Rethinking World Language Teacher Education TPACK for Integration of Digital Literacies in the Classroom

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Abstract

Studies indicate that many language teachers have a tendency to view language as an abstract linguistic system and are, therefore, hesitant to acknowledge new dimensions of literacy and that learning a language in the digital age involves new communicative competencies including the ability to construct knowledge collaboratively and create and interpret texts that combine various resources made available by digital technologies.

The main purpose of this thesis was to investigate the Technological Pedagogical Content Knowledge (TPACK) of language teachers engaged in the digital literacy practice of producing a multimodal ensemble with machinima with a view to proposing an updated TPACK model for integration of digital literacies into language teacher education. To this end, language teachers participated in a course specifically designed to train them to make machinima videos as well as prompt them to reflect on the affordances of the tool and their transformative effect on the concepts of language and literacy.

Findings show that while participating teachers express traditional views of literacy, they demonstrate profound knowledge of multimodal composition by collaboratively constructing complex mode relationships during the machinima production process. Findings also suggest that if digital literacies are seen as encompassing the ability to adapt affordances and constraints of digital technologies to particular circumstances, then, teachers possess digital literacies as they enact the affordances and overcome the constraints of digital technologies through synaesthesia, spontaneous improvising and coaction.

This thesis proposes a reconceptualisation of the Content Knowledge domain to include ecological perspectives on language and language learning and teaching and a metalanguage that would enable teachers to discuss and explain the creation of various mode relationships enabled by digital tools. The TPACK model proposed in this thesis allows for the consideration of concepts such as multimodal meaning-making, synaesthesia and coaction which are deemed to be relevant to a discussion of digital literacies within language teacher education programmes.

Keywords: Digital Literacies, Language Teacher Education, TPACK, Machinima

Acknowledgements

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List of Key Terms and Their Definitions in This Study

Affordances - relationships of possibility that make action, interaction and joint projects possible (van Lier 2010); relationships between organisms and the environment that signal opportunities for or inhibition from action (van Lier 2004)

Coaction – the process whereby one agent's full-bodied and linguistic action is influenced by or occurs in the context of another agent's action—and together they do something that is not fully attributable to either one alone (Wegner & Sparrow 2007; Zheng et al. 2012)

Digital literacies - the practices of communicating, relating, thinking and being associated with digital media and the ability to adapt the affordances and constraints of these tools to particular circumstances; more specifically, literacy practices accomplished through enactment of affordances which allow for making meaning in new ways, enacting new identities and doing things in new ways (Jones and Hafner 2012)

Machinima - animated film-making within a real-time virtual 3D environment (Hancock and Ingram 2007)

Mode - a socially shaped and culturally given resource for making meaning - image, writing, layout, music, gesture, speech, moving images are examples of modes used in representation and communication (Kress 2011)

Multimodality - the use of several semiotic modes in the design of a semiotic product or event, together with the particular way in which these modes are combined (Kress and Van Leeuwen 2001)

Multimodal Communicative Competence (MCC) - the ability to interpret and construct appropriate meanings multimodally (Royce 2007)

Synaesthesia - the process of shifting from one mode to another in search of the mode that feels right or is the best mode to convey intended meaning (Kress 1997)

TPACK – a framework for conceptualising teacher knowledge needed for appropriately teaching with digital technologies that entails an understanding of the interaction of three knowledge domains, i.e. content (C), pedagogy (P) and technology (T) and their intersections, pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) and technological pedagogical content knowledge (TPACK) (Mishra and Koehler 2006); the latter is achieved when a teacher knows how technological tools transform pedagogical strategies and content representations for teaching the subject matter and how these tools and representations impact students' understanding of the content (Graham et al. 2009)

Virtual worlds - 3D environments where users are represented by avatars; virtual worlds are persistent, accessible 24 hours a day and they are social spaces being used for functions ranging from socialising, buying and selling, holding business or club meetings and gathering for educational purposes (Sadler 2012)

Xray vision – the process whereby humans look through the rich details of the real world or a game world in order to see just what is important for their goals (Gee 2015)

CHAPTER 1 INTRODUCTION

Nowadays, not many would argue with the assertion that 'digital technology is a game changer' (Jones 2016, p. 286) mainly because most things people do, from working on school or work projects to socialising with friends, are inextricably technologically mediated (Jones & Hafner 2012). However, technology is not just enabling us to do old things in new ways. Rather, digital technologies are actually introducing new practices such as modding – modifying a game either by adding content or by creating a new game (Hancock & Ingram 2007; Jones & Hafner 2012), vlogging – video blogging, machinima-making – animated film-making within three dimensional virtual environments (Hancock & Ingram 2007) and so on, that simply did not exist before (Jones & Hafner 2012; Lankshear & Knobel 2006). These new digital literacy practices have profound implications as far as language learning is concerned and cannot simply be dismissed by language acquisition researchers because they have changed the actual way people learn and use language (Jones 2016; Lankshear & Knobel 2006). They not only involve new abilities and skills such as the ability to record and edit digital photos and videos, the ability to create multimodal documents that combine words, images, video and audio, the ability to interact in virtual environments, but also require from people new ways of thinking, new ways of interacting with others, new ways of making meaning and new understandings of authorship and agency (Gee & Hayes 2011; Jones & Hafner 2012; Lankshear & Knobel 2006).

Research studies indicate that literacy and communication practices are 'evolving symbiotically with new powerful technical devices flooding the public

marketplace' (Lotherington et al. 2016, p. 68). As a result, communication is becoming increasingly multimodal since multimedia technologies allow the engagement of multiple modes, i.e. linguistic, visual, audio, tactile, spatial and gestural in the meaning-making process. It is possible to argue that the norm in most forms of communication is for multimodality (Cope & Kalantzis 2000; 2009; Jewitt 2011; Kress 2003; Lotherington et al. 2016; New London Group 1996), given that 'what it means *to mean* in the current semiotic climate is something different from what had hitherto been understood' (Nelson 2006, p. 56). In this 'new landscape of communication' (Kress 2000a, p.183), the movement toward non-print and print-mixed texts such as video games, web sites, ads in which words are married to images, sounds and so on, has accelerated due to accessible digital resources for creating and mixing print, images, sounds, video and music (Miller 2010). Digital tools deliver knowledge and language 'faster, more widely, more easily, and in a way that allows rapid modification and wider participation' (Gee & Hayes 2011, p. 88) than writing and print do. In other words, using digital tools that provide multiple modes for easily representing meaning has led to new ways of creating texts (Kress 2003; New London Group 1996). As non-print and print-mixed texts are now widely multimodal, the literacy practices needed for functioning in the digital world have been and still are rapidly changing (Leu 2000).

1.1. Research background

1.1.1 New conceptualisations of literacy

Not surprisingly, these rapid developments in the communication environment have radically changed how literacy is viewed. It can no longer be thought of as

simply referring to reading, writing, speaking and listening to linguistic resources. On the contrary, literacy 'needs to address and acknowledge modes of meaning other than the linguistic one' (Cloonan 2010, p. 3). Therefore, the very concept of literacy in the traditional and narrow sense of the word, the ability to decipher and derive meaning from written language and to use it to convey one's own messages by producing written texts needs to be redefined. It is now viewed as a plural notion and termed 'multiliteracies' (Cope & Kalantzis 2000; New London Group 1996; 2000). The point that literacy is a plural concept with multiple dimensions has taken on added significance in the digital era. While in the preceding decades scholars discussed literacies such as 'visual literacy', 'media literacy' and 'information literacy', with the advent of web 2.0 came an explosion of interest in new—particularly digital—literacies (Jones & Hafner 2012; Jones 2016). The term has so far resisted precise definition but it has been broadly characterised by Jones and Hafner (2012, p. 13) as the practices of communicating, relating, thinking and being that people engage in using digital technologies (Jones 2016, p. 286). Language learning within a digital literacies framework 'is not a matter of mastering an abstract code or set of decontextualised skills, but of becoming competent in particular social practices such as Facebooking, Tweeting, Instagramming and gaming of various kinds' (Jones 2016, p. 287). Digital literacies scholars, drawing on ecological approaches to language learning that use the biological metaphor of *ecology*, or 'the totality of relationships of an organism with all other organisms with which it comes into contact' (van Lier 2004, p. 3) to characterise the language learning process, insist that 'language cannot be separated from the practice within which it is used' (Jones 2016, p. 287). Digital literacy practices such as social networking, texting, online gaming and micro-

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blogging are fundamentally about communication and represent the main ways in which students communicate with one another outside of the classroom (Jones 2014, p. 5). Therefore, Jones continues, an approach to language teaching that ignores these practices cannot claim to be 'truly communicative' (ibid).

1.1.2 Calls for teaching of digital literacies in schools

Such revolutionary shifts in the forms and functions of language and literacy practices call for radical adjustments in education (Nelson 2006, p. 56) in general but in the domain of language and literacy education in particular.

Despite repeated calls for attention to the growing importance of digital literacies for a generation of students for whom these literacies are required for successful participation in a globalised, digitally mediated society (Lotherington et al. 2016, p. 68), people are not always aware that these new literacy practices alter not just the way they communicate but also the identities they can enact and the types of relationships they can have with others (Jones & Hafner 2012, p. 1). As a result, the study of digital literacies and the ways they affect language learning and language use often take a back seat in the classroom. In fact, educators need to identify, understand and teach the competencies required for the communicative realities and needs of digitally mediated communication, such as knowing how to express meaning effectively by choosing and combining different meaning-making modes, work in collaborative author partnerships, learn by doing and so on (Lotherington et al. 2016, p. 68). To successfully face rigorous higher education coursework, career challenges and a globally competitive workforce students of the 21st century and, perhaps more importantly, their teachers need to develop these new literacies and multimodal learning strategies so as to take

advantage of the diverse modes of communication made possible by new technologies and to participate in global learning communities (Miller 2007). A practical example of why students need knowledge of digital technologies and digital literacies is discussed in Jones and Hafner's (2012, pp. 77-78) book on digital literacies. In 2011, the University of Iowa Tipple School of Business invited applicants to submit their admissions essays as 'tweets'. According to the director of admissions, the purpose of this was to gauge how imaginative applicants could be when asked to express themselves concisely, a key demand of business writing. The winning applicant who received a scholarship for the most creative effort chose to write his tweet in the form of a haiku, thus, combining one of the newest forms of communication with one of the oldest forms (ibid).

Some theorists and researchers stress the importance of teaching digital literacies, the literacies that 'digital natives' (Prensky 2001) need as citizens of a fast-changing world. Prensky's (2001) 'digital nativism' refers to those who 'have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age' (p. 1). Researchers agree that facility with understanding and designing digital multimodal literacies, literacies that 'transcend the alphabetic world' (Lotherington & Jenson 2011, p. 226) by utilising diverse media to represent the audio, visual, spatial, gestural and tactile dimensions of communication (Cope & Kalantzis 2009) will increasingly be required by human beings to communicate, work, and thrive in the digital world of the 21st century (Alvermann 2002; Cope & Kalantzis 2000; Gee 2004; Kress 2003; New London Group 1996). In today's world of multimodal texts, both teachers and students need to be able to interpret and represent meaning across and within modes

(Cloonan 2010). Therefore, students and teachers urgently need opportunities in schools and in teaching preparation programmes and professional development courses to acquire new literacies and multimodal learning strategies that are reflective of the society in which they live and are in fact required for new times and social futures (Gee & Hayes 2011; Miller 2007).

However, formal education has not really kept up with the rapid rate of change in digital communication practices (Lotherington et al. 2016, p. 65) and the literacy practices of school usually differ from the digital multimodal literacy practices needed to enter and succeed at various levels of the academic hierarchy and subsequently in the highly competitive workforce (Miller 2010). Some researchers put this point quite harshly by stating that modern schooling is rooted in 19th century industrialisation and 'intended to run as a tide assembly-line process where children are batched into classes and grades and processed in a monitored learning environment' (Lotherington et al. 2016, p. 65) whilst learning in this paradigm is narrated to learners by teachers and the deposited knowledge is then measured quantitatively in examinations (ibid). Thus, in many cases, the way students are educated today is based on 19th century ideas and methods, elements of the standard transmission model are used frequently in schools (Saavedra and Opfer, 2012, p. 7) and, moreover, 'schooling continues to be based on paper-based literacy instead of practices that allow students to explore and utilise the multimodal, non-linear literacies available in digital environments' (Rhodes & Robnolt 2009, p. 158). Skills such as producing multimodal texts, however central their role in contemporary society, are, in fact, not taught in schools (Kress & van Leeuwen 2006, pp. 17-18). In the words of Kress and van Leeuwen (2006), 'institutional education (…) produces illiterates' (p. 18). Lotherington & Jenson

(2011) also point out that in today's classrooms 'the interactive screen-based media of the 21st century have taken a back seat' (p. 227) and print literacies continue to dominate. However, the old logics of literacy and teaching on which school literacy is based are profoundly and continuously challenged by the new media environment (Cope & Kalantzis 2009). Moreover, they are bound to disappoint the Millennial Generation, i.e. those born after 1981 (Hagood et al. 2002), whose expectations of engagement are greater and are also likely to fail to direct them towards developing the kinds of knowledge and skills required for 'the new domains of work, citizenship and personality' (Yelland 2006 cited in Cope & Kalantzis 2009, p. 173). As a consequence, scholars such as Gee and Hayes (2011) warn, today's school is in a crisis since much of what students learn 'does not lead to the ability to solve problems or innovate' (p. 64). They illustrate their argument with an example of college physics students who could pass a pencil and paper test on Newton's laws of motion but could not in fact explain how many forces are impinging on a coin thrown in the air even though this could be deduced from Newton's laws (Gee & Hayes 2011, p. 117).

1.1.3 The disconnect between students' lifeworlds and school curricula

Many research studies suggest that various digital literacy practices such as designing multimodal texts already play a large role in learners' lifeworlds, i.e. their personal lives (NLG 2000, p. 10), as they engage in multimodal composing and producing in their everyday lives outside of school according to their personal and private contexts (Cope & Kalantzis 2000; 2009; Jewitt 2011; Kress 2003; New London Group 1996; Nallaya 2010). The Millennial Generation has been surrounded and shaped by practices related to computers; for them digital technologies, the Internet, and hand-held devices are increasingly ubiquitous.

Consequently, Millennials think of messages and meanings multimodally—not just in terms of printed words, but also in terms of moving and still images and music (Miller 2007, p. 62). Moreover, some research studies point out that 'we are moving away from a world in which some produce and many consume media, toward one in which everyone has a more active stake in the culture that is produced' (Jenkins 2006) and a majority of youth are already active producers thanks to user-friendly production possibilities in digitally mediated spaces (Sheridan & Rowsell 2010, p.12). Besides being active producers of meaning thanks to modern technology, young people today are often engaged outside of school in 'processes of learning that are deeper and richer than the forms of learning to which they are exposed in schools' (Gee 2004, p. 107). Gee (2004) takes modern first- and third-person shooter games as an example and identifies a few of the learning principles that the player is (however tacitly) exposed to in learning to play these games, i.e. learning is based on situated practice, learning is a form of extended engagement of self as an extension of an identity to which the player is committed, the learner can customise the game to suit his or her style of learning, the meaning of texts and symbols is situated in what one does, and is thus never purely verbal or textual; meaning is built up through various modalities (images, texts, symbols, interaction, abstract design, sound) and so on (pp. 198-199). Unfortunately, too often, these people's digital literacy practices in spaces such as online games, Facebook, Instagram, YouTube, and wikis have been largely ignored in school-based curriculum (Sheridan & Rowsell 2010, p. 5).

The disconnect between students' experiences in digitally mediated spaces where they frequently participate in knowledge production activities and their literacy experiences in the classroom where students generally only engage in fact and

information consumption can make schooling feel out of sync and irrelevant to the interests and issues that affect them (Gee and Hayes 2011, p. 67; Scott 2015, p. 10; Sheridan & Rowsell 2010, p. 5). Therefore, as a consequence of teachers being unresponsive to today's changing conditions and not recognising nor exploiting the affordances of digital environments, students are becoming 'less engaged' in this 'old-style instruction' which is only marginally helpful as they tackle 21st century challenges (Sheridan & Rowsell 2010, p. 69).

Gee and Hayes (2011) warn that schools risk eventually becoming relic institutions (p. 64) because they undermine what students already bring to the classroom, i.e. out-of-school sites of creativity and innovation. Education is failing to prepare learners for the challenges ahead by not taking account of digital literacies and their implicit multimodality and, instead, heavily focusing on print literacies. Students are not learning relevant pratices and skills under the current system of education and are thus being de-privileged and short-changed on their present and future needs (Dudeney et al. 2013; Scott 2015). They are missing out on experiences that will prepare them for more satisfying lives and productive work (Scott 2015, p. 15).

Although the advantages of rethinking the curriculum to take digital literacies into account for the benefit of the current generation of students are becoming increasingly clear, it is important not to romanticise concepts such as the one coined by Prensky, i.e. digital natives. While the bulk of the literature in language and literacy education indicates that today's students are digital natives whose '*thinking patterns* have changed' (Prensky 2001, p. 1) and these changes require a radical shift across today's classrooms which do not match the changes in the way digital natives' minds process information (ibid), researchers such as

Hubbard question whether the concept of digital natives has any real value. He points out that while there is indeed consensus that learners today are more technologically advanced in certain ways from those of a generation ago (Hubbard 2013, p. 165), it is important to note that 'a mere exposure to technology in everyday life does not automatically make them successful language learners who know how to effectively use technology for educational purposes' (Karabulut et al. 2012 cited in Hubbard 2013, pp. 171-172). While it is, therefore, unquestionable that some of the current generation of students will have grown up with technology as an integral part of their lives and may feel more comfortable with technology such as hand-held digital devices for entertainment and communication, researchers (Hubbard 2008; Jones 2014) caution against assuming that exposure to technology has indeed changed digital natives' thinking patterns. Moreover, they question the extent to which students' 'familiarity with technology would transfer so as to significantly impact their ability to know how to more intuitively use these tools effectively' (Hubbard 2008, p. 179) for learning. For example, knowledge of how to search for and locate web pages in the second language does not mean learners are able to critically evaluate the claims and rhetorical techniques found in those webpages (Jones 2014).

1.1.4 Digital natives vs. digital immigrants

Jones (2014) identifies Prensky's distinction between digital natives and digital immigrants as one of the most damaging discourses for teacher identities in the digital age. Digital natives are described as 'native speakers of the digital language of computers, video games and the internet' while 'digital immigrants' is the label given to most language teachers who are portrayed as clumsy 'second language learners', unfamiliar with new digital environments. One reason why

Jones considers the distinction to be mostly unhelpful is because it exaggerates the 'generation gap' between teachers and learners. According to Fieldhouse and Nicholas (2008), 'the digital generation gap represents something of a dichotomy, with digital natives and digital immigrants using different languages' (p. 60). More specifically, digital natives have no experience of pre-digital life, computers are not technology but part of life and, consequently, they do not describe things in terms of them being digital, since to them they have always been. The language of digital immigrants, on the other hand, reflects their experience of pre-digital life, therefore, they describe things as digital in order to differentiate between electronic and traditional versions (ibid). The literature reviewed by Fieldhouse and Nicholas also suggests that digital natives and digital immigrants have different learning styles with the former favouring instant information, animations, audio, and video to text, and naturally interacting with others while multitasking. For digital natives, doing is more important than knowing, and learning has to be fun and instantly relevant. The latter opt to handle knowledge systematically, logically and to inform discrete activities (ibid).

The other reason why Jones and other researchers consider the distinction between natives and immigrants problematic is that it tends to romanticise the everyday digital literacies of learners while also implying that teachers have nothing to add to these literacies. In other words, students are seen as adept at dealing with digital media and teachers as 'fumbling, hopelessly out-of-touch without much meaningful to say' (Jenkins 2007). Consequently, the distinction is likely to disempower teachers, encouraging them to feel helpless, and thus justifying their decision not to know nor care about what happens to young people as they move into the online world (ibid).

However, the very real problem of educators not having grown up in an environment where digital literacy practices were necessary (Belshaw 2012, p. 177) cannot be ignored particularly because many research studies have frequently identified teachers as the strongest influence on learner achievement (Knobel & Kalman 2016). Even more, it is the teachers who, according to Halliday (1978), 'exert the most influence on the social environment' (...) 'by playing a major part in the process whereby a human being becomes social man' (Halliday 1978, p. 10). While many factors contribute to a learner's academic performance, including individual background, family experiences, class size and other variables, research consistently suggests that, among school-related factors, teachers matter most (Knobel & Kalman 2016). Knobel and Kalman (2016) cite several research papers whose authors go so far as to claim that an 'education system is only as good as its teachers' (Bokova 2014 quoted in Knobel & Kalman 2016, p. 2) and problematise unsatisfactory student test scores in terms of the quality of teachers and their teaching thus placing much of the responsibility for how students do at school squarely on teachers' shoulders (Knobel & Kalman 2016, p. 2). There is then a very real conundrum teachers themselves are faced with.

According to Lotherington et al. (2016) teachers need to negotiate the call to make learning more creative, innovative and collaborative while also being held accountable for student learning and their performance on mandatory standardised assessments which have remained largely unchanged and measure knowledge quantitatively (p. 65). The teachers' dilemma is summarised by Lotherington et al. (2016) in terms of learning approaches and aims that collide over assessment ideals with examinations limiting technological facilitation in spite of learning in

the context of everyday practice being frequently technologically mediated (p. 67). Cloonan (2010) discusses the pervasive power of assessments that only measure print literacies thus determining what is taught in schools. She identifies assessments as one of the most important reasons why literacies continue to refer only to traditional print literacies (ibid). This is most often the case in the language classroom, where the linguistic mode is considered essential to assessment. Not surprisingly, it is this mode that attracts teaching emphases leading to the neglect and sometimes exclusion of visual, audio, gestural, spatial and tactile meaning-making modes. According to Hafner et al. (2015, p. 5), this is why students' participation in innovative multimodal digital practices such as video-making remains problematic as far as language-dominant assessment is concerned. If such high-stakes examinations are not altered, many teachers will continue to view digital literacies as mostly an add-on than an integral part of the language curriculum (ibid). It becomes, therefore, evident that transforming 21st century instruction cannot be addressed without also addressing current assessment paradigms (ibid).

Teaching towards digital multimodal literacies within educational frameworks based on past models, principles and ideas is extremely challenging (Lotherington et al. 2016, p. 67). Many, if not most teachers admit to being ill-prepared for the current generation of students not only because of a lack of digital literacies but also because the teacher-centred pedagogical practices they are familiar with focus on print-based literacy and are inadequate preparation for the exploratory, student-centred, constructivist learning facilitated by digital tools that encourage collaborative and creative thinking and enable the design and production of multimodal ensembles (Lotherington et al. 2016, p. 72).

Therefore, in spite of a global push for the adoption of 21st century learning models that support the development of digital literacies in educational institutions, the majority of teachers are unprepared to integrate them into their classrooms (Lotherington et al. 2016, p. 74). Further compounding the issue, 'teachers who are not tech-savvy or feel unsupported when integrating digital tools can be overwhelmed and easily discouraged when something goes awry, and they are unsure of the value of what they are doing' (ibid). This constitutes yet another issue besides problematic assessment paradigms and 'the digital divide and disconnect' (O'Brien & Bauer 2005, p. 126), that has been signalled in a considerable number of studies, i.e. the lack of digital literacy among educators. Many teachers seem to be caught in the traditional notion of reading and writing print text as the only legitimate form of school literacy (Cloonan 2010; Lotherington & Jenson 2011; Kress 2003; Miller 2007). Language teaching with digital technologies has not been transformed and many teachers have been reluctant to acknowledge this extended understanding of literacy (Lotherington & Jenson, 2011). Garrett (2009) asserts that, even though,

> nowadays, there are perhaps not many postsecondary language teachers who make no use of technology, there are still many—especially those whose teaching preparation did not include mention of technology—who use it only to a limited extent. They may use email, word processing, and digital audio; they may find authentic materials on the Web to use in class or to make available to students, and they may use their institutions' course management systems to post syllabi and assignments and to manage their grading (p. 719).

Technology use often limited to PowerPoint presentations, word processing, emails and Web searches (Ware 2008) is predominantly framed by a traditional view of technology as a tool to improve language skills rather than to engage students in new digital literacies which can support language speakers in their

authentic uses of technologies in target languages. Garrett (2009) argues that these uses of technology do not support the full integration of technology into language learning which involves 'a dynamic complex in which technology, theory, and pedagogy are inseparably interwoven' (p. 719). Even though there is nothing wrong with viewing technology as a tool to support language learning, in the view of digital literacies scholars, this perspective is limiting and can impede the development of students' digital literacies capabilities (Kalantzis et al. 2016; Tour 2015). This seems to be the case in second and foreign language teaching contexts in particular.

According to Valdes (2004), teachers have been hesitant to acknowledge and engage with the new dimensions of literacy primarily because of their 'tendency to conceptualize language in their teaching as an abstract linguistic system, detached from a broader socially constructed multimodal perspective' (p. 79). She goes on to argue that:

> The view that there are multiple literacies rather than a single literacy and that these literacies depend on the context of the situation, the activity itself, the interactions between participants, and the knowledge and experiences that these various participants bring to these interactions, is distant from the view held by most L2 educators who still embrace a technocratic notion of literacy and emphasise the development of decontextualized skills (p. 79).

Her insight chimes with that of Kress who in his discussion of TESOL (Teaching English to Speakers of Other Languages) educators points out that:

> TESOL professionals continue to act as though language fully represented the meanings they wish to encode and communicate. Yes, they admit that other features are important, but if pressed, the linguist and the applied linguist would maintain that their business was language, after all, and these other things were someone else's to look after (2000b, p. 337).

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This finding might help explain teachers' inattention to multimodal design and new ways of knowing (Leu et al. 2004, p. 1600), being and doing (Hafner et al. 2015; Jones & Hafner 2012) afforded by digital literacy practices.

However, reducing second and foreign language teaching to print-based literacies by spending most of the classroom time developing students' reading and writing skills poses many challenges for the language learner as mentioned above. According to Lotherington and Jenson (2011), this practice raises questions of authenticity, as it is not reflective of the society about which the language student learns (p. 228). Although becoming digitally literate is not an easy task for any student, it is especially difficult for foreign and second language students. In their attempts to become digitally literate, these students must acquire linguistic competence in a new language and at the same time develop the sociocultural skills required to gain access into the 21st century social, academic, and workforce environments (Kasper 2000, pp. 105-106). Therefore, since 'language is no longer the carrier of all meaning' (Kress 2000b, p. 339), education in general and language education in particular need to reconsider the traditional, almost exclusive focus on print-based literacies. Integrating the dramatic broadening of the concept of literacy to include multimodal meaning-making beyond print-only texts for all students and their teachers becomes the essential task for schools and schools of education in the 21st century (Miller & Borrowicz 2006). For education to remain relevant it must 'account for the assumption that literacy is indeed multiple' (Stewart 2012, p. 27) and this can be achieved only if educators consciously deploy multimodality in learning and teaching (Cope & Kalantzis 2009, p. 182).

1.1.5 The role of professional development

Professional development opportunities that fundamentally incorporate new digital tools and literacy practices are sorely needed. Research studies frequently suggest that most teacher education programs do not offer anything more than superficial preparation for and in digital tools and technology-enhanced learning (Lotherington et al. 2016, p. 73). Consequently, teachers are inadequately prepared to use digital technologies in meaningful ways (ibid)—this inadequate teacher preparation has been identified as yet another disconnect between the needs and expectations of 21st century learners and the unsatisfactory preparation of teachers where the focus is often on using digital tools for instructional practice, not facilitating the practice of multimodal digital literacies. Not surprisingly, then, many critics believe that teacher education has 'failed to keep pace with the profound sociopolitical changes in society' (Imig and Switzer 1996, p. 213) precisely because, as Velez-Rendon (2002) argues, the knowledge and skills that a second and foreign language teacher needed two decades ago are no longer sufficient in today's highly wired and rapidly changing world (p. 461). While knowledge of the subject matter and pedagogy was all that was needed twenty years ago, today's second and foreign language teachers face challenges that demand a wider array of competencies and skills (ibid).

In this context, providing teachers with opportunities to experiment with emerging literacies and use digital learning tools in the classroom is an obvious but complex solution. Consequently, efforts have to be made to renew teaching practices through teacher education. Moreover, teacher educators need to provide pre-service and in-service teachers with opportunities to learn new multimodal literacies for their own authentic purposes before they can effectively use them as

student learning tools in their classrooms (Lankshear and Knobel 2003, p. 67). Albers et al. (2008) also point out that it is essential for teacher education to be reconceptualised so as to allow for activities that engage teachers in discovering on their own the relationship between digital technologies and multiple literacies learning. Teachers, they conclude, can only do for students what they have experienced for themselves (p. 12).

Jones (2014) points out that only by engaging teachers in digital literacy practices and allowing them to experience the transformative effect of digital technologies, can they be in a position to guide their students' collaboration and creation online into sensible learning outcomes as well as increase their understanding of how to help students participate successfully in these practices (pp. 12-13). In other words, 'teachers need to spend more time understanding how the language and communication skills learners will need in the future differ' from those they are currently teaching them, and 'to explore the ways learners are already engaging in effective learning in the context of digital networks and affinity groups outside the classroom' (Jones 2014, p. 17). Equally importantly, Blake and Egbert et al. (2009 cited in Lafford 2009, p. 687) point out that often educators are only willing to implement new technologies with which they are already familiar from use in other contexts. Also, teachers will only integrate technologies into their curriculum after they have been convinced of their usefulness (Lafford 2009, p.687).

This makes imperative a change in the professional development of pre-service and in-service teachers (Knobel & Kalman 2016; Miller 2007; 2008; Pianfetti 2001). Teachers should be provided during their teacher education classes and in professional development programmes with opportunities to transform their roles,

knowledge and beliefs (Koehler & Mishra 2005) but, perhaps most importantly, their view of what counts as literacy.

However, despite the prevalence of arguments for transforming professional development for teachers to better support the acquisition of 21st century skills, the question of how best to purposefully and explicitly integrate digital literacies into teacher education remains largely overlooked. This calls for professional development that is directly aimed at increasing teachers' awareness of digital literacies and broadening their teaching repertoires in relation to multimodality by involving them in hands-on experiences. Cloonan (2010) makes the point that 'professional learning directly affects student achievement by improving the quality of teaching practice, fostering those improved teacher pedagogical and content practices which lead to student achievement' (p. 31). Therefore, she continues, 'we must turn our attention to the major impact of teachers in affecting student achievement and the strong influence of professional learning on teacher knowledge, and subsequently, student knowledge' (ibid).

One useful framework to address the issues discussed above, especially the inadequacies of teacher training in the age of digital literacies, is the framework of Technological Pedagogical Content Knowledge (TPACK). TPACK has been often proposed as a framework to understand the multi-faceted forms of knowledge required for effectively integrating technology in the classroom and as a new direction in understanding the complex interactions among content, pedagogy and technology (Koehler & Mishra 2008). Despite its complexity, TPACK is 'an intuitive concept that resonates easily with practitioners' and has consequently been embraced by both scholars and practitioners (Voogt et al. 2016, p. 1).

The TPACK framework can be used as a tool to offer insight into how the intricacy inherent in teaching and learning with technology can be approached to promote teacher growth (Spires et al. 2013, p. 35). Additionally, and more relevantly to this research project, TPACK might advance the current understanding of the types of knowledge language teachers have and the knowledge they need to achieve in order to develop thoughtful and pedagogically sound approaches to integrate digital literacy practices such as machinima into the classroom.

1.2 Scope of the Thesis

Given the many research studies discussed above that identify teachers as one of main factors impeding the integration of digital literacies into the classroom and, frequently, openly blame teachers for the lack of change and innovation using digital media in language classrooms, primarily because of their own disengagement with digital literacies, this study set out to investigate language teachers' existing TPACK in the context of using digital literacy practices. More exactly, this thesis looks at teachers' knowledge of multimodal meaning-making while engaging in inherently multimodal digital literacy practices such as machinima. Thus, responding to repeated calls for professional development programs to provide teachers with hands-on opportunities to reflect on digital tools affordances that transform the very nature of literacy by engaging them creatively and innovatively with digital literacies for their own authentic purposes, this thesis looks at language teachers' existing TPACK while they discover on their own in a professional development setting the relationship between digital technologies and multiple literacies.

Despite that 'improving teachers is a trending topic internationally' (Knobel & Kalman 2016, p. 1), the purpose of this study was not to help teachers become better at mastering the digital literacy of machinima but rather to investigate their understanding of how such literacy practices affect the way meaning is made (multimodally) and the way they can relate to others (collaboration, coaction). Thus, the study proposes that a better understanding of teachers' disengagement with digital literacies can be gained through a better understanding of their existing TPACK.

A dialogue between theory and insights into teachers' own views and practices can enrich our understanding of teachers' TPACK in general and their Content Knowledge and its interplay with the Technological Knowledge domain in particular. Thus, this study used TPACK as a theoretical framework and machinima as a digital literacy practice to examine how teachers view new digital literacy practices and how they themselves carry out and participate in multimodal literacy practices so as to understand their design process of a machinima video.

The fundamental multimodality of machinima can be a powerful tool for challenging language teachers' assumptions about literacy particularly their disproportionate reverence for the printed word as it requires multimodal design and 'it offers new possibilities for expression' (Lowood 2006, p. 36). In creating a machinima film, teachers are forced out of the comfort zone of monomodal production of meaning as they need to combine spoken words, images, sound, music and camera action (Burn 2009). Machinima allows for a deep understanding of the transformative effect technology has on literacy and language and the shift from monomodal to multimodal communication of meaning. Drawing on and orchestrating several multimodal resources to

communicate a meaningful message is at the heart of machinima and once teachers have had these experiences themselves by focusing their attention on how modes work together they may realise the transformative effect on the concept of literacy and meaning-making.

The purpose of the present study is then to examine the TPACK of English language teachers as revealed by their participation in a professional development course entitled *Multimodality and Machinima* in order to understand their cognition in relation to digital literacies and their views and practices of the multimodal communication of meaning in the context of using tools such as machinima. Therefore, a pilot teacher professional development course has been devised to allow the study of teachers' knowledge as well as to give them hands-on practice with digital literacies. The professional learning course, *Multimodality and Machinima*, is operationalised by the use of machinima and emphasises production since it is the actual production process that challenges 'the sufficiency of static understandings of mono-modal academic literacies' (Sheridan & Rowsell 2010, p.12). Seeking to understand teachers' knowledge as they participate in the machinima making project, this study also makes the production process the unit of analysis so as to allow the researcher to gain insights into and give an account of the knowledge and processes teachers draw on to complete the project. The study aims to illuminate the nature and workings of teachers' Content Knowledge when interacting with this increasingly popular species of multimodal communication of meaning, machinima. It discusses teachers' perception and enactment of the affordances for meaning-making embedded in the programs used for the creation of a machinima video as well as the overcoming of the constraints of the same tools. This study was designed to bring a fresh perspective on

language teacher education and to allow an in-depth exploration and analysis of language teachers' crafting process of a machinima project as well as the extent to which engagement with such a practice expands their understanding about the changing landscape of literacy in relation to second language education. By analysing language teachers' production process, how they assign meaning to semiotic resources, how they construct multimodal texts to convey their intended meaning, the extent to which they do indeed give priority to the linguistic mode, the researcher hopes to make a contribution to the reconceptualisation of language teachers' TPACK, particularly to the Content Knowledge domain whose monomodal current conceptualisation might constitute one of the biggest impediments to the effective integration of digital literacies in the classroom.

While in the field of second language learning and teaching, researchers have studied how students carry out new literacy practices such as composing digital multimodal texts (Burn 2009; Hafner et al. 2015; Nelson 2006; Walsh 2007; Thomas 2008), limited studies have explored language teachers' crafting process of multimodal composing to gain a better understanding of their disengagement with digital literacies. Thus, this thesis aims to extend understanding about language teachers' cognition in relation to digital literacies.

Through the machinima production experiences, teachers create new images of themselves as designers and producers of multimodal meaning-making, experience the empowerment of authorship and acknowledge the multiple dimensions of meaning-making, and how technology facilitates its multimodal communication and enables natural processes such as synaesthesia. In other words, engagement with machinima during the professional development course situates teachers as designers and producers of multimodal meaning and not just

as consumers or passive recipients. Teachers work in pairs to create a machinima video in order to experience the empowerment of authorship and the transformative effect of technological tools on literacy, whilst also allowing the researcher to examine the complex interplay between their Content Knowledge and Technological Knowledge domains, ie. the knowledge and processes they draw on to construct meaning multimodally with digital tools.

Thus, the professional development course gives teachers opportunities to transform their views of what counts as literacy. The approach to professional development taken in this study takes into account teachers' personal experiences with technologies responding to calls for the integrations of teachers' voice and experience in the development of professional development, while also allowing them to reflect critically on their conceptualisations of literacy and to examine and challenge their dominant assumptions. It is important to stress that the focus in this study is on how digital literacies are conceptualised and practiced by the teachers rather than on how technologies such as machinima can 'fix' problems. In other words, attempts are made to make teachers aware of affordances for multimodal meaning-making in more recent technologies while the professional development course was designed to give teachers an opportunity to explore the impact of such digital practices on language learning.

With the transformation of new technologies and ever-evolving definitions of digital literacies, this study argues that investigation of teachers' digital literacies and their development is crucial.

Interviews were collected and teachers' work on producing machinima videos was recorded in order to document how they make meaning multimodally by

constructing various mode relationships. Primarily aimed as the main data source for this project, the course was designed to provide the means for the investigation of teachers' Technological Pedagogical Content Knowledge (TPACK) in the context of using machinima to create multimodal ensembles. Participants' perceptions of what literacy is and what the impact of technology on literacy is, were investigated before and after the course to understand whether the practice of multimodal meaning-making with machinima effects a change in perceptions. In relation to employment of multimodal resources, it was found that during the process of multimodal authoring, teachers used their existing knowledge of multimodal meaning-making and enacted affordances of the technologies at hand to construct mode relationships while also developing their awareness and understanding about the relationship between digital technologies and literacies.

1.3 Research questions

To date very little attention has been given to the knowledge that teachers need to foster digital literacies in the classroom. Since teachers are identified as a key factor in student achievement but many of them often lack digital literacies, the researcher sets out to investigate teachers' TPACK and the extent to which engagement with digital literacy practices such as machinima has the potential to challenge their assumptions about digital literacies. Thus, language teachers' existing beliefs about the impact of digital technologies on the concepts of language and literacy are explored alongside the knowledge and processes they draw on while using tools whose affordances make new forms of interaction possible and give rise to unique and creative ways of making meaning (Jones & Hafner 2012, p. 68). As discussed earlier in this chapter, exploring with teachers

the beliefs they have about the importance, efficacy and implementation of digital technologies and empowering them to appropriately use technology is an essential part of the process of encouraging teachers to change their practices (Motteram et al. 2013, p. 58).

Thus, the TPACK framework and ecological perspectives on language learning (Kramsch 2008; van Lier 2000; 2004), alongside tools from unified discourse analysis and multimodal analysis have been used to investigate the following research questions:

1) What does the investigation of teachers' TPACK in the context of engaging with digital literacy practices such as machinima reveal about their assumptions about digital literacies? Specifically, what are teachers' views and practices of meaning-making and what knowledge and processes do they draw on when the focus is on semiosis?

2) What principles for the design of professional development framed by TPACK and aimed at effective integration of digital literacies can be derived from the case study results?

1.4 Thesis outline

Chapter 2 of this thesis reviews the literature on the subject of digital literacies and their affordances for new ways of making meaning, doing and interacting with others, or, in other words, affordances for multimodality and coaction. Chapter 3 introduces machinima as an example of such a digital literacy practice. In Chapter 4, the theoretical framework, TPACK, is discussed and the research design outlined. Chapter 5 provides a presentation of the teachers participating in

this study, outlines the design and implementation of the *Multimodality and Machinima* course and discusses the concepts used in the analysis of teachers' machinima production process as well as methodological choices. In Chapter 6, teachers' design and creation of machinima videos is analysed, with a focus on the interplay between teachers' existing CK and TK as revealed by their perception and enactment of affordances for multimodal meaning-making. In Chapter 7, the teachers' machinima production experience is mapped onto the TPACK framework to identify their assumptions about digital literacies and their role in the language classroom. Chapter 8 summarises the findings of the empirical analyses and proposes a reconceptualised TPACK model for professional development models designed to increase language teachers' awareness of the transformative effect of digital tools on language learning and teaching. It also discusses the limitations of this study and notes implications for an agenda of ongoing research on the development of TPACK for integration of digital literacies in second language education.

CHAPTER 2 DIGITAL LITERACIES

Even though the concept of digital literacies has been increasingly discussed lately, it remains a complex topic whose terminology is still very confused (Bawden 2008, p. 17). This chapter examines the notion of digital literacies and its ambiguous nature as well as two dimensions of our daily lives that digital literacies are drastically changing, i.e. our ways of making meaning and doing things in collaboration with others (Jones & Hafner 2012).

The chapter begins by looking at how the origins and development of the idea of digital literacies are discussed by the researchers in the field. It continues with an exploration of the ethos and technical dimensions of digital literacies. This is followed by an account of how language and language learning are conceptualised by digital literacies and ecological Computer Assisted Language Learning scholars.

The remainder of this chapter focuses on the affordances of digital literacies for transforming the ways in which we make meaning and interact with others. Given the numerous ways in which digital literacy practices affect the notion of literacy, the chapter explores only two dimensions that are particularly relevant to this study. Thus, section 2.3 discusses the new ways in which meaning can be made via digital technologies. Specifically, this section introduces the concept of multimodality while also looking at the various mode relationships that can be built via digital technologies. Next, a short description of processes such as synaesthesia that are afforded by digital literacy practices is provided. In section 2.4, the affordances of digital literacies for new ways of doing things, i.e. through

coaction are examined. In short, sections 2.3 and 2.4 explicate the notions of multimodality, synaesthesia and coaction since a grasp of these concepts in the specific sense in which they are meant here is crucial to the development of the arguments to follow in this study. The chapter concludes with a few words on machinima as an example of a digital literacy practice which is then discussed in greater depth in Chapter 3.

2.1 Genesis and evolution of digital literacies

The idea of a 'turn' has been used by educators and researchers to signal 'large-scale, even paradigmatic shifts in thinking and practice within a field of study' (Knobel & Kalman 2016, p. 5). Sheridan and Rowsell (2010) discuss two 'turns' that have played a major part in the reconceptualisation of the notion of literacy, i.e. the social and the semiotic turns.

An expansion of the definition of literacy can be traced back to the 'social turn' that took place in the 1980s and 1990s when researchers in 'the new literacy studies' (Scollon & Scollon 1981 cited in Jones & Hafner 2012) pointed to the need to broaden understandings of the 'seemingly-straightforward' notion of literacy (Belshaw 2012, p. 13) and the contexts within which it happened. According to Belshaw (2012), the New Literacy Studies (NLS) approach is part of the wider social turn that triggered a shift in 'focus away from individual minds towards social interactions' (p. 150). Even though the NLS proponents, a group of interdisciplinary academics including Street, Gee and Barton, continue to view literacy in a traditional manner, as reading and writing, they approach the concept from a sociocultural viewpoint, thus moving away from defining it as a merely cognitive process. They argue that literacy 'must be understood as operating

within social and cultural contexts' (Belshaw 2012, p. 150). The New Literacy Studies approach to literacy is eleoquently explained by Gee:

> The NLS opposed a traditional psychological approach to literacy. Such an approach viewed literacy as a 'cognitive phenomenon' and defined it in terms of mental states and mental processing. The 'ability to read' and 'the ability to write' were treated as things people did inside their heads. The NLS instead saw literacy as something people did inside society. It argued that literacy was not primarily a mental phenomenon, but rather a sociocultural one. Literacy was a social and cultural achievement—it was about ways of participating in social and cultural groups—not just a mental achievement. Thus, literacy needed to be understood and studied in its full range of contexts—not just cognitive but social, cultural, historical, and institutional, as well (2010, p. 10).

Therefore, the 'social turn' recognises the expanded contexts in which literacy and literacy learning occur and shifts the focus from conceptualisations of literacy as just 'a matter of things going on inside people's heads' (Jones & Hafner 2012, p. 12), a decontextualised cognitive skill of encoding and decoding words and sentences toward seeing it as a socially situated practice in the context of literacy events (Barton & Hamilton 1998).

NLS theorists also argue for a plurality of literacies because texts can be read in different ways. For example, the Bible can be read from a religious, historical or hermeneutic point of view meaning that "literacy always involves 'apprenticeship' to a group" (Belshaw 2012, p. 150). Belshaw (2012) notes that 'being literate is always being literate *for* entry into a particular community or group' (p. 150) and, consequently,

> People do not just read and write in general, they read and write specific sorts of 'texts' in specific ways; these ways are determined by the values and practices of different social and cultural groups (Gee 2010, p.11 cited in Belshaw 2012, p. 150)

As a cultural, social activity, literacy is something people do (Sheridan & Rowsell 2010, p.10). People read and write in certain ways for specific purposes in specific contexts to be part of particular communities (Jones & Hafner 2012; Sheridan & Rowsell 2010, pp. 10-11). In other words, reading and writing are carried out in the service of social goals in particular social contexts (Serafini 2014).

