:
"El Desarrollo del Pensamiento Crítico en Niños a través de La Producción Colaborativa de un Corto Metraje

Comprendo que trabajaré con un grupo de estudiantes en mi grupo para hacer un corto-metraje de 5 minutos con iPads y iMovie. El tema del corto sera sobre cómo nos influencian los estereotipos, imágenes corporales e ideales de belleza en television, Internet y otros medios. Quizás se requiera que partícipe en juegos de roles durante la grabación como hacen los actores, o entrevistar a personas y grabarlas. También participaré en entrevistas con la investigadora y discusiones con mi grupo – que serán grabadas – y completar una encuesta. Comprendo que el video que harémos podría ser mostrado a otros estudiantes participantes para que puedan ver lo que hemos hecho, y aprender de ello. Mi nombre verdadero jamás será expuesto, y usarémos seudónimos para proteger nuestras identidades.

Entiendo que mi participación es voluntaria, y me comprometo a terminar el proyecto, pero si por alguna razón no puedo, entonces puedo retirarme sin consecuencias. También, que cualquier información personal – como mi identidad – será confidencial. Finalmente, entiendo que puedo hacer preguntas sobre este estudio durante cualquier momento y abiertamente.

Si deseo participar, tengo que firmar un formulario de autorización y mis padres también tienen que firmar otro.

Estos dos formularios se los entregaré a mi maestra/o firmados y completados lo antes possible para poder ser considerado para este proyecto.

Teacher information sheet – Project 2

I

Information Sheet for PhD Study at Clapham Manor, Years 5 & 6

A bit about the researcher: Danielle Melgoza is a research student at UCL/IOE and comes from a primary school teaching background. She has taught years 2, 4 and 5 in a bilingual ESL environment teaching English in Mexico City. Danielle received her Bachelor's in Mass Communications at UC Berkeley and then her M.Ed. in International Education from Endicott College. She is interested in the ways media production can spawn learning across diverse social issues, in particular, how collaborative projects in education aid in critical thinking.

Objective/Question:	*How does critical thought develop in young children through the act of co-researching, role-playing, and producing a short video about the media's influence on body image, beauty ideals, thoughts and behaviour?*
Sample / Participants:	**Participants** Ages: 9 - 12 Years: 5 & 6 (4 participants from each year, per group)
Methodology:	Mixed Methods: primarily qualitative Research Techniques: a) **Concept maps to assess thought process** drawn [on paper] by the participants in baseline and follow-up interviews with researcher facilitation b) **Written reflections** after each session [on iPad's Google doc app], to reflect on the events of that session c) **Observation and video recording sessions** of child participants during the study and their process of production. There may be researcher facilitation with some aspects of production, iMovie and iPad use, and general progress of the session, however it is endeavoured that the participants take a central role in their production d) **Video-recorded group interviews** of each group at the project's end
Study Guidelines:	• Previous-signed consent of all participants involved is required • Pseudonyms will be used for all participants • Use of iPads by child participants (provided by researcher) • The researcher isn't looking for any "right" or "wrong" patterns of interaction, but to see how and if production helps them engage in critical thinking, as well as how critical thinking about the video's topic develops because of production • It is understood that if any information of concern is drawn to the researcher's attention, that after due consideration it will be disclosed and handled in the appropriate manner following ethical procedures of the BPS (British Psychological Society) • Commitment to participate in a collaborative study; but if at any point during any of the sessions you/your child would like to stop taking part, you/they can
Teacher Participation	• Consent, access to and support with students and their participation time slots and some facilitation with choosing the participant groups
Child Participation	• Voluntary collaborative participation during the programmed study sessions • An interest in the subject of media, or media production • Has worked on iPad (iMovie skills will be essential to the group) • Is able to miss portions of class to participate
Parent Participation	• Permission for their child to participate • Permit the use of iPads, internet use, image downloading, and media researching in a controlled environment and with the researcher's supervision during the study

Teacher consent form – Project 2

This project is a part of the study
The development of critical thought by collaboratively producing a short video about the media's influence on body image

Researcher	University
Danielle Marie Melgoza, research Student XXXXXXXXXXXXX	UCL/ IOE Dept. of Culture, Communication and Media 20 Bedford Way, WC1H 0AL London

Consent Form for Teacher of Child Participant

I understand that some students in my classroom will participate to make a 5-minute video in collaboration about the media's influence on body image, thoughts and behavior. During the production they may be asked to role-play or act out scenarios much like actors in a play or interview others to create a unique documentary, but if not, they can also choose to be behind the camera or participate in another helpful way to make this video. As their teacher, I will give the researcher access to my students, facilitate in group formation per the participant criteria, and help coordinate schedules for sessions. I recognize that my participation in this study is voluntary, and am free to withdraw at any time during the study without consequence. I also understand that any personal information resulting from this project will be confidential and that my name will remain anonymous in all publications. I realize that I may ask for further information about this study at any time.