Thus, the traditional notion of literacy as a cognitive skill has been replaced with the increasingly widely accepted perspective advanced by NLS scholars that literacy is multiple, a set of social skills and practices—ways of participating with larger communities. This definition not only emphasises the multiple character and, above all, the social dimension of literacy but also challenges autonomous views of the term, views that posited 'a lone learner or a solitary genius' (Sheridan & Rowsell 2010, p.10).

To sum up, literacy scholars attempt to make clear that literacy is a matter of various interpersonal and social processes (Jones & Hafner 2012, p. 12). Literacy is viewed as a social phenomenon, a way of relating to others and showing them who we are, a way of doing things in the world, and a way of developing new ideas about and solutions to the challenges we are facing (ibid).

The perspective that literacy is a socially situated practice linked to people's identities, having multiple forms (Barton & Hamilton 1998; Street 1984) gives rise in the literature to discussions about social and cultural practices upon which literacy may be predicated (Belshaw 2012, p. 58) and holds two principles as central, i.e. literacy events and literacy practices (Tour 2015). According to Barton and Hamilton (1998) events are 'observable episodes' (p. 7) while practices are 'non-observable' because they are 'the general cultural ways of

utilising written language which people draw upon in their lives' (Barton & Hamilton 1998, p. 6). Tour (2015) notes that 'people's literacy practices are always connected to their values, beliefs, and attitudes as they always bring their cultural knowledge and understandings when they read or write' (pp. 125-126).

Belshaw (2012) proposes two thought experiments to illustrate that literacy is both culturally and historically situated. First, he discusses the hypothetical case of a 21st century person taken as they are and transported to a village in a country whose language they are not familiar with. That person would be unable to read anything written down by the villagers or write themselves in a way in which the village community would understand. Thus, that individual cannot and would not be considered 'literate' in that community. The second thought experiment suggested by Belshaw involves a time frame. More specifically, Belshaw provides the example of an English monk from the 10th century that somehow is being transported to modern day England. Despite some similarities between certain words in Old English and Latin and their modern-day equivalents, the monk would still struggle to communicate. Moreover, he would be limited, at least in the beginning, to being able to use only those technologies available to him in the 10th century. As a result, Belshaw argues, the monk would not be fully 'literate' in a 21st century sense of the term. Belshaw uses these two examples to clearly demonstrate that literacy depends upon culture and has a historical aspect. In fact, he adds, literacy must include the latter for community and cultural cohesion since 'generations have to be able to communicate with one another effectively. Literacy evolves rather than is created anew. " 'Participation in culture' is perhaps the best term to use as one can participate in something without actively creating or altering what is there" (Belshaw 2012, p. 63).

If the 'social turn' recognises the expanded contexts within which literacy occurrs, the 'semiotic turn' recognises an expanded variety of modes such as the visual, gestural, audio, spatial modes that are pervasive in everyday modern communication. Thus, the semiotic turn is credited with opening up textual formats to include the multimodality that is naturally invoked in communication (Sheridan & Rowsell 2010, p.11). Interestingly, Knobel and Kalman (2016) note, new kinds of texts often are 'seamlessly multimodal' (p. 5) and highly collaborative thanks to cloud-based interfaces which allow multiple authors to work on a literacy text at the same time (ibid). Kalman and Knobel (2016) take Facebook as an example and point out that its interface enables users to post text, emoticons, images, sounds and video clips while their friends can write on their timeline or share photos, videos and songs and so on (p. 5).

In short, the semiotic turn posits that literacy is not only alphabetic print, but inclusive of multiple modes and emphasises that while the linguistic mode remains a priviliged mode of communication, proficiency in the linguistic mode is no longer sufficient since successful contemporary communication requires being literate across multiple modes (Sheridan & Rowsell 2010). Sheridan and Rowsell also point to the importance of acknowledging that 'multimodal composing responds to and is part of large-scale social, technological, and economic changes' (2010, p.11). Belshaw (2012) argues that the rapid pace of innovation in new technologies is one of the factors causing problems for conceptions of literacy since literacy is based on technologies used to encode and decode texts. He notes that so far traditional literacy has been a very stable concept with a definite meaning to most people because it is being predicated upon a technology— paper—that has not changed significantly for centuries (p. 191).

According to Sheridan and Rowsell, the two turns briefly discussed above, namely the social and semiotic turns came together in the 1990s and 2000s, inspiring researchers to explore a wider range of places and text formats in their investigation of what it meant to be literate (2010, p. 9). Furthermore, definitions of literacy have been expanded as evident in a significant number of studies that advance an epistemology of plurality. Among these, the sociocultural approaches to literacy such as NLS mentioned above (Barton 1994; Gee 1996; Street 1995) have argued that literacy is multiple and not just one thing.

New Literacies research focuses on 'more recently developed literacy practices which are often (but not always) associated with new technologies like computers and the internet' (Jones & Hafner 2012, pp. 12-13). Work on Multiliteracies (or multiple literacies)—a notion which was coined and developed in 1996 by the New London Group, a team of literacy educators from various English-speaking countries—refers to the reconceptualisation of literacy as a response to the increasing complexity and multimodal nature of texts (New London Group 1996). The NLG expressed their concerns about the inequalities that exist in education and called for literacy education to recognise the social diversity of contemporary forms of literacy and the fact that new communications digital media require new forms of cultural, multimodal communicative competence (Cope & Kalantzis 2000; Kalantzis & Cope 2012; New London Group 2000). New Media Literacies studies explore new media literacies, 'a set of cultural competencies and social skills that young people need in the new media landscape' (Jenkins et al. 2006, p. 4) and point out that the concept of 'participatory culture' is central to their conception of new media literacies (ibid). Participatory culture is characterised by

low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices (Jenkins et al. 2006, p. 3).

From a new media literacies perspective, using new media blurs 'the boundaries between mass communication and interpersonal communication, and between producers and consumers' (Buckingham, 2003, p. 310 cited in Lankshear et al. 2013, p. 3).

Finally, studies on Digital Literacies (Jones & Hafner 2012; Lankshear & Knobel 2008) are based on previous attempts to extend the notion of literacy beyond its traditional emphasis on alphabetical literacy (Cope & Kalantzis 2009, pp. 2-3) and its original application to the medium of writing (Buckingham 2007) to entail that literacy means socially situated practices in the context of literacy events (Barton & Hamilton 1998). Thus, the point that literacy is, in fact, a plural concept which includes not just individual skills and competencies located in individual minds but social practice has taken on 'added significance in the digital era' (Dudeney et al. 2013, p. 3). Coiro et al. (2008a, p. 5 cited in Lankshear et al. 2013, p. 2) make the point that literacy has come to mean 'a rapid and continuous process of change in the ways in which we read, write, view, listen, compose and communicate information'. The explosion of the Internet and rapidly emerging new technologies drive reconceptualisations of literacy which now seems to have 'meaning only on a case-by-case, context-by-context basis' (ibid).

In the preceding decades, literacy scholars talked about specific literacies such as 'visual literacy' and 'multiliteracies'. However, with the advent of web 2.0 a search for a term more in keeping with the Internet age began. As such an

explosion of interest in new—especially digital—literacies came (Dudeney et al. 2013, p. 3).

The concept of digital literacy was introduced by Paul Gilster in 1997, in his book of the same name which, in fact, constituted 'the first extended English-language treatment' of the term (Lankshear & Knobel 2008, p. 4). It also marked the beginning of a real discussion of the notion (Bawden 2008). Gilster was not the first to use the phrase 'digital literacy', which was applied throughout the 1990s by a number of authors to mean essentially an ability to read and comprehend information items in the hypertext or multimedia formats which were then becoming available (Bawden 2001 cited in Bawden 2008, p. 18). Gilster (1997, p. 1) defines digital literacy as 'the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers' (ibid). It is therefore the current form of the traditional idea of literacy—the ability to read, write and otherwise deal with information using the technologies and formats of the time (Bawden 2008, p. 18). This, says Bawden, is quite simply 'literacy in the digital age' (ibid). However, unlike traditional literacies, digital literacies are mediated by digital tools (Jones & Hafner 2012, p. 35). Pen and paper, typewriters and printing presses are used to mediate the activities of reading and writing but with the development of digital media they are being replaced with digital tools such as computers and other digital devices (ibid). Therefore, digital literacies are fundamentally different from conventional print literacies in that their inscriptions are rendered via digital code rather than by material means that are printed and illustrated by hand, typewriter or press (Knobel & Kalman 2016, p. 5).

The concept of 'mediation' is central to Jones and Hafner's (2012) approach to digital literacies. Drawing on Vygotsky (1978), the two scholars point out that all:

> human actions are mediated through tools, either technological tools, like telephones and computers, or symbolic tools like languages and other semiotic systems. The crux of the concept of mediation is that we cannot interact with the world without doing it through some kind of medium, and the media the we use play an important role in determining how we perceive the world and the actions we can take. (Jones & Hafner 2012, p. 99).

Following Vygotsky's insight that all interaction—and indeed all human action—is in some way mediated and that all learning involves learning how to use some kind of tool that facilitates interaction between an individual and the thing or person he or she is interacting with, Jones and Hafner (2012) provide a few straightforward examples to clarify the role of tools in all interactions:

> To learn to eat, you have to learn to use a spoon or a fork or chopsticks, which come between you and the food and facilitate the action of eating. To learn to read, you have to learn to use language and objects like books that come between you and other people and facilitate the action of communication (p. 2).

Jones and Hafner further argue that the affordances and contraints of digital tools shape new emerging literacy practices since, in many ways, 'digital media are breaking down boundaries that have traditionally defined our literacy practices' (Jones & Hafner 2012, p. 13). For instance, digital media are breaking down boundaries of time and space since, thanks to digital technologies, people can engage in literacy practices that were previously confined to particular physical spaces such as classrooms, libraries, offices and so on and particular times (ibid). Another example is the way digital media are blurring the traditional barriers

between media producers and media consumers (Jones & Hafner 2012, p. 13) a point which is discussed in greater depth in Section 2.3.

Although a consensus is growing around what digital literacies mean, the term remains, like many others in the field of new literacy studies, vaguely defined. However, even though 'a unified definition of digital literacy, or literacies, is yet to emerge' (Meyers, Erickson & Small 2013, p. 360 cited in Hafner et al 2015, p. 2), researchers such as Jones and Hafner (2012) broadly characterise it as "the practices of communicating, relating, thinking and 'being' associated with digital media" (p. 13). They add that in their view 'understanding digital literacies means in part understanding how these media themselves may affect the kinds of literacy practices that are possible' (ibid). While Jones and Hafner (2012) do not want to suggest that 'new practices of reading and writing are determined solely by the affordances and constraints of the new digital tools available', they emphasise that:

> an understanding of these affordances and constraints is important, but developing digital literacies means more than mastering the technical aspects of digital tools. It also means using those tools to do something in the social world, and these things we do invariably involve managing our social relationships and our social identities in all sorts of different and sometimes unpredictable situations. (p. 13).

Dudeney et al. (2013) define digital literacies as 'the individual and social skills needed to effectively interpret, manage, share and create meaning in the growing range of digital communication channels' (p. 2). Importantly then, the concept of digital literacies encompasses a wide range of social practices that people engage in when using digital media, going beyond mere technical competencies required to operate digital tools (Hafner 2013, p. 830; Knobel & Lankshear 2007). This is

in line with Lankshear and Knobel (2008) who maintain that the term digital literacies can be thought of as

> a shorthand for the myriad social practices and conceptions of engaging in meaning-making mediated by texts that are produced, received, distributed, exchanged, etc., via digital codification (p. 5).

The notion of digital literacies that this study follows is the one proposed by Jones and Hafner (2012) and is based on principles developed in the new literacy studies which as discussed above view literacy as a socially situated activity, with different ways of communicating adopted according to the goals of writers and readers and the social relationships between them (Hafner et al. 2013, p. 813). For the purpose of this study, it is important to think of digital literacies as 'the practices of communicating, relating, thinking and 'being' associated with digital media' (Jones & Hafner 2012, p. 13) and enacting affordances and overcoming constraints of digital tools. In other words**,** digital literacies involve not just being able to operate tools like computers, tablets and mobile phones, but also the ability to adapt the affordances and constraints of these tools to particular circumstances. While this definition focuses on the digital dimension of digital literacies, it is not the actual tools that take centre stage but the process through which people appropriate these tools to successfully carry out particular social practices (ibid).

Jones and Hafner (2012) warn us that while their conceptualisation of digital literacies may sometimes seem to dwell on the affordances and constraints of new technologies, on the technological dimension, their focus is, in fact, on the process of 'mediation' or 'the process through which people appropriate these tools to accomplish particular social practices' (p. 13).

In other words, digital literacies are viewed as literacy practices accomplished through enactment of affordances which allow for making meaning in new ways, enacting new identities and doing things in new ways. As such, digital literacies can be narrowly defined as social practices or more broadly defined as communication through digital codification.

Importantly, these practices go beyond mere technical competencies to encompass the development of a particular way of thinking or 'mindset' (Knobel & Lankshear 2007). Even some of the earliest definitions of digital literacies such as the one advanced by Gilster (1997) state explicitly that 'digital literacy is about mastering ideas, not keystrokes' (pp. 1-2)—thus pointing out that it is essential not to fall into the trap of views that limit the term to 'technical skills' (Bawden 2008, pp. 18-19). In a nutshell, digital literacies here are considered from a sociocultural perspective and include two dimensions: a technical one and a different 'ethos' (Lankshear and Knobel 2011). The ethos dimension that characterises new literacies applies to recent conceptualisations of digital literacies and it, in fact, sets them apart from simply being conventional literacies in a digital form. Thus digital literacies are 'participatory, collaborative, and distributed, and less 'published', less 'author-centric' and less 'individual' than conventional literacies' (Knobel & Kalman 2016, p. 6). Asking students to write reviews about a book using a private discussion board, for example, does not constitute a new literacy practice that actually embodies 'the ethos' of digital literacies since the task could be easily achieved with pen and paper or face-to-face dialogue. Rather, the task strips digital literacies of their newness and colonises them to current teaching practices (Knobel & Kalman 2016, p. 6).

According to Knobel and Lankshear (2014, p. 98 cited in Knobel & Kalman 2016, p. 6), the ethos dimension is visible in new digital literacy practices when participants:

> actively seek out memberships and peers in areas of affinity and interest and pursue different kinds of relationships between 'authors' and 'audiences' from those characterizing many conventional literacy practices. They generally value attending to the interests and knowledge of others, recognize that quality is judged by groups rather than appointed experts, welcome diversity of opinion in decision-making, and so on.

It becomes very important, therefore, that professional development endeavours take both dimensions of new literacies very seriously (Knobel & Kalman 2016, p. 6).

2.2 Digital literacies vs. Computer Assisted Language Learning

Some digital literacies scholars such as Jones (2016) point to the need to make a clear distinction between the study of digital literacies and that of Computer Assisted Language Learning (CALL), the model which has dominated the field of applied linguistics for the past two decades (p. 286). Jones argues that conceptualisations of language and language learning in a digital literacies framework differ radically from those proposed by some CALL researchers (ibid). More explicitly, learning a language in the digital age, the kinds of skills and social practices that one must have in order to be a productive member of the modern society, has shifted as a result of the changes in the communication landscape made possible by digital technologies (Hafner et al. 2015, p. 1). Language learning transcends learning grammar and lexis and involves a whole host of new 'communicative competencies' including the ability to construct

knowledge collaboratively through online platforms and create multimodal texts that combine visual, aural, textual and other resources made available by digital technologies for meaning-making (Hafner et al. 2013; Jones 2014). In addition to knowing how to combine the target language with other modes of communication to make meaning which constitutes an important part of language learning within a digital literacies framework (Hafner 2014; Hafner et al. 2015; Jones 2014; Tour 2015), digital literacies researchers share a perspective on language learning as a sociocultural process, which views reading, writing, and communicating as situated, goal-oriented activities, inextricably tied to their contexts (Hafner et al 2015, p. 2).

Digital literacies and CALL, Jones (2016) adds, approach the relationship between language learning and technology from different perspectives because their basic assumptions about technology, language and language learning are starkly different (p. 286). Firstly, in the CALL paradigm, digital devices and the Internet are seen as 'delivery mechanisms for language leaning materials' or 'facilitators of language learning activities' (ibid) while the user of digital technologies is viewed as a 'learner' whose interaction with technology is discussed in terms of usually cognitive processes of learning. Secondly, language is often conceptualised as a discrete and purely linguistic system of meaning-making which can be clearly identified as, for example, 'English' or 'French' (ibid). Thirdly, CALL continues to promote the same kind of 'container' metaphor associated with other forms of classroom instruction, i.e the process of learning is 'contained' within physical or virtual spaces, times, and domains of activity (ibid).

Digital literacies, on the other hand, view digital devices and the Internet as 'environments' in which people engage in various social practices (Gee & Hayes, 2011; Lam & Kramsch, 2003 cited in Jones 2016, p. 286) while computer users are considered social actors involved in practices rather than learning. They are seen as " 'participating' in social groups in ways that afford gradually fuller opportunities to engage in these groups" (Lave & Wenger, 1991 cited in Jones 2016, p. 287). Learners' computer use is not regarded as a means for facilitating language learning. Rather, a digital literacies framework considers how 'language learning serves as means for facilitating learners' participation in various real-world social practices using computers' (Jones 2014, pp. 3-4).

Language in the digital literacies paradigm is considered one of the many resources that social actors employ to show themselves to be competent members of their communities. Conceptualisations of language in this model often "defy traditional labels like 'English' or 'French' since the 'language' people use in digital literacy practices usually involves unstable hybrids or 'remixes' of codes, modes, and 'voices' deployed in inventive and strategic ways" (Jones 2016, p. 287). Jones (2014) quotes Barton and Potts (2013, p. 816) as saying the way learners engage with language in out-of-school digital practices

> is not the ordered acquisition of grammatical forms, conformity to powerful genres of institutional educational discourse, or the patterned social interaction that dominates communicative language textbooks. Rather, people are taking it upon themselves to master the situated, contingent registers that are used to get things done in life, registers which pattern across contexts of use but which nonetheless are individuated, particular, and dynamic (Jones 2014, pp. 3-4).

A digital literacies framework based on principles of NLS acknowledges that learning a language, especially in the digital age, goes beyond 'mastering an

abstract code or set of decontextualised skills' (Jones 2016, p. 287). It also 'goes beyond the insistence of adherents of communicative language teaching that language is learned more effectively when learned within the context of social practices to insist that language cannot be separated from the social practice in which it is used' (Jones 2016, p. 287). Jones (2016) draws on van Lier (2004), one of the proponents of an ecological perspective on language and language learning to support the importance of context in a digital literacies framework. Jones cites the latter as saying that 'if you take the context away, there is no language to be studied…it's context all the way down' (van Lier 2000, p. 20 cited in Jones 2016, p. 287).

Digital literacies studies take as the object of study 'literacies' rather than 'language learning'. As discussed above, literacies encompass participation in concrete social practices in ways that allow social actors to show themselves to be competent members of communities. Importantly, Jones asserts, participating in social practices always involves more than just making meaning. It also involves 'doing' things, 'relating' to others, 'being' a certain kind of person (Jones & Hafner, 2012; Jones 2016). This is not to say that language learning is not important. According to Jones (2016), the foundational idea of digital literacies studies is that language learning encompasses proficiency in particular social practices, such as Facebooking, Instagramming, Tweeting, memeing and gaming of various kinds (p. 287). Language learning involves being able to communicate in the target language using modes and media of communication that introduce new sets of affordances and constraints on what can be done with the language. Speaking a language in the digital age involves new 'communicative competencies' such as the:

ability to search for and critically evaluate large quantities of information in online databases; construct meaningful reading paths through hypertext documents; comment on the online writing of others in appropriate ways; construct knowledge collaboratively through online platforms like blogs and wikis; create multimodal texts that combine visual, aural, and textual information, remix online texts creatively; and interact appropriately with others in a range of online spaces (Hafner et al. 2013, p. 813).

One other final difference between the two paradigms, digital literacies and CALL, is that digital literacies researchers attempt to understand how people use language in their lifeworlds, looking outside the classroom walls to accomplish this goal. The 'container' metaphor is thus replaced with metaphors of 'connectivity' and 'mobility' (Jones 2016, p. 287).

According to Jones (2014; 2016), a primary preoccupation of digital literacies scholars is on the ways language learning is embedded into students' daily participation in digital literacy practices, practices in which students use language to align themselves with particular social groups, and to enact various identities (Jones 2014, p.3). Digital literacies studies are concerned with

> how language learning occurs in the context of situated social practice and the role it plays in social identity and membership in communities. And rather than ignoring classrooms, they are seen as key sites into which social actors import their everyday literacy practices, sometimes in ways commensurate with traditional classroom practices, and sometimes in ways that conflict with or contest them (Jones 2010 cited in Jones 2016, p. 287).

There is then more interest in the literacies students use in their lifeworlds and then bring into the classroom and how these literacies interact with more formal processes of learning than with using technology to reinforce the traditional pedagogies of the formal syllabus (Jones 2014, pp. 3-4).

2.2.1 Ecological CALL

As is clear from the above discussion, some digital literacies scholars consider the paradigm of digital literacies to be in stark contrast with a traditional model of CALL. However, this study adopts an ecological, rather than traditional, perspective on CALL (Blin 2016; Lafford 1991) and, at times, uses the two terms, digital literacies and CALL interchangeably.

Blin cites Lam and Kramsch (2003) in her discussion of the role and contribution of the 'ecology metaphor', borrowed from the natural sciences, to Second Language Acquistion (SLA) research. Thus, the metaphor is used 'to capture the interconnectedness of psychological, social and environmental process in SLA' (Lam & Kramsch 2003, p. 144 cited in Blin 2016b, p. 40).

Blin (2016) uses the term 'ecological CALL theory' to discuss paradigms which

> 1) place a strong focus on the context of language learning, language use, and technology use as well as on the relationship between them; 2) explore language learning and language use across multiple timescales and spaces; 3) view the relationship between perception and action (i.e., affordances) as core to learning processes (p. 2).

Both Jones's account of digital literacies and Blin's ecological perspective of CALL draw on the work of van Lier (2004, 2008) to conceptualise language and language learning. Both advance a view of language as 'part of larger meaning-making resources that include the body, cultural-historical artefacts, the physical surroundings, in short, all the affordances that the physical, social, and symbolic worlds have to offer' (van Lier 2008, p. 599 cited in Blin 2016, p. 3) as well as a strong focus on the importance of context. 'Language does not exist in a vacuum' (van Lier 2004, p. 55) and knowing a language does not mean possessing a store

of linguistic structures, rules, words and phrases (van Lier 2000, p. 253) but rather:

> knowledge of language for a human is like knowledge of the jungle for an animal. The animal does not 'have' the jungle; it knows how to use the jungle and how to live in it. Perhaps we can say by analogy that we do not 'have' or 'possess' language, but that we learn to use it and to 'live in it' (ibid).

Digital literacies (Jones & Hafner 2012; Jones 2014; Jones 2016) and ecological CALL (Blin 2016b) share van Lier's (2008) view that language is a 'process of creating, co-creating, sharing, and exchanging meanings across speakers, time and space' (p. 599) rather than a set of decontextualised skills or an abstract code to be acquired**.** According to ecologist perspectives outlined by van Lier (2008) language cannot be 'boiled down' to mere words, spoken or written, or to 'a static system that can be described in terms of its inner structure and components' (p. 599) nor can it be 'quarantined', or separated from the various ways of communicating and making sense of the world that we use. In other words, gesture, expression and movement cannot be stripped away from the verbal message, and meaning-making cannot be boiled down to syntax or lexical constructions (van Lier 2004, p. 24; van Lier 2008, p. 599).

2.2.2 The concept of 'affordances' in digital literacies and ecological CALL paradigms

Digital literacies and ecological CALL hold the concept of affordances as central. The term comes from studies in ecology, an area which looks at the interrelation between an organism and other elements in an ecosystem. It was coined by the American psychologist Gibson to refer to a reciprocal relationship between an organism and a particular feature of its environment (1979). van Lier notes that an

affordance is 'a particular property of the environment that is relevant to an active, perceiving organism in that environment' (2000, p. 252). An affordance, he says, 'affords further action without causing or triggering it and what becomes an affordance is dependent on what the organism does, what it wants, and what is useful for it' (ibid). Blin quotes Kaptelinin and Nardi as saying that affordances 'exist irrespective of whether or not they are perceived by the observer' (2012, p. 968 cited in Blin 2016, p. 6). van Lier illustrates the invariant nature of affordances with an eloquent example:

> In the forest a leaf can offer very different affordances to different organisms. It can offer crawling on for a tree frog, cutting for an ant, food for a caterpillar, shade for a spider, medicine for a shaman, and so on. In all cases, the leaf is the same: its properties do not change; it is just that different properties are perceived and acted upon by different organisms (2000, p. 252).

In other words, the affordances of the leaf do not change and are always there but the organisms may or may not perceive or attend to them, according to their needs. van Lier (2000) argues that parallels to language learning can be easily made. He explains that when the learner is active and engaged, affordances will be perceived and used for action and hence for learning (p. 252). The concept of affordance is, therefore, essential to an ecological perspective on first and subsequent language development, which is viewed as

> a result of meaningful participation in human events. Such participation involves perception, action and joint construction of meaning. In such socioculturally organised action, affordances become available as resources for further action (van Lier 2004, p. 53).

While van Lier (2000) explains affordances as properties of the environment that are relevant to active, perceiving organisms in that environment (p. 252), Jones

(2016) points out that all technologies involve 'affordances' and 'constraints' on the social practices we engage in. In other words, technologies allow us 'to do certain things that we would not be able to do without them, and they prevent us from doing other things' (p. 287). Different tools bring with them different kinds of affordances and constraints, thus making some actions more possible and other actions less possible. They increase possibilities for participation in certain kinds of social practices and social groups, and constrain participation in others (Jones & Hafner 2012, p. 99). What is interesting about social practices involving digital technologies, Jones (2016) notes, is 'the way the affordances and constraints of different tools *interact*, the way digital technologies affect the ways we can use language, and the way language (and other semiotic tools) affect the way we can use digital technologies' (p. 288). To illustrate his point, Jones (2016) discusses the ways in which digital technologies allow users to combine different modes and different codes, and how, 'because of this, knowing how and when to combine languages and modes or to shift from one language or mode to another is much more important in digitally mediated communication than in many other contexts (such as traditional, school based literacy practices)' (ibid).

Jones and Hafner (2012) caution us that while emphasising affordances over constraints is a natural reaction to any new technology simply because people have a tendency to focus on the things technologies enable them to do rather than the limitations they might impose, it is essential to take a critical stance towards new media and develop an awareness of both their affordances and constraints, i.e. what they allow people to do as well as what they prevent people from doing (p. 99). Again, new tools enable users to do new things, think in new ways, express new kinds of meaning, establish new kinds of relationships and be

different people while also preventing users from doing other things, of thinking in other ways, of having other kinds of relationships and of being other kinds of people. Drawing on McLuhan, Jones and Hafner (2012) point out that new technologies 'extend' certain parts of us but also 'amputate' other parts. For example, while a microphone allows one to address a large audience at one time, it makes it more difficult for him or her to talk to just one person privately (p. 3).

Jones and Hafner (2012) warn against extreme views such as technological dystopianism, digital technologies are destroying our ability to communicate and interact with one another in meaningful ways, or technological utopianism, the belief that digital technologies will invariably make us all smarter and the world a better place. They point out that mediational means like computers and the internet are neither good nor bad—they simply bring certain affordances and constraints in particular social contexts which people have the ability to respond and adapt to in any number of ways, some with positive social consequences and some with negative ones (p. 11).

They also point out that people inevitably express concerns when new technologies arise because new media usually trigger new ways of doing, meaning, relating, thinking and being and this, in turn, makes people fear that their old ways of doing, meaning, relating, thinking and being are lost or marginalised (Jones & Hafner 2012, p. 11). For example, Jones and Hafner add, writing was declared to be a threat to civilisation by the Greek philosopher Socrates who was adamant that people would lose their ability to remember things and think for themselves under its influence. Similarly, the development of the printing press made some worry that social order would break down as governments and religious institutions lost control of information. The arrival of

cinema caused concern that people would stop reading books and spend all their time watching movies, and that what they watched would compromise their moral character. Television had some worried that it would make people stupid or violent, or both. Unsurprisingly then, many today are concerned about the effects of digital media and the new literacies associated with them on society and on individuals. Some of these concerns are justified, and some are based on emotions and insecurity. Jones and Hafner claim that most of these concerns focus on the five kinds of affordances and constraints discussed above. In other words, some worry that digital media are taking away people's ability to 'do' some of the things we could do before, or allowing people to do things that they don't think they should do. Moreover, some people worry that the ability to make meaning accurately with language might be ruined by digital media while others argue that digital media negatively impact social relationships, causing people to become isolated from others (ibid). Digital media could also be affecting people's ability to construct or follow complex, coherent arguments by causing them to become easily distracted and, thus, changing the way they think. Finally, digital media allow for the enactment of various social identities causing some to worry that these identities might not be genuine or that people might not always have control over how much of their identities and privacy is be revealed (ibid).

While Jones and Hafner acknowledge that some of these concerns are legitimate, they also stress it is important 'to separate the reasonable arguments from those based on emotion and exaggeration' (Jones & Hafner 2012, p. 99). They advise us to take a critical stance towards digital technologies, attempting to discover how these affordances and constraints embed particular ideologies and the agendas of particular people or groups. By 'critical stance' they really mean 'a conscious

stance'—a stance that puts one in the position to " 'interrogate' the ideologies and agendas promoted in the texts encountered via digital media and by digital media themselves" (Jones & Hafner 2012, p. 98).

As an example, the two digital literacies scholars discuss the western media's view that Twitter and other social media played a dramatic role in the Iranian protests in 2009 (Jones & Hafner 2012, p. 98). Utopians, those who 'uncritically extol the supposedly positive effects of digital media' argued that Twitter was used to organize demonstrations in Tehran and it put a crack in the tyranny in Iran in the summer of 2009. Writer Evgeny Morozov, author of the *Net Delusion* (2011) claims that this portrayal was probably wildly exaggerated as most of the 'tweets' about the protests came from outside of the country rather than inside of it. There is no strong evidence that digital social networking as opposed to word of mouth, for example, played a significant role in the organisation of the protests. Furthermore, the revolution was not successful, independent of whether or not digital media played a role. The government of President Ahmadinejad remained in power and exploited the power of social networking sites to encourage citizens to inform on dissidents (Morozov 2011 cited in Jones & Hafner 2012, p. 98).

The main problem with both digital sceptics and digital utopians, Jones and Hafner (2012) explain, is that they often focus on the technolgoy itself without paying enough attention to the social contexts in which it is used and the intentions of those who use it. They suggest that the first step to taking a critical stance towards digital media is to understand 'both the potential for technology to control us and our potential to exercise control over technology' (p. 99).

As noted above, Jones and Hafner (2012) divide the different affordances and constraints digital media introduce into five different categories: affordances and constraints on what we can 'mean', 'do', how we can 'relate' to others, how or what we can 'think', and, lastly, who we can 'be' (p. 5).

The next section in this chapter looks at the first category, new ways of meaning-making afforded by new media and digital literacies.

2.3 Digital literacies & multimodal meaning-making affordances

Jones and Hafner (2012) point out that new media allow us to make different kinds of meanings than we would be able to make without them. If the lines of print in a book allow for linear meaning-making based on time–first one thing is said, then something else is added to that, multimodal web pages and hypertext, on the other hand, allow for spatial meaning-making, enabling people to explore different parts of the screen and different linked web pages in any order they wish (p. 6). Multimedia, content that is represented as images, audio, video, as well as text, allows for a representation of information and meaning-making using a wider range of modes than is possible in print. Including visual elements with the help of print technologies is more difficult while inclusion of aural elements and moving images is downright impossible (Jones & Hafner 2012, p. 35). Digital technologies have made operations such as inserting a picture on a page 'childishly easy' while in the early days of print, this job posed significant technical challenges (ibid).

Before discussing the concept of multimodality in more detail, it is important to clarify the distinction between the often confused terms 'mode' and 'medium' that have been described in a variety of ways. Jewitt (2004) notes that a medium refers

to technologies of dissemination, such as printed books, computer applications, videos and so on (p. 184). In Jones and Hafner's view, a medium is 'something that stands in between two things or people and facilitates interaction between them.' (2012, p. 2).

A mode refers to any organised, regular means of representation and communication such as still image, gesture, speech, music, writing, or new configurations of the elements of these (Jewitt 2004, p. 184). Kress's definition of 'mode' grounded in social semiotics studies is commonly referenced in discussions of multimodal literacies. A 'mode is a socially shaped and culturally given resource for making meaning' and 'image, writing, layout, music, gesture, speech, moving images are examples of modes used in representation and communication' (Kress 2011, p. 54). It is with this understanding that this thesis proceeds. Importantly, modes physically realise what producers want to transmit. For instance, a picture can say what words cannot, a sound might resurrect thoughts, emotions, or sentiments in the listener (Kress et al. 2005). Sheridan and Rowsell (2010) point out that modes both show and tell the story and if traditional, linear, one-dimensional texts rely on conventional modes, i.e. words and visuals to convey messages, multimodal texts draw on multiple modes (p. 86).

Multimodality, the dynamic process of meaning-making (Ciekanski & Chanier 2008, p. 167) or the practice of combining multiple modes, and multimodal texts, texts that are made up of a combination of modes, are not new. There is consensus among scholars across disciplines that making meaning has always involved more than just words. Similarly, for multimodality scholars (Kress & van Leeuwen 2001; 2006; Jewitt 2011; Unsworth 2006) the concept of multimodality is not even remotely new (Gee & Hayes 2011) as people have long used images,

writing, music, words and non-verbal forms to communicate (Jewitt 2011). Sheridan and Rowsell (2010) identify wall drawings or pictographs dating back to 30.000 AD, followed by more intricate and complex drawings called ideographs that give a sense of the time and entrenched practices, such as hunting for animals as the earliest known attempts at making meaning with modes (p. 87).

Kress and Van Leeuwen (2001) define multimodality as:

> the use of several semiotic modes in the design of a semiotic product or event, together with the particular way in which these modes are combined—they may for instance reinforce each other [...], fulfil complementary roles [...] or be hierarchically ordered (p. 20).

Their definition alongside Kalantzis and Cope's (2012) view of multimodality as refering to the seven modes of meaning-making, i.e. oral, written, visual, gestural, spatial, tactile and audio, working together in our practices of communication and representation (p. 191) are commonly referenced in discussions of the plurality of literacies.

The starting point for multimodality is its approach to representation, communication and interaction as something more than language. It broadens

> the social interpretation of language and its meanings to the whole range of representational and communicational modes or semiotic resources for making meaning that are employed in a culture—such as image, writing, gesture, gaze, speech, posture (Jewitt 2011, p.1).

In spoken communication aural elements such as the pace, rhythm and the tone of one's voice, together with visual elements such as gestures, facial expressions and body language all contribute to conveying an intended message. In written communication the use of visual elements such as font, colour, spacing as well as

accompanying images affect the meaning that is made (Jones & Hafner 2012, p. 50). In other words, 'spoken and written texts have always drawn on multiple modes, aural and visual, as well as verbal and textual' (ibid). Sheridan and Rowsell (2010) point out that 'modes of representation have consistently depicted stories, and it is only the types of modes and our access to them that have become more sophisticated and varied' (p. 87). However, 'the proliferation of multimodality in so many different forms' (Gee & Hayes 2011, p. 111) constitutes a novelty that can be partly attributed to the use of digital technologies which 'enable modes to be configured, be circulated, and get recycled in different ways' (Jewitt 2011, p. 1). In other words, technological developments in digital media dramatically increase the possibilities for multimodal content to the point where nearly all written texts encountered in the 'real world' involve multimodal meaning-making (Jones 2014, p. 10). Nowadays, multimodality is more pervasive, diverse and important than ever before. Printed texts tend to incorporate more visual elements and there is, according to Jones and Hafner (2012, p. 50), a clear shift towards images. Newspapers, for example, have become increasingly visual, i.e. the quantity of images has increased, and their quality has improved. Similarly, pages of the World Wide Web have become increasingly multimodal as digital technologies have improved (ibid). Technological development also creates new expectations that communicators will make use of these new resources digital technologies make available and go beyond linguistic codes, and include all sorts of new multimodal tools like icons, pictures, moving images, videos, embedded sounds, backgrounds, and layouts (Kress, 2003) effectively. Relatively new genres like digital storytelling and vlogging require the ability to creatively mix images, background sounds and

music with spoken language. In other words, the ability to combine the target language with other modes of meaning-making is an important part of language learning in a digital literacies paradigm (Jones 2014, pp. 10-11).

Jones and Hafner (2012) argue that 'these new practices follow a shift in the dominant organising principle of texts from the primarily textual mode of the page to the primarily visual mode of the screen' (p. 50). Kress distinguishes between the underlying principles of the medium of the printed page and the medium of the screen. These media, he notes, organise information differently. The printed page in a book is dominated by the logic of writing which is time-based and sequentially organised. The screen of a webpage, on the other hand, is dominated by the logic of the image which is space-based and simultaneously organized (Kress 2003, p. 19). In other words writing, similarly to speech, follows a temporal logic so when an individual is telling a story in speech, the story unfolds in time and, consequently, the individual has to organise his story into a kind of a sequence. Writing along the line, sentence by sentence, paragraph by paragraph, one page after the next follows a sequential logic meaning that even though writing is fixed in space (as words on a page) rather than unfolding over time, readers are expected to process it in a linear and sequential manner (Kress 2003; Jones & Hafner 2012, p. 52).

 By comparison, images follow a spatial/simultaneous logic. In other words, all of the information in an image is displayed simultaneously and the different elements of the image are related to one another in space (Kress 2003). Images collocate elements according to the logic of simultaneous space, and so favour the genre of display (ibid). Jones and Hafner (2012) assert that images have a more direct effect, often provoking immediate emotional reactions from viewers

because of this spatial logic. Also, they add, images tend to be 'polysemous'—they send numerous messages at the same time and this in turn can create challenges for communication as 'viewers of images are sometimes presented with a range of competing messages to choose from or to integrate' (p. 52). Because of these different affordances and constraints, modal choice makes a difference to the kind of meanings that one can make.

Cope and Kalantzis (2009) point to the importance of acknowledging that different modes of meaning are not simply parallel and meaning expressed in one mode cannot be directly and completely translated into another. For instance, the movie can never be the same as the novel and the image can never do the same thing as the description of a scene in language. The same thing can be depicted in different modes, but the meaning is never quite the same. Importantly, meaning is not located within any one mode but is represented through multiple modes, which in turn have the potential to represent many meanings (Albers 2006, p. 77; Unsworth 2008). Albers emphasises that various modes are involved in the making of any one text and even though modes operate together to represent an overall message, each mode is not equal in its importance, and each carries different parts of the overall message (ibid). In digital multimodal texts, all modes work together to create meaning (Jones & Hafner 2012, p. 48) by sometimes reinforcing each other or fulfiling complementary roles (Kress & van Leeuwen 2001, p. 20). The next section of this chapter discusses relationships between and among various modes of communication.

2.3.1 Mode relationships

In his discussion of the changing conditions surrounding literacy, Kress emphatically argues that literacy or language can no longer be treated as the main means for representation and communication. Rather, they should be seen as partial bearers of meaning only and the co-presence of other modes of communication should be acknowledged. Kress points out that it is important to identify the function of modes other than the linguistic one present in a multimodal text. More specifically, he asks whether the co-present modes are merely replicating what language does, are ancillary, marginal or they do, in fact, play a full role (Kress 2003, p. 35).

Responding to such needs, Unsworth (2006; 2008) and Daly and Unsworth (2011) developed a metalanguage that includes an integrated description of the combined meaning-making resources of language and images in multimodal texts. Different kinds of meaning-making combinations are possible. Their work on image–text interaction shows that the meanings in different modes can be in a relationship of (1) concurrence, where the meanings of each mode reinforce each other; (2) complementarity, where the meanings are supportive but different; and (3) divergence, where the meanings contradict one another. As mentioned above, Unsworth used these concepts to interpret relationships between texts and illustrations but they can be usefully aplied to other multimodal ensembles as well.

Unsworth began work on developing a metalanguage for mode relationships in multimodal texts in the late nineties. Since then, he further elaborated and exemplified the different types of image-language relations. Daly and Unsworth

(2011) classified the relationships between illustrations and the main text as indicating *complementarity* through enhancement, by explaining the how or why about an event in the main text, or extension when additional information to the main text is provided by an image. Put differently, complementarity is a relationship where a new element (participant or process) is introduced by either the written text or the image (p. 62). It may also involve an image extending or adding new meanings to those realised by the text or the text extending the meanings realised in the image (Unsworth 2006, p. 62). *Concurrence* means that the messages in the visual and textual information are the same and reinforce each other. Concurrence can be indicated through elaboration where there is a restating or specifying of what is in the main text. In other words, in concurrence one mode elaborates on the meaning of the other by further specifying or describing it but, importantly, no new element is introduced by the written text or image. Thus, concurrence implies equivalence between image and text, the image further clarifies or explains the text, it may be an example or instance of what is in the text or the text may present an instance of what is depicted more generally in the image (Unsworth 2006, p. 60). An example of concurrence through elaboration provided by Daly and Unsworth (2011) is that of a text mentioning 'destructive behaviour of pets' and the photo shows an instance of a puppy chewing a shoe—the image constitutes an example or instance of what is in the text (p. 62). In relationships of *divergence* the visual and the textual information diverge in meaning, carrying messages that are incompatible with each other. Thus, divergence refers to when 'the content of text and image are at variance' (Unsworth 2006, p. 63) or 'parallel combinations' in which words and pictures seem to follow very different courses—without intersecting (Unsworth 2008, p.

394)**.** This might be seen where the 'tone' of an image, the attitudes and emotions conveyed, differ from those in the accompanying text (Daly & Unsworth 2011, p. 62). The tension created in a newspaper article whose text denounces a person's criminal act but which simultaneously presents a head and shoulders portrait of that individual smiling in a sympathetic way constitutes an example of divergence (Hafner 2014, p. 660).

In sum, Unsworth (2008) identifies a number of relationships that can arise from the interaction between images and language, i.e. concurrence, complementarity and divergence (p. 389). Unsworth's metalanguage for various mode relationships is important in the context of this study as it lends support to the analysis of the process of machinima-making. The process of constructing mode relationships is relevant to the research questions under investigation in the current study.

2.3.2 Synaesthesia

The concept of synaesthesia comes from the medical field. Its clinical definition refers to 'a condition whereby a person experiences one sensation, e.g. smelling a scent or seeing a colour, in regular correspondence with a seemingly unrelated sensation' (Nelson 2006, p.58). Nelson explains that this scientific definition of synaesthesia indicates a replacement of one sensation with another or a co-occurrence of two sensations (ibid).

However, the definition of synaesthesia that this thesis trades on is very different from the one outlined above. It refers to conceptualisations of synaesthesia as formulated by Kress in 1997 in his book *Before Writing: Rethinking the Paths to Literacy*. Kress interprets the concept of synaesthesia as referring to the fact that modes need to 'feel right' for a text (1997, p. 36) and describes what an 'entirely

common human characteristic' it is to present moods and feelings through modes that 'feel right' to the meaning-maker in the moment of production (ibid). Kress (1997) identifies synaesthesia as the 'basis of all metaphor' and points out that individuals, subconsciously or consciously, constantly translate from one medium to another. Synaesthesia, Kress notes, is crucial for humans to understand the world (1997, p. 36).

Kress also employs the notion of synaesthesia to emphasise the importance of acknowledging that there are 'best ways' to convey meanings (1997, p. 35). For example, he says, language may be the best mode to express meaning in some circumstances while colours, sounds or pictures may be more appropriate modes for conveying meaning in other circumstances. Importantly, according to Kress, many modes of representation are always in use at the same time but some may be dominant or foregrounded. For instance, language in a legal document constitutes the most important mode and, therefore, readers hardly ever attend to other aspects such as typographic features or layout (1997, pp. 35-36).