I have read the Information Sheet about this study ☐ (please tick)

I agree to take part in the above-mentioned activities ☐ (please tick)

Using a pseudonym, I give consent for video/images of myself to be used in (please tick any that apply):

Written publications ☐ (please tick)

Conference presentations ☐ (please tick)

Project web pages ☐ (please tick)

Teacher's Name	
Signature	
Date	
Year/Group Teaching	
Email	

Thank you, for your participation. Looking forward to working with you and your students! ☺

Parent information sheet – Project 2

This project is a part of the study:
The development of critical thought by collaboratively producing a short video about the media's influence on body image

Researcher	University
Danielle Marie Melgoza, research Student XXXXXXXXXXXXXXX	UCL/ IOE Institute of Education Dept. of Culture, Communication and Media 20 Bedford Way, WC1H 0AL London

Parent Information Sheet

This project aims to look at how critical thought can be fostered in young children as they co-research and collaborate to produce their own short video. The video will focus on mediated body ideals that are aimed at their age group, and content found in: Internet, television, cinema, magazines, books and music. Of interest is understanding how and if by co-researching and producing this video, it promotes the critical thought about these issues, and, if this experience enables and supports critical thinking.

This study will take place at Clapham Manor School, for one session per week. The sessions will run 1 hour, from October – November 2015. During these sessions your child will work with three other participants in a group of their same year to produce a short 5-minute video about: *How does the media affect body image, thoughts and behaviors?* They will each use an iPad provided by the researcher to record and edit in iMovie. They will use pseudonyms throughout the entire project to protect identities.

Your child may be asked to role-play and record, interview others about these topics, and download necessary images, music and other media to compile for the video. They will be asked to write reflections, participate in interviews, draw cconcept maps (with the researcher's help) to organize thoughts, and to collaborate as a group to produce their video. These sessions will be video-recorded as it difficult for the researcher to capture all that is seen and heard and the interactions amongst them. The researcher isn't looking for any "right" or "wrong" patterns of interaction, but to see how and if the production of their own unique video helps them think more critically, and what about.

Data from the study will be used for research and teaching purposes only. Your child's name or personal details will not be given to anyone outside the project. Sometimes we like to use some images, video or quotes given throughout the study for academic presentations or publications or project web pages, but all names in our reports, publications and presentations will be changed. All information, images and video will be kept in a safe place and password-protected. It is understood that if any information of concern is drawn to the Researcher's attention, that after due consideration it will be disclosed and handled in the appropriate manner.

We hope that your child will enjoy taking part in this project and talking to the researcher, but if at any point during any of the sessions you/your child would like to stop taking part, you/they can.

Thank you, please feel free to contact me with any comments or querries at any time ☺

Danielle Marie Melgoza

Parent consent form – Project 2

This project is a part of the study
The development of critical thought by collaboratively producing a short video about the media's influence on body image

Researcher	University
Danielle Marie Melgoza, research Student XXXXXXXXXXXXXX	UCL/ IOE Dept. of Culture, Communication and Media 20 Bedford Way, WC1H 0AL London

Consent Form for Parent of Child Participant

The participation of your child in this study is voluntary, and may ask the researcher any questions at any time. Your child's real name will not be connected to the research results or released to anyone outside the project.

It is understood that if any information of concern is drawn to the researcher's attention, that after due consideration it will be disclosed and handled in the appropriate manner.

I have read the Information Sheet about this study ☐ (please tick)

I agree for my child to take part in the research activities outlined in the information sheet ☐ (please tick)

Using a pseudonym, I give consent for video/images of my child to be used in (please tick any that apply):

Written publications ☐ (please tick)

Conference presentations ☐ (please tick)

Project web pages ☐ (please tick)

Child Participant's Name	
Parent's Name	
Parent Signature	
Date	
Email	
Tel.	

Child information sheet – Project 2

This project is a part of the study:
The development of critical thought by collaboratively producing a short video about the media's influence on body image

Researcher	University
Danielle Marie Melgoza, research Student XXXXXXXXXXXXXX	UCL/ IOE Institute of Education Dept. of Culture, Communication and Media 20 Bedford Way, WC1H 0AL London

Child Participant Information Sheet

This study will take place at Clapham Manor School, for one session per week on Mondays. The sessions will run 1 hour, during October – November 2015.

I understand that I will work together with a group of three other students in my year to make a short, 5-minute movie about the media's influence on the body and beauty ideals. To make the video I may be asked to role-play or act out scenarios much like actors in a play, or record and interview people like a documentary, but if I don't wish to be in front of the camera, I can also choose to be behind the camera or participate in another helpful way to make this video. I will research the Internet, download images, choose music, edit, and decide what will go in our video with my group, and the editing with be done on iMovie on an iPad that the researcher gives me. I will participate in recorded sessions with my group and the researcher during the production and about this topic, draw a "Spidergram" with the Researcher's help, and write one reflection per week after each session. I also understand that this video may be shown to other participants in this project so they can see what we've done and learn from it, as well as colleagues of the researcher and academics who are interested in this subject. My real name will *never* be used, and I will be allowed to create my own "stage name" (or *pseudonym*) to protect my identity.

I comprehend that the researcher isn't looking for any "right" or "wrong" answers from my group or myself, but to see how working together on our own unique video makes us think critically, and also how we think about the media's influence on how we see bodies and perceive beauty. I also understand that this video will be used for teaching purposes only.

If I am OK with everything I've read here and wish to participate, I will sign the **Child Participant Consent Form** and one of my parents must sign the **Parent Consent Form**, and I must return these signed back to my teacher as soon as possible.

Child consent form – Project 2

This project is a part of the study:
The development of critical thought by collaboratively producing a short video about the media's influence on body image

Researcher	University
Danielle Marie Melgoza, research Student XXXXXXXXXXXXX	UCL/ IOE Institute of Education Dept. of Culture, Communication and Media 20 Bedford Way, WC1H 0AL London

Consent Form for Child Participant

I understand that my participation in this study is voluntary. Also, that any personal information resulting from this project will be confidential, such as my age and my identity. I understand that I may ask Danielle any questions about this study at any time.

I have read the Child Participant Information Sheet ☐ (please tick)

I

(Print Your Full Name Here)

Give consent to participate in this project.

(Your Signature)	(Date Today)

(Name of School)	(Year Level)	(Date of Birth)

Thank you and look forward to working with you ! ☺

Appendix B – Assessments

Relevant assessments conducted with the participants are found in this section.

Types of questions asked during focus groups – Project 1

What do you think about _____?
Where do you get that idea?
Why do you think that?
What does it/that mean to you?
How does this influence body image, thoughts or behavior?
Can you take a guess?
What do you mean by that?

Individual exit interview questions – Project 1

What is critical thinking?
What is a cultural stereotype and why is it important to think critically about this?
How did it help to make a video about stereotypes and body image?
What did you learn? The biggest lesson?
When you initially started this project, what did you think or expect of it?

Participant exit questionnaire – Project 1

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Leading education and social research
Institute of Education
University of London

This study is a part of the project:
The Development of Critical Thought through Collaborative Film Making by Young Students

Student Questionnaire

Please answer inside the box. You can answer as generously as you'd like.
Once finished, make sure you "save as" and put your pseudonym + country as the new document title. For ex. "jorge.mex"
Then "save as" to the desktop.

1.) "In your own words… What is a cultural stereotype?"

2.) "What does the term *critical thinking* mean to you?"

3.) "What have you learned during this project?"

4.) "What was your favourite part of this project?"

5.) "What was your *least* favourite part of this project?"

6.) "How do the images we see in the media influence how we view ourselves and our body image?"

7.) "How is it helpful to produce a short film to learn about a topic?"

8.) "Who determines what are good and bad influences for kids in the media?"

9.) "To what extent do you *believe* in commercial selling/consumer gimmicks on TV or elsewhere?" (mark "x" in one box only)

Don't believe at all	Sometimes believe	Undecided	Believe regularly	Strongly believe

10.) "To what extent are you interested in fashion, music, and or celebrities?" (mark "x" in one box only)

A lot of Interest	Some Interest	Not Sure	Of Little Interest	No Interest At All

11.) "If yes, to what degree does this influence how you dress?" (mark "x" in one box only)

No influence at all	Some influence	Not sure	Regularly Influences	A Big Influence

12.) "If it *doesn't* influence you or only *some influence*, what *does* influence how you dress? Please be specific…."

13.) "How important is body image to you?" (mark "x" in one box only)

Not important at all	Somewhat Important	Not sure	Important	Very Important

14.) "What are the 'cool' trends today with respect to body image, body types, dress, and beauty ideals that kids your age want?"

15.) "Have you ever doubted your own body image? If so, do you remember how old you were when you felt this way?"

16.) If so, *why* did you doubt yourself? What prompted this issue? *Why* did you think about it?"

17.) "Did you tell someone how you felt? How have these issues (if at all) been addressed?"

18.) "Who makes the decisions in your house? Your mom? Your dad? If not…who?"

19.) "Who influences *your* decision-making: Mom? Dad? Friends? (list the people in order of importance, for ex., if your mom is your biggest influence then put her first)"

20.) "List the decisions and areas of your life that your friends influence:"

21.) "List the decisions and areas of your life that your parents influence:"

22.) "Finally, list ALL the things in your age group that are trending/influencing right now (*positively or negatively*): clothing brands, artists, songs, video games, social media sites, etc.

Questions asked during written reflections – Project 2

How did working on this group video today help you learn about media influence?
What did you learn about media influence today, and what do you think about that?
What else did you learn while producing today, and what do you think about that?
Is there anything you liked/disliked? Why? How can it improve in the future?

Questions asked during exit group interview – Project 2

What did you learn during this project?
How did you learn that?
Where did you learn that?
Why do you think that?
How does that happen?

Appendix C – Project 1 data

This section includes analysed data from the participants in Project 1.

Transcription – Year 6 focus group: *What is critical thinking?*

All dialogue that denoted *understanding* of the term "critical thinking" was highlighted in yellow, and this excerpt presents the entire discussion had.