In his account of two images made by a six-year-old girl and an eight-year-old boy, Kress discusses how the two images depict 'the iconography of Halloween' (p. 39) by using colour as 'the main representational factor' but in quite different manners. The girl's drawing includes bright orange, blue, red and green while the boy's presents a darker mood with heavy black lines and occasional splashes of colour. The dominant meaning in both drawings, Kress notes, is expressed in colour. The girl's drawing could be translated into language as: 'For me Halloween means first and foremost bright colours, candles in bright orange pumpkins, and so on', and the boy's as 'Halloween, for me, signals a gloomy, a bleak period of the year, and so on' (1997, p. 36). Kress points out that both

children were able to foreground the mode that felt right or best suited for the purpose (ibid). Sheridan and Rowsell (2010) make the point that Kress's analysis of the drawings clearly shows how modal choice, i.e. the modes producers of meaning choose, relies on a producer's translation of mood in the modes chosen to convey a message and point out that synaesthesia plays an important role in modal choice. Producers, they argue, draw on synaesthesia to produce multimodal compositions. Feeling right about modal choice and experimenting with design until a design materialises an idea is a disposition of major importance when producing a text (p. 90). Nelson (2009) emphasises that the true quality of synaesthesia obtains in the act of authoring multimodal texts (p. 59).

Cope and Kalantzis (2009) similarly speak of synaesthesia as 'the process of shifting between modes and re-representing the same thing from one mode to another' (p. 13). Importantly, they add, most of our daily representational experience is intrinsically multimodal and 'synaesthesia is integral to representation' (Cope & Kalantzis 2009, pp. 13-14).

Another point made by Cope and Kalantzis (2009) in relation to the concept of synaesthesia is that despite it being essential to practices of representation, the meaning and learning potentials inherent in synaesthesia are not recognised or adequately used by traditional literacy. The two multiliteracies scholars note that conventional literacy follows a narrowing agenda which confines it to the monomodal formalities of written language even though various other modes of meaning-making are becoming increasingly prominent in public communication in which language was formerly used exclusively or dominantly (Kress 2005). According to Kress, children have natural synaesthetic capacities (1997) but despite that, this synaesthetic quality is inhibited in schools, where there is a

'preference for writing-centred work'. Instead of fostering these capacities, school literacy attempts to supress synaesthesia 'to the extent even of creating different subjects or disciplines, literacy in one cell of the class timetable and art in another' (Kress, 1997, p. 36 cited in Cope & Kalantzis 2009, pp. 13-14). The narrowing agenda of conventional literacy can be seen as entirely unrealistic given the multimodal realities of the new digital media and the profound changes in the communications environment (Cope & Kalantzis 2009, pp. 13-14).

In Cope and Kalantzis's (2009) view, synaesthesia promotes powerful learning in different ways. For instance, some students might feel more comfortable using one mode than another simply because they may have a talent or passion for that mode, or it might be what comes easiest (p. 14). A pedagogy that limits learning to an 'artificially segregated mode', they argue, risks favouring some types of students over others. The parallelism between modes might also mean that the starting point for meaning in one mode may lead to extending one's representational repertoire by shifting from favoured modes to less familiar ones. For example, when the words don't make sense, the picture might, and then the words start to make sense (2009, p. 14). The words make sense because the picture conveys meaning that words could never (quite or in a completely satisfactorily way) do.

The position Cope and Kalantzis put forward here resonates with Kress's (1997) who constradicts the view that cognition always depends on language and is not fully possible without the latter. In his words:

> all modes enable cognition, or, cognition is possible, takes place in all modes—but differently so. That is the central point: written language enables one form of cognition; drawing another; colour as a medium another (p. 39).

This point is essential in the case of second and foreign language students for whom the target language may constitute a 'modally impoverished semiotic environment' (Nelson 2006, p. 71). Multimodal communication offers a potential leveling effect and synaesthesia can provide an alternative route whereby new understandings can be reached (ibid). Thus, conscious mode switching such as the one required by many digital literacy practices makes for more powerful learning (Cope & Kalantzis 2009, p. 14). In the context of this study, Kress's conceptualisation of synaesthesia is significant as it lends support to the analysis of the participating teachers' video production processes.

2.4 Digital literacies and new ways of doing and interacting with others

Section 2.3 discussed the affordances of digital media for increasingly multimodal ways of making meaning. It introduced concepts such as synaesthesia and mode relationships that are facilitated by new digital literacy practices. However, using new media influences not just how meaning is made but also how people can do things as well as the kinds of social identities they can assume and the social relationships they can have with others (Jones & Hafner 2012, p. 5).

2.4.1 Coaction and collaboration

New digital media also facilitate new kinds of relationships with the people with whom we interact by enabling new patterns of participation in interaction (Jones & Hafner 2012, p. 17). Jones and Hafner quote Schrage (2001) as saying that the real revolution brought by the internet is not an information revolution but rather a 'relationship revolution' (Jones & Hafner 2012, p. 7). The patterns of participation

afforded by a practice such as blogging are very different from the ones allowed by a printed book. In the case of the latter, one author communicates with many readers through the book albeit in relative isolation as most people read books alone. At the same time, readers cannot communicate with the book author as they are reading. They, however, could write letters or emails to the writer provided he or she is still alive. However, the chances of having an actual conversation with the author, Jones and Hafner note, are slim (ibid). A blog, on the other hand, allows readers to easily communicate with the writer. They could dispute what the writer is saying, ask for clarification or even contribute their own ideas. In response, the blog author could update what they have said or provide clarification. Moreover, readers of the blogs can communicate between and among themselves in the comment section (ibid).

Fan fiction is a genre in which authors write their own stories featuring characters from popular television shows or movies, stories which are posted online on sites like fanfiction.net where they are read, rated, commented upon and critiqued by readers who often are also writers of fan fiction themselves (Jones 2016, p. 290). Fan fiction sites, similarly to blogs, provide readers with a built-in review function so that they can give feedback to the authors on their work. Authors can also respond directly to readers' comments. Interestingly, according to fan fiction studies discussed by Knobel and Kalman (2016), receiving feedback gives the authors a sense of 'being appreciated and plays a major role in their decision to continue writing' (pp. 9-10).

The development of new digital technologies affords innovative forms of collaboration, 'a 21st century trend that shifts learning from teacher or lecture-centred settings to collaborative ones' (Scott 2015, p. 5). Collaboration is one of

the 4Cs principles employed by proposed instructional models for the 21st century such as project- and problem-based learning. The other three are critical thinking, communication and creativity (ibid). A collaborative learning environment stimulates students to justify their ideas and articulate their positions as well as generate their own ideas based on reflection (Scott 2015, p. 5). The end goal of collaborative learning is to create new knowledge. It is learner-centred and prepares learners for real-life social and employment situations. Learners benefit from group interactions through exposure to differing points of view and diverse backgrounds. Scott (2015) reviews several studies on collaborative learning and concludes that collaborative learning also leads to the development of metacognition, improvement in formulating ideas, and higher levels of discussion and debate (p. 7). Learners discuss their ideas with their colleagues, exchange different points of view, ask for clarification and participate in higher order thinking such as managing, organising, critical thinking as well as creation of new learning and deeper understanding (Scott 2015, p. 6).

The notion of interaction is essential not only to successful collaboration but to 'social practices' (and the 'technologies' which mediate them). According to Jones (2016), social practices can only be mastered through *interaction* with others in social groups. For digital literacies scholars, Jones notes, interactions always take place in social groups or communities and rely on participants' ability 'to claim membership in some social group' (p. 288). Put differently, individuals become members of social groups through interaction. Social groups are being described by some researchers as " 'communities of practice' (Lave & Wenger 1991), 'affinity spaces' (Gee 2004), 'nexus of practice' (Scollon 2001) and so on" (Jones 2016, p. 288).

An interesting question arises when individuals do things together, namely who the author is (Wegner & Sparrow 2007, p. 17). This has been termed 'the puzzle of coaction' (ibid). The example of Fred Astair and Ginger Rogers's classic dance duets is used by Wegner and Sparrow to illustrate the puzzle. They answer the question of who is actually doing the dancing by stating that the puzzle of coaction is open to multiple possible solutions at every moment. Interestingly, Wenger and Sparrow add, 'the perception of the authorship of coaction can shift and shimmer from one coactor to another in our minds, and we may even perceive that the action is being produced by no individual—and instead by the group as a unit' (ibid).

Coaction happens when one agent's full-bodied and linguistic action is influenced by or occurs in the context of another agent's action—and together they do something that is not fully attributable to either one alone (Wegner & Sparrow 2007, p. 17; Zheng et al. 2012, p. 343). Put differently, during coaction each agent is influenced by, or acts within, the context of the other agent's actions and at least one agent uses this to come up with action that could not otherwise have happened (Cowley 2011). In other words, coaction refers to 'coordinations between interacting parties that are seemingly synchronised and collectivised' (Zheng et al. 2012, p. 343). A bride and a groom grasping a knife and cutting into their wedding cake together constitutes a prototypical case of coaction that immediately raises questions of authorship (Wegner & Sparrow 2007, p. 18).

Zheng et al. (2012) make a distinction between coaction and paired group activity, pointing out that the two concepts are not equivalent. Paired group activity does not necessitate a highly coordinated behavior to accomplish an objective (p. 343). They emphasise that meaning is constructed though coaction, but construction of

meaning does not always involve coaction (ibid). Zheng et al. (2012) explain that coaction is a 'functionally coordinated process' (p. 343) that may have an unexpected outcome and it differs from paired group activity in that a highly coordinated behaviour might be necessary for the accomplishment of an objective.

Zheng and Newgarden (2012, pp. 18-19) propose that coaction in avatar-based virtual worlds manifests itself in two ways. The first type of coaction takes place between the player, the gamer's physical body, and the avatar. The avatar, the participant's extended body in the virtual world, 'can perform actions that physical bodies are not capable of (e.g., flying)' (p. 18) while 'the avatar's context offers new affordances on which the physical body/mind can act' (ibid). Together, the avatar and the participant, 'perceive and act to accomplish virtual and real life goals on multiple timescales' (Zheng et al. 2012, p. 343). The second type of coaction theorised by Zheng and Newgarden (2012) is the coacting of avatars/bodies (p. 19) or the coacting of participants as they coordinate during game play (Zheng et al. 2012, p. 343). In both kinds of coaction, Zheng and Newgarden (2012) continue, 'we orient toward the other and create new affordances for both' (p. 19). Thus, 'coaction is prospective, always feeds forward, and in and of itself is transforming.' (ibid).

Zheng and Newgarden's (2012) view of coaction between avatars and players for understanding virtual world avatar-embodied interactions lends support to the analysis in Chapter 6 on the interaction facilitated by digital literacy practices such as machinima. It is with this understanding of coaction that the researcher proceeds. The concept of coaction is deemed relevant to the questions under investigation in the current study as it has been observed that at certain stages

meaning was created to accomplish the goal of producing the machinima video by participants through highly coordinated behaviour, a characteristic of coaction.

Zheng (2012) cites Hodges's (2007) definitions of coordination and cooperation as follows: 'coordination among humans involves two or more intentional agents synchronizing their activities; cooperation requires their working together to achieve a common goal' (p. 154) and points out that synchronised coordination is sometimes called co-action (Cowley 2011; Wegner & Sparrow, 2007).

2.5 Conclusion

This chapter explored the concept of digital literacies as well as two dimensions of our daily lives that digital literacies are drastically changing, i.e. our ways of making meaning and doing things in collaboration with others.

The chapter started with a brief overview of the origins and development of the idea of digital literacies. It then continued with an exploration of the ethos and technical dimensions of digital literacies. Next, the different conceptualisations of language and language learning in digital literacies and CALL were outlined and it was noted that this thesis takes an ecological perspective on CALL which, in fact, overlaps a great deal with digital literacies perspectives on language, language learning and technology.

The last two sections of the chapter focused on the affordances of digital literacies for transforming the ways in which we make meaning and how we relate to others (collaborate or do things). Various ways of constructing meaning through mode relationships were described, the concept of synaesthesia as the shifting from one mode to another in search of the mode that feels right or is the best mode to

convey meaning was introduced. Section 2.4 presented the dimensions of doing and relating that are also drastically affected by digital literacy practices. More specifically, the concept of coaction was introduced in order to illustrate how digital literacies can affect our ways of doing things and relating to others.

The next chapter proposes machinima as a powerful tool and digital literacy practice to investigate teachers' views of and assumptions about literacy. Machinima can help teachers move away from print-only literacy as it requires multimodal design and offers new possibilities for expression. The process of making a machinima film can be seen as an example of multimodality in action.

CHAPTER 3 DIGITAL LITERACY PRACTICES: MACHINIMA

This chapter introduces machinima as an example of a digital literacy practice that involves new technologies and as a powerful tool for investigating and, perhaps, developing language teachers' TPACK. Machinima requires multimodal design, offers new possibilities for expression and, thus, is a digital literacy practice that might contribute to shifting teachers' attention from traditional views of literacy.

This chapter outlines past and current research on machinima. Section 3.1 discusses various existing definitions for the concept of machinima. It, then, continues with an exploration of the emergence of machinima in the context of gaming when its main function was documenting game play. Next, a presentation of machinima as a sophisticated digital literacy practice characterised by use of digital tools and techniques in conjunction with a distinctive ethos is given. This is followed by a review of the different techniques and platforms used to make machinima videos and a comparison of machinima to live action filming and conventional animation. Similarities and differences between these practices are identified. Finally, the last section of this chapter looks at the use of machinima in educational settings and provides a rationale for its use to investigate teachers' assumptions about digital literacies.

3.1 Machinima: towards a definition

While a variety of definitions of the term machinima have been proposed, to date there is no consensus among machinima scholars with respect to what this relatively novel concept really stands for.

The original word 'machinema' was coined in 1999 by Anthony Bailey (Hancock & Ingram 2007, p. 12), the director of the first machinima hit *Quake don Quick*, by combining the concepts of 'machine' and 'cinema'. Subsequently, another leading *Quake* film-maker, Hugh Hancock, misspelled the word as 'machinima' and the new name with its additional meanings of both anime and animation, stuck (Hancock & Ingram 2007, p. 12; Kelland et al. 2005, p. 30; Nitsche 2005, pp. 210-211). Machinima was viewed as a new art form rooted in the gaming communities of the early nineties (Berkeley 2006, p. 67; Tsai & Czarnecki 2008, p. 29). Machinima film-makers are called machinimists or machinimators (Strickland 2008).

Machinima is a rather new concept that is still working on its boundaries. Therefore, many leading machinima scholars acknowledge that it is a tricky term to grasp (Daly-Swanson 2007, p. 4) and admit that they have been wrestling with its definition for years (Johnson & Pettit 2012, p. 7). Problematic to its definition is the temptation to label everything and anything recorded inside a virtual world or a game as machinima (ibid). As if to make things even more unclear the term machinima is frequently used to refer to the art of making animated films within a realtime virtual 3D environment and, confusingly, the word is often also used to describe the actual films made this way (Bardzell et al. 2006, p. 433; Kelland et al. 2005, p. 10). However, Nitsche (2005) argues that as machinima describes a technique and not its results the above definition is somewhat incomplete and ambiguous (p. 211).

Hancock and Ingram's definition according to which machinima is 'animated film-making within a real-time virtual 3D environment' (p. 1) or the slightly re-phrased 'technique of making films inside virtual realities … the technique of

taking a viewpoint on a virtual world, and recording that, editing it, and showing it to other people as a film' (2007, p. 10) is also challenged by Nitsche. He regards it as a useful introductory description but a rather loose definition. Nitsche's own definition is meant to shed some light on what machinima really is:

> Machinima is a production technique that relies on the images created by real-time 3D engines such as computer games to create cinematic pieces of computer animation. During that process the game engine effectively operates like a virtual film studio providing access to virtual lighting, staging, and camerawork. As Machinima describes a technique but not its results the initial definition is somewhat unfinished and possibly misleading. As long as it is produced in a realtime 3D engine the result can be either a live performance, a recorded game session, or post-produced linear video clips—all are accepted forms of Machinima (2005, p. 211).

Kirschner (2011) points out that because machinima is so new, the term actually stands for a continuous, heated topic of debate. It is however safe to say that the mainstream media perceives it as 'movie(s) created using a video-game engine' (p. 20). Perhaps machinima is best described by Harwood (2011) who examines its past, present and future and defines it as an art form in transition. She goes on to say that although embedded in gaming cultures, 'machinima could expand well beyond gaming, as it represents a successful example of convergence of filmmaking, animation and games development' (p. 6). In simpler words, Martin (2013) defines machinima as a way of making animated movies by filming either in an immersive virtual world or a video game, with nothing more than a computer and screencapture software (p. 16).

3.2 Machinima: from speedrun recordings to digital literacy practice

In order to best explore machinima as a digital literacy practice whose affordances dramatically impact dimensions of meaning-making, being and doing, it is important to understand the context of its emergence.

Even if to date there has been little agreement on what machinima really is, there is a consensus among machinima scholars that this type of film-making comes from the gaming world, more specifically from first-person shooter (FPS) games (Bardzell et al. 2006, p. 433; Hancock & Ingram 2007; Johnson & Pettit 2012; Jones 2006; Kelland et al. 2005; Nitsche 2005). Ng (2013) notes that 'the origins of machinima are in the subversion/hacking of one media form (videogame) into another (cinema)' (p. xiv).

The actual history of machinima, however, is as difficult to grasp as is its definition. While its beginnings can be traced back to the early days of demo scenes in the 1980s, it wasn't until the mid-1990s that the phenomenon really took off (Lowood 2006). Machinima grew out of modding or mods, the practice of creating new content for one's favourite game (Hancock & Ingram 2007, p. 108), made to the game *Quake*, which allowed players to edit recordings of their gameplay into real movies (Hancock & Ingram 2007, pp. 12-13). Strickland notes that the fans of early machinima were really other gamers, primarily because to watch machinima one had to own the game engine (2008). Machinima practices originated in the 1990s recordings of gameplay in first person shooter (FPS) video games, such as *DOOM* and *Quake* produced by id Software, a pioneer in early three-dimensional first person shooter (3D FPS) game development (Lowood

2006, p. 63). Initially, these recordings documented speedruns, attempts to complete a level as quickly as possible, and multiplayer matches. The addition of storylines to these films created the *Quake* movies. Referring to the early beginnings of machinima practices, Kelland et al. (2005) state that it started out with a few players recording footage of their avatars 'messing around' (p.8).

Similarly, Lowood (2006) notes that the origins of machinima "lie not in content production but in gameplay as 'play was the thing' in the early history of game movies" (p. 27).

Therefore, machinima makers started out as game players who discovered that they could transform themselves into actors, directors and even 'cameras' to make animated movies on the same personal computers used to kill monsters in *DOOM* or *Quake* at virtually no cost (Lowood 2006, p. 26). The actual machinima movement is traced back to 1993 when the multi-player *DOOM* game engine was released by id Software. *DOOM* included the ability to record game sessions that could be replayed only if the engine was installed on one's computer (Kelland et al. 2005; Lowood 2006; Nitsche 2005). In fact, Jones (2006) credits *DOOM* with having changed the face of computer gaming because now 'gamers could both play the game and play with the game's design' as the source code of *DOOM* was also made available to its fan base (p. 266). Opening the source code of their games to gaming communities provided players with the opportunity to generate their own content, improve id Software's creations as well as maintain a vested interest in the game (Lowood 2006, p. 63).

DOOM required considerable skills such as 'high levels of manual dexterity' and 'extensive practice' (Jones 2006, p. 268) as it introduced fundamentally new

styles of play and modes of content development. Some players excelled in different aspects of the game and soon star players emerged. Everyone wanted to see them play, to gather insights into their play tactics and possibly learn a trick or two. Displays of skill by admired players circulated widely. The first demo movies using *DOOM* were 'demonstrations of gameplay made by recording actual matches' which were distributed as discrete files and replayed by others who owned a copy of the game (Lowood 2006, p. 29). In a typical use of these movies, a new player who wanted to improve his skills requested that a game with a higher-skilled player be recorded, and then the new player watched the demo from the higher-skilled player's point of view, hoping to learn new ways to improve (ibid). Demos also certified the status of these star players. Starting with 1994, the *DOOM* Honorific Title (DHT) programme, a game rating system, became the means by which skilled players could objectively prove to the world that they were as good as they claimed. The certification process explicitly demonstrated the performance of gameplay through demo movies (ibid). The DHTs which were created to basically determine the best DOOM players by distributing their demos online, motivated gamers even more to record their gameplay (Jones 2006, p. 268). Lowood (2006) points out that 'the result was nothing less than the metamorphosis of the player into a performer' (p. 29).

Even though the *DOOM* demo movies played an important role in the development of the machinima concept, the machinima community begins its historical reflections with the launch of *Quake*, also from id Software as it was only then that things really took off (Kelland et al. 2005; Lowood 2006). *Quake*, *DOOM*'s 1996 successor was far more complex than the latter with respect to the software, but it had also been made more accessible. *Quake* offered new

opportunities for both gameplay and customisation, while retaining the ability to record demos. As multiplayer games became increasingly popular, many players perceived them almost as a sport and formed regular teams, known as clans. Demos of matches between clans were recorded and *Quake* players from all over the world would watch them with the same intensity some watched football matches, just for entertainment, or to study the form of their potential opponents. In 1996, a university student in Scotland, Hugh Hancock, alongside his *Rangers Clan* from the *Quake* game used a demo function in *Quake* to record their film and made mods that resulted in the first demo for playback outside a game, the 90-second *Diary of a Camper*. This was a story about a lone soldier who challenged the clan but, most importantly, contained a storyline and dialogue. Thus, 'it marked the transition from sports footage to true film-making' (Kelland et al. 2005, p. 28). The Rangers choreographed the players as actors who also typed in dialogue that appeared in the recording and used one player as a camera. Once completed, the demo served as the first true machinima film—a narrative story told within a game space (Berkeley 2006; Daly-Swanson 2007; Kelland et al. 2005; Lowood 2006; Strickland 2008). This first machinima, Lowood (2006) notes, showed what could be done using the kind of tools that were originally available only to game developers (p.33).

The next *Quake* demo, *Quake done Quick*, directed by a graduate student in computer science at the University of Manchester named Anthony Bailey, was released in 1997. *Quake done Quick* was a masterclass in how to play as it showed *Quake* fans how to progress through the levels at very high speed, collecting all the bonuses and fragging all the monsters (Kelland et al 2005, p. 28).

As briefly outlined above, the first demo recordings documented speedruns, attempts to complete a level as quickly as possible, and matches between rival clans. However, it was the addition of storylines to these films that created the *Quake* movies. In Lowood's view *Diary of a Camper* and *Quake done Quick* turned the *Quake* movie into 'high-performance play'. These movies were joined by a third project that incorporated elements of traditional animation and performance. *Operation Bayshield*, released by *Clan Undead* in January 1997 completed the trilogy of major machinima projects and was meant to be a larger comedy film in the *Quake* engine. It offered some notable innovations that would later become standard characteristics of machinima. First, the customisation of *Quake*'s content, i.e. *Clan Undead* dressed the avatars in new skins, manipulated their images to simulate lip-synching, and added visual effects (Lowood 2006, pp. 34-35). One other major innovation could be found in their attention to the movement of the avatars. Lowood views *Diary of a Camper*, *Quake done Quick*, and *Operation Bayshield* as the founding trilogy of machinima. Furthermore, he considers them to be 'milestones in the evolution of a new narrative medium, pointing forward to new possibilities of expression' (Lowood 2006, p. 36).

Even though the connection of today's machinima to games has shrunk considerably (Nitsche 2005), it is worth noting that 'the history of machinima is not the story of filmmaking innovators, but rather of gamers as insatiable fans' (Jones 2006, p. 277). The FPS genre in which machinima originated was overrun with male players and this might explain why the majority of machinima videos came from men. Also, according to Jones (2006) the technical skills required to manipulate a video game engine in order to produce machinima also presented a

barrier to female producers of machinima (p. 278). However, the creation of user-friendly technologies such as *Second Life*® has begun to change this.

The rapid evolution of 3D graphics software and hardware along with superior techniques enable film-makers to use machinima to tell stories that have nothing to do with games. Machinima is now capable of producing anything from animated shorts to feature-film length animated movies and live improvisational comedy (Kelland et al. 2005, p. 8; Lowood 2006, p. 39). Also, machinima is making its presence felt in mainstream animation, music video, and television and can now be seen in mainstream film festivals where it is picking up awards (Daly Swanson 2007, p. 5).

Ng (2013) classifies the machinima of gameplay documentation and game-related narrative as a 'first wave machinima' and the shift to non-video game engines such as *Second Life* and Moviestorm where machinima stands for 'more than just an innovative way of creating moving images to tell standard, linear narratives' as 'second wave machinima' (p. xvi). Second wave machinima has left 'the game roots behind them' (Johnson & Pettit 2012) and is being 're-hewn into a more liberated and free-form vocabulary' (Ng 2013, p. xvi). Moreover, Ng adds, the creative possibilities of second wave machinima are 'as yet untold', not only because machinima operates in environments without the physical laws of real life but, mainly, because machinima has shifted 'from an emphasis on narrative or its origins in games to exploring more sophisticated, nuanced stories and being an unprecedented literacy expressing people's diverse states of being and realities' (ibid). Ng argues that machinima should not be thought of as a less real cinema and points to the fact that 'this literacy is used in a mainstream car advertisement shows just how fluent we have become in it' (ibid).

Machinima is viewed by many digital literacies scholars as a quintessential digital literacy practice (Lankshear & Knobel 2008; Jones & Hafner 2012) that shares many characteristics as other forms of digital literate activities. In other words, it is viewed as a literacy practice that encompasses the 'ethos' described in Chapter 2, Section 2.1 and accomplished through enactment of affordances which allow for making meaning in new ways as well as doing things in new ways.

Similarly to many other digital literacy practices such as fan fiction, fan modding, digital storytelling and so on, machinima places a strong emphasis on production. In machinima 'the role of the media consumer has shifted from passive recipient to active participant' (Jones & Hafner 2012, p. 135). Machinima, like fan modding—the practice of modifying a game either by adding content (like a new level or new items) or by creating an entirely new game—illustrates the more active role of the consumer (ibid). As noted above, several video games provide fans with the tools to create these mods and, sometimes, mods can lead to a new commercial release. For instance, the popular game Counter-Strike is a mod of the earlier game Half-Life (Valve 1998 cited in Jones & Hafner 2012, p. 135).

The creation of machinima as an emerging literacy practice in the context of gaming is in many ways similar to another popular literate activity, i.e. the creation of fan fiction. Fan fiction is a genre in which authors write their own stories featuring characters and settings from popular games, television shows or movies but combine them in a manner that is new and original, whether that be as a drama, comedy, music video and so on (Jones 2016, p. 290; Jones & Hafner 2012, p. 135). Then, they post these stories online where readers, most frequently writers of fan fiction themselves, can comment on and critique them. Black's work (2005 cited in Jones 2016) on fan fiction written by language learners

illustrates the benefits of this practice for language learning in terms of 'access' and 'affiliation'. Fan fiction provides users with 'access' to opportunities to use language in the context of a genre in which they are heavily invested and to engage in talk about language, metalanguage, which is purposeful and motivated by a genuine desire to improve their texts rather than the abstract goal of 'language learning' (Black 2005 cited in Jones 2016). It also gives users the 'opportunity to be part of a community of writers in which their writing and talk about writing serves the purpose of forging relationships and enacting different kinds of identities' (Black 2005 cited in Jones 2016, pp. 290-291).

Other digital literacy practices that share similarities with machinima are digital storytellying, vlogging and even posting and sharing images and videos through online platforms like Facebook and Instagram. Many people engage in these practices as producers of digital videos and images because access to tools for capturing, manipulating and sharing digital images and video is easy and inexpensive (Jones & Hafner 2012; Jones 2016). Digital storytelling via a short film which combines digital images, video and audio in order to create a personally meaningful narrative is a popular practice which, similarly to machinima, allows people to adopt the role of film-maker and use multimodal forms of representation to create and share their stories with a potentially wide audience. Video blogging, also known as vlogging, entails that a vlogger posts a video on a website for the audience to watch instead of posting text for the audience to read. This video is usually uploaded to video sharing websites such as YouTube, or Blip.tv that also provide opportunities for interaction including text comments and video responses (ibid). Like digital storytelling and machinima practices, video blogging allows ordinary people to assume various identities in

addition to that of producer and designer of meaning. Jones and Hafner (2012) note they could take on identities such as that of a news reporter investigating issues of interest to them, shooting relevant footage, and editing together a video report, often very similar to a newscast. This practice also requires an understanding of multimodal resources available in video. In terms of multimodal content, digital stories and video blogs can range 'from very simple creations to semi-professional movie-like productions' (Jones & Hafner 2012, p. 58). Posting and sharing images and videos on social media is itself a multimodal practice because of the possibility to combine the image or video with a textual title, caption or tag (ibid). These elements in turn can interact with the image in different ways, depending on how consistent the textual and visual messages are (Jones & Hafner 2012, p. 59). Importantly, these practices of creating and sharing digital images and videos bring about shifts in roles that affect the ways people relate to one another. A medium that was previously restricted to a small, technically knowledgeable elite has now become available to anyone with access to a digital camera and an internet connection. This enables ordinary people 'to act as film-makers and news reporters with the potential to reach and influence a wide online audience' (Jones & Hafner 2012, p. 60). The opportunity to assume 'identities of expertise' is not very often available to students in a traditional learning setting even though Jones notes after reviewing a significant body of literature of productive practices that these opportunities enhance the development of literacy skills (Jones 2016, pp. 290-291).

Many of the practices briefly discussed above draw on 'prosuming' and increasingly involve users in interaction and/or collaboration with others (Jones & Hafner 2012, p. 158) in addition to allowing them to assume new, more active

roles in the creation and distribution of culture (Jones & Hafner 2012, p. 135). The practice of 'prosuming' loosely characterised by Jones (2016) as 'the practice of ordinary internet users creating and broadcasting different kinds of digital content' (p. 290) is an important characteristic of many digital literacy practices.

However, one aspect that needs to addressed in any discussion of prosuming is that of copyright. Garrett (2009) notes that teachers often feel uncertain about using texts, audio, images and videos from the internet with their students (p. 721). Undoubtedly, as a result of new digital technologies, people now have the ability to incorporate and appropriate the work of others (Jones & Hafner 2012, p. 45). Thus, digital literacy practices pose some interesting questions about originality, intellectual property and ethics. Lawrence Lessig, an American legal scholar who specializes in intellectual property and cyber law suggested in his 2004 book, *Free Culture*, that when it comes to the creation of cultural texts we have moved from a 'free culture' to a 'permission culture'. Lessig notes that the copyright law which automatically protects creative works such as books, films, songs, software and so on, and prohibits others from making copies without the consent of the copyright holder, puts severe constraints on the creation of cultural texts within the remix culture (Jones & Hafner 2012, p. 46). Thus, he proposed a system, 'Creative Commons Licensing', to make it easier for people to create and remix cultural texts. Creative Commons Licensing works by making available 'carefully drafted but easy-to-understand licenses, that clearly describe what intellectual property rights the creator wants to reserve', such as attribution, commerical use, and future participation (Jones & Hafner 2012, p. 47). Therefore,

using a creative commons license, one can specify that their creative work is available for others to use, subject to a range of possible conditions (ibid).

3.2.1 Machinima-making: techniques and platforms

Even though machinima scholars do not provide a straightforward definition of the concept, it is safe to say that machinima is about making animated films in a new and different way, and it's about using a virtual 3D environment such as computer games to do more than just play games. Machinima is becoming increasingly popular as it frees the film-maker from many of the constraints of the real world. For example, low-budget film producers can create far more convincing sets digitally than they can in reality (Kelland et al. 2005, p. 22). Special effects are also inexpensive and relatively easy by comparison. In a virtual world, the same building or car can be blown up over and over again. There's no pressure to get the shot exactly right the first time—everything can always be reset and reshot, and no damage is done (ibid). In other words, machinima brings films that would require prohibitive budgets to shoot to the grasp of the movie-maker thanks to this reduced need for physical resources (Bardzell et al. 2006, p. 433). Furthermore, the greatest attraction of machinima is in fact that starting is so easy. It is not necessary to invest in expensive tools or equipment to create high-quality film. Compared with the cost of buying cameras, lights, microphones, and all the other equipment required to make real films, it's ideal for a beginner 'to learn the craft of film-making without breaking the bank' (Kelland et al 2005, p. 74).

Machinima is an art form as diverse as animation or film-making, not just in the creative sense, but also in the technical sense. Just as there are many ways to

create animation, ranging from simple hand-drawn pencil sketches to full computer-generated images, so there are many different ways to create machinima. Each requires its own skills, tools and engines, and each yields different results (Kelland et al. 2005, p. 72). According to Kelland et al., the four most common machinima production techniques, from simple to advanced, are: relying on the game's artificial intelligence (AI) to control most actions, digital puppetry, recamming, and precise scripting of actions (2005, p. 80) – all four techniques are explained below.

The simplest form of machinima is more similar to reality television than drama. When relying on the game to record most actions, the game's characters are left to their own devices and the machinimator simply records their activities (Carr 2007; Kelland et al. 2005, p. 80). In other words, the machinimator does not create a story or script in advance but acts as a documentary cameraman recording the events as they unfold. *The Sims 2* is an example of a game that encourages the use of its AI, containing virtual personas, avatars, which cannot be directly controlled by the machinimator. Additionally, video-capturing technology is integrated in the computer game making the creation of machinima using this technique as simple as pressing the V button on the keyboard or clicking on the video camera icon (Schneider 2008, p. 30). However, it is important to note that the results are often unpredictable (Carr 2007; Kelland et al. 2005, p. 80).

For the second approach, puppeteering, machinima creators become virtual actors, namely each crew member controls a character in real-time, as in a multiplayer game. In other words, machinimators use their avatar as a puppet. Video is captured, using software such as oCam or Screencast-o-Matic which record the video directly to the computer's hard drive, from the perspectives of one or more

puppeteers who serve as camera operators. Once the footage is recorded, using an offline non-linear editing system such as Windows Movie Maker, YouTube Movie Maker or iMovie 'allows machinimators to use exactly the same techniques and tools as film and television directors would, such as transitions and colour shifting' (Kelland et al 2005, p. 87). Puppeteering is very attractive to many due to its immediacy and possibilities for improvisation. This technique is frequently used in live performances when the video from the engine is presented directly to an audience without being edited (Nitsche 2005, p. 224). The downside is that digital puppetry does not constitute a viable option for the solo machinimator. Most stories require more than one character to be on set at once and working with a crew brings its own problems as 'too much different creative input can lead to ruffled feathers and crews splitting up over artistic differences' (Kelland et al 2005, p. 87). Another drawback is the possibility of disruption when filming in an open multi-user environment (Carr 2007; Kelland et al. 2005, p. 87). Digital puppetry draws most heavily on game-playing roots, since the puppeteers are using exactly the same interface to act as they would to play a game (Kelland et al. 2005, p. 87).

Recamming, the third technique, builds on puppetry and combines it with re-recording. It allows for additional characters to be added, lighting to be adjusted, or cameras moved (Carr 2007). Instead of capturing the footage as a video file, actions are first recorded to a game engine's demo file format. While video, once recorded, is forever fixed, demos are continually open to manipulation. In the words of Kelland et al., recamming 'is the equivalent of being able to change the script of a play, and knowing that at the next perfomance, the actors will deliver the revised version, complete with new lines, new stage directions, and even the

scenes in a different order' (2005, p. 90). The greatest drawback to using these hybrid techniques is that they are limited to the very few engines and software tools that support them (ibid).

The fourth technique, scripting, consists of programming the game's characters to perform in particular and specific ways. Every gesture, every head movement, and every change of posture or expression is scripted allowing for extreme precision in the control of the characters. More similar to traditional animation than other forms of machinima, it works just like the recamming techniques discussed above, except that the initial puppeteering of the characters is replaced completely with scripts. However, using scripts to control characters is slow and laborious. The performance of each character has to be created one at a time, since it is not possible to use a cast of actors performing simultaneously. As a result, fully scripted machinima are mostly solitary pursuits (Carr 2007; Kelland et al. 2005, p. 94). While many renowned machinimators agree that the most powerful technique is in some respects the fully scripted technique in which the entire film is created programmatically, Hancock points out that most people use puppeteering when they first start, then go to scripting because of its flexibility, then return to puppeteering because of its immediacy (cited in Kelland et al. 2005, p. 81).

Bardzell et al. (2006) evaluated the existing machinima plaforms, which they subsequently classified into four types: pure machinima platforms, hybrid games, pure games and modded games. The authors identified a major limitation common to all four platforms, namely their inability to deal properly with facial expressions or human emotion. Consequently, certain interactions that rely heavily on gestures and expressions are hard to present effectively (p. 436).

Pure machinima platforms, platforms that exist only as machinima producing tools, have recently become available. Examples of these include *Machinimation* and *Virtual Stage.* In the area of camera controls, the two applications named above are relatively strong, offering flexibility in how shots are taken. Also, asset libraries are available albeit limited. In Bardzell et al.'s view, libraries make set and character design considerably faster and easier. They point out that even though in theory these applications are flexible enough to accommodate a variety of different kinds of videos, in reality, unless what a developer needs is already in the library, both applications are less practical than existing alternatives (Bardzell et al. 2006, p. 434).

According to Bardzell et al. (2006), hybrid games that are also used as machinima platforms include mechanisms that are built into the interface to make the production of machinima easier. Examples of such environments are *The Sims 2* and *Second Life.* Some game companies have recently begun actively courting machinima creators by providing them with the necessary software. Nevertheless, the widespread use of digital assets from copyrighted games is still debated in complex, unresolved legal issues. *Second Life* which is a user-constructed 3D social space features a number of tools that have been appropriated for machinima, including an in-game 3D modelling toolset, a scripting language, and the ability to import character animations. *Second Life*'s library is by far the largest, because users have access to much of the millions of user-created artefacts that have been introduced into the world over the years (Bardzell et al. 2006, p. 435). Before discussing the other two platforms, it is important to note here that what Bardzell et al. term as hybrid games, i.e. *The Sims* and *Second Life* are not in fact actual games. If in *The Sims* characters are simulated, in *Second Life* only the

environment is simulated, the characters being controlled by humans. There is no specific goal or competition and users do not follow a game plot in either of the two environments. In *Second Life*, residents interact with the world and with other inhabitants by building, selling or buying items or simply socialising (Pereira 2009, p. 22). In short, *Second Life* is a user-created virtual environment which allows for the development of and participation in collaborative experiences (Au 2008). However, even if *Second Life* is a simulated environment and not a game, it may also be considered a game engine in that it is possible to construct games within it (Salt et al. 2008, p. 13). Moreover, both *Second Life* and *The Sims* have many of the attributes of games, such as the sophisticated graphics, the ability to be represented by an avatar, the interaction with other online residents and the freedom to explore the environment without being in physical danger and at risk (Pereira 2009, p. 23).

Pure games such as *Halo 2* and *World of Warcraft* have no explicitly built-in mechanisms for the making of machinima, but can be used for producing it nonetheless (Bradzell et al. 2006, p. 434). The major benefit that they offer is that controlling actors in sophisticated animations is as simple as using a keyboard and mouse in real-time. Walking, turning, jumping, interacting with the environment are built-in and easy for anyone competent with a game controller. The downside is that similarly to pure machinima platforms, pure games lack libraries altogether or provide only highly limited ones (ibid).

Bardzell et al. conclude their evaluation with the observation that to date, hybrid games in general and *Second Life* in particular, offer a range of functionality that makes them better suited than either pure games or pure machinima platforms for machinima development. They also point out that other hybrid games such as *The*

Sims and *The Movies* do not offer the same degree of freedom to customise sets, props and camera angles that can be found in *Second Life* (Middleton & Maher 2008, p. 209). The flexibility of environments such as *Second Life* constitutes one of the main reasons for which this study uses the virtual world of *Second Life* for the production of the machinima videos.

Sadler (2012) discusses certain characteristics that all virtual worlds share. More specifically, they are online 3D environments where users are represented by avatars. Virtual worlds such as *Second Life* are persistent, they continue to exist even after the user logs out, accessible 24 hours a day and, importantly, they are social spaces being used for functions ranging from virtual dancing, socialising, virtual building, buying and selling, holding business or club meetings and, last but not least, gathering for educational purposes (pp. 24 - 25). *Second Life*, for example, provides its residents with an environment which they themselves can design, using modelling tools to construct virtual islands, buildings, gardens, and objects like cars, motorbikes, clothes and accessories for their avatars and so on. This kind of creativity is not limited in the same way that it is in the real world and, as a result, players can experience a range of virtual recreations and simulated environments, which might be difficult or impossible to access in real life. *Second Life* also allows residents to adopt new identities, new ways of being in the world (Jones & Hafner 2012, p. 137).

Even though 3D virtual worlds share similarities with Massively Multiplayer Online Games (MMOGs), the former are in fact rather different from the latter in the sense that there are no clearly defined goals or problems to be solved, and players do not level up, so talk of 'winning' or 'losing' doesn't make much sense (Jones & Hafner 2012, p. 137).

3.2.2 Machinima versus animation and film-making

Strickland (2008) points out that a machinima film shares similarities with both animation and real film-making as the end product looks like a computer animated movie while the production process, the actual film-making, is more like a live action movie. At the same time, machinima is distinct from live action in that it is not recorded from physical reality. It is, also, different from computer-generated animation, whose images are composed out of basic geometric shapes as machinima is generated by either a game's engine, a software, or the world in which it is recorded (Ng 2013, p. xv).

Like conventional 3D animation, machinima 'allows total control over visual representations' of sets, characters and events (AMAS 2010 cited in Johnson & Pettit 2012, p. 6). Nonetheless, there are a number of important differences between machinima and traditional and conventional 3D animation that are worth mentioning. However, before pointing these out it is important to clarify the difference between traditional animation and computer-generated image (CGI) animation. The former is the oldest type of animation, which employs the classic technique of hand-drawing every image. The latter uses digital equipment and software to produce 2D or 3D visuals, instead of hand-drawn images (Kelland et al. 2005, p. 19). Everything that happens in conventional animation, does so only because animators, who work in a world which exists only visually, made it happen (ibid). In other words, animators must create every single texture, gesture, character and object. The advantage is that they have total control over every frame of film and can create 'a picture perfect animation' (Kelland et al. 2005, p. 21). On the other hand, this extremely laborious process requires hours of work for the rendering of a single frame of animation. Thus, conventional animation is

slow and time-consuming (Hancock & Ingram 2007, p. 11; Johnson & Pettit 2012, p. 6; Strickland 2008). Machinima, in contrast, is much faster and less laborious. Machinimators work in virtual worlds and games that artists and programmers have designed and created. Thus, the machinimators are provided with all the animation they will need to tell a story (Strickland 2008). Put differently, objects, characters and environments within games and virtual worlds such as *Second Life* are at the machinimators' disposal. They can control their game characters or avatars like a virtual puppeteer with simple keyboard controls and mouse clicks (Kelland et al. 2005, p. 20).

Another significant difference is that machinima is considerably cheaper than both traditional and conventional 3D animation. A basic machinima film produced within a game could cost as little as the price of the actual game. Even if one splurges and buys software and hardware of the highest quality to produce their machinima, they are unlikely to spend more than a few thousand euros. The budget of a computer-animated motion picture may easily exceed a hundred million euros (Jones 2006; Strickland 2008).

One of the greatest advantages of machinima when compared to real world film-making is that 'it frees the filmmaker from the many constraints of the real world' (Kelland et al. 2005, p. 22). Additionally, machinima production is highly flexible, cost-effective, time-efficient and offers producers a large amount of creative control (Middleton & Maher 2008, p. 209). Moreover, it provides an extraordinary environment for 'experimentation and innovation' (Kelland et al 2005, p. 74). Importantly, it is not necessary to have any knowledge of 3D modelling, texturing, animation, or even lighting because the game engines or the virtual worlds provide the beginner film-maker with enough to start capturing

footage right away (Kelland et al 2005, p. 74). Furthermore, machinima solves several other costly issues, such as equipment, actors, costumes, and locations. The entire cast and crew can be taken to a plethora of virtual filming locations inaccessible in real life for low budget film-makers who in the view of Kelland et al. can 'create far more convincing sets digitally than they can in reality' (2005, p. 22). Special effects are also inexpensive and easy to use by comparison with real world film-making. For instance, in a virtual world or a game, the same building or car can be blown up over and over again without financial worries and risk of injury (ibid). Therefore, it is safe to say that virtual acting is less dangerous and physically restricted than live action. Kelland et al. (2005) point out that when compared with the prohibitive cost of buying cameras, lights, microphones, and all the other equipment required to produce real films, machinima is perfect for a beginner to learn the craft of film-making (p. 74) 'on a shoestring budget' (Methenitis 2011, p. 81).

Similarly to film-making, machinima is recorded in real-time, and real people can perform and control the camera. 'Looking through the virtual camera is exactly like looking through the lens while on set' (Kelland et al. 2005, p. 22). Actors' performance on camera can immediately be reviewed and retaken until it works (ibid). Camera controls in machinima films are similar to the moves in the shooting of traditional film and production of video and include panning and zooming (Berkeley 2006, p. 72). Machinima recording involves screen-capture, with the resultant video footage edited using desktop software such as Windows' Movie Maker or Apple's iMovie. Sound-tracks and effects can also be inserted at this stage. Finally, the films are exported to a digital video file. In sum, machinima production follows the same steps, and uses similar techniques, as

real-world filmmaking: scenes are story-boarded, shot and then edited with user-friendly non-linear video editing software (Middleton & Maher 2008, pp. 208-209).

In conclusion, machinima provides both advantages and disadvantages when compared to traditional filmmaking and 3D conventional animation. Bardzell et al. (2006, p. 433) identify machinima's reduced need for physical resources, i.e. human actors or physical props, as being its most obvious attraction as it gives producers the power to make movies more rapidly and cheaply (Middleton and Maher 2008, p. 209).

3.3 Machinima in education

One area where machinima is just beginning to make inroads is education. Carter (2012) notes that machinima represents 'one of the most creative ways in which students can express their understanding of complex ideas while learning new skills, all within an environment that encourages interactivity and engagement' (p. 204). Many educators have been drawn to machinima due to its potential for learning and teaching which is detectable even in its earliest forms, i.e. the Quake films, highly appreciated for their educational value by other gamers (Lowood 2006). Daly Swanson (2007) offers a rather convincing argument for the educational potential of machinima stating that it is recreational and educational and can be distributed on many of the social networking sites where young people are already publishing and sharing content (p. 5). Thus, machinima is beginning to attract more educators due to its potential for learning and teaching. Thanks to machinima scholars such as Henry Lowood, Paul Marino and many others, 'the term has entered the lexicon in pretty significant ways' (Nideffer 2011, p. 71) and

machinima is now starting to be taught in various contexts inside and outside academia (ibid).

Martin (2013) suggests incorporating machinima into the teaching process to bring interest, help explain difficult concepts, and just get attention in a way that today's students are used to. In her opinion, the most effective way to use machinima with students is to have them work in a group and develop the machinima employing a variety of skills and roles. Just as with moviemaking, machinima production requires direction, script-writing, acting, special effects, technical skills, music, narration and editing. Machinima offers educators locations, costumes and special effects that would be impractical or impossible on a student budget. A machinima project pushes students to collaborate, communicate and solve problems (p. 16). Martin (2013) recommends a number of ways to use machinima for teaching and learning, e.g lesson/unit introductions to captivate students' attention. She argues that student-created machinima videos could be used as unit assessment since they constitute a form of authentic assessment, evaluated with the use of a rubric provided to students at the start of the unit. Lastly, she points out that all students can contribute to a machinima as a variety of skills and levels are necessary to produce it (p. 17).

As already mentioned, machinima's potential for education is just starting to be investigated. One of the very early initiatives which involved students in the making process of a machinima belonged to Global Kids, a nonprofit organisation in New York City. The organisation has incorporated machinima into one of its after-school programmes. Its Online Leadership Program (OLP) is meant to help students gain the skills necessary to use the Internet as a tool for research and social change. One of the areas the online programme focuses on is virtual worlds,

primarily *Teen Second Life* which has been closed in the meantime. Workshops are hosted in this environment to engage teens in globally relevant topics such as racism and genocide (Tsai & Czarnecki 2008, p. 29). The programme works with teens to teach them in a practical way about global issues and how to communicate in multiple formats. It combines film production skills and leadership development to empower the youth to become critical thinkers, media producers, and global citizens. 'Global Kids' Machinima Camp, a partnership between Global Kids and UNICEF, ran in *Second Life* and the final project was for the fifteen participants to each make a one-minute machinima movie about a specific children's right. The machinima videos were screened for teens within *Second Life*, at the *Second Life* Community Convention in Chicago, and were promoted by UNICEF (Tsai & Czarnecki 2008, p. 30).

Another educational project that engaged students in making machinima videos took place in 2012 and was initiated by Carter who designed and taught a course on Digital Culture in *Second Life*. His project adds to the growing body of knowledge of how machinima is being used in the humanities. At the end of the course, Carter noted that properly incorporated machinima has the potential to change students' understanding of a text through performance. Additionally, it can also create 'memorable experiences in class, thus increasing retention' (2012, p. 198). Carter divided his twenty-five students into groups consisting of three to four members who worked on machinima projects in *Second Life* to demonstrate creative ways to express their understanding of concepts found in the reading assignments related to digital culture. At the end of the term, students expressed an overall increase in their technical skills as well as an acquisition of skills that

they felt they would use outside their class as they moved into their careers (Carter 2012, p. 203).

In the field of language learning and teaching, Standen-Raz, a Talkademy (*Second Life*-based school) teacher, carried out one of the first machinima projects. The idea to use machinima for teaching English was initially part of an online language programme developed by the founders of Talkademy, Gerhilde Meissl-Egghart and Klaus Hammermueller. Standen-Raz, who was also a film-maker joined the two and together they created the 'ifilm academy' concept. The ifilm academy course was designed primarily as a language course. The students were attending these classes as part of a Business English course. The project was designed to take place via *Second Life* and consequently Standen-Raz never met the students, they only communicated in class in *Second Life* or via email when he sent them extra instructions or motivational information (Kern 2009). The course Standen-Raz taught was an additional part of the traditional language course curriculum so it functioned best when used as an add-on as it could not have entirely replaced a standard English course (ibid). He reports that at times students despaired that their work load from other courses was too high to also cope with making a film, or that they could not manage something with the technical side of making machinima videos, but that in the end they worked through it. The machinima films made by students were shown at an Awards Ceremony, which was a live mixed-reality event where students had to give a short presentation about the making of the film (ibid).

Within the last few years, there has been a significant amount of research specifically focusing on the use of machinima in the language classroom or in language teacher education and quite a few studies are worth mentioning. Most

recently, Dooly and Sadler (2016) completed a research study based on data compiled during a 10-week language project that employed videoconferencing and machinima to introduce concepts of good and bad habits related to personal hygiene, physical activities, and eating to young, beginner language learners. The students used the information they learnt about the topic to communicate face-to-face with their classmates and online with telecollaborative partners in the target language in order to solve topic related problems (Dooly & Sadler 2016, p. 54). The results of Dooly and Sadler's study show that in addition to the assimilation by the class participants of the curricular objectives set by the teachers, many students "were able to produce target language structures far beyond the expected output of learners at this age and level (e.g. the use of modality and the creative 'free-form' reproduction of language structures in other contexts)" (Dooly & Sadler 2016, p. 67).

3.3.1 New ways of meaning-making and doing with machinima

Digital literacy practices such as modding, fan fiction, digital storytelling, vlogging and machinima are quintessentially multimodal literacies that require orchestration of visual, aural, kinetic, and verbal modes and allow fans to take on new, more active roles in the creation and distribution of culture (Jones & Hafner 2012, p. 135). Encouragingly, then they become active designers of meaning by engaging in these practices (New London Group 2000).

Thus, engagement with such practices in formal educational settings could transform what goes on in schools (Miller 2010, p. 275). A large body of literature indicates that when students are involved in multimodal digital literacy practices in the classroom, such as digital video making, for instance, their motivation,

participation and collaboration are increased. These types of projects support student-centred, authentic learning experiences, promote student voice and develop a sense of agency (Miller 2010, p. 263). One of the teachers in a study carried out by Miller remarked that her students 'flourished in their new roles of cinematographers, planners and directors (Miller 2007, p. 75). Additionally, one of the greatest affordances of digital literacy practices is that they have the potential to blur the boundaries between the classroom and the real world thus, altering the limitation of the classroom being such a different space from the real world (Jones 2014, p. 5) and, therefore, connecting students with their out-of-school interests (Hofer & Swan 2005; Masats et al. 2009; Miller 2007; 2008; 2010; Nikitina 2011). Also, many of today's students feel at ease when confronted with texts which cannot be processed sequentially. Their world is increasingly digital, multimedia and online. Jenkins reports that 'over half of all American teens, and 57% of those who use the Internet are media creators, having published some form of multimedia such as blogs, webpages or videos' (2006). Yet, these multimodal practices that so many students participate in are not a routine component of the formal curriculum (Knobel & Lankshear 2006).

Inevitably, these changes have had a tremendous impact on educational environments where students are reportedly becoming increasingly disengaged. Miller reports that more and more students arrive at school more competent in the new literacies than their teachers (2007; 2008; 2010). It has been argued that the problem is that educators are basically outsiders who have grown up and worked in a print-based world, while students are insiders who have grown up in a digital world of new literacies. Miller's studies confirm this as she reports that many of her in-service teachers in the classes 'were caught in the traditional notion of

reading and writing printed text as the only legitimate form of school literacy, the form that had brought them success in school' (Miller 2007, p. 68).

Miller stresses that it is important for teachers to have these experiences themselves in their teacher education programmes (Miller 2007, p. 74). The first step is for teachers 'to develop performance knowledge through design themselves and, thereby, develop an understanding of the wired world of the digital age, where knowledge is multimodal, co-constructed, and performed or represented, not absorbed' (Miller 2008, pp. 6-7).

The practice of machinima has been chosen for:

> its democratic promise as a medium available to most people with a reasonably fast computer who can now make films with any number of scenes which would have been far more difficult to animate or film in real life (car explosions, alien armies, and epic battles are all relatively easy with machinima); machines give us visions of performance that are not just beautiful or even graceful but that are also, and just as importantly, not available to human performers. Human beings are restricted physically by the limits of our bodies and hindered by the constraints of consciousness and self-awareness (Ng 2013, p.xiv).

3.4 Conclusion

Living in a highly wired world has transformed the way in which literacy is conceptualised. In response, teacher education programmes must prepare teachers (and teachers must prepare their students) for the 21st workplace. Digital literacies scholars and researchers agree that students urgently need opportunities in schools to develop these new literacies and the multitude of elements they comprise. To this end, teacher education needs to be highlighted as part of the digital literacies school reform agenda. Teachers in general and language teachers in particular

need to be provided with opportunities to reflect critically on the affordances of digital tools for transformation of practices of communication, interaction and enactment of various identities in order to be prepared for teaching students in the 21st century classrooms.

Furthermore, teachers need ongoing professional development activities to help them transform their beliefs about the purposes for schooling, learning, and literacy. The fundamental multimodality of machinima might provide an entry point for developing new multimodal literacy practices for teachers and their students. There are many reasons for focusing on machinima to make films, however, one is extremely important. Machinima, similarly to digital video composing, could provide a potential solution to the signaled under-using of resources of new multimodal literacies in educational contexts as it requires integration of many modes which makes it difficult for teachers to stay in the comfort zone of print-only texts. Therefore, professional development aimed at preparing language teachers to use digital literacy practice such as machinima for their students is needed.

In this chapter, research on machinima was reviewed. Various existing definitions of machinima were discussed and the context within which machinima emerged was presented. A discussion of machinima alongside other various digital literacy practices characterised by use of digital tools and techniques in conjunction with a distinctive ethos was provided next. The different techniques and platforms used to make machinima videos were overviewed and the ones employed in this study were highlighted. A comparison between machinima, filmmaking and conventional animation was then made and similarities and differences between

these practices were identified. Finally, section 3.4 looked at the use of machinima in educational settings.

This thesis proposes that a contemporary language educator needs to be concerned not only with developing students' proficiency in reading, writing and use of technologies but also with developing literacies in the multimodal designs enabled by various technological tools such as machinima. This chapter described machinima as a digital literacy practice that many students engage with in their lifeworlds and offered a rationale for using this particular tool which is quintessentially multimodal and collaborative to be used to investigate teachers' TPACK. Teachers are often identified as outsiders when it comes to new literacy practices so this study investigates their cognition in relation to digital literacies with the use of machinima. Making machinima might induce changes in teachers' views of the impact of digital technologies affordances on our ways of making meaning, doing things and enacting identities. As a solution to the problems outlined above, this study proposes machinima production experiences to closely examine teachers' TPACK as well as to enable them to begin to broaden their notions of school literacy from only reading and writing print to also composing multimodal ensembles for authentic purposes.

Chapter 4 will provide a detailed description of the TPACK framework and the domains of knowledge that have been adapted for this study.

CHAPTER 4 TPACK AND METHODOLOGICAL CONSIDERATIONS

TPACK constitutes the theoretical framework used to explore language teachers' cognition in relation to digital literacies as well as their meaning-making practices during a machinima production process. This chapter begins with a brief account of the context which led to the emergence of TPACK. Next, the foundational ideas and the theoretical bases of the TPACK framework are described. Then, definitions for each of the seven TPACK domains of knowledge are provided. This is followed by the presentation of the framework adapted for second and foreign language teacher education, i.e. World Language Teacher Education (WLTE). The expanded definitions of the Content and Technological Knowledge domains employed in this study for the analysis of teachers' TPACK are then introduced. Next, methodological choices and the rationale for the use of TPACK as a theoretical framework are explained. Finally, the research questions are reviewed and the research design that helped carry out the investigation of teachers' TPACK is outlined.

4.1. The context which led to the emergence of TPACK

We are living in a world that has embraced digital technology and allowed it to reinvent the ways in which our society operates (Mishra & Koehler 2006; Niess 2005; Pierson 2001). As a result of rapid technological developments, the field of education requires fundamental transformations so as to adequately prepare today's students who learn in different ways from those of previous generations (Spires et al. 2012, p. 35). However, despite these dramatic changes in our

society, in the field of education the reality has been lagging far behind the visions held by many researchers and practitioners (Mishra & Koehler 2006). A considerable amount of literature has been published on the topic of barriers to effective technology integration. Numerous research studies show that learner-centred education supported by technology constitutes 'an exception rather than the norm' (Chai et al. 2010, p. 63) and teachers frequently use technology for the transmission of teacher knowledge despite consensus among educators and researchers that true knowledge is not disseminated from experts to learners, nor is it acquired through passivity. On the contrary, students develop new ideas when their teachers 'facilitate learner-centred experiences in order to promote deep understanding through the construction of knowledge' (Nelson et al. 2009, p. 18).

As already mentioned in Chapter 1, teachers are often blamed for the lack of change and innovation with digital technologies in the classroom. According to Niess (2011), most teachers have been taught in traditional educational systems and have not learned their content with these new and emerging digital technologies. Consequently, teachers do not have the necessary experience to teach their subject matter with technology.

In a review of research from the field of foreign and second language teaching on teacher cognition, Borg (2003) notes that there is 'ample evidence that teachers' experiences as learners can inform cognitions about teaching and learning which continue to exert an influence on teachers throughout their career' (p. 81). Teacher cognition refers to 'what teachers think, know, and believe and the relationships of these mental constructs to what teachers do in the language teaching classroom' (ibid). Borg cites several studies which indicate that teachers learn significantly about teaching from their experience as learners, what has been referred to as 'the

apprenticeship of observation' (Lortie cited in Borg 2003, p. 87). Furthermore, beliefs formed early in life 'take the form of episodically stored material derived from critical incidents in individuals' personal experience' (Nespor 1987 cited in Borg 2003, p. 87). These beliefs are resistant to change even in the face of contradictory evidence. Findings that illustrate the influence of teachers' experience as learners on their cognition emerge from research with language teachers as well (Borg 2003, p. 88). In other words,

> teachers' prior language learning experiences establish cognitions about learning and language learning which form the basis of their initial conceptualisations of L2 teaching during teacher education, and which may continue to be influential throughout their professional lives (ibid).

The need to rethink teacher education becomes, therefore, very important. Borg (2003) argues that for professional preparation programmes to effectively shape teachers' cognition, preservice or inservice teachers' priors beliefs must not be ignored (p. 81).

It becomes evident that as today's teachers prepare to educate new generations, they are confronted with a broader range of needs than teachers were a few decades ago (van Olphen 2008a, p. 108). Nonetheless, many teacher preparation and professional development programmes are failing to provide preservice and inservice teachers with the knowledge, skills, and dispositions required to use new digital technologies effectively (Marino et al. 2009, p. 187) and to adopt digital literacy practices afforded by digital technological advancements. Bos et al. (2011) maintain that the problem lies in the belief held by many educators that there is no real need for technology and that what worked in the past in education works today. In other words, society has changed and schools have not (p. 177).

Koehler et al. (2011) identify one other significant complication teachers face when seeking to integrate technology in their classroom, namely the fact that most technologies are not designed for educational purposes (p. 147). They argue that transforming a tool into an educational technology requires 'creative input from the teacher to re-design, or maybe even subvert the original intentions of the designer' (ibid). However, often, teachers using technology 'tend to domesticate the application in such a way that it becomes congruent with their prevalent teaching practices while ignoring the affordances the technology offers' (Higgins et al. 2007 cited in Voogt & McKenney 2017, p. 69).

Another important barrier to effective technology integration in educational settings is the fact that 'schools often bow to societal pressure to fund technology without having a thoughtful plan for implementation' (Pierson 2001, p. 413). Pierson (2001) points out that in many cases 'schools are so eager to purchase and have teachers begin using technology, that they mistake simply having and turning on a computer as integration' (p. 426). One preservice teacher participating in a study carried out by Kajder (2005) eloquently noted that 'punching buttons is easy to learn' (p. 18) but 'thinking like a teacher' before 'punching buttons' constitutes the real challenge that needs to be addressed in teacher preparation programmes (Hammond & Manfra 2009, p. 162). Consequently, this tendency within the educational field to focus primarily on the technical dimension of teachers' use of digital technologies skills and not on how to use specific technologies to teach content does not adequately prepare teachers to integrate technology appropriately for the learning benefit of students (Doering et al. 2009; Koehler & Mishra 2005; Koehler & Mishra 2008; Mishra & Koehler 2006; Mishra et al. 2009). This view is supported by Koehler & Mishra (2008)

who assert that 'learning how to use technology is very different from knowing what to do with it instructionally' (p. 148). Furthermore, Koehler et al. (2011) point out that even when teachers acknowledge the pedagogical value of technological tools, they rarely have 'the skills and dispositions to risk experimenting and playing with them in order to optimise their educational potential' (p. 148).

In spite of the large number of studies indicating that comfort and competence with technological tools alone are not enough to efficiently prepare preservice and inservice teachers, many teacher education institutes continue to have a technocentric approach towards technology integration (Mishra et al. 2009). It becomes therefore evident that strong preservice education and professional development courses on the integration of emerging technologies are essential because they can help counter the possibilities of transmission-oriented school practices (Chai et al. 2010, p. 63) and fulfil technology's great potential for transforming the teaching and learning environment. Although there still is skepticism about technology use in education, there is a broad agreement among educators that technology can be effective and support learning if it is appropriately integrated into teaching (Dede 1998; Pamuk 2012). This in turn generates a new set of needs when preparing highly competent, professional educators across disciplines (Van Olphen 2008b, pp. 2-3).

To purposefully redesign teacher education, there has recently been an increasing interest in what teachers need to know to integrate digital technologies successfully into their classrooms (Angeli & Valanides 2009; Cox & Graham 2009; Koehler & Mishra 2009; Mishra & Koehler 2006; Niess 2005). There is now wide recognition among educational technologists that teachers from

different curriculum areas conceptualise and use digital technologies in different ways (Hennessy et al. 2005). In other words, 'the pedagogical uses of technology are strongly influenced by the content domains within which they are situated' (Graham et al. 2009, p. 70). More specifically, the teacher knowledge required to effectively incorporate technology into a language classroom, for example, is very different from that required for a science classroom (ibid).

Earle also points to teacher knowledge as being the key variable in teaching with technology:

> Integrating technology is not about technology—it is primarily about content and effective instructional practices. Technology involves the tools with which we deliver content and implement practices in better ways. Its focus must be on curriculum and learning. Integration is defined not by the amount or type of technology used, but by how and why it is used (2002, p. 8 cited in Niess 2009, p. 446).

Earle's view is supported by Angeli and Valanides (2009) who argue that merely introducing technology in schools will not have the desirable outcome because 'technology in and of itself does not constitute a transformation mechanism or a vehicle for change' (p. 157). The two researchers view technology as a tool that can be employed by teachers to reconstruct the subject matter (ibid) but in order to be able to do this educators have 'to develop an understanding of the complex web of relationships between users, technologies, practices and tools' (Koehler and Mishra 2005, p. 132). As Mehan (1989) states 'it is what people do with the machine, not the machine itself that makes a difference' (p. 19 cited in Angeli & Valanides 2009, p. 157). In light of these findings, teacher educators have started realising that simply providing teacher preparation programmes and professional development on technologies alone is not actively impacting teachers' knowledge

for teaching with technology (Niess 2013). In essence, appropriate teaching with technology requires an ability to integrate content, pedagogy and technology flexibly during the act of teaching (Koehler & Mishra 2005; Mishra & Koehler 2006) or, in other words, Technological Pedagogical Content Knowledge, TPACK (Mishra & Koehler 2006).

Researchers' investigations of how technological knowledge fits into effective teaching practices have revealed that knowledge related to the effective use of digital technologies is an important aspect of an educator's knowledge-base for the 21st century. Subsequently, in 2006, a framework was proposed, TPCK, now known as TPACK, that combined three important aspects of teacher knowledge, i.e. *Technological Knowledge*, *Pedagogical Knowledge*, and *Content Knowledge* (Mishra & Koehler, 2006).

Since scholars have proposed this new view on teacher knowledge for teaching in the 21st century, teacher educators are expected to provide the experiences necessary for developing the knowledge, skills, and dispositions that teachers need to successfully incorporate technology into their classroom practice (Niess 2011, p. 300). Differently put, teacher education needs to be transformed so as to prepare technology-proficient educators to meet the needs of 21st century learners (Niess 2013). However, this is a complex task 'given the fast changing nature of digital technologies and the multiple sources of knowledge which need to be synthesized' (Chai et al. 2010, p. 64). Hence, teacher educators are being confronted with a 'wicked problem' (Ritel & Webber 1973), namely preparing current and future educators to utilise TPACK so as to transform their teaching with technology and create new opportunities for learning. Thus, preservice and inservice teachers must develop an overarching conception of their subject matter

with respect to technology and what it means to teach with technology in order to be able to guide their students in exploring content topics with technologies (Niess 2005, p. 510; Niess 2011, p. 307). To meet this need, Mishra and Koehler (2006) offered their TPACK framework for teacher knowledge as a complex interaction among three categories of knowledge: content, pedagogy, and technology. The two researchers describe how these bodies of knowledge interact theoretically and in practice so as to produce the type of flexible knowledge needed to successfully integrate technology in the classroom (p. 3).

The now widely referenced TPACK represents a conceptual framework designed to illustrate the type of teacher knowledge, skills, and dispositions necessary for successful technology integration. In the words of its developers, TPACK is 'a way of thinking about the knowledge teachers need to integrate technology effectively into their classrooms' (Koehler & Mishra 2008, p. 1). Further, TPACK represents a new direction in understanding the complex interactions among content, pedagogy and technology that can result in successful integration of technology in classroom practice. Bos et al. (2011, p. 168) point out that there is a broad consensus among researchers and educators that TPACK arises from multiple interactions among content, pedagogical, and technological knowledge (Angeli & Valanides 2005; 2009; Graham 2011; Koehler et al. 2011; Mishra & Koehler 2006) and describes how teachers' understandings of technology, pedagogy, and content can interact with one another to produce effective teaching with digital technologies.

The TPACK framework can be used as a tool to offer insight into how the intricacy inherent in teaching and learning with technology can be approached to facilitate teacher growth (Spires et al. 2012, p. 35). Additionally and more

relevantly to this research project, TPACK might advance the current understanding of the types of knowledge language teachers have and the knowledge they need to achieve in order to develop thoughtful and pedagogically sound approaches to integrate digital literacy practices in their classes.

4.2 Theoretical bases of the TPACK framework

This section describes the foundational ideas and the theoretical bases of the TPACK framework.

4.2.1 Shulman's pedagogical content knowledge

Mishra and Koehler (2006) have drawn extensively on Shulman's (1986; 1987) widely cited *Pedagogical Content Knowledge* (PCK) for the development of their framework. An understanding of Shulman's PCK is necessary before attempting to grasp the concept of TPACK.

PCK was first introduced into the field of teacher education by Shulman in 1986 and has since them become 'common currency' in the area of teacher education, having strongly impacted the field (Segall 2004, p. 490).

In his seminal article, *Knowledge and Teaching: Foundations of the New Reform*, Shulman (1987) notes that historically in teacher education it is often assumed that knowledge of the content area is sufficient for teachers to successfully teach their students. However, he argues, knowing the content is not enough for effective instruction. Rather, he advocates the need for teachers to possess pedagogical knowledge as well, i.e. knowledge of how to teach (ibid). Shulman points out that content is the domain of scholars while pedagogy represents the domain of teachers (1986). Considering content knowledge and pedagogy as

mutually exclusive domains, writes Shulman, led to the development of teacher education programmes that focused either on the subject matter or pedagogy (Mishra & Koehler 2006, pp. 1020-1021). Shulman (1986) advances thinking about teacher knowledge by addressing this dichotomy through the introduction of the idea of PCK. Pedagogical Content Knowledge 'goes beyond knowledge of subject matter per-se to the dimension of subject matter knowledge for teaching' (p. 15). More specifically, PCK lies at the intersection of content and pedagogy. In Shulman's view, teaching is the transformation of content into forms that are pedagogically powerful (ibid).

Teachers need to find the most helpful forms of representation of the subject matter, the most powerful analogies, illustrations, examples, explanations, and demonstrations—in essence, 'the ways of representing and formulating the subject that make it comprehensible to others' (Shulman 1986, p. 9). Thus, the PCK construct is at the heart of the teaching process and represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented and adapted to the diverse interests and abilities of learners, and presented for instruction (p. 8). In short, Shulman's explication of PCK results in the idea that 'teachers should have knowledge related to both content and pedagogy, and that teacher preparation programmes should provide learning opportunities to teachers for developing these' (Polly & Brantley-Dias 2009, p. 46).

4.2.2 Early conceptualisations of TPACK

More recently, the rapid expansion of available technological tools has prompted other scholars to build on Shulman's concept of PCK by including a third

component to teacher knowledge, namely technological knowledge so as to help describe the sort of knowledge teachers need for teaching with technology (Groth et al. 2009, p. 393). Even though Mishra and Koehler's conceptualisation of TPACK has prevailed in the literature on teacher education, the two scholars were not the first ones to use the term TPACK.

Pierson (2001) was one of the first researchers to formally introduce the concept of Technological Pedagogical Content Knowledge. Her framework adds teachers' technology knowledge to Shulman's well-established PCK construct. In Pierson's view, the technological knowledge component should include basic knowledge competency as well as an understanding of 'the unique characteristics of particular types of technologies that would lend themselves to particular aspects of the teaching and learning processes' (p. 427). A teacher who incorporates technology appropriately, adds Pierson, is able to draw on extensive subject matter knowledge and pedagogical knowledge, in combination with technological knowledge (ibid). According to Pierson, it is the intersection of these three types of knowledge, technological pedagogical content knowledge, that defines effective technology integration. Figure 4.1 represents the possible relationships among the three types of teacher knowledge. It is worth noting that Pierson illustrated the three variables as ovals, with the oval representing technology significantly smaller than the other two (Hammond & Manfra 2009, p. 162). Another contribution of Pierson's work was that it was among the first in the field to demonstrate the need for an operational definition for technology integration as it applies to classroom teachers (Spires et al. 2010, p. 37).
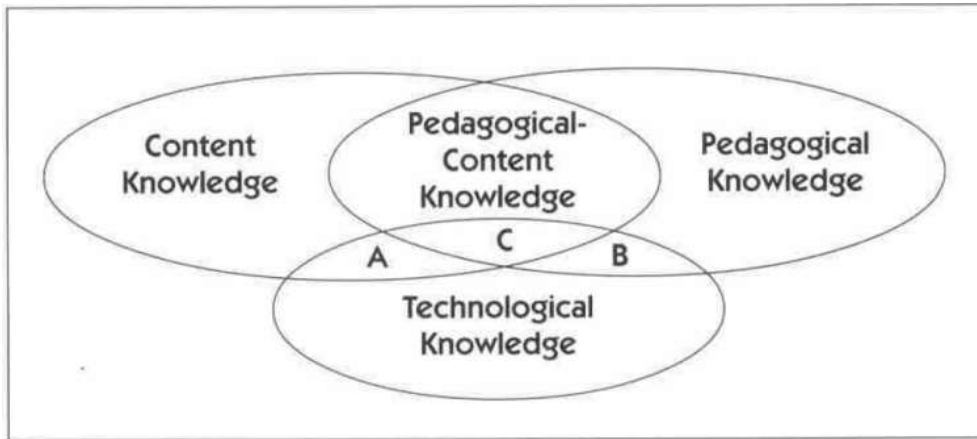
Figure 4.1 Pierson's Representation of Technological Pedagogical Content Knowledge

Pierson's initial articulation of technological pedagogical content knowledge was followed by various other scholars suggesting similar constructs. Niess (2005) used the term TPCK to refer to technology-enhanced PCK. She used the construct to study how a technology integration programme impacted student-teachers' use of technology in their classroom practice. Voogt et al. (2013) note that Niess (2005) did not consider TPCK as a new definition of teacher technology integration, as Pierson (2001) did. Rather, she defined it as 'the integration of the development of knowledge of subject matter with the development of technology and of knowledge of teaching and learning' (Niess 2005, p. 510). Niess (2005) argued that this integration of the different domains is what supports teachers in teaching their subject matter with technology (p. 510). Because the term 'pedagogy' did not clearly represent the multiplicity of inputs to teaching and learning, the phrase 'teaching and learning' was used to incorporate the knowledge of curriculum, learners, and schools together with pedagogy (Figure 4.2).
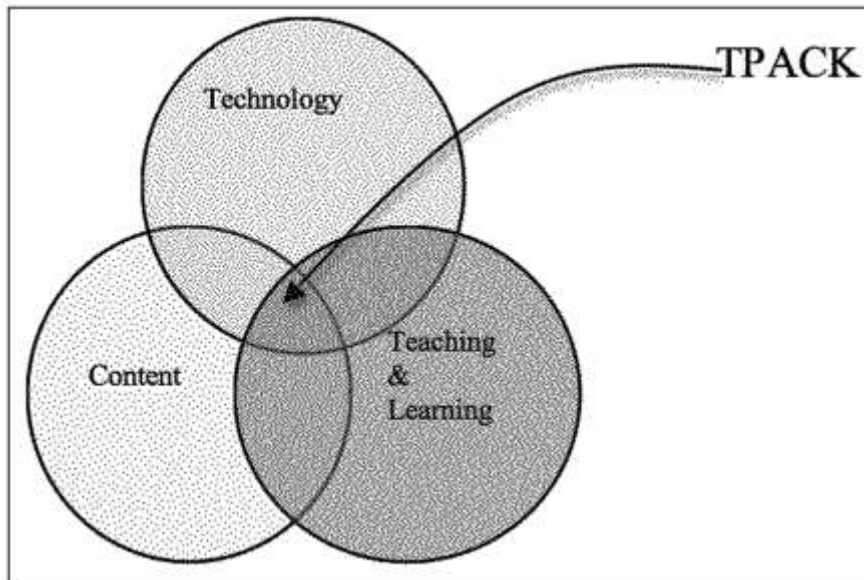
Figure 4.2 Niess's Representation of Technological Pedagogical Content Knowledge

4.3 Koehler and Mishra's TPACK

More or less at the same time with Niess (2005), Koehler and Mishra (Koehler & Mishra 2005; Mishra & Koehler 2006) started to use TPACK as a conceptual framework to discuss the knowledge base for teachers to effectively teach with technology. TPACK was called TPCK in the literature until 2007 (Thompson & Mishra 2007) when an updated version of the TPCK acronym was revealed and discussed in the winter issue of the *Journal of Computing in Teacher Education*. Thompson and Mishra pointed out that the initial acronym TPCK was problematic because it was consonant-heavy and, consequently, difficult to say (p. 38). They felt that the acronym did disservice to what was otherwise a simple but powerful concept (ibid). The main argument for the updated acronym was that the insertion of the vowel *A* better represented the interdependence of the three knowledge categories, i.e. technology, pedagogy and content and consequently the framework better explained the *Total PACKage* of teacher knowledge (Thompson & Mishra 2007, p. 38).

CHAPTER 4 TPACK AND METHODOLOGICAL CONSIDERATIONS

In their studies on collaborative design of online courses by teacher education faculty and master students, Mishra and Koehler found that 'the participants developed through the experience a deeper understanding of the complex web of relationships between content, pedagogy and technology and the contexts in which they function' (Koehler & Mishra 2005, p. 149). Unlike Niess (2005) who presented TPACK as an enhancement of PCK, Mishra and Koehler introduced the construct as an understanding of the interaction of three knowledge domains, i.e. content (C), pedagogy (P) and technology (T) and their intersections, pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) and technological pedagogical content knowledge (TPACK) (Koehler & Mishra 2008; Mishra & Koehler 2006). The latter is achieved when a teacher knows how technological tools transform pedagogical strategies and content representations for teaching the subject matter and how these tools and representations impact students' understanding of the content (Graham et al. 2009, p. 71). In other words, Mishra & Koehler's conceptualisation stresses that TPACK is more than just the sum of its parts, indicating that teachers must engage with content, pedagogy, and technology in tandem to develop knowledge of how technology can help students learn the content (Groth et al. 2009, p. 393). In short, TPACK is a framework for conceptualising teacher knowledge needed for appropriately teaching with digital technologies (Voogt & McKenney 2017, p.70).

Mishra and Koehler (2006) point out that their framework attempts 'to capture some of the essential qualities of teacher knowledge required for technology integration in teaching, while addressing the complex, multifaceted, and situated nature of this knowledge' (p. 1017). They add that foundational to their TPACK

construct is the understanding that teaching is a highly complex activity that draws on many kinds of knowledge in addition to being a complex cognitive skill occurring in a dynamic environment (2006, p. 1020).

The two researchers illustrate their TPACK model with a Venn diagram made up of three overlapping identically sized circles (Hammond & Manfra 2009, p. 162), each representing a distinct form of teacher knowledge, i.e. content, pedagogy and technology. Their figure is therefore different from the one devised by Pierson (2001) as technology, pedagogy and content play equally important roles in effective teaching with technology. Also, in Mishra and Koehler's model the interactions between and among technology, pedagogy and content, namely PCK, TCK, TPK and TPACK are equally important. TPACK is represented by the centric overlap, the complex interplay of the three circles. In sum, Mishra and Koehler's conceptualisation of TPACK considers all possible interactions and connections between and among the constructs and 'postulates high quality and effective integration of technology, pedagogy and content as part of the teaching and learning experience' (Hechter et al. 2012, pp. 140-141). Koehler et al. (2011) argue that the TPACK framework requires teachers to go beyond knowledge of specific subject matter, technologies and pedagogical techniques in isolation to develop a kind of knowledge that is contingent and flexible. This type of knowledge lies at the intersection of all three knowledge bases, requiring teachers to develop deep, complex, fluid and flexible knowledge of all three components of the framework (p. 149). True technology integration, Koehler and Mishra (2005) argue, does not simply mean adding technology to the existing teaching and content domains (p. 134). Rather, it causes the representation of new concepts and consequently demands developing a sensitivity to the dynamic, transactional

relationship between all three elements suggested by the TPACK framework (ibid).

In 2008, Koehler and Mishra revised their representation of TPACK in their chapter in the *Handbook of Technological Pedagogical Content Knowledge for Educators*. As shown in Figure 4.3, their revision added context to the seven knowledge domains to convey that teaching with technology does not happen in isolation. On the contrary, it is situated and teachers need to have the flexibility to incorporate knowledge about students, schools, infrastructure and environment to teach effectively with technology.
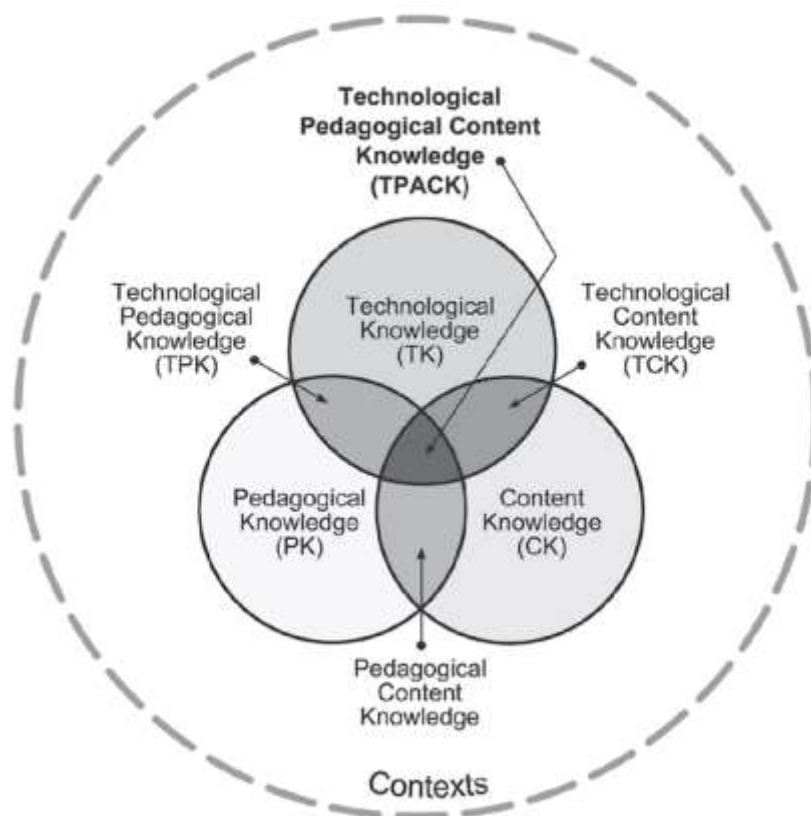

Figure 4.3 Koehler & Mishra's (2008) Conceptualisation of Technological Pedagogical Content Knowledge

What sets Mishra and Koehler's approach apart from other researchers such as Pierson and Niess, is the specificity of their articulation of the relationships

between content, pedagogy, and technology, namely three pairs of knowledge intersection (PCK, TCK and TPK) and a triad (2006, p. 1026). Each type of teacher knowledge represented in the framework is briefly described in the section below.

4.3.1 TPACK domain definitions

Content knowledge (CK) is deep knowledge about the subject matter that is to be learned or taught and is of critical importance to teachers. The content to be covered in middle school science is different from the content to be covered in an undergraduate course on art appreciation or a graduate seminar on astrophysics. As Shulman (1986) states, this knowledge would include knowledge of concepts, theories, ideas, organisational frameworks, knowledge of evidence and proof, alongside established practices and approaches toward developing such knowledge (Koehler & Mishra 2009, p. 63; Mishra & Koehler 2006, p. 1026).

According to Mishra and Koehler (2006) *technological knowledge* (TK) is in continuous flux and necessitates a deep and essential understanding as well as a mastery of technology. Because technology is continually changing it is notoriously difficult to define. Until recently, most technologies used in traditional classrooms, from textbooks to overhead projectors were considered 'transparent' (Bruce & Hogan 1998 cited in Mishra & Koehler 2006, p. 1023), or in the words of Mishra and Koehler (2006), 'they had become commonplace and were not even regarded as technologies'. Contrastingly, the more recent usage of technology refers to hardware and software such as computers, educational games, and the Internet and the multitude of applications supported by it (p. 1023). Importantly, the rapid rate of evolution of these new digital technologies prevents them from

becoming 'transparent' any time soon (p. 1024). This is a very different context from earlier conceptualisations of teacher knowledge, in which technologies were standardised and relatively stable. This new context has foregrounded technology, making knowledge of technology an important aspect of overall teacher knowledge (p. 1024).

Pedagogical knowledge (PK) is teachers' deep knowledge about the processes and practices or methods of teaching and learning. It encompasses, among other things, overall educational purposes, values, and aims. This is a generic form of knowledge that applies to understanding how students learn, classroom management, lesson plan development and implementation, and student assessment (Koehler & Mishra 2009, p. 64; Mishra & Koehler 2006, pp. 1026-1027). It includes knowledge about techniques or methods to be used in the classroom, the nature of the target audience, and strategies for evaluating student understanding (Mishra & Koehler 2006, pp. 1026-1027). Pedagogical knowledge entails understanding 'how students construct knowledge and acquire skills and and how they develop habits of mind and positive dispositions toward learning' (ibid).

Mishra and Koehler (2006) stress that their idea of *pedagogical content knowledge* (PCK) is consistent with and similar to Shulman's idea of knowledge of pedagogy that is applicable to the teaching of specific content. PCK is concerned with the representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of what the students bring to the learning situation, and theories of epistemology (p. 1027). It also covers knowledge of teaching strategies that

incorporate appropriate conceptual representations in order to address learner difficulties and misconceptions and promote meaningful understanding (ibid).

Technological content knowledge (TCK) is teachers' knowledge about the manner in which technology and content are reciprocally related. Educators need to know not just the subject matter they teach but also the manner in which the subject matter can be changed by the application of technology (Mishra & Koehler 2006, p. 1028). Understanding the impact of technology on a given discipline is critical to developing appropriate technological tools for educational purposes (Koehler & Mishra 2009, p. 65). Teachers need to understand which specific technologies are best suited for addressing subject-matter learning in their domains and how the content dictates or perhaps even changes the technology—or vice versa (ibid). Thus, TCK is an understanding of the manner in which technology and content influence and constrain one another.

Technological pedagogical knowledge (TPK) is knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching and learning might change when particular technologies are used in particular ways (Koehler & Mishra 2009, p. 66; Mishra & Koehler 2006, p. 1029). This might include knowing that a range of tools exists for a particular task, strategies for using the tool's affordances and knowledge of pedagogical strategies and the ability to apply those strategies for use of technologies. To build TPK, a deeper understanding of the constraints and affordances of technologies and the disciplinary contexts within which they function is needed (Koehler & Mishra 2009, p. 65). TPK is particularly important because most popular technological tools are not designed for educational purposes. Teachers have to reject

'functional fixedness' (Duncker 1945 cited in Koehler & Mishra 2009) and 'develop skills to look beyond most common uses for technologies, reconfiguring them for customized pedagogical purposes' (Koehler & Mishra 2009, p. 66).

Technological pedagogical content knowledge (TPACK) is an emergent form of knowledge that goes beyond all three components, namely content, pedagogy, and technology. It is the basis of good teaching with technology and requires knowledge of the representation of concepts using technologies, pedagogical techniques that use technologies in constructive ways to teach content, knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face, knowledge of students' prior knowledge and theories of epistemology and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones (Mishra & Koehler 2006, p. 1029). Paraphrasing Marks (1990), the two researchers assert that TPACK 'represents a class of knowledge that is central to teachers' work with technology' (Mishra & Koehler 2006, p. 1029). Technological pedagogical content knowledge is an understanding that emerges from interactions among content, pedagogy, and technology knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. The TPACK framework suggests that content, pedagogy, technology, and teaching/learning contexts have roles to play individually and together. Importantly, teaching effectively with technology 'requires continually creating, maintaining, and re-establishing a dynamic equilibrium among all components' (Koehler & Mishra 2009, p. 67).

4.4 World language teacher education TPACK domain definitions

Several TPACK scholars note that despite TPACK's central connection to subject content, there is a severe lack of research that explicitly relates TPACK to specific subject domains (McKenney & Voogt 2017; Voogt et al. 2013; Voogt & McKenney 2017). Therefore, TPACK sholars such as Voogt and McKenney (2017) advocate for the examination of the framework for specific learning domains. If technology, pedagogy and content are not integrated during preservice teacher education, 'they are likely to remain isolated and unexploited' (Polly et al., 2010 cited in Voogt & McKenney 2017, p. 79) and the programme cannot be conducive to developing TPACK (Voogt & McKenney 2017, p. 79).

The sphere of teacher education in Computer Assisted Language Learning (CALL) constitutes an exception to the aforementioned as van Olphen (2008) adapted TPACK for World Language Teacher Education (WLTE) by describing its domains for second and foreign language teachers. In 2013, Motteram et al. made the point that the field of teacher education for CALL began having 'a separate identity as a subject for serious study and scholarship' only in the last decade despite having been 'part of the teacher education landscape for at least twenty years' (p. 55). CALL was defined by Egbert (2005) as referring to 'learning language in any context, with, through, and around computer technologies' (p. 4). In 2009, Garrett pointed out that CALL was not shorthand for 'the use of technology' but that, in fact, it designated 'a dynamic complex in which technology, theory, and pedagogy are inseparably interwoven' (p. 674).

According to van Olphen (2008a), the Content Knowledge (CK) of language teachers should consist of, but not be limited to, proficiency in and knowledge

about the target language and its culture (p. 110). CK for teachers broadly encompasses the study of language specific linguistics (morphology, phonetics, phonology, pragmatics, second language acquisition [SLA], semantics, socio-linguistics, syntax) and the development of cross-cultural awareness and near-native language proficiency. CK for language teachers includes 'all the necessary elements that help language learners to communicate both verbally and non-verbally across linguistic and cultural borders' (ibid). Knowledge of SLA theories is included in the CK domain since understanding how second languages are acquired has a direct effect on how teachers conceptualise language and, consequently, how they believe language should be taught (ibid).