Researcher: What is critical thinking?

(Prolonged silence)

Researcher: What do you think it might be?

(Shaking of heads, shrugging of shoulders)

Researcher: Can you take a guess?

Alexa: Is it thinking about criticizing?

Researcher: Why do you think that?

Alexa: Um, because it says, "critical"?

Researcher: I see.

Daniela: Maybe like when people criticize others?

Researcher: Ok. These are good guesses. Anyone else? Mariana? Renata? What do you think?

Renata: I don't know.

Mariana: I don't know either, sorry.

Transcription – Year 7 focus group: *What is critical thinking?*

All dialogue signifying *understanding* of the meaning of "critical thinking" was highlighted in yellow, and this transcription portrays the discussion in its entirety.

Researcher: What is critical thinking? Who knows? Who can raise their hand and let me know what critical thinking is?

Diego: I don't know.

Researcher: What does it sound like?

Diego: I don't... (shrugs shoulders)

Benji: It sounds like... No, I don't know.

Researcher: So nobody really knows what critical thinking is.

Benji: No.

(All shake head, "no")

Transcription – Year 6 focus group: *Researcher presents Selena Gomez*

All dialogue expressing an *understanding* of the presented media image was highlighted in yellow. Any indication of *engagement in CT* (per this project's coding frame (6.4)) with the content was highlighted in turquoise.

Researcher: Who is this young lady?

All: Selena Gomez.

Researcher: Ok, you recognized this one, huh?

Alexa: Yes.

Researcher: Of course, Selena Gomez, very well. And what are your opinions about this photo?

(Prolonged silence)

Researcher: Can be anything. Mariana what do you think? Can be anything, huh? You can speak freely, there are no bad or good, right or wrong answers here. It's whatever you think…. What do you think, Mariana?

(Prolonged silence)

Alexa: She's also been edited.

Mariana: Mm hm.

Researcher: She is edited, OK. And what else? Whatever comes to mind. Renata, what do you think? What is your opinion? How do you see her?

Renata: She looks very pretty, and she doesn't look like herself.

Researcher: She doesn't look like herself? Ok, but you recognized her straight away.

Renata: Yes.

Mariana: Her face.

Researcher: Ok, her face. Ok, but if she was edited, like what part do you think was edited?

Alexa: So like they cut her face and they put it on another photo…Her face looks too small with that body.

Transcription – Year 7 Focus group: *Researcher presents Justin Bieber*

Per this project's coding frame (per this project's coding frame (6.4)), dialogue expressing an *understanding* of the presented media content was highlighted in yellow. Any indication of *engagement in CT* with the content was highlighted in turquoise.

Researcher: Who is this guy?

Diego: That looks like Justin Bieber.

Researcher: Ok, and what do you think about these two images?

Jordan: They look different.

Researcher: How?

Benji: It's been Photoshopped.

Researcher: Ok, but which one is the real Justin Bieber?

Jordan: That one (points to the image on the left side).

Researcher: Why do you think that?

Jordan: Because they put Calvin Klein on the Photoshopped one and made it look clearer and made him look better, more muscular.

Researcher: Better, how is he better?

Luke: They added muscles and made him look bigger. Everything is bigger, his hands, arms, legs.

Researcher: Why would they do that? Make him look better, more muscular?

(Prolonged silence)

Jordan: I don't know.

Transcription – Year 6 focus group: *Bloom's pyramid*

Per this project's coding frame (per this project's coding frame (6.4)), dialogue expressing an *understanding* of the pyramid levels was highlighted in yellow. Any indication of *engagement in CT* with the pyramid in relation to the video project was highlighted in turquoise.

Researcher: Who can explain what to "understand" means? Why do we try to "understand" something?

Alexa: To know what it's about?

Researcher: To know what it's about...Who can explain the third level?

Mariana: To "apply".

Researcher: ... how can we "apply" something?

Daniela: By doing some investigation about it?

Researcher: Ok, so to investigate it,,

Researcher: So what about to "analyze"? What does it mean to "analyze"?

Mariana: Like to revise something?

Researcher: Ok, yes because it means to look into it in more detail. And to "evaluate", how does a person "evaluate"? For example, your teachers are always evaluating you.

Mariana: It's like to see whether or not something works.

Researcher: To see what works, what doesn't work. Ok. And the last level to "create", what does that mean? It seems a lot of kids like to "create" things.

Alexa: To do something new?

Transcription – Year 7 focus group: Bloom's pyramid

Per this project's coding frame (per this project's coding frame (6.4)), dialogue expressing an *understanding* of the pyramid levels was highlighted in yellow. Any indication of *engagement in CT* with the pyramid was highlighted in turquoise.

Researcher: What are some examples of how we "analyze" things?

Luke: Like when you look at things more closely?

Diego: Kind of like what researchers do, no?

Researcher: Yes, researchers analyze for sure.

Benji: That's what your doing.

Researcher: Yes, amongst other things. And what about the next level?

Jordan: To evaluate.

Researcher: Yes, but what does it mean?

Jordan: Kind of like analyzing, but more?

Researcher: Can you give me an example?

(Prolonged silence)

Luke: Maybe how people see what works and doesn't work? Like for an exam?

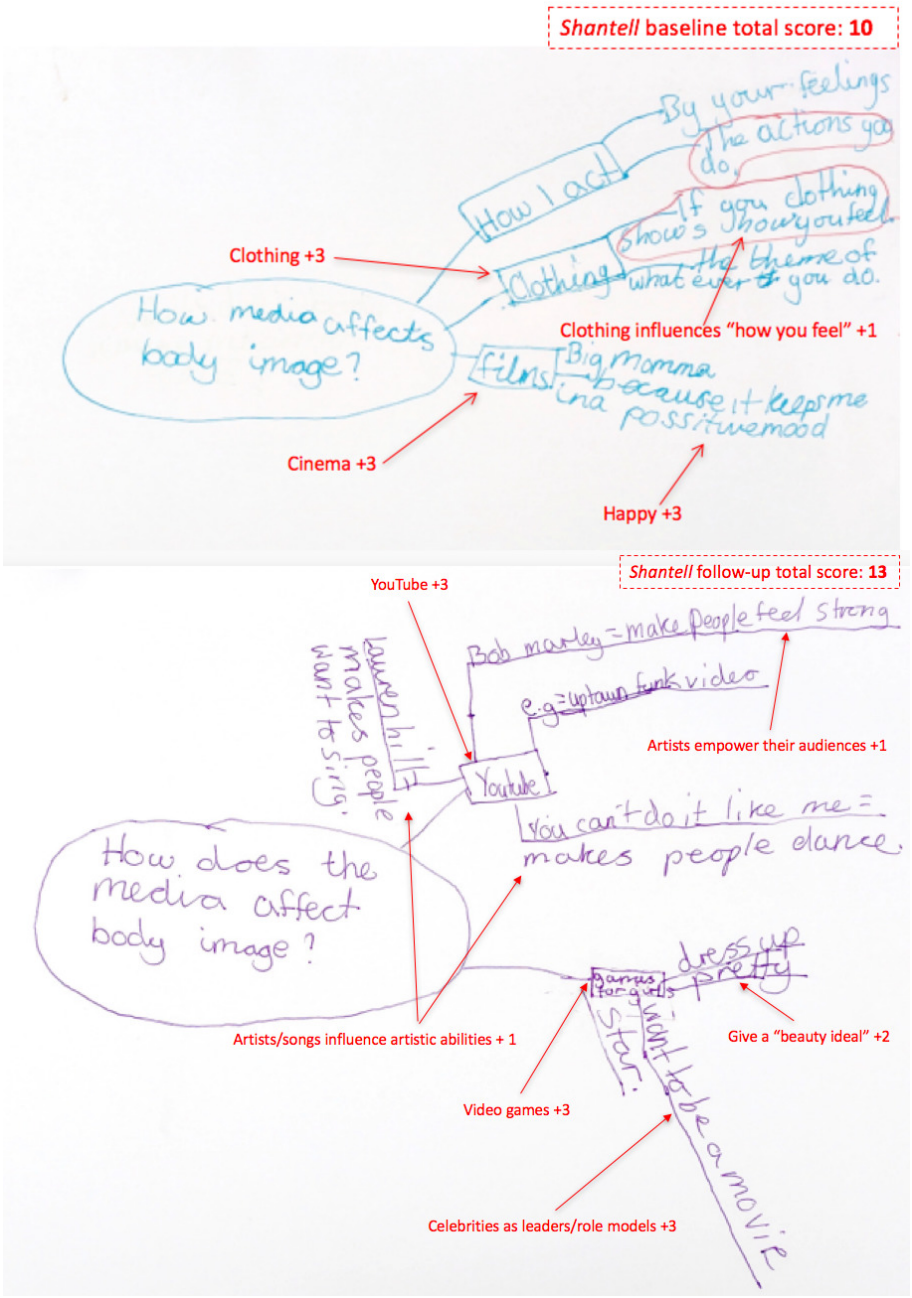
Researcher: Yes, good example. And who knows what the last level means? To "create"?

Diego: To make a new thing of your own.