Technological Knowledge (TK) in van Olphen's TPACK refers to knowledge of different technologies. In general, TK includes the ability to troubleshoot and an understanding of how to use different technologies (van Olphen 2008a).

Technological Content Knowledge (TCK) for language teachers is the body of knowledge that they have about their target language and its culture and how technology is used to represent this knowledge.

Pedagogical Content Knowledge (PCK) refers to knowledge of SLA theories and teaching skills while Technological Pedagogical Knowledge (TPK) refers to an understanding of how technology can be used to aid the teaching and learning process.

TPACK would then represent the knowledge of how these components interact with each other, helping create effective teaching with technology.

Silva (2012) further adapted the TPACK framework to specifically address teaching languages in virtual worlds such as *Second Life* (SL). She describes the seven knowledge domains according to van Olphen's definitions but also makes important contributions to the TK and TCK domains by acknowledging the importance of the affordances embedded in technological tools. For the purposes of her study, TK specifically refers to 'knowledge of how to use emerging technologies'—technologies that are not yet transparent in the contexts in which they are being used. Silva's adapted TPACK draws on Angeli and Valanides (2009) and brings into discussion the concept of tool affordances and its relevance for representations of content with technology. She points out that teachers should bear in mind that explicitly teaching 'how the unique features or affordances of a tool can be used to transform a specific content domain for specific learners' is essential (Angeli & Valanides 2009, p. 158 cited in Silva 2012, p. 31). Therefore, TK in Silva's (2012) study encompasses knowledge of tool affordances and is described as 'the ability to use *Second Life*, help students learn how to use and solve problems in SL, as well as understand the different features of this platform' (p. 34) while TCK refers to the ability to understand how features of the virtual world can be used to represent language concepts (ibid).

In this thesis, TK refers specifically to knowledge of machinima and the software required to produce a video with this technique, i.e. the virtual world of *Second Life*, screencapture and editing programs, namely oCam and Movie Maker. Furthermore, the TK domain here includes not only the 'technical mastery' or technical dimension (Hafner 2013, p. 830)—the ability to operate the tools—but also knowledge of the affordances for meaning-making embedded in the software. Voogt et al. (2016) argue that 'the affordances of a technology need to be

recognized and considered useful by teachers' (p. 36). In other words, 'teachers need a deep understanding of the affordances of specific technologies to help their students learn a specific topic or skill with the help of technology' (Voogt et al. 2016, p. 36). Therefore, TK here takes into consideration the perspectives outlined by Voogt et al. (2016) and does not only refer to the instrumental skills needed to operate the technology such as being able to navigate *Second Life* or to record with oCam but it also implies knowledge of the affordances of *Second Life*, oCam and Movie Maker to achieve the goals of creating a rich multimodal product with machinima (Voogt et al. 2016).

TCK here refers to a 'higher level of conceptual mastery' (Hafner 2013, p. 830) which involves using the different semiotic resources of digital media for meaning-making. This requires the ability to enact the affordances provided by the tools mentioned above for the digitally mediated multimodal representation of CK.

The definition of TPK follows the one proposed by van Olphen (2008a) but it also includes the knowledge required in order to create rich multimodal ensembles with digital literacy practices such as machinima as well as enhance their awareness of the ethos of digital literacies. TPK is also the ability to use digital literacy practices to facilitate students' learning and to identify appropriate tools and resources that help students not only make rich multimodal ensembles but also foster their understanding of the transformative impact of the affordances of digital literacies.

TPACK includes an understanding of how the affordances and constraints of machinima can influence students' learning of digital literacies and their inherent

multimodality, knowledge of how to use machinima to provide students opportunities to create and interpret multimodal ensembles and the ability to assess students' learning with machinima.

4.4.1 Ecological perspectives on CK and affordances

The cognitive versus the social debate in the field of language development is worth mentioning in a discussion of CK because, as already noted, the view teachers have of language learning influences how they conceptualise the CK of WLTE TPACK. Motteram et al. (2013) discuss the debate between the social and the cognitive views of language learning and note that there is a consensus among researchers that this debate has been generated by Firth and Wagner (1997) who challenged the perceived dominance of a cognitive, mentalistic tradition to SLA (Larsen-Freeman 2007, p. 773) which theorised language development as a process that occurs in isolation in the mind of the individual and focused on researching the acquisition of grammar and vocabulary (Motteram et al. 2013, p. 56). Instead, Firth and Wagner called for a more socially and contextually situated awareness of SLA (Larsen-Freeman 2007, p. 773; Motteram et al. 2013, p. 56). The sociocultural tradition rooted in the work of Vygotsky (1978; 1986),

> views language development as a process that occurs in the social realm first and the meaning that is made in the social realm is then internalized. The research traditions are more holistic and look at what happens in the activity of language learning itself taking into account all of the elements in the environment and all of the actors. As a result we get a richer and broader understanding of how languages are acquired and what the practices are that facilitate the process (Motteram et al. 2013, p. 56).

More recently, however, 'several developments show the spread of ecological ways of thinking about language, language learning and language use' (Kramsch

2008, p. 389). Proponents of an ecological approach to language learning use the biological metaphor of *ecology*, or 'the totality of relationships of an organism with all other organisms with which it comes into contact' (van Lier 2004, p. 3) to characterise the language learning process.

Lafford notes that even though the reductionism inherent in a structuralist view of language based on assumptions of scholars who divorce the study of language from its context is rejected by ecologist approaches, the study of cognitive processes in SLA is not (2009, pp. 674-675). In fact, Lam and Kramsch (2003) note that the 'metaphor of *ecology* attempts to capture the *interconnectedness* of psychological, social, and environmental process in SLA' (p. 144). Among the basic tenets of ecological perspectives to language and language learning are considerations that 'language must be studied as a phenomenon situated in context' and that 'learners acquire language by taking advantage of various *affordances*', or 'a relationship between an organism (a learner, in our case) and the environment that signals an opportunity for or inhibition from action' (van Lier, 2004, p. 4 cited in Lafford 2009, pp. 674-675).

In this thesis, the WLTE TPACK framework was further adapted to better correspond to the issues being investigated, namely the examination of teachers' cognition in relation to digital literacies in the context of interaction with tools such as machinima (TK) for the production of rich multimodal ensembles. The CK domain here is framed by an ecological view of second language and literacy development and consequently the two concepts are regarded as integral parts of many connected meaning-making systems (van Lier 2000; 2004).

van Lier (2008) explains that an ecological perspective on language and language learning entails that language is:

> part of larger meaning-making resources that include the body, cultural-historical artifacts, the physical surroundings, in short, all the affordances that the physical, social, and symbolic worlds have to offer (p. 599).

Moreover,

> the totality of these meaning-making resources is captured in the term semiotics, or the totality of sign-making and sign-using processes and practices. Thus, any act of language use incorporates far more than the mere words that are spoken (or written, for that matter) [...] language does not act alone in this meaning-making process. The surrounding world plays a constitutive part as well, including the physical world of objects and spatio-temporal relationships, the social world of other meaning-making and meaning-sharing persons, the symbolic world of thoughts, feelings, cultural practices, values, and so on—in short, the whole mind-body-world complex of resources that is involved in any communicative act (van Lier 2008, p. 599).

In short, according to ecologist perspectives, 'language cannot be boiled down' to grammar or meaning only, and it cannot be 'quarantined', or separated from the totality of ways of communicating and making sense of the world that we use (van Lier 2004, p. 24). Gesture, facial expressions and movement cannot be stripped away from the verbal message, and meaning-making cannot be reduced to syntax or lexical constructions (ibid). From an ecological perspective, both second and foreign languages teachers are not teachers of a linguistic code but 'teachers of meaning' (Kramsch 2008, pp. 403-404).

The concept of affordance comes from studies in ecology, an area which looks at the interrelation between an organism and other elements in an ecosystem. It was coined by the American psychologist Gibson (1979) to refer to a reciprocal relationship between an organism and a particular feature of its environment.

However, the notion of affordance has been expanded beyond the original meanings discussed in the work of Gibson (van Lier 2004, p. 94). Van Lier (2000) notes that an affordance is 'a particular property of the environment that is relevant to an active, perceiving organism in that environment' (p. 252). An affordance 'affords further action without causing or triggering it and what becomes an affordance is dependent on what the organism does, what it wants, and what is useful for it' (van Lier 2000, p. 252).

Furthermore, the notion of 'affordance' is important to ecological conceptualisations of language and language learning since the focus is on 'language as relations between people and the world, and on language learning as ways of relating more effectively to people and the world' (van Lier 2004, p. 4). van Lier (2004) briefly reviews Reed's distinction between 'natural' and 'cultural' affordances with the latter encompassing 'historically specific meanings and values' (1988, p. 310 cited in van Lier 2004, p. 94), Shotter and Newson's conceptualisation of affordances as including various types of linguistic 'enablements and constraints' and Forrester's (1999) discussion of 'conversational affordances as part of making sense of talk in interaction' (van Lier 2004, p. 94). He concludes that 'language affordances, whether natural or cultural, direct or indirect, are relations of possibility between language users' (van Lier 2004, p. 95). van Lier (2004) points out that Gibson's theory of affordances and direct perception leaves the issue of relevant features of the environment unaddressed (p. 95). Organisms 'relate to certain invariant features of their environment naturally' (ibid) because 'they are in tune with these affordances' and 'they perceive them directly' (ibid), for instance, 'the flower is relevant to the bee'. In van Lier's view, this direct relevance also applies to humans to a certain extent. For instance, a flat

surface is 'walkable-on', a pebble is 'throwable', and so on (ibid). In the case of manufactured objects (cultural artefacts), the intended use is designed into the artefact itself, it signals its purpose (e.g., a hammer, a doorknob, a show). These features 'entail a special kind of relevance, and this has led to a special field of study that has also extended to the design of computer interface and web design conventions (Norman 1988)' (van Lier 2004, p. 95).

The environment is full of meaning potential, especially if it has a rich semiotic budget, which may not be true of all classrooms, textbooks or pedagogical interactions. The agent (the learner, in our case) has certain abilities, aptitudes, effectiveness and so on. Affordances are those relationships that provide a 'match' between something in the environment (whether it's a chair or an utterance) and the learner (van Lier 2004, p. 96). Perception is tied together with action by the notion of affordance (van Lier 2008, p. 597). With respect to learning, van Lier explains that:

> While being active in the learning environment the learner detects properties in the environment that provide opportunities for further action and hence for learning. Affordances are discovered through perceptual learning, and the effective use of affordances must also be learned. Perceiving and using affordances are the first steps on the road toward meaning-making (2008, pp. 597-598).

One immediate implication of an ecological perspective on language and language learning but also of the evolving uses of digital technologies is the need to expand the linguistically conceptualised notion of communicative competence (Chapelle 2009, p. 741) that constitutes the primary focus of the second language classroom to multimodal communicative competence (MCC) which refers to the ability to interpret and construct appropriate meanings multimodally (Haberle 2010; Hafner

2014; Royce 2007; Stenglin & Iedema 2001). Therefore, the definition of teacher CK presented here follows the one proposed by van Olphen and Silva but adds an understanding of how different modes of meaning work together in practices of representation and communication to the domain of knowledge of the language. In other words, it expands WLTE CK to include an understanding of multimodal meaning-making.

The TPACK study reported in this thesis draws on the theory of affordances as outlined by van Lier (2000; 2004) in that it aims to understand teachers' TPACK in terms of their knowledge of digital technologies affordances for new ways of meaning-making, interacting with others and enacting social identities as well as their awareness, during the *Multimodality and Machinima* professional development course, of the affordances for meaning-making embedded in environments with a 'rich semiotic budget' (van Lier 2004, p. 96) such as *Second Life*. Furthermore, the study explores the interaction between teachers' CK and TK by identifying instances of their perception and enactment of the affordances when they are involved in the joint construction of meaning with machinima.

4.5 Strengths and limitations of TPACK

Before Mishra and Koehler's articulation of TPACK, the field of educational technology lacked a unifying conceptual framework. Consequently, the introduction of the TPACK framework has taken the field by storm (Cox & Graham 2009). The construct has quickly become popular within the educational technology community among researchers and practitioners alike (Angeli & Valanides 2009).

TPACK is viewed as a useful conceptual framework to explicate the kind of knowledge teachers have about the manner in which technology and content are related. It might also enable researchers to capture any changes in teachers' conceptualisations of the seven knowledge domains, particularly those of content and technological content knowledge domains. In other words, it might capture how teachers might change their understanding of the complex interaction between the content and technological knowledge domains as they experience on their own the dramatic effect of digital technologies on content knowledge.

TPACK offers options for looking at a complex phenomenon like technology integration in ways that are now amenable to analysis and development (Koehler & Mishra 2009, p. 67). This view is supported by Doering et al. (2009, p. 334) who note that TPACK pushes trainers and researchers to rethink the knowledge teachers should have. Also, they note that in the study they carried out in 2009, TPACK proved to be a metacognitive tool teachers made use of to enhance technology integration into their classrooms. The framework helped teachers visualise how their existing knowledge of technology alongside their skills work in tandem with their other knowledge domains about teaching and learning (Doering et al. 2009, p. 335). Additionally, thinking about TPACK through visual representations prompted teachers to be metacognitve about their teacher knowledge strengths and areas of growth. This metacognitive awareness of TPACK allows teachers to set learning goals for themselves and, subsequently, make thoughtful decisions for technology integration (ibid). Importantly, the teachers participating in Doering et al.'s 2009 study reported that that the 'TPACK approach to professional development was *vital* as it *empowered* them

and didn't make them feel dependent on someone else, thus increasing confidence' (p. 332).

This does not mean that 'teachers need to know the TPACK framework but implies that teachers need to understand how to shape instructional practices in which technological, content and pedagogical knowledge are embedded' (Voogt & McKenney 2017, p. 70).

Another strength of TPACK identified by Doering et al. (2009) is its user-friendliness. They observed that the framework 'seems to resonate and make sense to teachers' (p. 337). The three domains are not only easily recognisable but also familiar to both teachers and researchers indicating the potential of the construct for both research and practice (ibid). The possibilities offered by TPACK for the field of teaching and that of research are reported in Mishra and Koehler (2006) as well. They note that TPACK is useful for articulating a clear approach to teaching but also as an analytic lens for studying the development of teacher knowledge about educational technology (p. 1041).

In their 2006 introduction to TPACK, Mishra and Koehler outline the various contributions that their construct makes to the field of educational technology. They first refer to the 'descriptive' value of TPACK, noting that it allows practitioners and researchers to make sense, in a methodological manner, of the complex web of relationships that exist when teachers seek to apply technology to the teaching of content (p. 1044). Further, TPACK helps identify important components of teacher knowledge that are relevant to the thoughtful integration of technology in education (ibid). Moreover, the TPACK framework, they argue,

offers a language to talk about the connections that are present (or absent) in conceptualisations of educational technology (ibid).

Next, they discuss the 'inferential' value of TPACK arguing that it allows both researchers and practitioners to make predictions and inferences about contexts under which such effective teaching with technology will occur (2006, p. 1045). For example, professional development courses that focus solely on skill sets specific to particular technologies or preparation programmes that focus on generic pedagogical techniques removed from content are clearly not sufficient when looked at through the TPACK lens since they address only one component in the framework, ignoring the connections with the other elements (p. 1045). Conversely, TPACK also becomes a valuable tool for the examination of successful programmes of technology integration and for suggesting 'inferences about the causal mechanisms underlying their success' (ibid).

Mishra and Koehler (2006) point to the 'application' of the TPACK framework and explain why it constitutes a strength. They argue that the TPACK framework enables practitioners and researchers to critique shallow approaches toward developing teacher knowledge (p. 1045). Moreover, it assists educational technologists in developing better learning environments (ibid). Specifically, it advocates against teaching technology skills in isolation and argues that teachers should be allowed to explore digital technologies 'in relationship to subject matter in authentic contexts' (ibid). Further, the TPACK framework can be a useful guide when conducting scholarship and research into the nature and development of teacher knowledge. In the words of its authors, 'it provides an analytic framework and categorization schemes for the analysis of teacher knowledge and its evolution' (ibid). Put differently, TPACK can be used not only to design

pedagogical strategies but also as an analytic lens to study changes in teachers' knowledge about effective teaching with technology as it enables researchers and practitioners 'to view the entire process of technology integration as being amenable to analysis and development work' (ibid).

Mishra and Koehler (2006) conclude their discussion on the strengths of TPACK by stating that developing TPACK should be a critical goal of teacher education. They paraphrase Fenstermacher (1978, 1986) who argues that 'the goal of teacher education is not to indoctrinate or train teachers to behave in prescribed ways, but to educate teachers to reason soundly about their teaching as well as to perform skillfully' to support their view (Mishra & Koehler 2006, p. 1046).

In sum, TPACK gives a holistic perspective of the knowledge required for the successful integration of technology into classroom practice, accounting for what teachers know and what teachers do (Polly & Brantley-Dias 2009, p. 46). Most importantly, TPACK provides a robust framework for shaping the way teacher educators and professional developers prepare teachers to integrate technology (p. 47).

Despite the strengths enumerated above, there are scholars who warn that more research is needed to address the limitations of TPACK before offering it as 'the proverbial panacea for redressing the challenges of teaching the 21st century student' (Archambault & Barnett 2010, p. 1657).

 One such limitation is that the definitions of TPACK and its associated constructs are not clear enough for researchers to agree on what is and is not an example of each construct (Archambault & Barnett 2010, p. 1658). Additionally, the boundaries between the constructs such as TCK and TPK are fuzzy, thus making

it difficult to categorise borderline cases and indicating a weakness in accurate knowledge categorisation or discrimination and consequently, a lack of precision and clarity in the framework (Angeli & Valanides 2009, p. 157; Archambault & Barnett 2010, p. 1658). A literature review done by Cox in 2008 reveals that at that time there were thirteen distinct definitions for TCK, ten definitions for TPK, and eighty-nine different definitions of the central construct, TPCK, in the model. Graham (2011) points out that Koehler and Mishra (2008) do not distinguish between the types of technology encompassed within TK as they include older transparent technologies like the pencil and chalkboard as well as newer opaque digital technologies, thus compounding the confusion (p. 1956). Angeli and Valanides (2009) argue that the lack of definitional clarity and construct precision constitutes a serious limitation as it refers to the discriminating value of the construct and has significant implications for its development and evaluation (p. 157). Consequently, they postulate that TPACK's 'degree of precision needs to be put under scrutiny' (ibid).

To date, none of the existing World Language Teacher Education TPACK models (Silva 2012; Tai 2015; van Olphen 2008) account for the transformative impact of the affordances and constraints of digital media on social relationships and interactions, representations and interpretations of meaning, and, finally, enactment of various identities. In other words, current TPACK models for language teaching and learning do not account for digital literacies and their affordances for new, fundamentally multimodal ways of making meaning, new architectures of participation and increased possibilities for enactment of identities of designers and producers of meaning. The reconceptualised TPACK proposed in this thesis offers a model for digital literacies integration, thus shifting the focus

from digital technologies and allowing for the consideration of concepts such as multimodal meaning-making, synaesthesia and new architectures of participation evident in the literacy practices that require intense collaboration and allow for coaction. While the digital literacies TPACK model discussed in this thesis builds on the previous models enumerated above, it also entails an understanding of the fact that digital media introduce affordances and constraints that radically transform several dimensions of our lives. Teachers' understanding of the relevance of these affordances and constraints to the language classroom is essential to a fully developed digital literacies TPACK.

4.6. Research questions

As briefly discussed in Chapter 1, this thesis sets out to investigate teachers' TPACK and the extent to which engagement with digital literacy practices such as machinima has the potential to challenge their assumptions about digital literacies. In other words, it is proposed that an investigation of language teachers' TPACK can offer insights into the cause of their disengagement with digital literacies, disengagement that has been documented by a significant body of literature.

Language teachers' existing beliefs about the impact of digital technologies on the concepts of language and literacy are explored alongside the knowledge and processes they draw on while using tools whose affordances facilitate new forms of interaction and give rise to unique and creative ways of making meaning and enacting various social identities (Jones & Hafner 2012, p. 68). As mentioned earlier in this chapter, exploring with teachers the beliefs they have about the importance, efficacy and implementation of digital technologies is an essential

part of the process of encouraging them to change their practices (Motteram et al. 2013, p. 58). Thus, the focus of reflection in this thesis is on teachers themselves and their own ways of thinking, beliefs and attitudes and how these aspects might influence their acceptance and use of digital technologies.

The TPACK framework and ecological perspectives on language learning alongisde tools from unified discourse analysis and multimodal analysis have been used to investigate the following research quetions:

1) What does the investigation of teachers' TPACK in the context of engaging with digital literacy practices such as machinima reveal about their assumptions about digital literacies? Specifically, what are teachers' views and practices of meaning-making and what knowledge and processes do they draw on when the focus is on semiosis?

2) What principles for the design of professional development framed by TPACK and aimed at effective integration of digital literacies can be derived from the case study results?

The sections below explain the research design adopted alongside methodological choices made to answer the research questions above.

4.7 Rationale for using TPACK as a theoretical framework

The TPACK framework holds the promise to help identify teachers' existing views of digital literacies and knowledge and practices of meaning-making as well as any changes in their perceptions towards the impact of technologies such as machinima on the concept of literacy. While many TPACK studies look at whether knowledge about technology integration develops after technology

interventions (Doering et al. 2009; Tai 2015), this study investigates teachers' existing CK and how it influences the enactment of the affordances embedded in digital tools responding thus to calls from teacher educators to provide language educators with opportunities to reflect on the affordances of digital tools and how they change literacy practices (Hafner 2015; Tour 2015). TPACK is used here as an analytic lens to explore together with the participating teachers their existing and evolving knowledge and beliefs related to digital literacies.

As the focus of TPACK is on the interplay and complex interactions of the three domains of knowledge for effective technology integration, its use in this study is relevant because when employing inherently multimodal tools such as machinima special consideration is required for the examination of the impact of the tool on the representation of content, i.e. multimodal communication of meaning with technology. TPACK, unlike other frameworks, also accounts for content knowledge emphasising the importance of comprehending how content can be represented by technology, thus going beyond the traditional techno-centric approach to technology integration (Silva 2012, p. 31).

In the context of this study, TPACK has both a descriptive and an inferential value—the descriptive TPACK allows for the identification of the complex web of relationships that exist when teachers interact with digital literacy practices for their own authentic purposes. Teachers' existing knowledge of multimodal ways of making meaning is inferred by the researcher through the observation of their video making endeavours.

In order to address one of the main limitations of TPACK, i.e. the lack of definitional clarity and construct precision, definitions of the domains that are the

focus of this thesis have been outlined in sections 4.4 and 4.4.1. Because TPACK represents knowledge that may or may not be explicitly mentioned, especially regarding the CK domain, TPACK codes were developed to account for an explicit mention of knowledge participants believe they have or an indication of this knowledge as inferred by the researcher. The coding scheme is explained in detail in Chapter 6.

4.8 Research design

The present study is framed by an ecological view of second language and literacy development (van Lier 2004) and informed by TPACK (Mishra & Koehler 2006). The study also draws substantially on the conceptual work on digital literacies (Jones & Hafner 2012; Lankshear & Knobel 2008) discussed in Chapter 2 and the ecological concept of affordances described in Section 4.4.1 of this chapter. It aims to illuminate the nature and workings of teachers' Content Knowledge when interacting with an increasingly popular digital literacy practice, machinima. It discusses teachers' perception and enactment of affordances for meaning-making embedded in the programs used for the creation of a machinima video. This study, similarly to digital literacies studies (Jones 2016, p. 290) began by considering literacies as social practices and proceeded by examining a digital technology or a 'mediational mean', machinima, used to engage participants in these practices, including the affordances and constraints this technology introduces, the kinds of social interactions, the enactment of various identities it makes possible and the multimodal communication of meaning it involves.

This study brings a fresh perspective on language teacher education by responding to calls from researchers for studying teachers' understanding of digital literacies

by providing them with opportunities to reflect on the affordances of digital tools that transform the very nature of literacy. The purpose of the present study is to examine the TPACK of English language teachers as revealed by their participation in a professional development course entitled *Multimodality and Machinima* in order to explore their beliefs, understanding and practices of digital literacies, especially the multimodal communication of meaning in the context of using digital technologies such as machinima. An investigation of teachers' TPACK as it manifests itself in the process of collaboratively creating a machinima video as well as the extent to which engagement with such a practice has the potential to challenge teachers' dominant assumptions and beliefs about digital literacies is carried out.

The best way to explore teachers' understanding of the multiple dimensions of literacy is by observing them while they participate in multimodal production practices themselves. The *Multimodality and Machinima* professional development course designed for the present research study constitutes the main data source. The course aims to provide the means for the investigation of participating teachers' TPACK in the context of exploring multimodality through the use of machinima as well as challenge their assumptions of language and literacy. The course also aims at situating teachers in an authentic context as they learnt to use technology (Chapelle & Hegelheimer 2004) to construct a multimodal ensemble and equipping them with more than just Technological Knowledge while actually investigating their understanding of literacy and the importance of TCK.

The short course *Multimodality and Machinima* as well as the present study were purposefully designed to allow for the investigation of language teachers' TPACK

in relation to digital literacies when engaged with multimodal tools such as machinima as well as to creatively engage teachers in reflection and inquiry through a production process that requires 'an integrative, combinatorial assemblage of modes' (Burn & Parker 2003, p. 59), namely machinima-video making. According to Richards (1998), 'reflection and inquiry are key components of teacher development' (p. 22). The skills of self-inquiry and critical thinking, Richard argues, are essential for continued professional growth and can assist teachers to 'move beyond a level where they are guided largely by impulse, intuition or routine' (ibid). The course was taught twice in the summer of 2014. Data were collected before, during and after each time the course was taught.

The TPACK framework was introduced to guide the investigation in the present study. It offered a conceptual blueprint to guide the process of investigating what language teachers' direct interaction with an inherently multimodal practice such as machinima entailed. It was used to guide the design of the present study and of the *Multimodality and Machinima* professional development course that aimed at situating teachers in an authentic context as well as equipping them with more than just Technological Knowledge. In other words, the course was designed to provide teachers with 1) hands-on experience of how technology and content knowledge interact in the multimodal communication of meaning with digital tools such as machinima to form technological content knowledge and 2) opportunities to reflect on how the affordances of digital tools transform literacy practices.

This research was conducted with English language teachers of adult and young adult learners. There are two reasons why there is a strong need to conduct a study such as the present one with language teachers. First, research studies claim that

language teachers have been hesitant to acknowledge and engage with the new dimensions of literacy primarily because of their 'tendency to conceptualize language as an abstract linguistic system, detached from a broader socially constructed multimodal perspective' (Valdes 2004, p. 79). Second, language teaching with digital technologies has not been transformed. Technology use is predominantly framed by a traditional view of technology as a tool to improve language skills rather than to engage students in new literacies which can support language speakers in their authentic uses of technologies in second or foreign languages (Tour 2015). This study sets out to investigate teachers' interaction with digital literacies and their knowledge of multimodal communication of meaning. Second, the study aims to challenge teachers' views of literacy to include multiple dimensions of literacy and their implicit multimodal communication of meaning by offering them opportunities to engage in critical reflection on the affordances of digital tools and their transformative impact on the construct of literacy.

What sets this work apart from other research on teacher professional developments is that it is framed and driven by a research agenda to investigate teachers' existing TPACK in relation to digital literacies as well as create opportunities for them to showcase their understanding through a multimodal video production process. A particularity of this study is that technical skills acquisition was not the focus of the professional development because the purpose of the project was not to upskill teachers to use particular digital tools and then leaving it to them to find things to do with these tools in their teaching. Rather, the project was intentionally designed to serve a greater purpose, that of introducing language teachers to the concepts of digital literacies and multimodality through a

technological tool that is also a digital literacy practice, i.e. machinima. The project was conceptualised to address digital literacies by exploring the affordances of digital tools for new dimensions of meaning-making, being and relating in creative and meaningful ways. Therefore, language teachers' production process of a machinima project in a professional development course was analysed. By analysing teachers' crafting process, this thesis reports how the participants approach the complex process of multimodal composing and how they assign meaning to the semiotic resources used in their machinima through Unsworth's (2008) notion of mode relationships and van Lier's (2004) concept of affordance.

Case-study methodology

To explore teachers' cognition in relation to digital literacy practices, an instrumental single-case study is conducted. The present study employs a case-study methodology which is viewed as allowing the researcher to conduct an in-depth investigation of the teachers' TPACK with a focus on the interplay between their CK and TK. More specifically, this study examines teachers' TPACK and their views and practices of meaning-making in the context of using digital tools such as machinima for the production of rich multimodal ensembles.

Creswell (2013) explains that he views case-studies as a methodology, a type of design in qualitative research that may be an object of study, as well as a product of the inquiry. According to him, case study research is a qualitative approach in which the investigator explores

> a real-life contemporary bounded system, a case or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple

sources of information (e.g. observations, interviews, audiovisual material, and documents and reports), and reports a case description and case themes (p. 97).

The unit of analysis in the case study might be multiple cases or a single case (ibid). Creswell (2013) drawing on Stake (2005) mentions three variations of case studies in terms of the intent of the case analysis: the single instrumental case study, the collective or multiple case study and the intrinsic case study. In a single instrumental case study (Stake 1995), the inquirer focuses on understanding a specific issue, problem, or concern and then selects one bounded case to illustrate this issue or to better understand the problem. In a collective case study, the one issue or concern is again selected, but the researcher selects multiple case studies to illustrate the issue. Finally, in an intrinsic case study the focus is on the case itself because the case presents an unusual or unique situation that needs to be described and detailed (pp. 99-100). The case study reported here is an instrumental single-case study with two units of analysis; that is, four language teachers who worked in pairs while participating in the study and undertaking the professional development course *Multimodality and Machinima* which is discussed in more detail in the next chapter.

Case studies need to be defined by clear boundaries for the case under investigation (Creswell 2013; Yin 2009). van Lier describes case studies as being a 'common method of educational research' (2004, p. 194) and notes that a bounded case, often an individual, or a small group, is investigated to characterise its workings and development. However, he continues, 'the boundaries (temporal and spatial) of a case study are not easy to determine' (ibid). The present study was bounded by participants, language teachers who have not used machinima before, and time, two to four weeks. In this particular case study the units of

analysis were two pairs of teachers participating in two instantiations of the *Multimodality and Machinima* course. The investigation of English language teachers' TPACK and, more specifically, of their views and practices of multimodal meaning-making as revealed by their interaction with tools such as machinima that allow for reflection on the affordances of the technology and its impact on literacy can be described as a ground-breaking case, one in which 'the situation is totally new, and little if any, knowledge exists that has been gained through structured research' (Scholz and Tietje 2002, p. 13). Because case studies 'can open up new areas of future research' (Duff 2008, p. 44), case study methodology seems the most suitable research method to explore the rather unexplored area of language teachers' understandings and beliefs of how the affordances of digital tools can transform literacy practices.

Case study methodology requires the careful planning of data collection to include multiple sources of data (Creswell 2013; Duff 2008; Yin 2009). Yin (2009) recommends six types of information to collect, namely documents, archival records, interviews, direct observation, participant observation, and physical artefacts. By using several different sources of data a detailed description of the case emerges and the research findings are strengthened as the evidence is triangulated. Farquhar (2012) argues that 'triangulation is an important concept in case study research because an investigation of the phenomenon from different perspectives provides robust foundations for the findings and supports arguments for its contribution to knowledge' (p. 7).

According to TPACK scholars, there are three types of data that can be used to investigate teachers' TPACK, 1) self-report via interviews, surveys, or other generated documents, such as reflexive journal entries, 2) observed behaviour and

3) teaching artefacts, such as lesson plans (Harris et al. 2010, p. 3834). Harris et al. (2010) point out that

> teachers' knowledge is typically reflected through actions, statements, and artefacts, rather than being directly observable, instruments and techniques that assist the assessment of teachers' TPACK should provide ways for assessors to discern the dimensions and extent of teachers' TPACK in systematic, reliable, and valid ways (p. 3834).

The present study included multiple qualitative sources of evidence drawing data from pre- and post-course interviews, screen and audio recordings and artefacts such as scripts and storyboards. The data were triangulated to answer the research questions and address them from different angles as well as to add to the validity of interpretations made of the case (Creswell 2013, p. 251). In other words, since teachers' stated beliefs do not always align with their practice, the researcher triangulated teachers' interview answers with screen and audio recordings of the production process and their artefacts to better understand the nature of their TPACK.

Using a qualitative lens in this case study allowed the researcher to gain insights and more fully understand the depth, breadth and nuances of each teacher's views of digital literacies and practices of meaning-making before, during and after participation in a complex machinima production process. The aim of case study research is to 'dig deep, look for explanations and gain understanding of the phenomenon through multiple data sources and through this understanding extend or test theory' (Farquhar 2012, p.8).

The research design consisted of four phases. Firstly, the design of the *Multimodality and Machinima* course and the development of other instruments

such as interview questions that would allow the investigation of teachers' existing TPACK. This was followed by the delivery of the course and data collection and storage. The third phase involved the selection of data to be analysed, the development of a coding scheme based on the WLTE adaptation of TPACK outlined in section 4.4 of this chapter, the encoding and the TPACK interpretation of the data. Finally, the fourth stage involved a reconceptualisation of the TPACK model as well as the formulation of professional development principles for digital literacies integration based on the findings resulted from the analysis of the data. Figure 4.4 illustrates the four research design stages outlined above.

Phase 1

- Development of instruments such as interview questions and design of Machinima and Multimodality course to investigate teachers' TPACK

Phase 2

- Implementation of the design and delivery of the course
- Pre- and post-course interviews with the participating teachers
- Data collection and storage

Phase 3

- Selection of data to be analysed
- Transcription of interview data and video recordings of the machinima-making process
- Development of TPACK coding scheme
- Data encoding
- TPACK interpretation of the data

Phase 4

- Reconceptualisation of the TPACK model for digital literacies integration
- Formulation of professional development principles for the integration of digital literacies in language teacher education
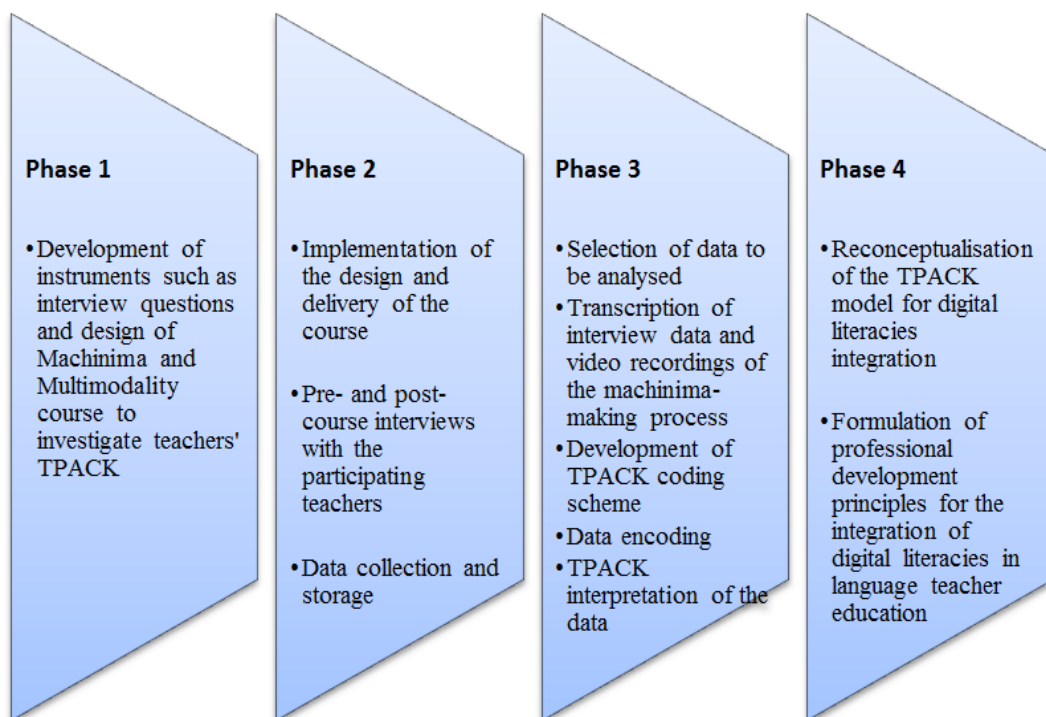
Figure 4.4. Research Design Phases

4.9 Conclusion

Mishra and Koehler's (2006) concept of Technological Pedagogical Content Knowledge provides a robust framework within which to situate a study aimed at

understanding what language teachers know in relation to new digital multimodal literacies.

This chapter started by considering the context which led to the emergence of TPACK, the theoretical framework employed in this thesis. General definitions for each domain of knowledge were first provided. The expanded definitions of WLTE TPACK were then explained. Next, the research design adopted for this thesis and the methodological choices were described. More specifically, a definition of and a rationale for the use of a case study design were provided. Finally, an overview of the project workflow as part of the case-study discussed here was given.

CHAPTER 5 METHODS AND CONTEXT

Chapter 4 made the case for choosing a case study methodology and outlined some broad methodological choices. Chapter 5 describes the methods and techniques employed in this thesis for data collection and analysis. It first provides a detailed description of the research setting. The *Multimodality and Machinima* professional development course which constitutes the main data source for this research project is then discussed. A rich description of both the course design and its implementation is presented. Next, after a brief discussion of the participant recruitment process, the background, teaching experience and motivation for enrolling in the course and participating in the study of the teachers that accepted to take part in the research are presented. Finally, the strategies and procedures used for data collection as well as methods used for data analysis are listed and explained in detail.

5.1 Research setting

This research was conducted with English language teachers of adults and young adults. The data collection and the professional development course happened at various locations in Dublin, Ireland. Language teachers of English as a second or foreign language participated in a professional development course that took place in a computer lab at Dublin City University. The participants completed background questionnaires and answered interview questions before and after the course during meetings with the researcher or via Skype.

I (in this section chapter, the first person singular is used when deemed necessary to indicate the direct involvement of this researcher) also acted as a participant in

that I was the designer and facilitator of the *Multimodality and Machinima* professional development course and guided the teachers in the crafting process of their digital project. The interview data were collected at different locations in the city where the interviews took place while all the audio and video data from the course which took place simultaneously in *Second Life* and the computer lab were recorded remotely with the help of screenrecording software Camtasia and Teamviewer.

5.2 Multimodality and Machinima professional development course

As noted previously in Chapter 4, this study responds to calls from educational researchers to provide language teachers with professional development opportunities that would prompt them to reflect critically on the affordances of technologies for multimodal communication of meaning, examine and challenge their dominant assumptions about the impact of technology on language and literacy in order to broaden their views of the constructs and in turn re-think approaches to language teaching with technology.

The new dimensions of digital literacies are at the heart of the professional development project described as teachers are engaged in collaboratively producing machinima videos that cast them as both designers and producers of meaning.

The digital technologies in this professional development course were not meant to be ends in themselves because as Prensky (2012) points out, 'it is not the tools themselves that we need to focus on', but rather the processes, 'products,

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creativity and skills that the tools enable and enhance' (p. 25). The key to meaningful professional development, according to Scott (2015) is 'to view technology not as the sole solution, but as an enabler within a culture of learning and collaboration' (p. 8).

As a result of such considerations, the *Multimodality and Machinima* course involved more than simply adding technical skills to teachers' existing repertoires. It required teachers to experience and experiment with digital technologies so as to collaboratively produce a machinima film. Encouraging teachers "to 'muck around' in a low-risk environment helps them take more control over their learning and the choices they make and to take an experimental stance toward learning firsthand" (Knobel & Kalman 2016, p. 16).

5.2.1 Theory and design principles underpinning the course

Informed by an ecological perspective on language and literacy, the course was designed to offer teachers the opportunity to reflect on how modes tell stories in the production of a machinima video. The course design shared the belief that 'language does not occur in a vacuum' (van Lier 2004, p. 55) and modes other than language are prominent in text production and, consequently, took into consideration the different modes of communication afforded by the technological tools introduced in the course. Importantly, the course avoided privileging any modes. The affordances for meaning-making of the technological tools were discussed in terms of the five modes of meaning, (1) linguistic, (2) visual, (3) audio, (4) gestural, and (5) spatial, that the New London Group (1996) recommended be given systematic attention in literacy education. Each of these modes can be described as a systematic semiotic resource, with its own internal

grammar. By allowing teachers to experiment with modes in detail, the course offered them the opportunity to think about how modes work together to create meaning**.** New digital technologies allow 'anyone to be a producer but the choices a person makes and the modes a person selects to bring an idea to life separate one producer from another' (Sheridan & Rowsell 2010, pp. 84-86)**.** In short, the course was designed to make explicit the resources teachers had at their disposal to make a multimodal ensemble with machinima as well as to allow for the investigation of the choices they made and decisions they faced when determining the best way to represent an idea.

The course was developed within the 'Learning by Design' framework (Kalantzis & Cope 2004; Cope & Kalantzis 2009) to introduce teachers to *Second Life* and machinima while also providing the means for the investigation of their TPACK in the context of producing a multimodal video through the use of machinima.

'Learning by Design' describes eight 'knowledge processes', or recognisable pedagogical acts, of experiencing the known and new, conceptualising by naming and theorising, analysing functionally or critically, and applying appropriately and creatively. A knowledge process is seen as kinds of activities, or things which represent a distinct way of making knowledge and of learning (Cope & Kalantzis 2009). The framework recognises that 'engagement with these knowledge processes is not step-wise, but there is inevitably a fairly fluid movement backward and forward' across and between all eight (Chandler et al. 2010a, p. 37).

The knowledge processes were used as prompts to design and deploy the *Multimodality and Machinima* course. The processes can be (and were) mixed and

ordered, their purpose being to prompt one to think explicitly about the most appropriate range and sequence of activities for introducing the participating teachers to the concepts of machinima and multimodality.
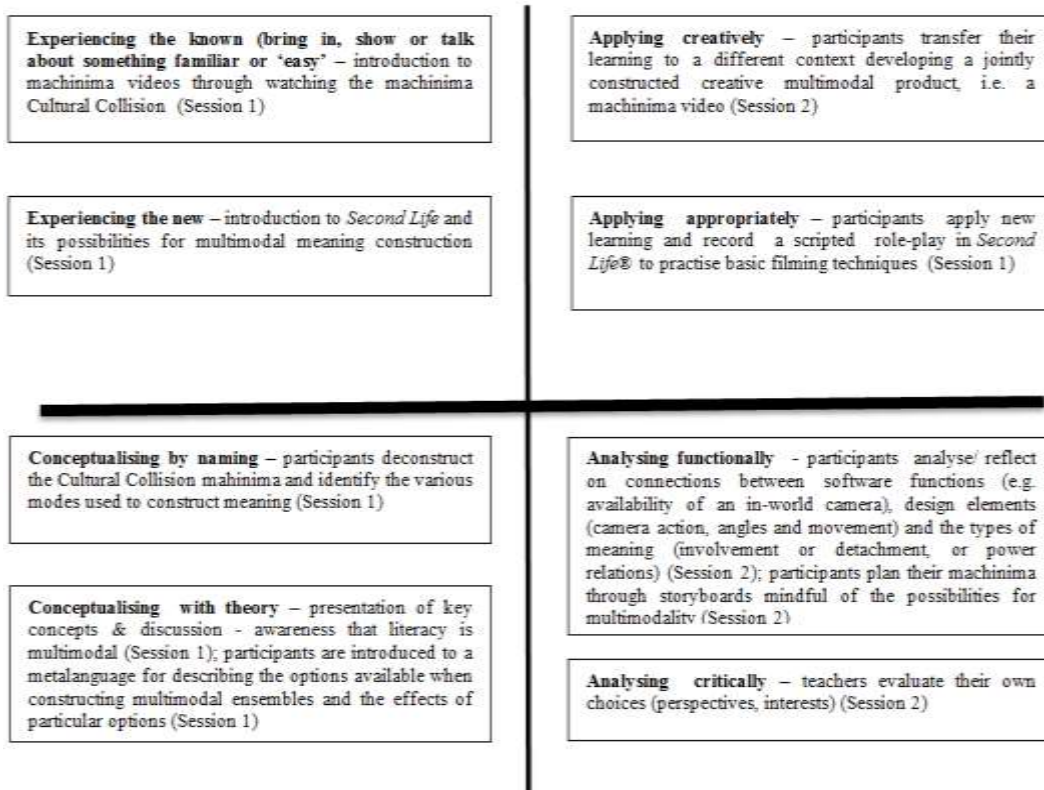
Experiencing the known (bring in, show or talk about something familiar or 'easy' – introduction to machinima videos through watching the machinima Cultural Collision (Session 1)	**Applying creatively** – participants transfer their learning to a different context developing a jointly constructed creative multimodal product, i.e. a machinima video (Session 2)
Experiencing the new – introduction to *Second Life* and its possibilities for multimodal meaning construction (Session 1)	**Applying appropriately** – participants apply new learning and record a scripted role-play in *Second Life*® to practise basic filming techniques (Session 1)
Conceptualising by naming – participants deconstruct the Cultural Collision mahinima and identify the various modes used to construct meaning (Session 1)	**Analysing functionally** - participants analyse/ reflect on connections between software functions (e.g. availability of an in-world camera), design elements (camera action, angles and movement) and the types of meaning (involvement or detachment, or power relations) (Session 2); participants plan their machinima through storyboards mindful of the possibilities for multimodality (Session 2)
Conceptualising with theory – presentation of key concepts & discussion - awareness that literacy is multimodal (Session 1); participants are introduced to a metalanguage for describing the options available when constructing multimodal ensembles and the effects of particular options (Session 1)	**Analysing critically** – teachers evaluate their own choices (perspectives, interests) (Session 2)

Figure 5.1 Knowledge Processes in the Multimodality and Machinima Course

The course introduced the participants to various choices for meaning representation made available by various software functions in order to help them develop a metalanguage. Therefore, affordances for meaning-making were made explicit and teachers were presented with possibilities for modal choice. Systematic attention was given to meaning and the way in which people use modes to represent the world. However, the main goal was to raise teachers' awareness of the semiotic resources made available by the technology not to teach the specific meanings or the functional specialisation of the different modes. The only exception was the teaching of some basic concepts about the grammar of

shot composition (Kress & Van Leeuwen 2006) and the camera action made possible by the camera controls in *Second Life* (Table 5.1 below). For example, participants explored and experimented with the different kinds of 'interpersonal appeals that can be established visually using different camera angles (looking across the subject or directly at them) and distances of shot (long, medium, or close up' (Hafner 2013, p. 813) afforded by the camera controls function in *Second Life*. Thus, they were introduced to the availability of the in-world camera in *Second Life* and how it could be used to construct design elements such as vertical and horizontal camera angles to communicate various types of meaning such as power relations, involvement or detachment between the object/character/action and the viewer (Kress & van Leeuwen 2006, pp. 135-142).

Participants were provided with a handout that contained information on the construction of camera angles in *Second Life* to help them understand the purpose of different camera shots and their potential application to construct power relations and social distance such as involvement or detachment (Chandler et al. 2010a; Chandler et al. 2010b; Kress & van Leuween 2006; O'Brien & Chandler 2010). Furthermore, they were shown and explained how to manipulate the camera in *Second Life* to construct various angles.

Kress and van Leeuwen (2006) explain that the angles of a shot can be used to influence the way viewers feel about and react to what they see. This means that as producers of machinima, teachers need to reflect on what they want their audience to feel about a character or about what is happening in each shot and then make a choice of camera angle and perspective to achieve this reaction. In other words, they need to make a 'considered decision' (O'Brien & Chandler 2010), about the angles to be used and how these could help them tell their story.

This in turn would adress and help avoid what O'Brien and Chandler (2010) identify as a frequently encountered problem with multimodal videos produced by beginners, namely that they are fairly uninteresting precisely because the camera work has not been thoroughly thought through. Often times, only the default camera position is used and, consequently, not enough information is provided about social distance, power relations, about what characters in the story are feeling. By thinking more carefully about how the camera can be used, these issues can be addressed and thereby videos made much more interesting (ibid).

Table 5.1 shows the material on meaning construction with camera action that the participants were provided with. It illustrates how the availability of the *Second Life* in-world camera allows for the construction of various camera angles and movements and the types of meaning that can be represented with these design elements.

Camera distances when showing characters	Close up - can be used to get close in on the action; if there is action in the machinima, it is good to pick it out as it may be lost from a distance; Close ups are useful for lip-synching – avatar mouths move when the microphone picks up any sound (therefore, it is useful to chat all the time when filming and take lots of close-ups of the face whilst it appears to be talking).	Extreme close up – can be used to offer a dramatic effect; not very effective in machinima as the eyes, the whole face or hands are not very expressive but it can add extra interest.	Mid shot –can be used to to show very general actions and movement	Wide shot – can be used to give an overall impression of where the action is taking place; it sets the scene for the whole event and shows the characters for the clip.
Vertical camera angles	High Angle - the camera is tilted to look down on the character/object/action. **Meaning** - high angles can be used to create an unequal relationship between the viewer and the character - the viewer appears larger and more powerful than the subject who can look small and insignificant or scared. High angles tend to diminish the individual, to flatten him morally by reducing him to ground level.	Low Angle - the camera is tilted to look up to the subject, the viewer is looking up to the character/object/action. **Meaning** – low angles can be used to create an unequal relationship between the viewer and story characters. This can make the viewer feel less powerful or smaller than the subject who is shown in a dominant position, looking imposing and dominant. Low angles give an impression of superiority, exaltation and triumph.	Eye level angle - the camera is on the same level as the subject. **Meaning** – eye level angles can be used to show the viewer and the character/action on an equal level; this camera angle looks 'normal' and is most commonly used.	Bird's eye view - the camera is high overhead looking down on the tiny character in a vast landscape. **Meaning** – can be used to indicate that the viewer is in a dramatic powerful, all-knowing 'God-like' position
Horizontal camera angles to express involvement or detachment	Oblique Angle - the character/object/action is turned away from the viewer and is shown at a horizontal angle to the viewer) **Meaning** – oblique angles can be used to indicate that the viewer is being excluded or ignored by the character, to create a sense of separation between the character and the viewer; the viewer is observing what is going on rather than interacting directly with the character. The oblique angle says 'What you see here is *not* part of our world; it is *their* world, something we are not involved with.'	Frontal Angle - the character/object/action is directly facing the viewer) **Meaning**– front views can be used to demand attention from the viewer and set up a sense of direct attention between the character and the viewer. The frontal angle says 'What you see here is part of our world, something we are involved with.'	Rear View/Extreme Oblique - the character/object/action has his/her back to the viewer) **Meaning** –rear views can be used to create an extreme sense of separation between the character and the viewer (like someone has turned their back on you); by 'turning their back on us' a character shows that they are not involved with the viewer.	

Table 5.1 Creating Meaning with Camera Angles and Movement in *Second Life* (adapted from Kress & van Leeuwen 2006)

The explicit teaching of a metalanguage of multimodal design was meant to facilitate participants' construction of a rich multimodal ensemble. The need for some basic teaching of multimodal grammatical design has been emphasised in studies of students' use of animation and digital video (Burn & Parker 2003) that showed students made very sophisticated commentaries on their movies when grammatical design was taught (Burn & Durran 2006).

5.2.2 Delivery of the course

The professional development course was held in the summer of 2014 at Dublin City University in Ireland. To raise teachers' awareness of the affordances of digital technologies for new ways of meaning-making, being and doing, they were guided to produce a machinima video. Before teachers developed their machinima, they were instructed to develop a script and a storyboard of their videos so that they could consider early on in the project what modes were going to be better suited to convey their intended meaning. After the course, participating teachers were invited to reflect on the production process, their modal choices and their awareness of the impact of digital technologies on important dimensions of our daily lives such as meaning-making, interaction with others and enactment of various identities.

The participants were invited to take part in the course which consisted of two, six-hour sessions and was run over two days for each pair of teachers. The first day of the course was dedicated to targeted technical training and raising teachers' awareness of the possibilities for multimodality embedded in the software. The second day was dedicated to the machinima production process.

Table 5.2 describes the Multimodality and Machinima course in more detail.

Session No. 1			
	Topic	**Intended Learning Objectives**	**Activities**
1	Machinima & Multimodality	1. Awareness that literacy is multimodal; 2. Understanding of the added meaning that different modes bring when working together; 3. Introducing participants to a metalanguage for describing the options available when constructing multimodal ensembles and the effects of particular options.	1. Presentation of key concepts & discussion; 2. Watching & discussing machinima video *Cultural Collision* with the participants.
2	3D Platforms for the Creation of Machinima: *Second Life*; Navigation &Communication in *Second Life*	An understanding of the basic navigation and communication possibilities of *Second Life* and their potential for machinima & multimodality.	1. Navigation (walking, running, flying, teleporting, landmarking); 2. Communication (local chat, IMs, notecards, voice conversation & gestures); 3. Snapshots.
3	Avatar Customisation & Exploration of Locations in *Second Life*	An understanding of the possibilities for avatar customisation and location variety in *Second Life* and their importance for multimodality and machinima creation.	1. Editing shape & appearance; 2. Finding free clothes on the marketplace and storing them in the inventory; 3. Exploring holodecks & walking tours of sims such as Virtlantis, MOSP, Dublin, Berlin 1920 and Paris 1900.
4	*Second Life* Camera Controls	An understanding of the camera controls in *Second Life* and their potential for constructing meaning.	1. Using camera controls in SL (panning, zooming, close-up shots, extreme close-up shots); 2. Disabling the camera constraints to increase the zoom distance; 3. Hiding & showing the user interface; 4. Removing the typing animation; 5. Hiding name tags; 6. Getting the camera to follow an avatar; 7. Altering daylight; 8. Useful keyboard shortcuts; 9. Completion of Media Zoo tutorial.
5	Filming (Practice)	Understanding of basic filming techniques using the software provided.	1. Introduction to the screencapture software, i.e. oCam; 2. Discussion of the concepts to be mastered within the screencapture software such as set up, hiding the mouse cursor (oCam), recording, pausing, resuming, stopping and saving the footage; 3. Recording a role-play in *Second Life* in order to practise basic filming techniques.
Session No. 2			
	Topic	**Intended Learning Objectives**	**Activities**
1	Braintorming; Scripting & Storyboarding (Machinima Pre-production Phase)	Understanding of the importance of the machinima pre-production phases of scripting and storyboarding for the creation of a multimodal ensemble.	1. Presentation of the concepts of scripting and storyboarding and their relevance for multimodality and benefits for machinima making; 2. Brainstorming ideas for the machinima video with particular emphasis on the modes to be used.

2	1. Creative Commons & Copyright; 2. Filming (Machinima Production Phase)	1. Understanding of the concepts of Creative Commons and Copyright; 2. Understanding how basic filming techniques contribute to the multimodal communication of meaning.	1. Discussion of Creative Commons and Copyright; 2. Recording the machinima videos.
3	Editing (Machinima Post-production Phase)	Understanding of basic editing techniques and how they can contribute to the multimodality of an ensemble;	1. Introduction to the editing software, i.e. Windows Movie Maker; 2. Discussion of the skills and concepts to be mastered within these programs: importing media into both Windows Movie Maker and YouTube Movie Maker, panning and zooming in and out, adding transitions, narration and music; 3. Discussion of the affordances and constraints of the editing software and their relevance to the construction of a multimodal ensemble; 4. Importing and editing the machinima video.
4	Editing (Machinima Post-production Phase)	Understanding of basic editing techniques and how they can contribute to the multimodality of an ensemble.	1. Discussion of the skills and concepts to be mastered within the editing software such as editing the clip size, splitting, trimming and cutting, adding captions, using visual and sound effects; 2. Editing the machinima video.
5	Editing (Machinima Post-production Phase)	Understanding of advanced editing techniques and ability to use them appropriately and creatively to enhance the multimodality of an ensemble.	1. Introduction to advanced editing techniques such as separating video and audio on different tracks (YouTube Movie Maker), disabling or muting existing audio from footage, audio fading in and out, adjusting volume audio, emphasizing audio, pictures within a picture (YouTube Movie Maker), films within a film (YouTube Movie Maker), adding title, intro, captions and credits; 2. Editing the machinima video.
6	Editing and Uploading the Machinima Video (Machinima Post-production Phase)	Understanding of advanced video editing techniques and ability to use them appropriately and creatively to enhance the multimodality of an ensemble.	1. Final editing of the machinima video.

Table 5.2 Multimodality and Machinima Course

The first session of the course started with some theoretical orientation toward the nature and implications of digital literacies and their implicit multimodal communication of meaning. TPACK was briefly explained to participants with the purpose of giving them a framework within which to reflect and discuss their own respective creative processes. However, as the objective of the study was to discern what teachers' views and practices were attendant to the process of multimodal design and production, not a great deal of emphasis was placed on theory. Rather, it was preferred that the participating teachers reflected throughout the creative process on the meanings they wanted to express in the video and how

well they felt those meanings were communicated by the modes offered by the tools introduced during the course. The only machinima model the teachers were shown was a video entitled *Cultural Collision* produced by language educators participating in the MachinEVO (2014) workshop. They were also guided to analyse in group discussions the design of this multimodal artefact. This served mainly to draw attention to a range of multimodal design issues and discuss how different modes were used for meaning construction and not as a model to be slavishly followed. In order to avoid leading teachers in any particular direction, the course was carefully framed as an opportunity to experiment with a new technological tool, machinima, broadly characterised as encompassing different digital literacies that could be used in the classroom to develop their own students' digital literacies.

Next, *Second Life* was introduced. *Second Life* shares some characteristics with Massively Multiplayer Online Role Playing Games (MMORPG): it offers avatar-based interaction in a persistent online world; it offers resources for roleplay, fantasy and the building of communities (Sadler 2012). As it has already been pointed out in Chapter 3, *Second Life* is not a game in the same sense as an MMORPG because it does not provide ludic resources or goals despite that its aesthetic is derived in many ways from gaming cultures (Burn 2009, p. 137).

In the first step, the affordances for meaning-making embedded into *Second Life* were demonstrated so as to give teachers an understanding of the virtual world's potential for the creation of rich multimodal ensembles such as machinima videos. *Second Life* is full of affordances for meaning-making thus providing a 'rich semiotic budget' (Blin et al. 2013 cited in Blin 2016, p. 29). Participants' activities and participation were structured so that access was available and

engagement encouraged. Given that 'the learning curve for VWs is higher than other CMC tools' and the amount of time needed to assimilate skills such as manipulating one's avatar's mobility and controlling communicative settings is even higher (Sadler & Dooly 2013, p. 166), my desktop on which *Second Life* was running was shared with the participants at all times during the course (Figure 5.2 on page 169).

The sequence of activities in each session was constructed so that the design elements could be deployed after the software functions of *Second Life*, video and editing programs were learnt. It was important that the participants became familiar with *Second Life* and the other technological tools and understood how their various functions could be used to enact design elements before they commenced the production of the machinima videos. As discussed earlier, participants were made aware of the camera controls in *Second Life* and shown how these could be used to enact design elements such as vertical and horizontal camera angles to express various types of meaning such as power relations between the characters/actions in their machinima and the viewers.

After learning about the resources for meaning-making made available by the software introduced during the first session of the course, each pair of teachers undertook the project of conceiving, designing and constructing a ninety-second machinima video during the second session of the course. The decision to create short machinima videos was influenced by the time constraints under which the course was held. Callot (2009) notes that most machinima projects, either industrial or user-generated are short films. He quotes Marino as saying that 'the average machinima project requires roughly one hour of production and post-production time for every thirty seconds of finished screen time' (in Callot 2009,

p. 29). Since teachers participating in the study had only six hours at their disposal to produce the machinima videos, time was an important criterion for the decision to ask them to create a short machinima. Callot adds that longer machinima such as 'feature films, are often the realm of for-profit teams such as Rooster Teeth, the creative team behind Red vs. Blue because there are very few user-generated machinima artists who can put forward that much effort in addition to their professional careers, so short form projects tend to be the norm' (ibid).

Participants in this study were guided to use the pupeetering technique discussed in Chapter 3. In a virtual world such as *Second Life* objects, characters and environments are at the machinima producers' disposal. In other words, they control their avatars like a virtual puppeteer with simple keyboard controls and mouse clicks. In *Second Life* they can prompt their avatars to walk, run, fly or gesticulate by pressing specific buttons on the keyboard, such as the arrow keys to make the avatar walk, run or fly. Subsequently, the game engine shows the characters' actions on the screen without other human intervention (Kelland et al. 2005, p. 20). Teachers worked in pairs to make the videos, thus sharing the 'responsibility for authorship' and adopting different roles in the production process (Burn 2009, p. 136).

Broadly, the creation of the machinima video followed the contours of the typical structure of moving image production: a period of work on the different modes to be employed in the film, followed by a period of assembly in which these modes are brought together to make the moving image (Burn 2009). More specifically, the machinima-making process consisted of five stages: 1) brainstorming for ideas, 2) scripting, 3) storyboarding, 4) performing and filming, 5) editing. In film production, a storyboard refers to a visual plan of the film, similar to a cartoon

comic strip, used to represent the scenes in the multimodal ensemble. Broadly, each scene incorporates a visual depiction, the written script, and notes about camera action, e.g. pan, zoom and so on (Hafner 2014, p. 662).

The machinima-making process worked to overcome the more usual monomodal way in which text production is approached in the language classroom. As a result, the participating teachers experienced a full range of multimodal and multimedial engagement as they made their film. Teachers had to step out of the comfort zone of print-only texts and consciously deploy multimodality to actually produce the video. They were given complete freedom to choose the topic of the video but were, however, asked to engage actively with issues of multimodal meaning-making, reflecting critically on their choices and their significance in the process of constructing their videos.

In sum, the *Multimodality and Machinima* professional development course provided opportunities for the participating teachers to experiment with digital literacies while also allowing for the possibility to carry out an extensive investigation of the knowledge and processes involved in collaborative machinima making.

Finally, after the course ended, participants were given the opportunity to reflect upon their work during the post-course interviews.

5.3 Participants

Recruitment of participants

The first method to reach intended participants was to make direct contact with teachers in a large language school in Dublin by presenting the research project to

them. After the ethical approval was obtained from the university's Research Ethics Committee (Appendix F), an introductory session was held at the end of January 2014 for the school's teaching staff in order to explain the main purpose of the study and some of its key concepts. Subsequently, an email invitation to participate in the project was sent to all in-service language teachers in the school.

Because the response was not the one anticipated, another recruitment plan had to be elaborated. Therefore, as a second method to reach the intended participants, an announcement was sent via email to directors of studies at all Dublin-based language schools registered with the Irish national body responsible for the development and management of inspection and recognition scheme for English Language Teaching organisations, i.e. ACELS (the Accreditation and Coordination of English Language Services) as well as to professional associations such as ELT Ireland.

In the announcement the purpose of the course as well as the benefits for and responsibilities of participants were stated (Appendix E). Participation was voluntary and no compensation was provided despite words of caution from scholars that 'teachers are often not motivated to receive and implement technological training in the absence of incentives and professional rewards for activities related to technologically based materials development and utilization' (Lafford 2009, p. 687). Certificates of completion were, however, issued for the participants who completed the professional development course.

The announcement made clear that all ESL teachers were welcome to participate in the project and the professional development course. In other words, all English language teachers had equal access and opportunity to take part in the workshop

as part of their professional development. Seven English language teachers agreed to participate, however, only four followed through: three ESL teachers who worked in private language schools and colleges in Dublin and an EFL teacher who was also a PhD researcher at the time the data collection phase of this study took place. The four participants worked in pairs and took part in the course at different times. The same course was taught twice, over the span of two weeks in order to accommodate the needs of the participating teachers who had very busy schedules during workdays. Hence, the first pair participated in the course on two consecutive Saturdays while the second group was able to attend on Sundays.

The participants who agreed to take part in this study were English language teachers with different teaching experiences, ranging from three to eighteen years who, however, had no previous experience with machinima. Nonetheless, they were representative of a diversity of experiences with English teaching and use of digital technologies.

Because the participants were in-service teachers, it was assumed that they had knowledge of the content they were teaching. Therefore, the focus was on examining how teachers' existing knowledge interacted with the technological tools introduced during the course. Participants were not expected to know how to use any of digital technologies involved in the production of a machinima video before the course started.

Tables 5.3 and 5.4 summarise the background information of the teachers who participated in the study.

GROUP 1

Participants	Ciara	Beth
Gender	Female	Female
Age range	31 - 35	26 - 30
Native language	English	Thai
The highest level of education completed	Bachelor's degree	Master's degree
Years of experience	11.5	3
Language/s taught	English	English
Levels taught	All levels: A1 – C1	B1 – C2
Age group taught	All ages	18-24
Places where you teach/taught	Language school	University
Responsibilites	Plan classes, design materials, design tests, select textbooks;	Plan classes, design tests
Materials used	Textbooks, computers, board, overhead projector, dvd player, audio tapes/CDs, TV; Other: games;	Textbooks, computers, board, overhead projector;

Table 5.3 Group 1 Background Information

GROUP 2

Participants	Dean	Sean
Gender	Male	Male
Age range	41+	31 - 35
Native language	English	English
The highest level of education completed	Master's degree	Master's degree
Years of experience	18	5
Language/s taught	English	English
Levels taught	All levels: A1 – C1	A1 - C1;
Age group taught	All age groups	All age groups
Places where you teach/taught	Secondary school; university; language school;	Language School
Responsibilites	Plan classes, design materials, design tests, supervise teachers, train teachers, select textbooks	Supervise teachers, design courses, select textbooks;
Materials used when teaching	Textbooks, board, overhead projector, dvd player, audio tapes/CDs, mobile devices (ipad)	Textbooks, computers, board, overhead projector, dvd player, audio tapes/CDs

Table 5.4 Group 2 Background Information

As stated in section 5.1, my role was more prominent because I was an active participant in the speech event; being aware of potential bias and values is important (Creswell 2013). It is also worth noting that I undertook a number of courses such as the AVALON teacher training course which enabled me to first develop an awareness of the technical skills needed to explore the meaning-making affordances of 3D virtual environments such as *Second Life* within which machinima can be employed. I also participated in workshops such as MachinEVO during which language educators were taught to create machinima videos in *Second Life*.

5.4 Data collection

A variety of data were gathered including participants' scripts and storyboards, recordings of in-world sessions alongside recordings made by the participants for their machinima videos—all these were of particular value for the understanding of the thought processes that shaped teachers' decisions and helped confirm or disconfirm the veracity of suppositions made on the basis of the interview data. The complexity of such a project required extensive investigation from a number of perspectives.

5.4.1 Procedures for data collection

The data collection process lasted five weeks. Before the first session of the PD course all necessary teaching materials were developed, work packages were created for teachers and the software required for the creation of machinima videos, i.e *Second Life*, oCam and Movie Maker, was installed in the computer lab at the university where the research project took place. Before the course started, teachers took part in semi-structured interviews to discuss their views on the role

of technology in the language classroom, understanding of literacy and the impact of technology on literacy as well as their motivation for enrolling in the course and expectations in relation to the professional development opportunity. After that, they participated in the twelve-hour *Multimodality and Machinima* course which was audio and video recorded remotely, off-site.

The professional development course was run in a computer lab at Dublin City University but the participants' interaction in *Second Life* was recorded remotely with Camtasia while the editing part of the production process was recorded with the help of Teamviewer.

Figure 5.2 details the set-up for the course and the procedures for the recording of the second group of participants' production process. The course set-up for the participants in Group 1 was identical to the one outlined in Figure 5.2.
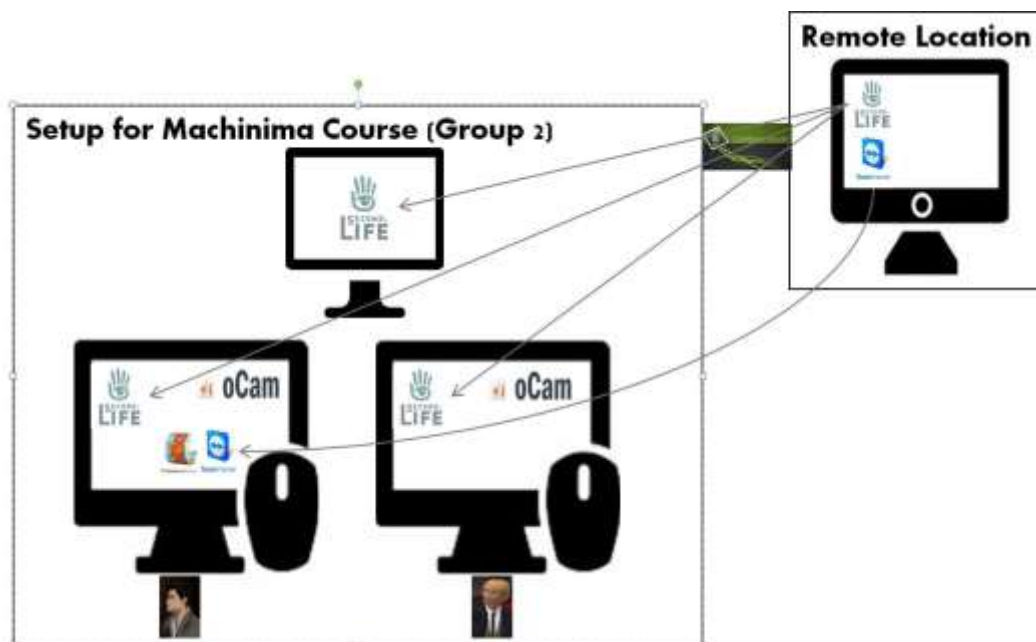

Figure 5.2 Course Set-up

Each participating teacher was interviewed individually after the course finished. The interviews engaged participants in critical reflection on the work they had

completed. All post-course interviews were recorded using a digital recorder and saved for data analysis.

Qualitative data were collected from audio and video recordings of the course, artefacts such as scripts and storyboards produced during the course and pre- and post-course interviews. The scripts and storyboards were scanned and saved on two external hard drives alongside the recordings of the course sessions and stored safely at the university where the project was carried out in accordance with ethical research procedures.

All data from the pre- and post-course interviews and the second sessions of the *Multimodality and Machinima* course were transcribed and coded for data analysis. Pseudonyms were used to refer to the participants.

Screen and audio recordings

Tai reported in 2015 that findings from computer assisted language learning (CALL) research were mostly based on self-reported data, such as surveys and interviews. Tai proposes to add observations as a data source to capture teachers' actions in technology integration in their classrooms in order to complement the survey and interview data since there might be potential for errors when recalling (Tai 2013, p. 51). The addition of observation as a source of data enables researchers to capture teachers' actions and triangulate them with their knowledge and competencies to further understand the impact of professional development courses (Tai 2013, p. 50).

While the present study does not include observations of teachers integrating practices such as machinima in their classrooms, it does, however, include direct

observations of the teachers' interactions with the technological tools involved in the making of machinima videos. Recordings of the participants working on creating videos in *Second Life* were used to answer the first research question.

As noted earlier, the primary strategy to collect data was the audio and video recording of the teachers' machinima making process. The PD course constituted the main data source for the study. Screen and audio recordings provided important information that allowed for a thick description of the context. However, in order to triangulate the data (Lincoln and Guba 1985), the researcher used supplementary data strategies: pre- and post-course interviewing and artefacts such as scripts and storyboards collected during the film-making process.

Background questionnaires

The questionnaire was designed so as to provide demographic and background information on the participants such as their prior language teaching experience and use of technology in the classroom. The questionnaires were completed by the participants before the pre-course interviews.

Semistructured interviews

Participants were invited to take part in pre- and post-course semi-structured interviews. Both pre-course and post-course interviews were carried out in a face-to-face environment or via Skype. The interviews were semi-structured to allow for freedom of digression (Mackey & Gass 2005) and to provide a fuller understanding of the participants' experiences. Interview questions were informed by the TPACK framework and mostly addressed participants' understanding of literacy, the impact of digital tools on the construct, and the knowledge they

thought was needed to successfully use such tools in the classroom with their students. The interview questions shed light on teachers' understanding and perception of the multiple dimensions of literacy after exposure to and interaction with multimodal practices such as machinima. Follow-up questions were asked to ensure participants had a chance to talk about other topics that they might have considered relevant.

Importantly, the interviews were designed to engage teachers in critical reflection on the PD experience and on their practices of multimodal construction of meaning with machinima.

> Reflection, or critical reflection refers to an activity or process in which an experience is recalled, considered, and evaluated, usually in relation to a broader purpose. It is a response to a past experience and involves conscious recall and examination of the experience as a basis for evaluation and decision making, and as a source for planning and action (Bartlett 1990 cited in Richards 1998, p. 21).

Richards (1998) notes that reflection is seen as a process that can facilitate both learning and understanding and plays an essential role in teacher development. Reflection, whether 'in action'—reflection in a situation, while it is occurring, or 'on-action'—reflection after an event but still about that particular context, may cause teachers 'to re-examine their knowledge and beliefs and this might lead to change' (Schon 1987 cited in Motteram et al. 2013, p. 61).Thus, the participating teachers were engaged in critical on-action reflection throughout the project and, especially, during the post-course interviews. Following Richards' recommendations teachers were engaged in a three-part process that involved: 1) the event itself—participation in the professional development course and the making of a machinima video; the starting point was an actual learning episode

and the focus of critical reflection was the teachers' own production process; 2) recollection of the event—the next stage was to produce an account of what happened; 3) review and response to the event—the participants reviewed the event with the purpose of processing it at a deeper level: the teachers were asked to watch the video they produced and explain their modal choices and intended meanings.

Artefacts

Storyboards and scripts produced by each of the four participants were collected. These provided significant insights into the meaning and purpose of the scripting and storyboarding steps in the machinima-making process.

The primary data resource of this project included recordings of the participating teachers' machinima-making process and pre-course and post-course interviews. Supplementary materials including teachers' scripts and storyboards for the machinima films were also collected. To understand how the participants approached the design and production of the machinima film and why they designed their story the way they did, the process of production from scripting to editing was recorded. The post-course interview aimed to clarify participants' modal choices and other decisions made during the second session of the course.

5.5 Data analysis

In this study, qualitative data were collected from screencasts of the professional development course which constituted the main data source for the project. Data also emerged from pre- and post-course interviews devised to analyse teachers' own perceptions towards and understanding of the affordances of the digital tools

for multimodal communication of meaning. As noted by researchers data analysis is an ongoing holistic and reiterative process that involves continual reflections (Creswell 2013). The process of data analysis was documented carefully and in detail as data were examined closely, coded and analysed to seek patterns and themes that emerged over time.

5.5.1 Software selection

Computer Assisted Qualitative Data Analysis Software, CAQDAS, was used in this study to assist with the transcribing, coding and analysis stages of the project. Miles et al. (2014) point out that CAQDAS is an excellent way to store and maintain the data corpus (p. 48). Furthermore, Creswell (2013) argues that computer programs aid in the analysis and representation of data. He points out that CAQDAS encourages researchers to examine the data closely, even line by line, and think about the meaning of each sentence and idea (p. 202).

The Professional version of Transana (2015) was deemed suitable to meet the needs of this project. It provided an organised storage file system and handled both text and multimedia data. It also provided the means for displaying the data in a database tree and the possibility to visually transcribe it, to develop codes and apply them easily to text and images in collection clips. It also allowed for the quick and easy location of the material and sorting for specific codes.

Transana Professional was used to create verbatim transcriptions for the video recordings of the participants' production process to capture what was said and separate 'visual' transcripts to capture what was presented visually. Transana shows both transcripts simultaneously allowing the researcher to see the interplay

between the visual and the verbal. This approach was essential to the data analysis phase which will be discussed in more detail later in this chapter.

Transana uses Collections to allow for the organisation of the analytic data of Clips, Snapshots, and Quotes. Collections are thus an organisational system that helps make sense of the data. They contain analytically meaningful Clips. Collection membership is immediately visible in the database tree. Five main Collections that corresponded to the machinima-making process stages were created to organise the data and help the analysis process, i.e. brainstorming, scripting, storyboarding, filming and editing. Each Collection contained Clips that were deemed anallytically meaningful and were named after the mode of meaning-making participants were focusing on.

5.5.2 Transcribing

Representation of data into written form is an interpretive process which involves making judgements and is therefore the first step in analysing data (Bailey 2007, p. 131). Transcripts are not neutral records of events, but reflect researchers' personal values, attitudes and beliefs and interpretations of data (Bailey 2007, p. 129; Miles et al. 2014, p. 11).

The process of transcription in this study was facilitated by Transana Professional. This program allowed for an easy handling of the visual data and provided an interface that made it easy to associate the visual information from the professional development course screencasts with the verbal information. The aims of this project dictated that visual information was necessary for data interpretation.

All data from interviews with the participants and from the second sessions of the professional development course Multimodality and Machinima were transcribed. In addition to verbatim transcripts, Transana's novel way of transcribing content was used by creating image-based visual transcripts using screenshots captured from video files, a new way to transcribe content that may elude simple verbal descriptions. This was considered useful since the images in the visual transcripts communicated important information about the participating teachers' views and practices of meaning-making and thus helped document their process of modal choice. The information in the visual transcripts often supplemented the audio portion of the data. Figure 5.5 shows an examples of both verbatim and visual transcripts where the latter communicates relevant information that in fact explains some decisions made by participants in Group 2 while filming a scene for their machinima video. This particular scene is analysed in detail in Chapter 6.
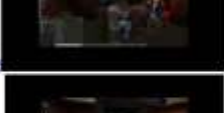
S: But you're not looking at me with (...)(2:30:23.3)
D: Yeah, so (...)
S: OK, grand, record! (...) You're leaning! (2:30:30.3)
R: Oh!
S: Wait one sec. No, no, you're leaning!
S: That one, yeah! (while Dean keeps changing his avatar's pose)(2:30:37.0)
D: That one?
S: Grand, I'm recording that.
D: (unintelligible)
R: Looks good, yeah.
S: That's it! I think I'll record that again. He's like, he's waving. (2:30:51.1)
R: Yeah.
S: OK, it's grand. I've recorded two waves like that.(2:30:54.0)

Figure 5.3 Verbatim and visual transcripts created with Transana Professional

5.5.3 Coding

The TPACK study reported here draws on the theory of affordances as outlined in Chapter 4 in that it aims to understand teachers' TPACK in terms of their knowledge of digital technologies affordances for new ways of meaning-making, interacting with others and enacting social identities. The study explores the interaction between teachers' CK and TK by identifying episodes of perception

and enactment of the affordances for meaning-making embedded in environments with a 'rich semiotic budget' (van Lier 2004, p. 96) such as *Second Life*.

Mishra and Koehler's (2006) concept of TPACK provides a robust framework within which to situate a study aimed at understanding not only what language teachers need to know in order to integrate digital literacies into their classes but also what their knowledge and beliefs actually are.

Miles et al. (2014) point out that despite some methodologists arguing that coding is merely technical, preparatory work for higher level thinking about the study, coding is, in fact, 'deep reflection about and, thus, deep analysis and interpretation of the data's meaning' (p. 72).

The coding of the qualitative data in this study was done in steps. The initial list of predefined codes drew heavily on the TPACK framework but was also informed by a view of affordances as perception-action relations. The initial analysis followed the procedures suggested by Miles et al. (2014). Qualitative data were viewed and transcripts were read several times. In the process of coding the data, the definitions of some of the initial codes had to be revised. Data were coded using predefined codes first and other codes later when other themes emerged. Due to the different layers of knowledge displayed by the participants some of the codes seemed to overlap.

Borg (2003) notes that teacher cognition is 'a multidimensional concept' within which 'untangling closely related notions such as belief and knowledge is problematic' (p. 86). Separating teachers' knowledge and belief about subject matter is recognised to be 'blurry at best' (Grossman, Wilson & Shulman 1989, p. 31 cited in Borg 2003, p. 86) because 'in the mind of the teacher, components of

knowledge, beliefs, conceptions, and intuitions are inextricably intertwined' (Verloop et al. 2001, p. 446 cited in Borg 2003, p. 86).

In this study, for instance, participants' existing knowledge of multimodal communication of meaning, CK_MCC, and their knowledge of meaning creation with the help of technology, TCK, was sometimes difficult to separate clearly.

A major challenge encountered at the coding stage was compartmentalising the data to force fit the TPACK framework while also capturing the complexities that emerged during the interplay between the CK and TK domains. Participants' complex orchestration of modes afforded by the technological tools introduced during the course has proven difficult to code within the TPACK framework particularly because teachers' existing knowledge of multimodal communicative competence played a major role in the enactment of the affordances of the technologies used. Lotherington et al. (2016) note that analysis of multimodality is 'slippery' because the various modes employed for the production of a video are not 'easily distinguished', often overlapping and requiring cultural agreement (p. 70).

The data were first coded within the seven knowledge domains identified by the TPACK framework. However, data obtained from recordings of the participants' machinima production were mostly coded within the CK, TK and TCK domains. Thus, data referring to the participants' existing knowledge of multimodal communication of meaning or multimodal communicative competence was coded as either CK_Perceived_MCC or CK_Actual_MCC as it was noticed that there was a difference between what participants thought they knew about multimodal communication of meaning and their actual knowledge of it. More specifically,

the Perceived_CK_MCC code was used when participants discussed their perceived knowledge and understanding of MCC. The Actual_CK_MCC keyword was used when participants showed evidence of multimodal communicative competence—MCC (design and interpretation of multimodal texts) without having been specifically asked to address it. Three subcodes were created: Actual_CK_MCC_Concurrence—the meanings of each mode reinforce each other; Actual_CK_MCC_Complementarity—the meanings are supportive but different, coloring in elements sketched out in the other modes; Actual_CK_MCC_Divergence—the meanings contradict one another.

In this study Technological Knowledge (TK) refers specifically to knowledge of machinima and the software required to produce a video with this technique, i.e. the virtual world of *Second Life*, and screencapture and editing programs, namely oCam and Movie Maker. The TK domain here includes not only the 'technical mastery' or the ability to operate the tools but also knowledge of the affordances for meaning-making embedded in the software.

Instances of the participants' knowledge of how to use the technological tools and their awareness of the affordances for meaning-making embedded in the tools were coded with a TK_Affordance code followed by the affordance participants displayed awareness of, as follows:

TK_Designed_SL_Aff_Avatar_Customisation
TK_Designed_SL_Aff_Camera_Action
TK_Designed_SL_Aff_Locations
TK_Designed_SL_Aff_Gestures_Walking
TK_Designed_SL_Aff_Lighting
TK_Designed_SL_Aff_Snapshots
TK_WMM_Aff_Animation_Editing

TK_WMM_Aff_Visual_Effects

TK_YT_Aff_Music_Sound_Effects

Technological Content Knowledge (TCK) refers to the ability to understand how practices such as machinima can be used to construct meaning multimodally. It includes knowing how to create rich multimodal ensembles using machinima, understanding how filmic devices such as point-of-view, bird's eye views, panning and zooming can be used to create meaning, knowing how 3D virtual worlds such as SL can be used for the creation of multimodal ensembles, understanding how camera angles and video editing software can be used to create meaning. TCK here refers to a higher level of conceptual mastery which involves using the different semiotic resources of digital media for meaning-making. This requires the ability to enact the affordances provided by the tools mentioned above for the digitally mediated multimodal representation of CK. A TCK code was used when participants were observed to actually enact the affordances for meaning-making drawing on their existing knowledge of multimodal communicative competence and their knowledge of the technology. The following TCK subcodes were used:

TCK_Designed_SL_Aff_Avatar_Customisation

TCK_Designed_SL_Aff_Camera_Action

TCK_Designed_SL_Aff_Gestures_Walking

TCK_Designed_SL_Aff_Lighting

TCK_Designed_SL_Aff_Locations

TCK_Designed_SL_Aff_Snapshots

TCK_WMM_Aff_Animation_Editing

TCK_WMM_Aff_Visual_Effects

TCK_YT_Aff_Music_Sound_Effects

The researcher continually adjusted coding schemes, the limitations and definitions of each code to account for the full meaning of the data. To illustrate

this point, after analysing the data under the broader categories of TK, CK and TCK, subcategories were created under each domain to show how different affordances for meaning-making were used to construct various mode relations during the machinima production process.

Pedagogical Knowledge (PK) and skill refer to what Shulman (1986) describes as the understanding of the subject matter (language) and how it can be taught (i.e. pedagogical content knowledge) (Mishra & Koehler 2006).

Technological Pedagogical Knowledge (TPK) has been defined as the knowledge required in order to help students create rich multimodal ensembles with digital literacy practices such as machinima as well as enhance their awareness of the ethos of digital literacies. TPK refers to an understanding of how technology can be used to aid the teaching and learning processes. TPK here refers to the ability to help students create rich multimodal ensembles with machinima and enhance their awareness of digital literacies. TPK is knowledge of the ethos dimension of digital literacy practices, of how to use these practices to facilitate students' learning, the ability to identify appropriate tools (such as screencapture and video-editing software) and resources (copy-right free music, images and so on) that help students make rich multimodal ensembles with machinima as well as foster their understanding of the transformative impact of digital literacy practices.

Technological Pedagogical Content Knowledge (TPACK) represents the knowledge of how these components interact with each other, helping create effective teaching with technology (van Olphen 2008a). TPACK includes an understanding of how the affordances and constraints of machinima can influence students' learning of digital literacies and multimodality, knowledge of how to use

machinima to provide students opportunities to create and interpret multimodal ensembles and the ability to assess students' learning with machinima.