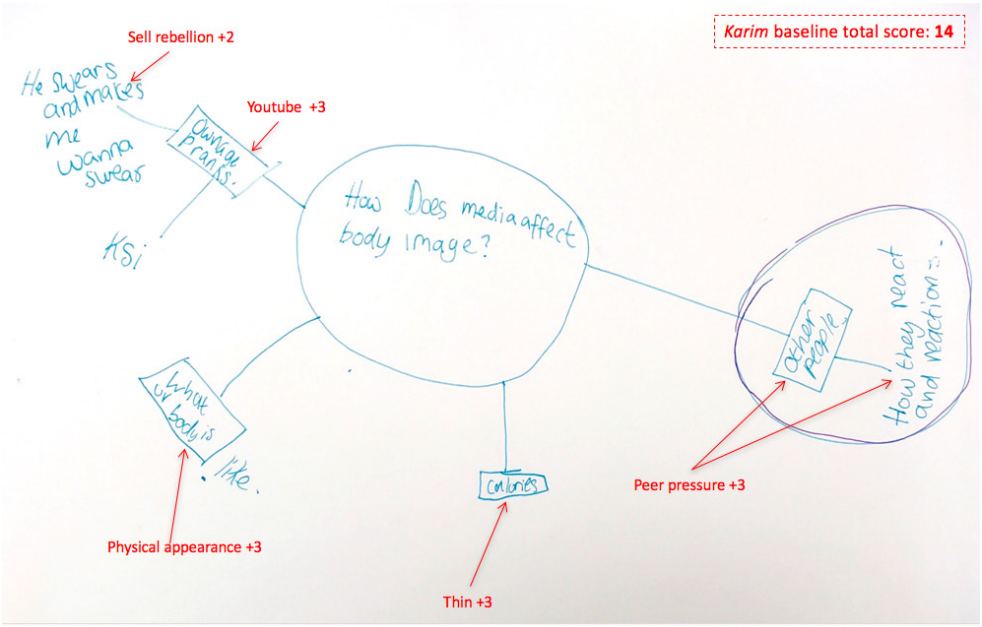
Appendix D – Project 2 data

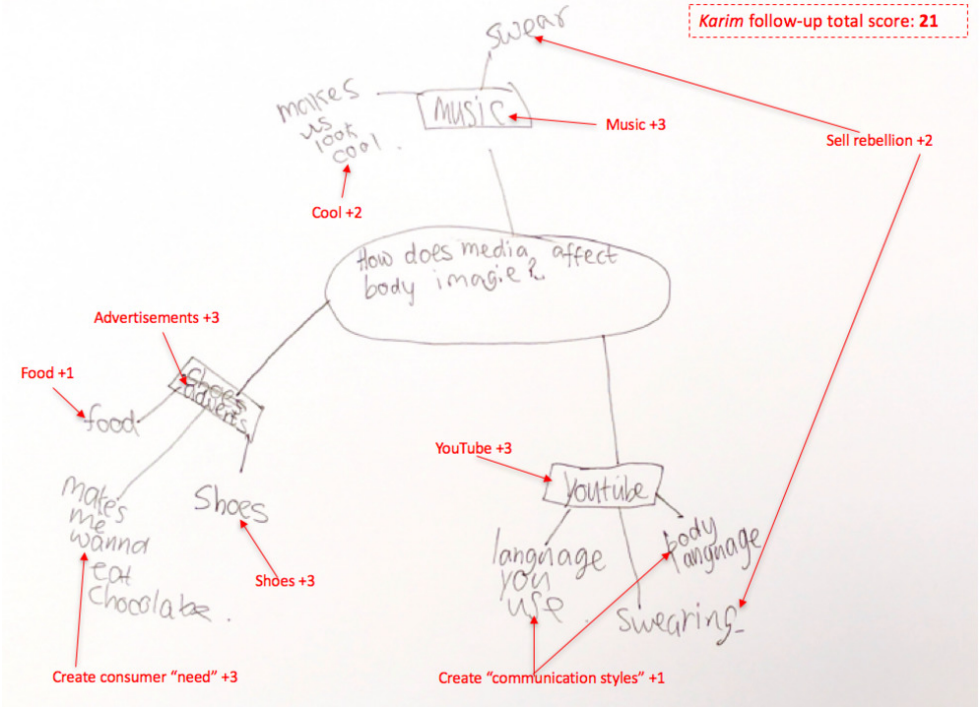
This section contains analysed data from the participants in Project 2.

Shantell concept maps comparison (baseline and follow-up)