TPACK DOMAIN - DEFINITION	EXAMPLES FROM THE DATA
Perceived_CK_MCC	Literacy: 'I suppose the ability to communicate with words. To be able to construct meaning with words.' (Sean, Group 2 – pre-course interview) Multimodality: 'I haven't come across the term but it seems that we do it all the time, that we don't just concentrate on any one thing, we're always speaking and reading, reading and listening, we're always doing more than one thing at the same time.' (Ciara, Group 1 – pre-course interview)
Actual_CK_MCC_Concurrence	'I think Bill, like on the chair Bill can look bored, there's a BORED setting for the chair so ...and the first, it's like, you know, he's sitting bored at the (...) I kind of have an avatar ready for him actually, just (...) he's wearing like boring clothes, that one there.' (Sean, Group 2, working on Character Construction during PD course)
Actual_CK_MCC_Complementarity	D:Well, I think the phone could be more effective because sometimes somebody answers the phone when you're in the middle of a conversation that could come across as very rude, you know, you're relegating the Steve character to less important and then it's just gonna be "Oh, I gotta go. See you later!" as though you are dimissing your old friend.' (Dean, Group 2, working on Character Construction during PD Course)
Actual_CK_MCC_Divergence	D: Because I think and maybe I'm becoming too ambitious here with the whole thing but I like the contrast you know of the story ...but it's the two guys, you know, the idea is that they are going back to their youth but when they meet there is a big contrast between the conversation they have and the setting.' (Dean, Group 2, Brainstorming during PD course).
TK_Designed_SL_Aff_Avatar_Customisation	B:I should change the appearance [of the avatar]? I mean (...) C: Well, maybe we got lost, we weren't supposed to be there at all. (Group 1, Brainstorming)
TK_Designed_SL_Aff_Camera_Action	C: Oh, yeah, yeah. OK, so we start with the arguing so I suppose we really want to be over each other's shoulders for that to get the angry faces in B: Yeah. So should we switch between the C: Yeah, I'll film you when you're cross and then you can film me (Group 1, Storyboarding)
TK_Designed_SL_Aff_Gestures_Walking	C: Third one then is you, if we can get you to do angry face. B: And close up. C: And then me close up. If we could get him to fold his arms it would be perfect. (Group 1, Storyboarding)
TK_Designed_SL_Aff_Lighting	C: This would be just the place for a horror film. B: Yeah. C: If it was dark, it would be so scary.(...) I think we should make it nighttime though, what do you think? (Group 1, Brainstorming)
TK_Designed_SL_Aff_Locations	C: So we'll have a look and see what rooms we can use. And that might give us some inspiration. B: Yeah. So where should we visit first? (Group 1, Brainstorming)

TK_Designed_SL_Aff_Snapshots	C: We want to start with a shot of the two of us. Maybe a snapshot would be better for that? (Group 1, Storyboarding)
TK_WMM_Aff_Animation_Editing	B: Could it be... louder? C: It will be when we edit.(...) B: Yeah? I don't know how to make that sound. C: We just make the sound in the edit. (Group 1, Filming)
TK_WMM_Aff_Visual_Effects	S: What we could do is just recycle that image. D: Well, I was thinking...so the very first image? S: Can you flip an image? (Group 2, Editing)
TK_YT_Aff_Music_Sound_Effects	S: Yeah, it's kind of oblique, yeah. Cause that would be the best shot, that would be the best angle to get the phone ringing (...) Cause the phone rings. (Group 2, Storyboarding).
TCK_Designed_SL_Aff_Avatar_Customisation	S: But it doesn't look, it doesn't look exactly sophisticated D: Yeah, it doesn't S: It doesn't really fit... D: Maybe classic? Maybe this will? S: Maybe the classic would? D: Right, yeah. There we go, something like that [looking at avatar options in *Second Life*] S: Yeah, that will do S: No, he's, he's like too nerdy, like ...yeah. S: He's too sophisticated D: So the first guy then? S: Yeah, yeah D: The first guy that you (continuing to look at avatar options) S: Him (...) business worker. (Group 2, Brainstorming – Character Construction)
TCK_Designed_SL_Aff_Camera_Action	C: Let's get in on the face and that will be perfect. B: OK. B: Should I close up? C: Sure, we can make the screen thing small enough to just take the face as well. (Group 1, Filming).
TCK_Designed_SL_Aff_Gestures_Walking	C: See if you can get angry face. B: Yeah. C: And we'll just record your line. And then we'll focus in on me. B: Yeah B: Scold? (Group 1, Filming)
TCK_Designed_SL_Aff_Lighting	C: It looks much scarier with the midnight setting! It's perfect! B: Yeah. (Group 1, Genre Selection)
TCK_Designed_SL_Aff_Locations	S: Cool. OK, so what if we're gonna do a script, two friends meeting in a bar? D: That's cool, yeah . S: That makes sense, doesn't it? D: Yeah. S: So one walks in, the other one is there (.) D: OK. S: What do they say? So they could be the barman and a customer or two friends? (Group 2, Brainstorming)
TCK_Designed_SL_Aff_Snapshots	S: So I have a snapshot at the bar, like that. That's a snapshot at the bar so. S: For the Old College Friends R: Right S: So can I copy that in? (Group 2, Editing)

TCK_WMM_Aff_Animation_Editing	B: Should we zoom or do something about it? C: Here? B: Yeah. C: OK.. That could be good. Zoom in? OK. Start here. Oh, yeah. It looks good with the zoom. (Group 1, Editing)
TCK_WMM_Aff_Visual_Effects	D: Is that what you wanted? S: No D: Is it like a mirror image you want really? S: Alright R: Mirror, let's see D: Grand. R: Is that what you want? S: Yeah, that's what I want. (Group 2, Editing)
TCK_YT_Aff_Music_Sound_Effects	S: Rock/ Angry I think it's fine actually. S: What was that one even called? D: Open Highway. S: Open Highway, let's have a listen to that one again, yeah. S: What do you think? Is that too dramatic? D: Does get going after a while? D: Yeah, it would be the kind of thing at that setting I think, you know? S: Yeah. D: In a pool bar, you know? S: Yeah D: With guys (.) S: It just seems, it just (...) we can change the volume to the background music. D: And we can do the dialogue. R: As I said with Movie Maker you can adjust the volume. S: For the ambience, that's great.
Technological Pedagogical Knowledge (TPK)	Dean: The interesting thing about *Second Life* because we are not videoing ourselves is that everything has to be thought of and everything has to be deliberately engineered, you know. So like, gestures or even sitting on a stool, you know so things that if we were just videoing the students themselves that would just happen naturally, you know.(...) Now we've got to think of it, plan it and because they're working in teams, I assume they gotta discuss it and then go into the programme and say, "OK, we wanted to have this kind of hair, or that particular gesture, this particular time, sit on this seat or that sofa," so almost everything has to be planned, everything has to be thought of, everything has to be critically analysed, rather than just assumed. I suppose, I mean one of my questions always was "Wouldn't it be easier to get the students themselves to say, you're Cleopatra and you're Anthony and write a script and off you go. (Dean, post-course interview)

Technological Pedagogical Content Knowledge (TPACK)	Beth: I think, yeah, they can expand their knowledge rather than convey the meaning through only language by writing or to understand the language by only reading. Now they can know how to express the meaning by language and visual images of courses. When you're considering from visual images, again, meaning matters even if you turn left or from bird's eye view, like camera angles or a close up or zoom out, everything can make meaning, different meaning so rather than just have to consider only language, they can know that visual images and even without speaking, just have background music and everything can make meaning for them. Yeah, I think it helps them to like be, to understand and have attention to everything surrounding them, to like gestures and postures. I think it can be applied in real life too. When you meet people, it doesn't mean that language can convey only meaning but you have to see their posture whether they have your attention or, because, yeah, I think it's very useful. (Beth, post-course interview)

Table 5.5 TPACK coding scheme (definitions and examples from the data)

5.5.4 Data analysis

Seeking to understand teachers' TPACK, this section makes the process of production a central focus of analysis. A focus on production 'challenges the sufficiency of static understandings of mono-modal literacies' (Sheridan & Rowsell 2010, p.12) because the production process includes the notion of composing (ibid) and encourages people 'to use their literacy skills in a manner that exceeds a prevalent way to participate in contemporary culture, that of being a consumer' (ibid). Given the importance of and emphasis on production during the *Multimodality and Machinima* professional development course, the focus in this thesis is primarily on the second session of the *Multimodality and Machinima* course, that of creating a multimodal ensemble using machinima. Teachers' choices in modes of representation that shape how meaning is made are examined. The study also looks at how participants' use of the affordances of digital technologies might challenge and transform their assumptions of literacy. The analysis takes, therefore, a new approach of viewing meaning-making from the perspective of teachers situated as multimodal designers of meaning. By

examining teachers' actual production practices and their own descriptions of the video production process and explanations of modal choice, this study offers ways that teachers can think about how different modes work together in semiosis. Thus, an analysis of modal choice can help identify a language for experimenting with multimodality in the second language classroom. The TPACK framework alongside tools from unified discourse analysis and multimodal analysis are used for the study of the participants' Content Knowledge interplay with their Technological Knowledge in the context of using digital practices such as machinima for multimodal creation of meaning.

The study investigates the potential of the multimodal production process for unravelling teachers' practices of meaning-making and promoting a broad notion of literacy which encompasses digital literacy practices such as machinima. More specifically, the researcher sought to move beyond deficit views of literacy skills to consider other ways of helping teachers expand their literate repertoires. The course design drew heavily on the TPACK framework but was also informed by an understanding that literacy is a social practice and always embedded in social and cultural contexts (Barton & Hamilton 1998).

As already mentioned in Section 5.2, the *Multimodality and Machinima* course required the participating teachers to select and orchestrate various modes into their designs so as to move beyond print-based representations of meaning and also prompt them to reflect on the transformative nature of digital tool affordances. The analysis section presents examples of teachers' designs as they construct meaning through conscious deployment of resources from both language and other semiotic systems. It is argued that this work is inherently creative and multimodal as teachers combined multiple semiotic modes in

relationships of concurrence, complementarity and divergence in their machinima videos. In particular, the ways in which teachers combined the affordances of different modes made available by the technology in order to construct mode relationships is examined. More specifically, the ways in which the different modes employed by the participants complemented, reiterated, and contradicted each other through the enactment of digital tools affordances for semiosis is looked at. Thus, when analysing participants' machinima-making process, the focus is on the interplay of meanings which created relationships of concurrence, complementarity and divergence between and among various modes.

As discussed in Chapter 2, different kinds of meaning-making combinations are possible. For example, different modes can be in a relationship of (1) concurrence, where the meanings of each mode reinforce each other through clarification— when one mode explains or clarifies the meaning of another mode, exposition— when meanings of one mode are reexpresed in another and exemplification— when one mode may be an example or an instance of what is expressed in the other mode (Unsworth 2006, p. 1186); (2) complementarity, where the meanings are supportive but different and, at the same time, 'joint contributors to an overall meaning that is more than the meanings conveyed by the separate modes' (ibid); and (3) divergence, where the meanings contradict one another or 'seem to follow different courses without intersecting' (McCloud 1994, p. 154 cited in Unsworth 2006, p. 1189). Unsworth used the concepts briefly revisited above to interpret relationships between texts and illustrations but the concepts are useful to apply to other multimodal ensembles as well.

While describing participants' construction of mode relationships, the moments in the production process where they utilise synaesthesia to determine what 'mode

feels right' in order to convey their intended meaning (Cope & Kalantzis 2009; Kress 1997; 2003; Nelson 2006; Sheridan & Rowsell 2010) are highlighted. The concept of synaesthesia is of significance in the production process and attempts are made to document its use at the different stages of the process, particularly its role in the enactment of affordances and the subsequent creation of relationships between and among modes. Sheridan and Rowsell argue that modal choice draws on a producer's translation of mood in modes chosen to depict a message. Producers, they argue, draw on synaesthesia to produce multimodal compositions. Feeling right about modal choice and experimenting with design until a design materialises an idea is a disposition of major significance when producing a multimodal ensemble (Sheridan& Rowsell 2010).

In the context of this study, Kress's view of synaesthesia is significant as it lends support to the analysis of the participating teachers' production processes, especially to the assumption that the teachers drew on synaesthesia to determine what modes could make difficult or abstract ideas explicit and this in turn triggered the perception and enactment of the affordances for meaning-making. Therefore, this study takes this concept of synaesthesia to heart by documenting teachers' practice of modal choice and representation and the roles it played in the goal-driven enactment of affordances. The notion of synaesthesia lends support to the theory of modal choice and intended meaning (Sheridan & Rowsell 2010). This analysis employs the concept of synaesthesia to illustrate how it guides teachers' modal choice when determing 1) what the 'best mode' is for a particular 'meaning' or 2) what mode 'feels right' and the subsequent realisation of affordances.

One other concept employed in the data analysis section is that of 'x-ray vision' introduced by Gee (2015). Gee explains the concept of x-ray vision as 'the ways in which we humans look through the rich details of the real world or a game world in order to see just what is important for our goals' (2015, p. 35). However, he continues,

> how we look through the world to see just what is important for our goals is relative to the avatar we are 'playing' since the avatar gives us the perspective, values, and tools from which and with which we act on and in the real world or the game world (ibid).

Gee uses the word avatar in relation to both avatars in games and social identities in the real world (2015, p. 35) and emphasises that any actor in the world or avatar in a game has goals. Similarly, teachers participating in this study had the goal of creating a machinima video and in order to accomplish their goal they had to employ what Gee calls x-ray vision. The digital tools teachers had to use came with 'quite beautifully detailed realistic graphic' (ibid) and a 'rich semiotic budget' (van Lier 2004, p. 96). But for teachers to solve their problem, namely to create their video, they had to see through or past the many details available to focus on just the elements that were relevant and important for the accomplishment of their goal. Participants' perception of affordances are seen as relevant or as evidence of what Gee termed x-ray vision.

 Finally, one other concept employed in the analysis section to help better explain the relationships between the TPACK knowledge domains in the context of collaborative work to accomplish the goal of producing a machinima video is that of coaction explained by Wegner and Sparrow (2007) as occurring 'when an agent's full-bodied action is influenced by or occurs in the context of another

agent's—and together they do something that is not fully attributable to either one alone' (p. 18). Put differently, during coaction each agent is influenced by, or acts within, the context of the other's actions and at least one agent uses this to come up with action that could not otherwise have arisen (Cowley 2011). The concept of coaction is deemed relevant to the questions under investigation in the current study as it was observed that at certain stages meaning was created to accomplish the goal of producing the video by participants through highly coordinated behaviour between the participants themselves or between the participants and their avatars, a characteristic of coaction.

Analitically meaningful clips from the various machinima production stages that were divided into five broad categories that roughly illustrate the workflow (Figure 5.4) of the two groups participating in the case study discussed here were selected for examination.
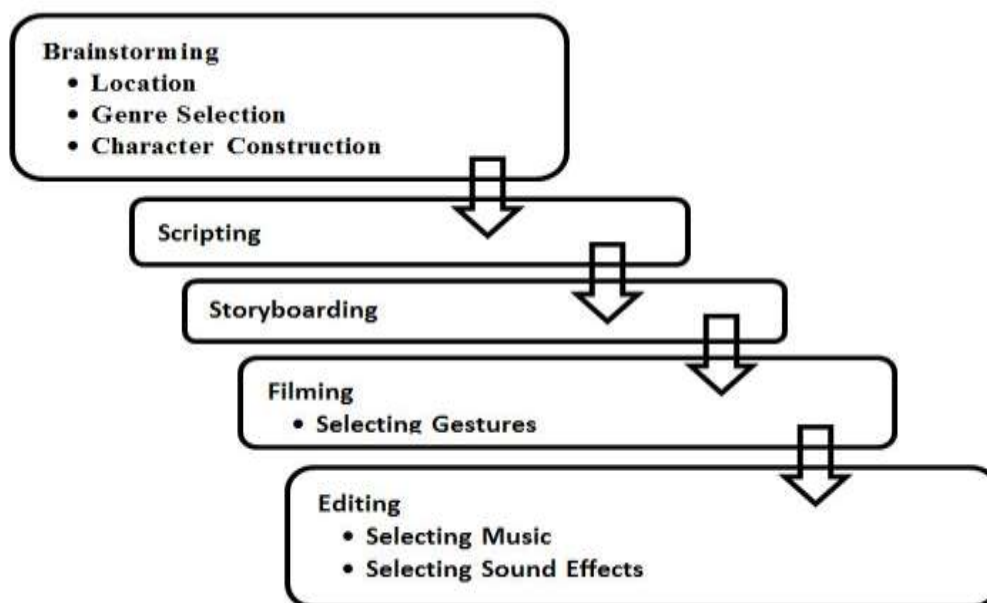
Figure 5.4 Machinima Workflow

Significant moments in the production process were selected to illustrate the possibilities for multimodal expression afforded by machinima and the ways in

which teachers layered these modal resources for meaning creation. For the analysis of the CK, TK and TCK domains of the two groups of participants, the same pattern was followed. Analytically meaningful clips from various machinima production stages are selected to illustrate the relationship between the participants' existing knowledge of multimodal communication of meaning (CK_Actual_MCC), the goal-driven perception of affordances (TK _Affordances) through x-ray vision and the enactment of affordances (TCK_Affordances) through processes such as synaesthesia and coaction.

The incorporation of machinima production recordings allows the researcher to develop a deep understanding about teachers' thinking process in constructing their machinima videos.

The discussion of teachers' TPK and TPACK in Chapter 7 is based on self-reported data, i.e. the pre- and post-*Multimodality and Machinima* course interviews. In other words, teachers have not been observed while integrating digital literacy practices in their classrooms and this in itself constitutes one of the weaknesses of this study. TPACK researchers recommend observations of teachers' integration of technology as a data source so as to enable researchers to capture teachers' actions and triangulate them with their knowledge and competencies in order to further understand the impact of professional development courses (Tai 2013, p. 50). While this study includes direct observations of teachers' interactions with the tools involved in the making of machinima videos it does not include observations of teachers employing such practices in their classrooms.

5.6 Conclusion

After briefly describing the setting for this research project, this chapter discussed the theory and design principles underlining the *Multimodality and Machinima* course as well as its actual delivery. The participant recruitment process was then presented and teachers that accepted to participate were introduced. Methods and procedures for the data collection and analysis processes were described and discussed. The coding scheme that draws on TPACK and the concept of affordances as outlined by ecological linguists was explained in detail and the concepts employed in the process of data analysis were revisited.

Chapter 6 will illustrate the complex process of multimodal composing and discuss the findings of this study in relation to teachers' existing knowledge of multimodality, van Lier's (2000; 2004) notion of affordance, Kress's (1997) notion of synaesthesia and Wegner and Sparrow's (2007) concept of coaction.

CHAPTER 6 DIGITAL LITERACIES AND NEW WAYS OF MAKING MEANING AND DOING

Chapter 6 reports and discusses findings from the current study. The focus is on the participating teachers' TPACK with a specific concern for their meaning-making practices as revelead by the machinima production process in which they took part. The aim is to make knowledge and processes otherwise hidden, visible. Therefore, attempts are made to illustrate the multilayered knowledge and complex processes that occur within even the relatively short production session described here. This chapter concentrates on teachers' actual process of making a machinima video in order to examine the knowledge and processes they draw on while using tools whose affordances make possible new forms of interaction and facilitate unique and creative ways of meaning-making, interacting with others and enacting social identities.

An analysis of the video production process and artefacts allows for an understanding of teachers' thinking process when constructing their machinima videos. Section 6.1 provides a brief introduction to the videos produced by the two pairs of teachers. Section 6.2 reports on the actual interplay between teachers' existing CK and TK domains—TCK—as it occurs at each machinima production stage, from brainstorming to editing. The interplay between teachers' CK and TK is discussed primarily in relation to their perception and enactment of affordances for meaning-making and the notion of mode relationships. The analysis of the data with respect to the CK, TK and TCK knowledge domains is aimed at illustrating the relationship between teachers' existing knowledge of multimodal

communicative competence [CK_Actual_MCC], their perception of the affordances of machinima for multimodal meaning-making [TK_Affordances] and the enactment of these affordances [TCK_Affordances]. The analytically meaningful clips selected for analysis and illustration from the various machinima production stages also demonstrate the possibilities for multimodal expression afforded by machinima and the intricate intertwining of multiple modes realised through the enactment of affordances. Section 6.3 investigates processes such as coaction that teachers draw on while making the machinima videos. It illustrates the new ways of doing and being that digital technologies such as machinima make possible.

6.1 Brief description of the machinima videos produced by participating teachers

Participants in this study were given the freedom to choose the topic of their videos. While a detailed analysis of the production process and the decisions made by the participants with respect to the topics of the videos as well as their modal choices will be given in Section 6.2, short descriptions of the machinima videos created by each group of teachers are provided below.

Figure 6.1 illustrates the storyline of the machinima produced by the participants in Group 1, i.e Ciara and Beth. They created a horror story based on a three scene script in which the main characters, a male and a female couple, returning home from a party got lost very late at night in a deserted place and decided to seek some help.

Verbatim Transcript	Visual Transcript	Visual Transcript
Scene 1: Argument B: It's all your fault! I told you before that we shouldn't stay this late! (0:00:10.6) C: There's no point blaming me now! Let's just go somewhere and look for help.(0:00:15.9) B: Argh!(0:00:21.0) **Scene 2: The House** C: Look! There's a house over there. Maybe they could help us?(0:00:35.3) B: It looks scary. I don't think there is anyone there.(0:00:53.3) C: Fine! Let's just stay here all night. (0:00:57.3) B: Are you sure that's a good idea?(0:01:00.5) C: Don't be such a baby, come on! (0:01:07.0) B: But ...(0:01:14.4) **Scene 3: Arriving** B: Oh my God! What's that?! (0:01:54.5)	(0:00:01.9) (0:00:02.8) (0:00:06.2) (0:00:11.5) (0:00:15.9) (0:00:21.1) (0:00:25.6) (0:00:32.4)	(0:00:45.0) (0:00:53.3) (0:00:55.0) (0:01:00.4) (0:01:07.1) (0:01:20.4) (0:01:32.7) (0:01:54.6)

Figure 6.1 Storyline of Machinima Video Produced by Group 1

Figure 6.2 presents the machinima video produced by the teachers in Group 2, Sean and Dean. The two teachers describe their video as an apparently simple drama between two college friends meeting up in their old college bar twelve years after their graduation. Sean and Dean wanted to capture that one moment in the characters' lives where they are in a reunion with old friends but that reunion

happens to be unsuccessful because the two characters have nothing left in common.

Verbatim Transcript	Visual Transcript	Visual Transcript
S: Hey Bill, how's it going?(0:00:29.1) B: Hey Steve, what's happening? (0:00:30.3) S: Oh, yeah! Great, yeah! It was great bumping into you yesterday! Oh, man! Is it 12 years since we were last here?(0:00:36.2) B: Yeah, yeah! It hasn't changed that much though, has it? (0:00:38.5) S: Yeah, it used to be great, the gang in here. Remember Joe, Jerry and Paul used to play pool, have a great laugh?(0:00:44.3) B: Yeah, so what have you been up to now? Has life been good since?(0:00:47.3) S: Oh, yeah, this and that. Back and forth. You know I was in England, you know, just doing the buildings over there but I got sick of that and came home. (0:00:54.6) B: Construction so? But what about that marketing degree you did? (0:00:58.0) S: Oh yeah, I did a bit of that but it wasn't really my thing in the end.(0:01:02.9) B: And Jean, remember you were with her for years?(0:01:05.8) S: Yeah, I was. Ah, Jean was great but I never got down on my knee and after a while it just kind of faded away. (0:01:12.9) And yourself? Kids now I heard you saying?(0:01:16.5) B: Yeah, yeah! Three kids now, 8, 6 and 3. I tell you they keep you busy, gotta work 60 hours a week just to keep them happy.(0:01:22.8) S: Oh yeah! Good, good! (0:01:24.2) [phone rings] B: Oh, I'm sorry! Hang on, hang on there, I gotta get this! [onto the phone] (0:01:27.7)William here. Yeah, yeah, OK, yeah. Give me about 20 minutes, alright? Yeah, I'll be there in about 20 minutes. OK, grand! See you then!(0:01:39.7) [to Steve] Listen, listen I gotta split, something's come up but nice talking to you. We'll do it again sometime, give us a call.(0:01:45.6) S: Oh, yeah, Bill, yeah. It was lovely to see you. We'll catch up next time so. Right? (0:01:50.8) B: Yeah, yeah. We'll do that. Right, Steve,Cheers! Good-luck!(0:01:53.9) S: OK, bye!(0:01:54.7) [Bill leaves, Steve turns back to his beer] (0:01:57.4)	(0:00:02.3) (0:00:09.9) (0:00:20.9) (0:00:24.5) (0:00:29.1) (0:00:30.3) (0:00:36.2) (0:00:38.5) (0:00:44.3)	(0:00:54.6) (0:01:02.8) (0:01:16.6) (0:01:27.2) (0:01:39.8) (0:01:45.6) (0:01:54.7) (0:01:57.5)

Figure 6.2 Storyline of Machinima Video Produced by Group 2

6.2 New ways of making meaning—the interplay between existing Content Knowledge, Technological Knowledge and Technological Content Knowledge

The three TPACK domains that are the main concern of this section, CK, TK and TCK, are analysed simultaneously because they are intricately intertwined. The process of meaning-making through the enactment of the affordances of machinima does not follow a linear trajectory because the logic of both the page and the screen (Kress 2003) are present and combined in such a medium. Being a highly visual medium, the affordances of images are taken up but at the same time machinima unfolds in time and it includes a sequential element, similar to a written narrative. In other words, even though a machinima video presents a sequence of images, it differs from images because it actually is a sequence of images, and so it mixes the affordances of image with the affordances of writing. In essence, a machinima video presents visual information organised according to the spatial/simultaneous logic of the screen but it also presents textual information in the form of scripted narrative, voiceover or dialogue that unfolds over time. The latter is organised according to the linear/sequential logic of speech and writing (Jones & Hafner 2012). This poses challenges for the analysis of the production process, especially when a TPACK lens is used. Therefore, the three domains of knowledge are analysed simultaneously for each of the two pairs of teachers who took part in this study.

Though the complexity of such a project necessitates extensive investigation of a number of perspectives, the concern in this section is with understanding the ways

in which teachers use machinima's affordances and draw upon various semiotic modes for multimodal composition.

The analysis of teachers' CK, TK and TCK domains below takes a new approach of viewing meaning-making from the perspective of teachers situated as multimodal designers of meaning. By examining their actual production practices together with their own descriptions of the video production process and explanations of modal choices in the post-course interviews, this thesis offers insights into how teachers think about how different modes work together in semiosis. Understanding the modes that a machinima producer can select and those that he or she ultimately selects to represent ideas might offer insights into the knowledge and practices needed to compose and communicate multimodally. Insights derived from such an analysis of modal choice can in turn help identify a language for experimenting with multimodality in the second language classroom.

As previously explained in Chapter 4, analytically meaningful clips were selected for examination from the various machinima production stages, brainstorming, scripting, storyboarding, filming and editing, that roughly illustrate the workflow of the two groups of participants. These clips were selected to illustrate the relationship between the participants' existing knowledge of multimodal communication of meaning (CK_Actual_MCC), the goal-driven perception of affordances (TK_Affordances) and the enactment of affordances (TCK_Affordances) through processes such as synaesthesia and x-ray vision.

 Significant moments in the production process were, therefore, selected to illustrate the possibilities for multimodal expression afforded by digital literacy

practices such as machinima and the ways in which teachers layered these modal resources for meaning creation.

The discussion below illustrates examples of mode relationships constructed by the participants to convey the desired meaning in their videos. These examples have been identified primarily in the data obtained from recordings of the machinima crafting process.

6.2.1 Brainstorming

Location

Group 1
The two participants in Group 1, Ciara and Beth, discuss a potential genre and topic for their machinima video in terms of mode relationships from the outset of the project, i.e. the brainstorming stage.

In Figure 6.3, Ciara points out to her partner, Beth, that the *Second Life* location they are at, Beach Walk at the Machinima Open Studio Project (MOSP), feels appropriate for a horror video. She adds that a different lighting setting would make the place look 'scarier' constructing thus a relationship of concurrence or equivalence between the meaning represented by the location and the meaning represented by lighting. Ciara perceives darkness to reinforce the idea of 'horror' which the Beach Walk set seems suitable for [CK_Actual_MCC_Concurrence]. Next, she suggests introducing another element into the story, 'a house or a structure', that would extend their storyline: the protagonists are lost and looking for directions. This constitutes an example of complementarity realised through extension as Ciara discusses adding information to what the location and darkness

already provide [CK_Actual_MCC_Complementarity]. Interestingly, even if this dialogue between the participants takes place at the outset of the production process there is already evidence of synaesthesia as Ciara deems both the location and darkness to be the best ways to convey the meaning required by the horror genre. Ciara also has the knowledge that allows her to see the *Second Life* environment in terms of what it has to offer for a horror movie. This constitutes what Gee terms x-ray vision, the ability to detect relevant affordances for meaning-making [TK_SL_Designed_Affordances_Location and Lighting].
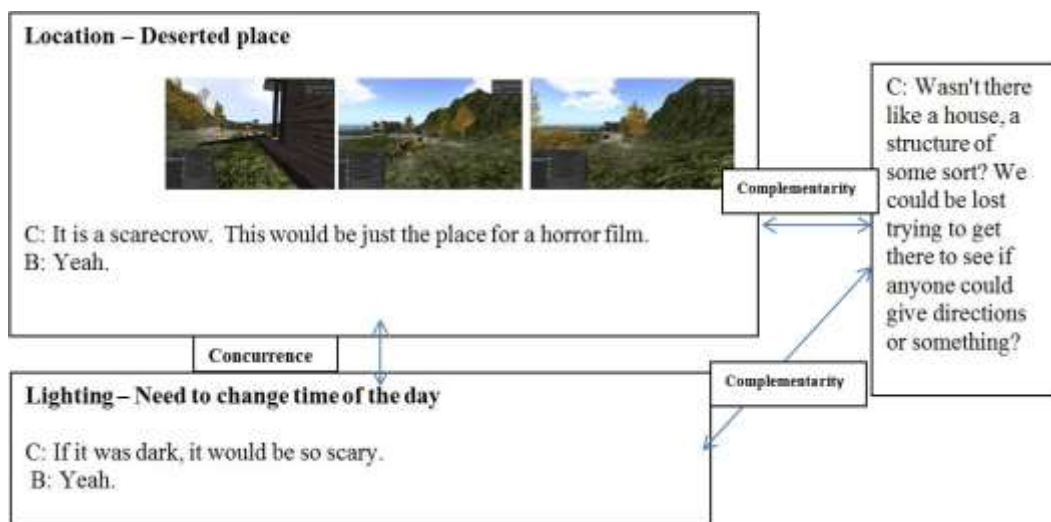
Figure 6.3 Group 1 Brainstorming: Location Influences Story

Ciara further explains in the post-course interview the context within which she and Beth selected horror as a genre for their machinima video and the influence that the MOSP location had on their decision:

Excerpt 6.1 (Ciara, post-course interview)

> C: We were going for a horror story.
> R: OK, and how did you decide on that? Or why did you decide on that?
> C: Well, I think it's because we were looking at these areas, the places and we got to this place, it struck us or it struck me anyways and I said 'This would be great for a horror story' and Beth agreed with me and we decided to go for that. (...)
> R: So I remember that you basically decided on the genre first?

C: Yeah, we did and then fit everything else within that. So, because we had one man and one woman we decided that we should be a couple and she was in a party dress so we were coming home from a party and the place was isolated so we were lost or stuck or something.
R: So you created the story based on the location?
C: Yeah, exactly and it kind of grew organically from there.

In the discussion of modes that would contribute to the creation of a horror story, Ciara shows awareness of the resource embedded in *Second Life* for the change in lighting [TK_Designed_SL_Aff_Lighting]. This is part of her Technological Knowledge and also an example of her x-ray vision illustrating her ability to focus on the details that would help accomplish their goal (Gee 2015), that of creating a horror story. Through a process that is recognised as synaesthesia, she also enacts the affordance of the location in *Second Life* [TCK_Designed_SL_Aff_Location] by identifying the place as being 'isolated' and this quality of being 'isolated' constitutes the 'trigger' for the selection of horror as a genre.

In Excerpt 6.2 below, Ciara seeks confirmation from her partner, Beth, in relation to the genre of their machinima video. The dialogue contains instances of both complementarity and concurrence as participants discuss possible resources that could be included into their story to make it fit the horror genre that they agreed upon. Both Ciara and Beth show awareness of the resources available to them for the creation of a horror story. Ciara's reference to 'a vampire' indicates her perception of the possibilities for avatar customisation in *Second Life* (coded as TK_SL_Designed_Aff_Avatar_Customisation). Whilst Beth considers some elements in the form of actions somewhat typical of the horror genre such as shooting or running and is concerned wih the dialogue for the video, Ciara discusses the linguistic mode in a relationship of complementarity or possibly

concurrence with the visual, where the latter is clearly privileged as evident from

her words below (in bold):

Excerpt 6.2 (Group 1, Brainstorming)

C: A lot of choice, so what do you think?
B: Yeah, well, we have a lot of choices so ...
C: I think we should pick a genre first and then we can pick a place that goes with it.
B: It should be short. I believe it's horror.
C: Yeah.
B: A horror one would be (...) but it might be difficult if you have to like shoot or do the running thing.
C: Yeah, did someone have a vampire last week?
B: Yeah, right, so one should be a vampire and the other one should be (unintelligible) that would be interesting. But what about the conversations we would have? Would it be like horror film?
C: With horror is that there is not so much conversation as screaming.
B: Yeah.
C: Is it gonna be more visual or more dialogue? **We could do a horror and maybe visual and not so much dialogue at all.**
R: Remember the sound effects as well.
C: Yeah [imitating one]. We wouldn't actually have to finish it then, we could leave it on a 'What really happened note', you know? The viewer would have to fill in the gap. You know the Michael Jackson's *Thriller*, the video. At the very end, he comes in and you see the eyes change but you don't know what happens (...)
B: Yes, so (...) a horror one?
C: Yeah, let's do that.

Group 2

The initial idea of the participants in Group 2, at the outset of the project, was to

create a story about two friends meeting in a bar since the location in *Second Life*

that seemed suitable for the machinima video was a bar scene (Figure 6.4).

S: Cool. OK, so what if we're gonna do a script, two friends meeting in a bar?
D: That's cool, yeah.
S: That makes sense, doesn't it?
D: Yeah.
S: So one walks in, the other one is there.
D: OK.
S: What, what (.) do they say? So they could be the barman and a customer or two friends? (...) Or it could be like, we could change one of the avatars to be like a woman and then a man, like so then they could have like that sort of dynamic? [TK_SL_Designed_Aff_Avatar_Customisation]
D: Right, OK.
S: It doesn't have to stay two men, it could be a man, a woman. (...)
D: It could change, yeah.
S: It could be a break-up at the bar, you know, a tragedy? Yeah, yeah.

S: Maybe two friends meeting, maybe two old friends meeting. (...)
D: After years like, yeah.
S: Yeah, school friends meeting, 'Hi, How are you?', 'Oh, fine'. One's been really successful, one's been a failure.
D: Funny enough now, I wrote a play about that when I was like 19 or something. Two friends meeting, one is very successful, the other one is just getting by and (.) And the guy that was trying to get by was trying to hide the fact that he was trying to get by. At the same time he was very resentful of the (.) other guy, acting up, you know?
S: Or what we could do, we could do it like it's their old college bar and it starts with 'Oh, we haven't been here since we were 19' and 10 years is a big difference.
D: Mhm.
S: 'What did you do last year?', 'Oh, yes. I was in Paris', 'Oh, yes, I was in the Paris bakery' [laughing], you know? We could do something simple like that and **we could just do the dialogue**, do the friends' meet. **And the good thing about that would be that with a dialogue like that we could easily film.** (...) One would be sitting at the bar, one walks in, then they talk, 30 seconds, **it could be just that one joke**, you know?
D: OK.
S: 'I went to Paris.', 'Oh yeah, I went to the Paris bakery, too.' That's (.) one is successful, one isn't.
D: Yeah.
S: Would that come across then?
D: I think so and it's something (...) a minute and a half would do it. (...)
S: Does that make sense? Would you like that?
D: Yeah. Good, that's fine. Cause there's a bit of **TENSION** there as well, you know? It can be (.) a bit (.) I don't know if you could put this across in our movie-making but a bit of discomfort. [CK_Actual_MCC_Complementarity]

Figure 6.4 Group 2 Brainstorming: Location Influences Story

They are thus enacting the affordance for location [TCK_SL_Designed_Aff_Location] that *Second Life* provides from the very early stages of the production process when they decide to make the bar scene the setting for their video. Their discussion above of the possibilities for having a male and a female protagonist [TK_SL_Designed_Aff_Avatar_Customisation] indicates they are using their x-ray vision to detect relevant resources that could help accomplish their video production goal.

Of particular interest with this group is a shift between an apparent tendency to privilege the linguistic mode to a multimodal production mindset that is particularly evident in Sean's case. He initially suggests a scenario (in bold in Figure 6.4 above, on the right side) whose focus is on the linguistic mode, i.e. a

joke that would convey the difference in the current social status of two old friends. Dean's identification of a 'tension' or 'discomfort' between the two characters constitutes a turning point in the participants' creation of a narrative as they begin to identify affordances that would allow them to convey that 'tension'.

Character Creation

Group 1

Figure 6.5 (on page 209) presents Ciara and Beth's enactment of the affordances of *Second Life* for avatar customisation [TCK_SL_Designed_Aff_Avatar_ Customisation] that was done through a process that can be termed 'spontaneous improvising'. The enactment was atypical since the two participants decided not to change anything about the avatars they had selected during the first session of the Multimodality and Machinima course. Beth's avatar represented a female while Ciara had selected a male avatar. Their decision can be interpreted as an attempt to overcome the extreme time constraints under which they were working. It was also triggered by Ciara's knowledge of mode relationships in horror stories. She pointed to a typical relationship of divergence between the usually inadequate appearance of protagonists and other modes in many horror stories. She noted that characters 'are never suitably dressed'. Therefore, the enactment of affordances here is guided by the participants' existing knowledge of multimodal communicative competence, in this case, CK_Actual_MCC_Divergence. However, complementarity is also evident in the conversation below as Beth and Ciara continue to brainstorm a potential scenario, adding elements to the story based on the resources they have at their disposal. In doing so, they both use x-ray vision as they see through details that are irrelevant to the horror genre they had

agreed upon, i.e. the sheep, the sunflowers or the fruit stalls at the Beach Walk location (Figure 6.6 on page 209). They simplify the richness of the surrounding environment and only focus on the parts that serve their purpose. Thus, they hypothesise the story could be about a couple since their avatars were a male and a female, they could be coming from a party since the female avatar was wearing high heels, they could be lost since they were in an isolated place and could be having an argument.

Also, what would be represented in the visual mode would be complementary to what is represented in the linguistic mode, i.e. asking for help would be extending the meaning of the visuals but together these modes would be joint contributors to an overall meaning that is more than the meanings conveyed by each mode separately.

Both participants show awareness of other resources available to them in addition to avatar customisation [TK_SL_Designed_Aff_Avatar_Customisation], namely the possibility to use sound effects from the free library on YouTube.com [TK_YT_Designed_Aff_Sound_Effects]. At the brainstorming stage, they discuss the audio mode in a relationship of complementarity with the rest of the story. The sound effects would have the function of introducing a new element, something 'weird' the protagonists could hear. Deeming sounds effects as 'feeling right' for referencing that the protagonists 'hear weird things' constitutes an example of synaesthesia.

B: I should change the appearance [of the avatar]?
C: Well, maybe we got lost, we weren't supposed to be there at all. You have really high heels on, that's not so good for running.
B: Should I take off her shoes?
C: Actually it's good for a horror film because they are never suitably dressed.
B: Yeah.
C: You could take them off halfway through and go in your bare feet.
B: So we get lost and we're trying to get into the house and ask for help.
C: Yeah, we hear weird things or something. We can use loads of sound effects for that.
C: I suppose we're obviously going to look like we're a couple so we should (...) guys never ask for directions so it's probably my fault [laughs]
B: [laughs]
C: You'd be giving out.
B: We can argue.
C: We got lost then and (...)
B: Yeah.
C: So we were on the way home maybe from a party cause you are in a party dress, or we got lost and ran out of petrol or something. Because of the high heels.

Figure 6.5 Group 1 Brainstorming: Avatar Customisation

Figure 6.6 Group 1 Employing X-Ray Vision: Seeing through Irrelevant Elements

Group 2

The materialisation of the 'tension' or 'discomfort' between the protagonists of

the story   becomes the focus of the participants in Group 2 and guides the

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construction of relationships of concurrence, complementarity and divergence between and among the modes at their disposal.

The excerpts below show how the participants' intention to convey 'tension' gradually develops at different stages of the production process and influences significantly the perception and enactment of the affordances embedded in the tools used.

A few examples of mode relationships and the affordances Sean and Dean perceive as relevant for the materialisation of 'tension' are shown in Excerpt 6.3 below. The two discuss how character creation could emphasise the discomfort between the protagonists:

Excerpt 6.3 (Group 2, Brainstorming)

> D: There is a bit of tension... I don't know if you could put this across in our movie-making but a bit of discomfort, a bit of ...
> S: I think **we could just contrast the clothes [TK_SL_Designed_ Aff_Avatar_Customisation]**
> D: Yeah.
> S: I think **we'll get one very casual and one in a suit** .(...)
> **[TK_SL_Designed_Aff_Avatar_Customisation]**
> S: To show the difference
> D: Yeah and **one could be more assertive** and the other one could be more (...)
> S: Yeah, yeah. Well, I think it would (...) **the one that's not successful would sit at the bar [TK_SL_Designed_Aff_Gesture] [CK_MCC_Actual_Concurrence]**
> D: Yeah.
> S: And the one that comes in late.
> D: Is, is (.)
> S: Coming from work.
> D: Yes, exactly, **strides in** and **[TK_SL_Designed_Aff_Gesture_Walking]**. Yes, yes and they were best pals ten years ago and their lives have become separate.(...)
> And their personalities have changed and should we? I don't know if we can get all that in, in one minute.

The two participants are seen as adept at identifying what modes transmit or evoke the tension and discomfort between the protagonists. More specifically, they draw on synaesthesia to determine what modes make the abstract ideas of

discomfort and tension explicit and this happens in tandem with their use of x-ray vision which focuses their attention on the perception and affordances relevant to their goal, i.e avatar customisation, location of unsuccessful protagonist in a bar, confident walking and so on.

Sean and Dean's existing knowledge of multimodality appears evident in the relationships of concurrence and complementarity they gradually develop. Thus, the successful character is depicted as wearing a suit, being assertive and striding into the bar, the visual modes being discussed in concurrence with the gestural. The unsuccessful character, on the other hand, is sitting at the bar, wearing casual clothes, the visual mode being once again coupled with the gestural in a relationship of concurrence whilst the difference in status between the two characters realises a relationship of complementarity.

Figure 6.7 illustrates the actual realisation of mode relationships through the enactment of affordances for avatar customisation and gestures that *Second Life* provides. Synaesthesia guides the process of selecting a name and an avatar that feel 'adequate' for the successful character. Sean and Dean contemplate the different possibilities for avatar customisation and decide on the 'business worker' option which fits their overall narrative and reinforces the idea of the character being successful, realising a relationship of concurrence [CK_MCC_Actual_Concurrence] with the name that the two participants have chosen for the successful protagonist.

The gesture of 'answering the phone' has a double function in the story—it is 'effective' in emphasising the change of status of the successful character whilst also adding another layer to him. Dean argues that such a gesture conveys

rudeness and disrespect toward the interlocutor—thus realising a relationship of

complementarity between the gestural mode and the other two modes discussed

above.
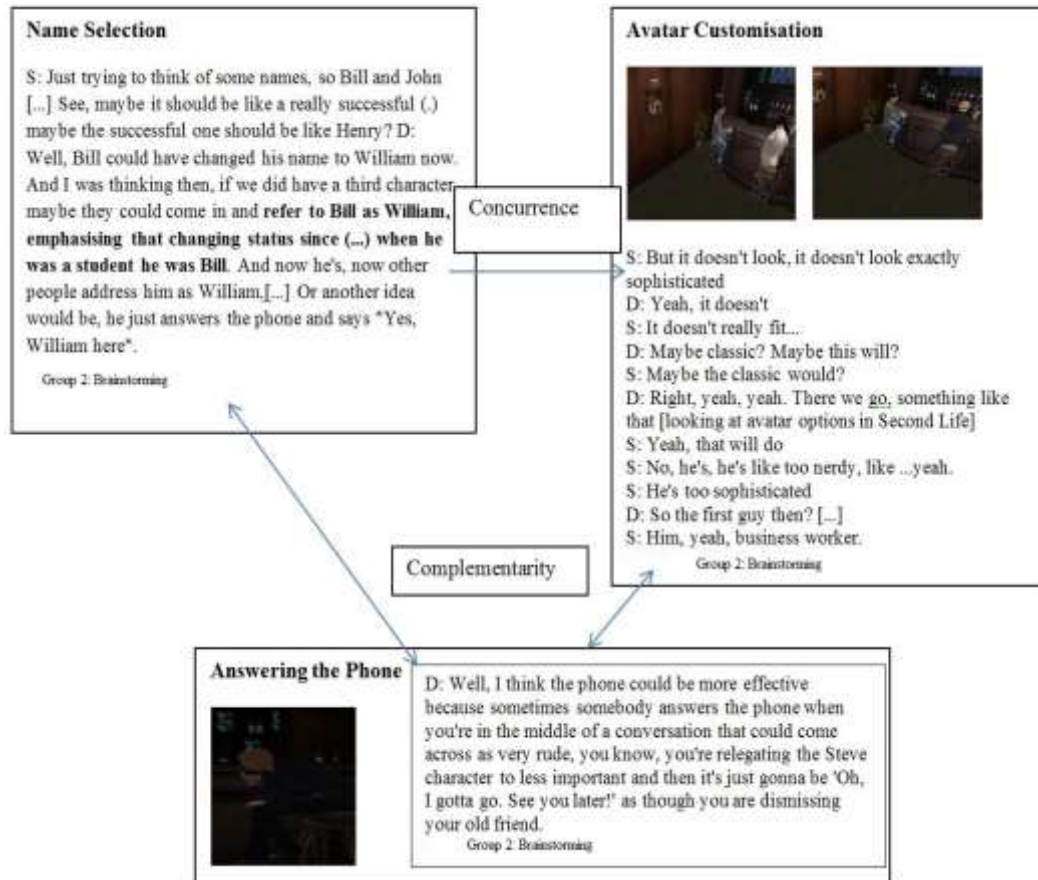
Figure 6.7 Group 2 Brainstorming: Character Construction

Throughout the machinima production process, Sean and Dean realise the

transformative effect of the affordances of machinima for multimodal meaning-

making as they progress along a continuum. As the two participants engage in

collaboratively brainstorming ideas for their videos, they begin to use their x-ray

vision to identify a variable range of affordances for multimodal meaning-making.

Genre Selection

Group 1

Ciara and Beth proceed to changing the lighting in *Second Life* after having agreed to produce a horror machinima video. The enactment of the affordance for lighting [TCK_SL_Designed_Aff_Lighting] draws on synaesthesia as both participants agree that the midnight setting would be the appropriate setting for their video. The enactment of the affordance for lighting realises a relationship of concurrence between the location and the lighting of the environment (Figure 6.8) and has the function to create 'a scary atmosphere' and provide a feeling of unease. Ciara's remark after the setting has been changed 'It looks much scarier with the midnight setting, it's perfect!' points to the fact that images can create an immediate reaction in a way that, in Jones and Hafner's view, writing cannot (2012, p. 61).

B: Yes, so (...) a horror one?
C: Yeah, let's do that.
B: Yeah.
C: I think we should make it nighttime though, what do you think?
B: Oh, OK, yeah, I'm just changing to the (...)
C: Sunset or midnight?
B: Should it be midnight?
C: The thing about horror books and films is that they really use the environment to make the meaning, always stormy. We can use that thunder thing that we downloaded.
B: Yeah, and again like you said, the soundtrack.
C: Yeah.
B: Can we control like raining or snowing at the scenes? (...)
C: We could do that with sound effects, we wouldn't have to see it maybe. If we can't get to see it we could do it with sound effects.
B: Are we going to need like a ghost or we could run together and create like a scene to make them guess?
C: We don't actually need to see the ghost either. We could just refer to it all time.
B: Yeah.
C: Like Grendel, we never see Grendel and everyone is scared of him.

Enactment of TK_SL_Designed_Aff_Lighting to realise the relationship of concurrence between lighting and location

C: Yeah! It looks much scarier with the midnight setting. It's perfect!

Figure 6.8 Group 1 Brainstorming: Enactment of Affordances for Lighting

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Ciara and Beth also discuss potentially combining visuals with sounds to guide the viewer into an interpretation of horror and suspense (Figure 6.8 above). They show awareness of the resources available for sound effects and music on the YouTube audio library [TK_YT_Aff_Sound_Effects_Music]. Participants' understanding of the modes and mode relationships usually employed in horror movies foregrounds the visual and audio modes in relationships of concurrence and complementarity. While discussing the lighting for their video, Ciara points out that 'they always' use the environment to make meaning. This might be a possible explanation for this group's foregrounding of the visual and audio modes.