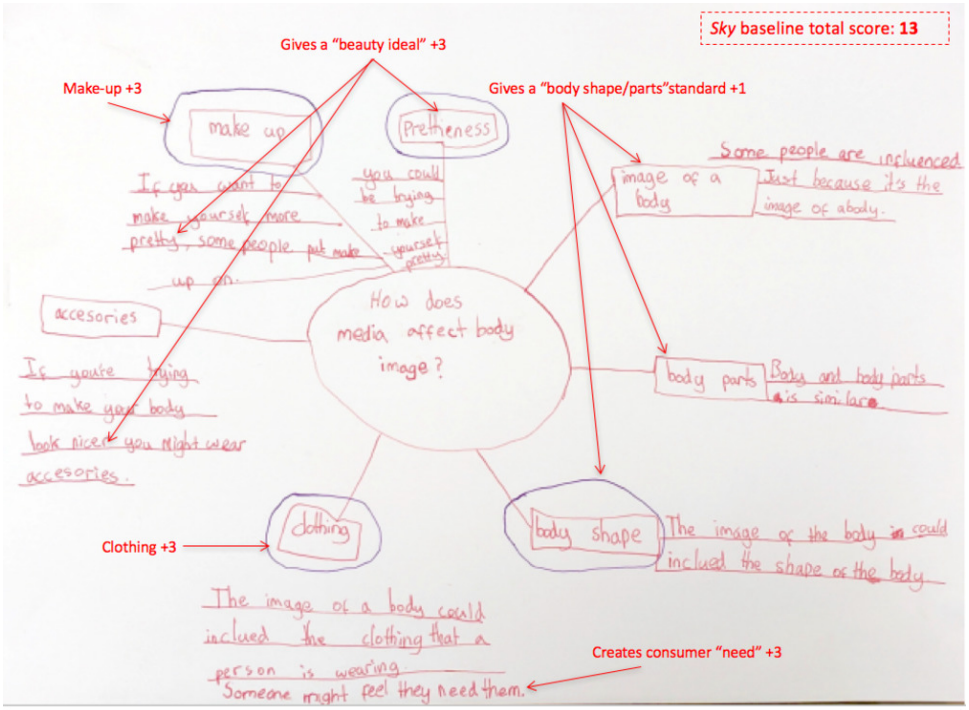


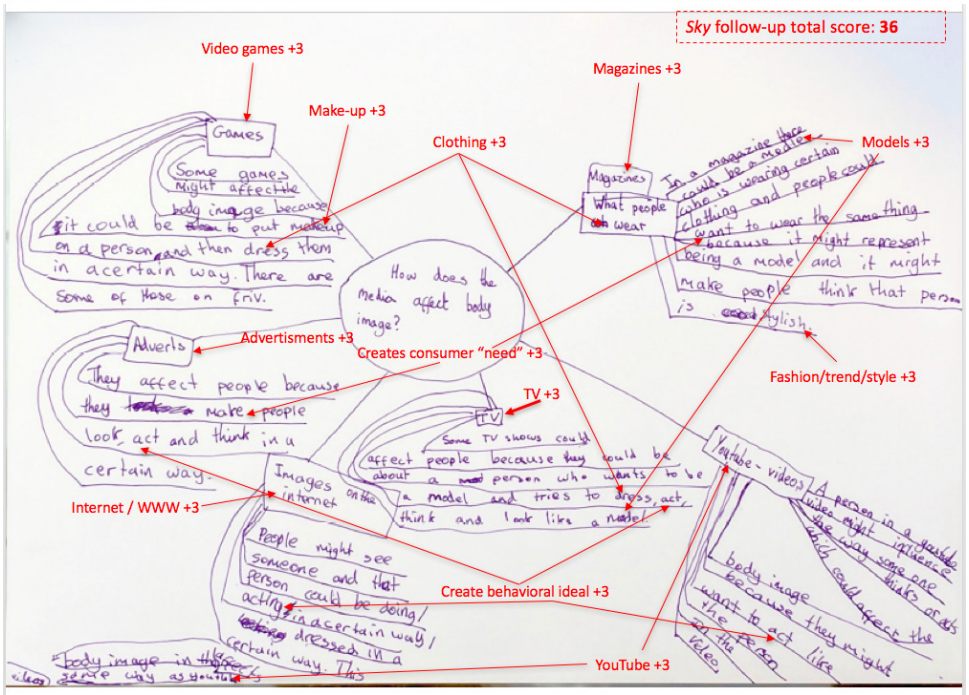
Karim concept maps comparison (baseline and follow-up)





Sky concept maps comparison (baseline and follow-up)





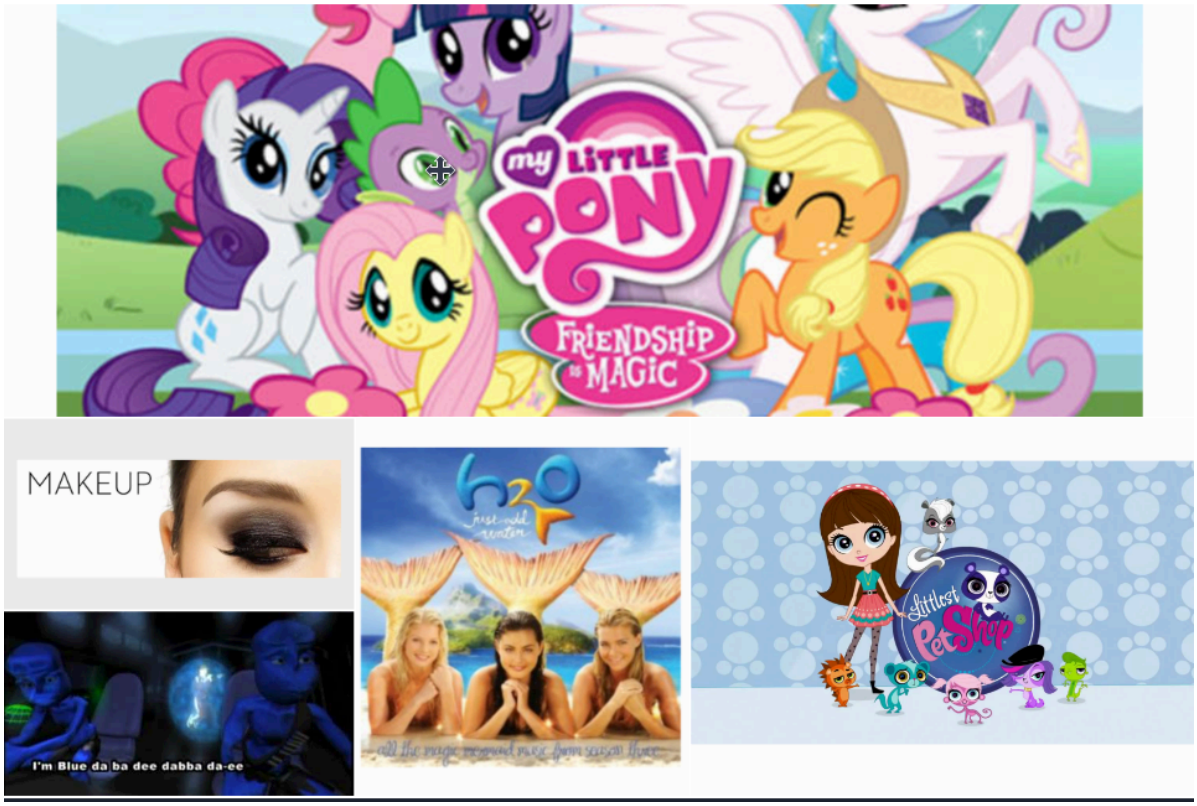
***Shantell's* iPad album – collage of representative media content**

In clockwise direction from the top left: Bob Marley, the online gaming site *Friv*, a book called *Ackee, Breadfruit, Callaboo* the movie *The Watsons go to Birmingham,* singer Lauren Hill, *The Minions,* and below this, the online gaming site *Games for Girls*.

***Karim's* iPad album – collage of representative media content**

From the top, going clockwise to bottom left: An *Obey* hat by artist Shepard Fairey, gold Nike trainers, artist Eminem, YouTube personality KSI, and magenta-coloured Nike trainers.

***Sky's* iPad album – collage of representative media content**



From the top, going clockwise to bottom left: *My Little Pony* cartoon, *Littlest Pet Shop* game, *H2O* television show, an image of "Make-up", an image of the music video, *I'm Blue.*

Y6 Participant-written reflections, Sessions 4 – 5

The following are the participant's reflections for sessions 4-6, as copied and pasted directly from their Google doc. To be noted is that they wrote both reflections for sessions 4 and 5 during session 5, because they did not have time at the end of session 4 to write that one.

Participant-written reflections for Sessions 4-5

"Karim" – Sessions 4-5

I enjoyed making the trailer and that working with others on a trailer is actually hard and making a trailer is really hard not easy as it looks.

"Sky" – Sessions 4-5

I learned how to AirDrop and that we have to organise carefully and that when making a movie you really have to work together. When we were making the trailer I got used to timing the videos and how to make a picture look like a selfie when it wasn't actually a selfie.

"Shantell" – Sessions 4-5

I have learned how to send videos and photos to my movie. I have also learned that some super models on magazines isn't real because in the back ground is just added to the photo. ¡ enjoyed sending the photos to go in our film.

"Oceana" – Sessions 4-5

Ses 4
I learnt how to air drop on a iPad I also learnt how to use iMovie which was really fun.

Ses 5
Today in the trailer I maid my own personality by acting like someone I'm not my new name was oceanna and I I was the funny one of the group.

Y6 Participant-written reflections, Session 6

Written reflections for Session 6

"Karim" – Session 6

I learnt that my friends love jewelry and that media influences that a lot and I enjoyed finishing the trailer. I didn't like how Shantell was acting. Oceana is influenced by Daisy's and Sky is influenced by My Little Pony. Shantell was acting like she knows everything.

"Sky" – Session 6

I have learned lots in the sessions that we (Dani and me) have been together. The thing I think was the most important part was learning how to, almost cope with one another. We had quite a few moments where we were angry/annoyed at each other and managed to get better at avoiding this
I really liked learning about the others (Shantell, Karim and Oceana) and what media actually is. I didn't know what it was and how much it influenced people until these lessons started. A few examples;
It changes the way people want to look (models in magazines)
It might make you want to learn/do different things (some people might want to be like famous people)
I think the only thing that I didn't like was the beginning when we wrote the things on paper individually. Apart from this, I enjoyed everything very very much!!!

"Shantell" – Session 6

I learned that when you organise your screenshot in your movie you have to know how to lay it out first.

"Oceana" – Session 6

This was my last lesson here and I really enjoyed it I learnt how others can be influenced by the media (newspaper, modeling, YouTube , and mainly just the Internet.) I also like working with the other girls and seeing their point of view on the media. I also learnt some new apps and how to airdrop on an iPad.

Y6 Collage of trailer clip targeting the “promised” child audience

The following collage is a compilation of a clip in Y6’s trailer depicting the type of audience this group had in mind for their video. The clip first shows the title: “a story for the kids”. This is then followed by the three images to the left.