Both participants were asked to explain their modal choice for the midnight setting in the post-course interviews. In excerpt 6.4, Beth emphasises the importance of realising the concurrence between the *Second Life* location and lighting:

Excerpt 6.4 (Beth, post-course interview)

> B**:** The first thing is about the time of the location. At first on screen we had like morning or midday so after we decided on the genre, that it would be a horror one, we changed the setting to be around midnight, so everything in the scene would be dark.

Ciara elaborates in Excerpt 6.5 on their choice while also describing the significant role synaesthesia has played in their decision (without specifically using the term). The 'midnight' setting was deemed to be the best way to set the scenes by a universal meaning that would meet the expectations of the audience as shown below in her first and second turns (in bold).

Excerpt 6.5 (Ciara, post-course interview)

C: Yeah, **we went for midnight because horror films happen at midnight**. (...)
We were really working with the props and the genre as well as making stuff up
ourselves
R: So that was quite intentional?
C: Yeah, because you only have this much time so you have to set scenes by some
kind of universal meaning. Like you say 'balcony' and everybody thinks Romeo and
Juliet, romantic. **You say 'midnight, creaky door' instantly horror movie so you
set that, you give the audience their expectation.**

6.2.2 Scripting

Group 1

The entire text of the machinima script produced by Beth and Ciara is reproduced

in Figure 6.9. The original script handwritten by Beth is on the left side of the

figure while the transcription is provided on the right side of the figure.
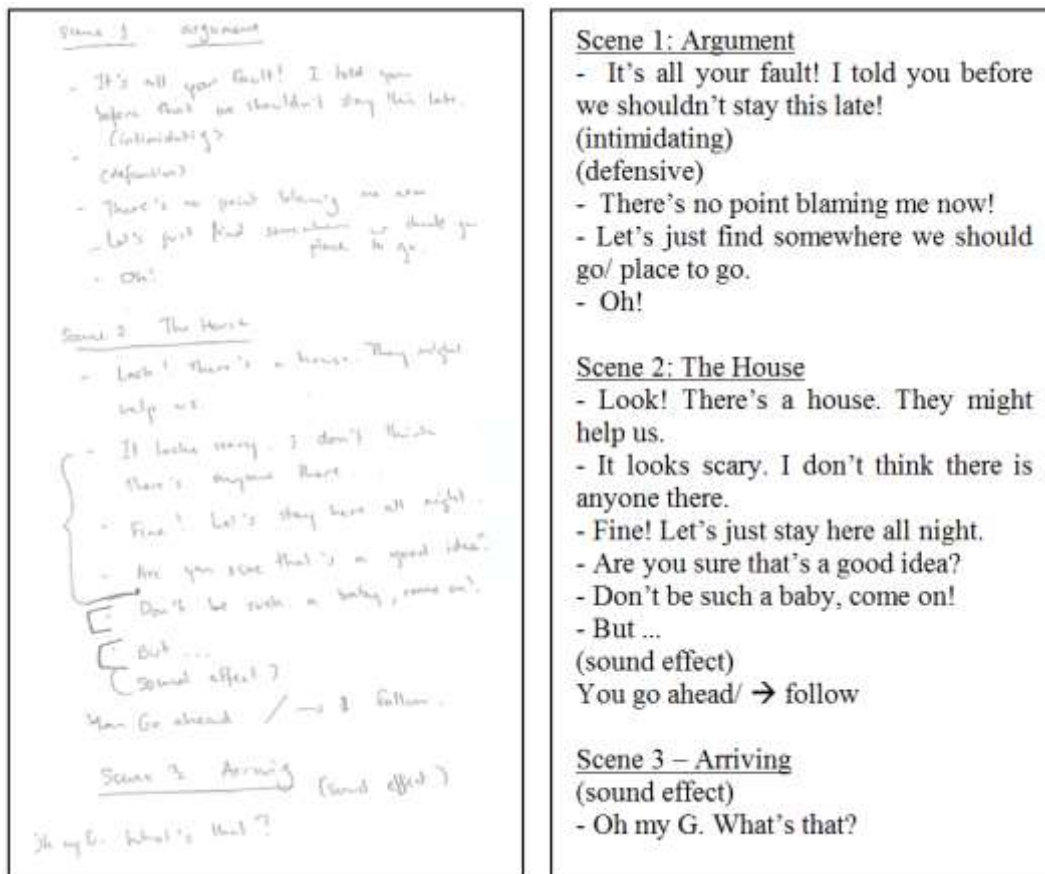
Figure 6.9 Group 1: Script (original text and transcript)

Looking solely at the script created by Ciara and Beth, one might notice a relatively decreased complexity of the text but this is, however, compensated by the complex multimodality employed by Beth and Ciara later in the project. Whilst the text could stand alone, it might seem somewhat incomplete by itself—this was, however, a deliberate decision of the participants. Much of the contextual information is missing because it is meant to be inferred. Beth and Ciara feel that the linguistic mode need not be the privileged mode in communicating the meaning of their video, hence other modes are added in relationships of concurrence and complementarity throughout the video.

Beth, who is writing the script on paper in collaboration with Ciara, makes notes about sound effects [TK_YT_Aff_Sound_Effects], movement and gestures of the protagonists [TK_SL_Designed_Aff_Gestures] indicating awareness of the resources at their disposal.

While working on the script and discussing the third scene, Ciara's first and second turns in Excerpt 6.6 below point to the need to complement the linguistic mode with the audio mode [CK_Actual_MCC_Complementarity] by using sound effects such 'knocking on the door' and 'creaky door' [TK_YT_Aff_Sound_ Effects] and with gestures [TK_SL_Designed_Aff _Gestures].

Excerpt 6.6 (Group 1, Scripting)

> C: So [scene] three we have to either see something or reference something, maybe we knock or we open the door. We can do knocking effects, can't we? Remember last week there was a door slam effect?
> B: Yeah.
> C: If we could get a creaky door or like we knock and there is nobody there but you can still open the door. And then you could say something like 'What's that?' and then just finish like.

The intended meaning of sound effects is to create suspense while the linguistic mode introduces a new element to the story. This new element, however, is not to

be seen by the viewer. Throughout the production process, Beth and Ciara employ

x-ray vision to identify resources that help create the impression of a threat

without actually specifically showing what the threat is.

In Excerpt 6.7, Ciara explains their way of introducing the 'threat element' into

the story in the post-course interview:

Excerpt 6.7 (Ciara, post-course interview)

> C: So basically we were coming home from a party and either the car ran out of
> petrol or we got lost and she [the female protagonist] blamed me because I was the
> guy, obviously, guys never ask for directions, it's always their fault when you're lost.
> (...) So from that we grew into a kind of an argument, we were arguing in the first
> scene and then we saw the house and we thought we should go over there and see if
> anyone can give directions or whatever. And then we decided that we were going to
> make it so that there was some kind of monster or something but the viewer would
> never see that. (...)But that in the end she just goes 'What's that?' but we never see
> what that is so we were making suspense by not showing things. (...)We didn't
> actually come right out and say 'We're lost!' but she goes 'This is all your fault!' so
> you can infer what happened, everything is, the whole thing is about inferring rather
> than showing.(...) Just by not showing what the threat was, you could see that there
> was one and you could see hints of it but you couldn't tell what it was.

The decision to make suspense 'by not showing things' shows that participants are

well aware that communication of meaning can occur indirectly (Jones & Hafner

2012, p. 77) and meaning is often conveyed in 'what is not said as well as in what

is said' (ibid). To illustrate this point, Jones and Hafner note that sometimes 'a

text message containing a single smiley can express just as much as an elaborate

verbal utterance' (ibid).

In Excerpt 6.8, Beth also details the script and points to the fact that the 'scary

thing' in the story is only seen by the protagonists and not by the viewer:

Excerpt 6.8 (Beth, post-course interview)

B: What we created, at first, we are lost in nowhere so I'm, the car is running out of petrol and everything so we have to seek help so that's why we are wandering in the middle of the night in a desert, deserted land. That's what we are trying to find. At the end we saw a house, yes, so Ciara's character decided to seek help from the house and then we both walk from where we are and then go to that house and didn't expect that we opened the house and saw something scary. (...)

Group 2

The first draft of the script handwritten by Dean was met with enthusiasm by

Sean. It reads as follows:

(S -Steve, B-Bill – the protagonisits)
Steve
Bill walks in.

S: Hey Bill, how's it going?
B: Hey Steve, what's happening?
S: Great bumping into you yesterday, it must be 12 years since we were here last, hasn't changed much. Yeah, it used to be the gang of us here, Joe, Jerry, Paul...
B: Yeah, so what have you been up to now? Has life been good since then?
S: Oh, yeah, this and that. Back from England where I was working on the buildings for a while.
B: Construction so, what about that marketing degree you did?
S: Oh yeah, I did a bit of that but it wasn't really my thing after a while.
B: And Jean, remember you were with Jean for years?
S: Yeah but that didn't really work out after a while. (laughs)Good while it lasted. And yourself? Kids now you were saying yesterday?
B: Three kids now, 8, 6 and 3 but they keep you busy, gotta work 60 hours a week now to keep them all happy.
S: Good so, good so!
[phone rings]
B: (onto the phone) William here. Yeah, OK. Grand so, yeah, be there in 20 minutes. Listen, Bill, I gotta split, nice talking to you, we'll do it again sometime, give us a call sometime.
S: Oh right so Bill, that's a pity, I was looking forward to catching up with you. Next time so.
B: Alright Steve, cheers.
[Bill leaves, Steve turns back to his beer]

Figure 6. 10 Group 2: Script (original text and transcript)

Unlike the script produced by Ciara and Beth, Sean and Dean's scenario could easily stand alone providing most of the contextual information necessary to understand why the two protagonists were meeting and that one was successful whereas the other one was struggling to get by. However, the more abstract concepts, i.e. tension and discomfort, discussed at the brainstorming stage could not be easily conveyed through the linguistic mode alone and the participants in Group 2 were aware of this. Hence, they looked for affordances of the tools at their disposal that would allow them to convey the 'tension' between the story's characters.

6.2.3 Storyboarding

Like many video making projects, the project reported here also included a storyboarding stage since the machinima production process required not only to script the narrative but to also map it into a sequence of images. Storyboarding constitutes a multimodal literacy practice in itself as it involves employing both written language and still visual design as notations for the machinima video, thus, taking the logic of both visual and written modes into account. Additionally, storyboarding requires consideration as well as understanding of how camera angles and distance interact with the linguistic and audio modes in order to effectively create the desired meaning.

Group 1

The convention of the closeup, 'with its selective indications of salient detail' (Burn and Parker 2003, p. 60) is used by Ciara and Beth several times for the depiction of frames in the first two scenes (Figure 6.11 below). The storyboarding stage implies multimodal design through expression of images and writing.

Relationships of concurrence and complementarity are articulated by the participants throughout the storyboarding process. Beth and Ciara tell their story through many visuals.
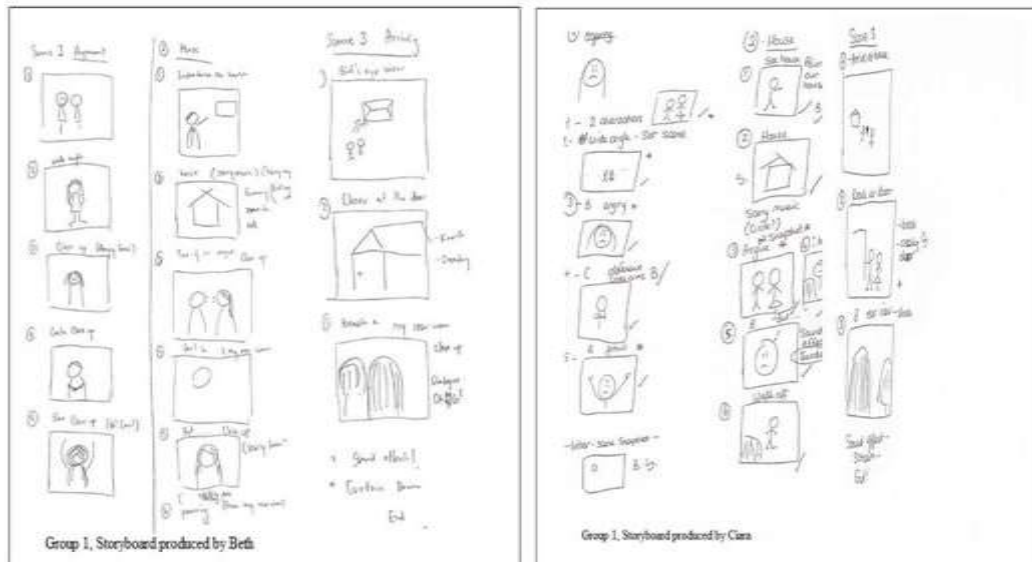
Figure 6.11 Group 1: Storyboards

The participants' conversation at the storyboarding stage contains many examples of perception of affordances at their disposal (as shown in excerpt 6.9 below in bold). Thus, both Ciara and Beth demonstrate awareness and appreciation of a range of multimodal semiotic resources available to them for meaning creation. They discuss the use of music [TK_YT_Aff_Music] to mark an increase in intensity, to frighten, and to perhaps prepare the viewer for the 'scariest' part of the video, achieving in this way complementarity [CK_Actual_MCC_ Complementarity] with the other modes. They give examples of what camera angles to use to either reinforce the meaning made in the gestural mode [CK_MCC_Actual_Concurrence] or to extend the meaning of the spatial mode [CM_ActuaL_MCC_Complementarity]. The storyboard created by Ciara and Beth shows a story that is not very complicated nor very deep but conveys a

sensation of something disquieting through the scenes. The two teachers do not

take a conventional approach to the horror genre. Rather, they prefer to employ

subtlety and project suspense with camera angles and distance, sound effects and

music.

Excerpt 6.9 shows instances of participants' perception of the affordances

available to them and their intended use for the construction of mode

relationships.

Excerpt 6.9 (Group 1, Storyboarding Scene 1)

C: Maybe we could start with a **wider angle just to set the scene** and **then go to close up** [TK_SL_Designed_Aff_Camera_Action].
B: Yeah, so...
C: So first close up, wide [correcting herself], wide angle.
B: Yes.
C: So like **really far away, you can see this deserted place** [TK_SL_Designed_Aff_Camera_Action]
C: Maybe we should come back a bit from the house so that we don't see that in the shot first.
B: **Should we start like with the two of us first and then wide angle** after that? [TK_SL_Designed_Aff_Camera_Action]
C: Yeah, good idea.
B: So the two of us first and that and then.
C: OK, I have that. Two, wide angle.
B: **Do we have any music**? I mean like do we need any music before the scene of the two of us or just starts with the two of us? [TK_YT_Aff_Sound_Effects_Music]
C: Maybe at first we could just start and **bring in the music when things get scary**.
 [TK_YT_Aff_Sound_Effects_Music] [CK_Actual_MCC_Complementarity]
B: Yeah, I agree.
C: Third one then is you, **if we can get you to do angry face**
[TK_SL_Designed_Aff_Gestures].
B: **And close up**. [TK_SL_Designed_Aff_Camera_Action], [CK_Actual_MCC_Concurrence , gesture and camera action]
C: And **then me close up**. If we could **get him to fold his arms** it would be perfect [TK_SL_Designed_Aff_Gestures] [CK_Actual_MCC_Concurrence, gesture and camera action].
C: Yeah, what did we say was next? Oh yeah, you doing that, I wonder can we get like the 'ARGH'
B: Yeah, yeah, OK.

Group 2

At this stage, Sean and Dean show mindfulness in their modal choice and
awareness of the possibilities for meaning-making afforded by camera action in
Second Life [TK_SL_Designed_Aff_Camera_Action].

Sean and Dean's conversation during the storyboarding stage contains various
examples of the two designing relationships of concurrence and complementarity
between camera actions [TK_SL_Designed_Aff_Camera_Action] and gestures
[TK_SL_Designed_Aff_Gestures_Walking] and using x-ray vision in the
perception of affordances relevant to the realisation of the mode relationships (as
shown in Excerpt 6.10 below in bold).

Excerpt 6.10 (Group 2, Storyboarding)

D: The opening shot is just the one guy at the bar and he's like, what is that
expression, (...) like he's well used to sitting (...) on a stool in a bar by himself
having a beer. This is the Steve character. [CK_Actual_MCC_Concurrence]
S: OK, so Steve is here at the bar, so that's what we're seeing, sitting at the bar .(...)
D: Scene 2. (...) Or (...) Bill striding in assertively, fairly casual, what's that word?
Formal casual, is it? [TK_SL_Designed_Aff_Gesture_Walking] And...(...) Steve
isn't quite aware of him until he (...)
S: So he comes in from behind him.
D: But like the Steve character is just there in his own thoughts, you know, until Bill
actually is right in front of him, just patting him on the shoulder.
S: But do you want to take that from the barman's angle? Bill walks over.
[TK_SL_Designed_Aff_Camera_Action]
D: Yeah, so you can see Bill getting bigger and bigger and bigger coming over
behind Steve and saying 'Hey Steve!' [TK_SL_Designed_Aff_Camera_Action](...)
S: And then the next conversation will be sitting at the bar talking. Does that make
sense?
D: Yeah.(...)
S: We could do a close up for the phone call and take the Steve character out. (...)
That could still mean on him taking the phone call so it's just him taking the phone
call.   (...)   [TK_SL_Designed_Aff_Gesture]   in   concurrence   with
[TK_SL_Designed_Aff_Camera_Action]
D: Would the expression of Steve be important to convey his? (...)
S: (...) I think it's better to not show that because in *Second Life* you can't, it's hard to
show that emotion so maybe it's better to show Steve's emotions when he's back
alone at the bar cause at the end of the story he's back alone. It starts with Steve
alone and it ends with him alone (...) the first shot Steve's at the bar and maybe he's
just *waiting* [pose embedded in stool] and at the end you're changing to Steve *bored*

[pose embedded in stool] so that would show the emotion
[TK_SL_Designed_Aff_Location & Gesture] so when he's bored at the end (...) he is
kind of like depressed (...) he's still at the bar and his friend (...) his life has moved
on. That's the whole narrative, isn't it? (...)

Camera action is discussed in complementarity with gestures to introduce a new

element in the story [CK_Actual_MCC_Complementarity], to evoke the

loneliness of the unsuccessful character. This is achieved in the video by the

careful texturing of the resources available. Employing x-ray vision to detect

relevant affordances and utilising synaesthesia to deem which resources 'feel

right' and what mode is the 'best way' to present the character's state of mind,

'being in his thoughts' and the feeling of lonelines, Sean and Dean decide on

using gestures and poses in concurrence. Filmic devices such as panning acoss to

present the protagonist alone at the start of the video and again alone at the end,

work in complementarity with gestures and poses, i.e. sitting bored at the bar and

drinking beer and in concurrence with the location so as to materialise the feeling

of loneliness (Figure 6.12).
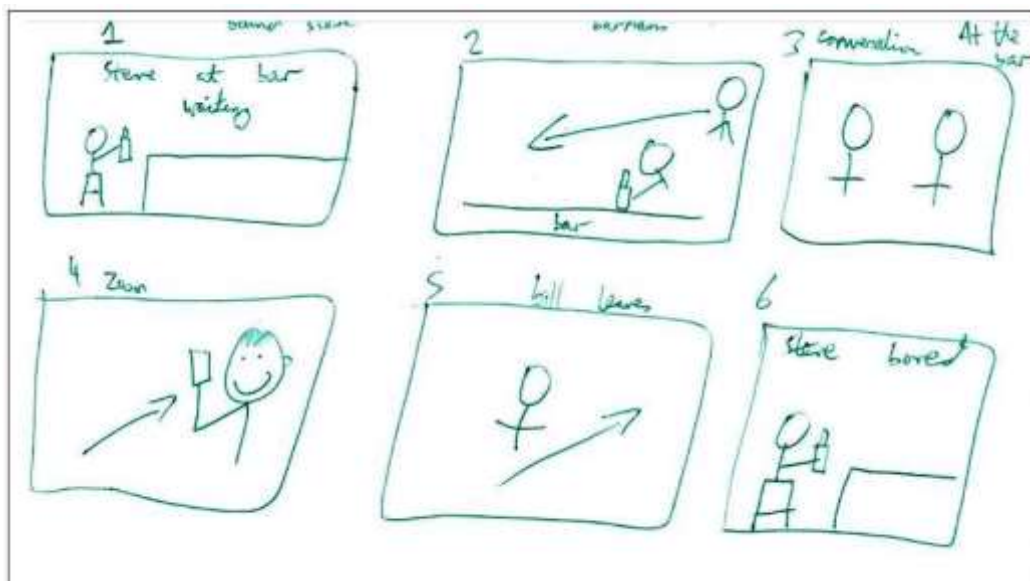
Figure 6.12 Group 2: Storyboard created by Sean

Sean explains in Excerpt 6.11 the intended meaning of the camera action in the

last scene during the post-course interview.

Excerpt 6.11 (Sean, post-course interview)

> S: So there is the idea that he would be at the bar alone waiting for his friends.
> [machinima playing in the background] (...)
> S: So, he's, the sense of loneliness was the idea in this shot.
> R: And how did you create that?
> S: Just by panning across. (...)
> S : You know, and no one else there.

Figure 6. 13 below illustrates the mindful choice of modal resources deployed by

Sean and Dean throughout the production process to construct the unsuccessful

character of the story and transmit abstract ideas such as loneliness and

depression. To further reiterate the desolate state of the protagonist, the avatar is

customised to 'look boring' as though 'he has been on a construction site' while

his location in the bar reminds the viewer of someone 'unassertive', 'well used to

sitting at the bar' all day.
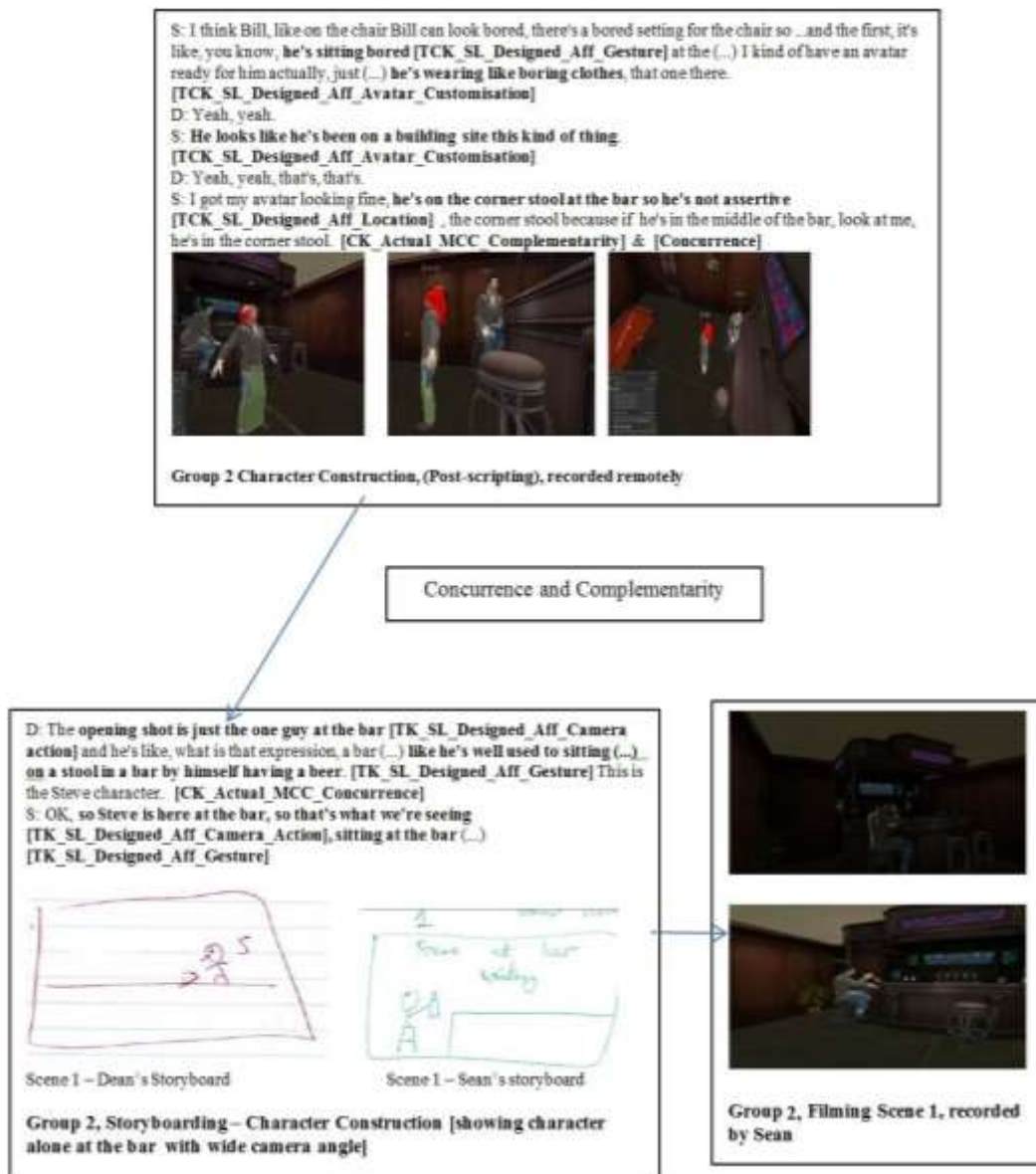
Figure 6.13 Group 2: Character Construction

6.2.4 Filming and experimenting with gestures

Bardzell et al. (2006) identify the inability to deal properly with facial expressions
and human emotion as one of the major limitations common to all machinima
platforms they evaluated. Not surprisingly then, interactions that rely heavily on
gestures and expressions are hard to present effectively in environments such as
Second Life. Kelland et al. concur with Bardzell et al.'s observation and note that

telling a good story with 'the help of emotion-infused characters' is the biggest challenge for drama creators in *Second Life* (2005, p. 50).

Group 1

Figure 6.14 below illustrates an example of the participants in Group 1 achieving a relationship of concurrrence between the linguistic and the gestural modes [CK_Actual_MCC_Concurrence] by enacting affordances for facial expressions [TCK_SL_Designed_Aff_Gestures] identified through synaesthesia. Beth and Ciara are initially trying to identify the right gesture or facial expression that would best convey the meaning expressed in the linguistic mode. In the process of choosing the right gesture, they are seeking out a way to achieve an effect, i.e. anger. They feel the 'scold' gesture with the angry facial expression it allows is an apt representation of the feelings they wish to present in the protagonist that would reinforce the meaning of the 'It's all your fault' line. Camera action is then used to reinforce the meaning conveyed by the 'scold' gesture thus realising a relation of concurrence between the two [CK_Actual_MCC_Concurrence]. Ciara makes use of the camera action afforded by *Second Life* and zooms in to a dramatic close up of the female protagonist who is positioned at a frontal angle [TCK_SL_Designed_Aff_Camera_Action] to encapsulate her frustration and anger. The facial expression afforded by the gesture 'scold' becomes the most salient aspect of the scene as the camera angle zooms in.

C: If we can get you to look really angry we could do your line. (...) See if you can get angry face.
B: Yeah.
C: And we'll just record your line. And then we'll focus in on me.
B: Yeah.
B: 'Scold'?
C: Yeah, perfect.
B: Yeah. (...)

Concurrence

Linguistic   Gestural

B: 'It's all your fault! I told you before that we shouldn't stay this late.'

Group 1, Experimenting with Gestures, filmed remotely

Concurrence

Camera Action (Close up)   Gestural

Group 1, Experimenting with Gestures, filmed by Ciara

Figure 6.14 Group 1: Filming - Enacting Affordances for Gestures and Camera Action

Both participants point out that they deliberately selected close-ups to show the emotions and feelings of the protagonists in the story [CK_MCC _Actual_Concurrence].

In Excerpt 6.12, Ciara discusses the intended meaning of gestures and camera action in the video in relation to the linguistic mode while also explaining that their use of camera action is in a relationship of both concurrence and complementarity with the gestural mode:

Excerpt 6.12 (Ciara, post-course interview)

R: You mentioned that you didn't rely on language a lot so what were some of the other modes that you used to tell the story?
C: **We tried to get into gestures** because we wanted to really work with that because we had it so **we showed our attitudes and feelings through the gestures. [CK_MCC_Actual_Concurrence]**
R: As complementary to language or...
C: Even extra, more than language because sometimes she [the female protagonist] did the big scared face and there weren't many words, just one word that didn't convey much in itself
C: 'But' could mean anything but the way it goes with that scared face and the big gesture meant more **[CK_MCC_Actual_Complementarity]**.

Both Ciara and Beth use the camera as a cinematic tool to construct various mode relations and set up an intriguing mystery. They manipulate the camera controls in *Second Life* during the filming part of the production process to get the best possible angles that would convey their intended meanings. For them, every camera movement had a specific purpose, mostly serving to either convey the feelings of the characters in the story or to heighten the suspense and, implicitly, maintain the viewers' curiosity.

Figure 6.15 below shows another example of the participants' enactment of affordances with the purpose of constructing a clear relationship of concurrence between the linguistic and the gestural modes. Interestingly, as Ciara and Beth try to find an appropriate gesture by exploring the options at their disposal that would make the male protagonist look defensive, they settle on 'shrug'. They deem it to be the 'best way' to convey the 'defensiveness' implied by the words 'There's no point blaming me now.' The selection of the gesture is done through synaesthesia. Interestingly, the repurposing of the gesture 'shrug' can be interpreted in this context as a first attempt to compensate for the lack of appropriate gestures and

facial expressions in *Second Life* that would allow the machinima characters to deliver a credible performance.

C: How do I get you to look defensive? (...) I will just play with a few of these [gestures] until I find the perfect one.
B: Yeah.
C: OK, that doesn't do anything. I guess the SHRUG might work.
C: 'Get lost' [Carla is experimenting with gestures from the gesture menu].
B: 'Get lost'?
C: That doesn't do anything [laughing]. Yeah, I guess we can go with this one.
B: It's, it's very detailed and that's (...) It takes time to get the right shot. (...)
C: I'll do a SHRUG. Let's see! I'm going to try and get front view so I can see what you see. (...)
B: Yeah, would that be OK?
C: OK, perfect, yeah.
B: Can I move the camera to make it closer?
C: See if you can see this? Yeah, that's perfect. I'll do that.

Group 1, Looking for gesture to convey defensiveness, filmed remotely

Enactment of TK_SL_Designed_Aff_Gesture & TK_SL_Designed_Aff_Camera_Action through synaesthesia and coaction to realise concurrence between the linguistic, gestural and camera action modes

B: OK. Are you ready?
C: Yep!
B: Three and action!
C: 'There's no point blaming me now. Let's go somewhere and look for help'.
B: Ok, yeah.
C: Two scenes down.

Group 1, Filming Scene 2, filmed by Beth

Figure 6. 15 Group 1: Filming – Enacting Affordances for Gestures and Camera Action

Of particular interest here is the way Beth constructs a medium shot with a front view of the male protagonist to show the action and movement. The front view can also be used to demand attention from the viewer and set up a sense of direct attention between the character and the viewer (Kress & van Leeuwen 2006). She also constructs a slightly high angle by tilting the camera to look down on the male character, making him look smaller as perhaps seen from the perspective of the unidentified threat [TCK_SL_Designed_SL_Aff_Camera_Action].

Figure 6.16 below illustrates an interesting example of the participants in Group 1 enacting the affordances for gestures in *Second Life* in that it constitutes another instance of spontaneous improvising. Beth and Ciara are preparing to film the last scene of their machinima video when they realise that the *Second Life* inventory does not contain a 'knock on door' gesture which is of particular significance in the story. While a 'knock on door' sound effect by itself is not imbued with any frightening meaning, here, the gesture is meant to add suspense and increase the intensity of the moment in the scene.

Since the choices for materialising new footage are limited to the resources participants have at their disposal, Ciara employs her x-ray vision suggesting to re-purpose a 'point' gesture (that they had used for the second scene) together with a rear view shot to make the 'point' gesture look like a 'knock on the door'. This constitutes another example of how constraints, in this case the constraints of the environment, spur the participants to come up with a creative solution through spontaneous improvising. In another words, the constraints imposed by the virtual world of Second Life actually drive the two participants to be creative and innovative.

Here, the use of the wide rear view camera action is not intended to create a sense

of separation between the characters and the viewer. Rather, it is used to allow for

the transformation of an existing gesture. Careful multimodal texturing is

deployed in the last scene to achieve the relationships of concurrence and

complementarity Beth and Ciara had planned for from the storyboarding stage.

C: So, we don't have any dialogue in this, apart from your last, your very last one so (.) Let's go up if we can, up this and do the knock on the door thing. (...)
B: I've already walked up.
C: All the way through. There we go. Oh, right at the door. [laughing]
That's it then. That's perfect! And I need to pull a little back. Yeah, if you can just come and stand beside me and I think that would be grand from the back, wouldn't it? Do we have any (.) a KNOCK ON DOOR gesture?
Maybe the POINT will make it look like knock? Let's see. Yeah. That works. From behind it doesn't look much like a POINT.
B: Oh, I cannot see it. (...) Let me move closer to you.
C: You need to move slightly to this side cause then I'm knocking on you rather than the door. [laughing]
B: Yeah, right.
C: Yeah, perfect!
B: And I need to turn.
C: Yeah, OK. That works.

Group 1, Experimenting with gestures and filming last scene, recorded remotely

Group 1, Filming Last Scene, recorded by Ciara

Figure 6. 16 Group 1: Filming - Enacting Affordances for Gestures through Spontaneous Improvising

Group 2

Figure 6.17 below illustrates an example of enactment of affordances for gestures [TCK_SL_Designed_Aff_Gestures] and camera action [TCK_SL_Designed_Aff_Camera_Action] to realise a relationship of concurrence [CK_Actual_MCC_Concurrence] between the linguistic, gestural and camera action modes through spontaneous improvising and coaction.

The scene in which the successful protagonist, Bill, is saying-goodbye is being filmed and participants in Group 2 experiment with the in-built poses at their disposal trying to determine which would work best in concurrence with the linguistic mode. Through x-ray vision Sean identifies a 'drinking pose' as being the closest to a 'wave'. Like Ciara in the example above, Sean suggests re-purposing it with the help of the camera action so as to only show the part of the pose that resembles 'a wave'. This constitutes an attempt to overcome the constraints of *Second Life* on gestures through spontaneous improvising. Thus, to realise this scene, Dean is enacting the pose while Sean is recording and adjusting the distance of the shot to a long shot and constructing an oblique angle which captures the successful protagonist realising the wave.

S: I need to film you, I need to come, to pan out, just one second.
D: Alright.
S: I need to pan out (...) so you have to kind of say good-bye. Just the two of them (...) [TCK_SL_Designed_Aff_Camera_Action].
I want him [the protagonist] to finish the call and then stand up so I'll tell you when he needs to stand up. (...)
S: Now can you change your pose? (...) Cause you look BORED [pose built into the stool] [TK_SL_Designed_Aff_Gesture] (...)
R: [directing Dean] So right-click on it.
D: The stool, is it?
R: Yeah.
D: And then?
R: You might have to (...) try TOUCH [to change avatar pose].
R: Yeah, OK
D: And (.)
S: But you're not looking at me? (...)
D: Yeah, so (.)?
S: OK, grand, record. (...) You're leaning. Wait one sec. No, no, you're leaning!
S: That one, yeah! [while Dean keeps changing his avatar's pose experimenting with the poses built-in the stool]
[TCK_SL_Designed_Aff_Gestures]
D: That one?
S: Grand, I'm recording that. That's it, I think I'll record that again. He's like, he's waving.
R: Yeah.
S: OK, it's grand. I've recorded two waves like. (...) OK (...) let's have a look if that will work.

Group 2, Filming: Experimenting with Gestures and Enacting Affordances for Gestures and Camera Action [TCK], recorded
remotely

Group 2, Filming – Enacting Affordances for Gestures and Camera Action, recorded by Sean

Figure 6. 17 Group 2: Filming – Enactment of Affordances for Gestures and Camera

6.2.5 Editing

Adding Music to the Machinima Videos

Jones and Hafner note that sound effects and music play a very important role in

video production. A video without a soundtrack, or with a poorly chosen one, they

add, 'is much less likely to be effective than one which uses sound in an appropriate way to complement the visual and verbal messages' (2012, p. 63).

Group 1

Group 1 wanted to mark an increase in intensity with music and subsequently attempted to find soundtracks that would have the function to intensify suspense and mark the most intense moments in the video.

Excerpt 6.13 shows that Ciara and Beth decided to use music as complementary to other modes in their video from the early stages of the project, i.e. storyboarding. The purpose of the audio mode was decided from the outset to mark the introduction of a narrative complication, 'when things get scary', in Ciara's words:

Excerpt 6.13 (Group 1, Storyboarding Scene 1)

B: Do we have any music? I mean like do we need any music before? The scene of two of us or just starts with the two of us? [TK_YT_Aff_Sound_Effect_Music]
C: Maybe at first we could just start and bring in the music [TK_YT_Aff_Music] when things get scary [CK_Actual_MCC_Complementarity]
B: Yeah, I agree.

Having decided from the scripting phase to mark significant moments in the story with music and sound effects, Ciara and Beth had to determine what songs to use at editing phase, under extreme time constraints.

The participants selected two pieces of music from the YouTube free audio library (Figure 6.18) in order to achieve different effects. The selection was done under extremely tight time constraints and both Ciara and Beth were influenced by the 'mood' description under which music is displayed on YouTube. The 'mood' selected for the first song discussed here was Cinematic/Dark and the song chosen

was *Voyeur* by Jingle Punks. The function of the song was to mark the male

protagonist's walk towards the house and to dramatically increase the intensity of

the scene. The house scene represents a major climatic moment in the video

where the suspense reaches its highest point.
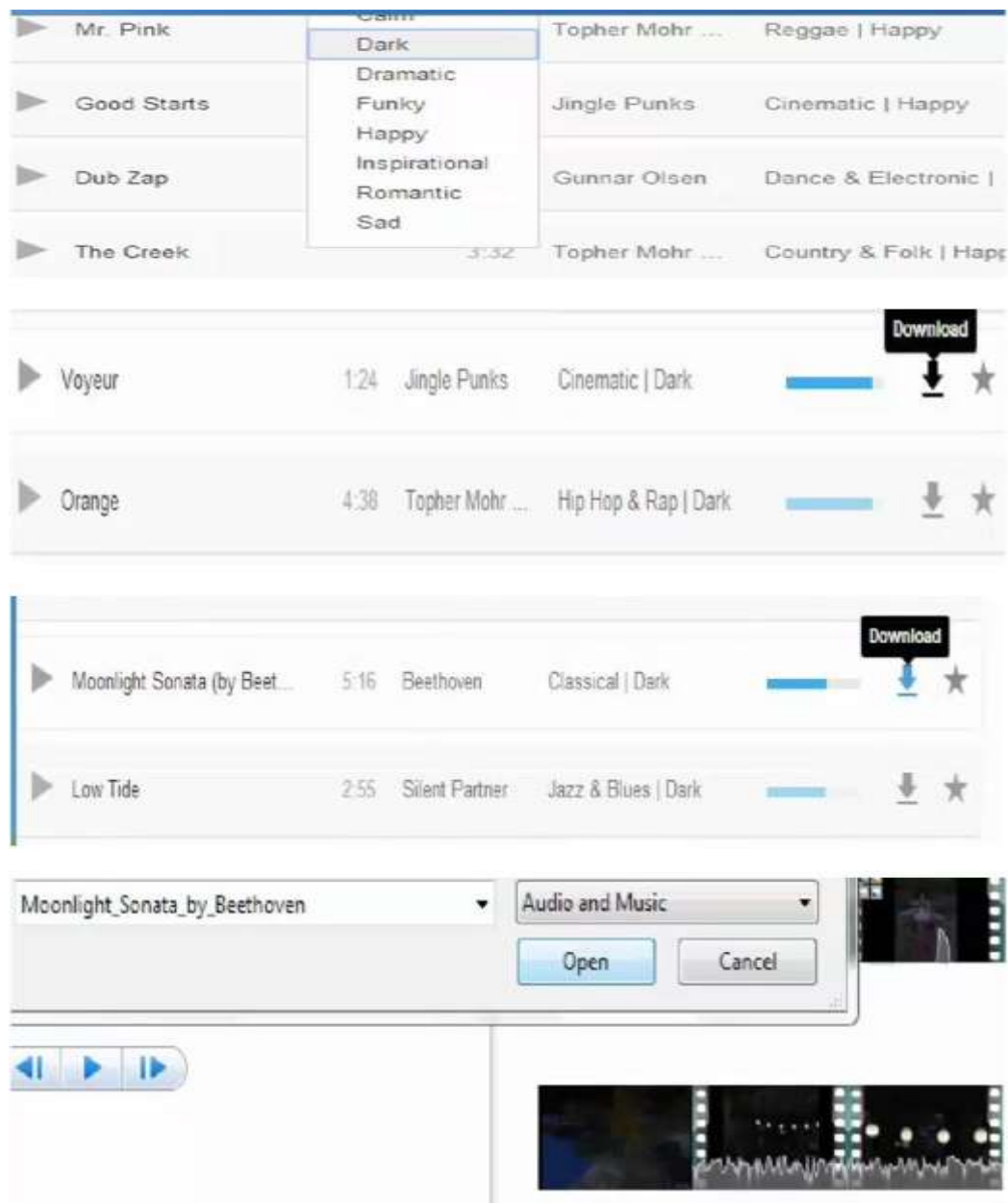
Figure 6. 18 Group 1 Editing – Enacting Affordances for Music

During the post-course interview, both Ciara and Beth explain the intended

meaning of the music selected and whether this was effectively achieved:

Excerpt 6.14 (Beth, post-course interview)

> B: (...) another thing is about the music, yeah, to create a meaning like a horror one,
> yeah, we used background music by using free YouTube, free YouTube music and
> choose dark one to get scary feeling.
> B: During his [the male protagonist's] walk to the house [while the machinima video
> is playing] (...)The part that he walks to the house, we chose this background music
> because now, because when we made the video, we knew that the house would be
> the scariest part. Yeah, to create, again to create more emotion, we chose this song.

In Excerpt 6.14, Beth describes the relationship between the audio mode, represented here by the *Voyeur* song and the other modes. The song she discusses in the excerpt above is in a relationship of complementarity with the other modes, particularly with the gestural mode. The male protagonist starts walking to the house in order to ask for help. The house is identified by Beth as being 'the scariest part' and music is used to build up suspense as well.

Ciara also explains in Excerpt 6.15 their initial intended meaning of music in their video and elaborates on why the selected song doesn't entirely convey their desired meaning. She also offers a re-interpretation of the last scene:

Excerpt 6.15 (Ciara, post-course interview)

> C: And the music that we tried to pick was supposed to give a creepy kind of
> meaning. (...) We chose it from the name not from actually listening to it because we
> didn't have time to listen to them all.
> R: Alright.
> C: So when I look back now, the one [the scene] where he's walking off into the
> distance, everything makes him look like some kind of Indiana Jones type. (...) What
> we were going for was that he was going off in a huff and hoping that she [the
> female character] was just left to follow (...) and something was watching basically,
> that's what we were going for but it's more of an Indiana Jones kind of song,
> [laughs].
> R: So the music, because of these time constraints, the music didn't really convey
> what (...)
> C: Not exactly, but I think it could work, it could make him seem like 'I'm gonna
> check it out, I'm the big strong man', [laughs] rather than 'I'm pissed off with you,
> stay there or come with me, I don't care'.

Group 2

Unlike Ciara and Beth, Dean and Sean selected the music for their video early on
in the production process, prompted by the researcher.

Figure 6.19 contains an excerpt from the conversation between the two
participants on whether music is needed for their project. Dean and Sean initially
discuss music in concurrence with the spatial mode, the student bar that
constitutes the setting for the story [CK_Actual_MCC_Concurrence]. They
contemplate various options trying to determine what song realises more
appropriately a relationship of concurrence with the setting, drawing on
synaesthesia in the enactment of the affordances for music provided by YouTube
[TCK_YT_Aff_Music]. The conversation also shows that teachers are mindful of
their modal choice and are also mindfully designing relationships between the
various modes at their disposal.

R: Do you need any music?
S: That's a good question, music.
D: Yeah, it's a student bar so there will be music there. [CK_Actual_MCC_Concurrence]
even if doesn't quite fit the ...
S: I think kind of like generic rock . (...) Generic rock so like not copyright rock . I wouldn't say funky, I wouldn't say angry [referring to MOOD options on Youtube] (...) kind of (.) Oh, yeah, like AD/CD kind of thing . (...) What about? Can we just try again Rock? What about happy [mood]? (...) Even though, you know, it's not a happy story .
D: Mhm
S:Can we just try? [name of song - unintelligible]
S: [after listening to another song] Yeah, no, it's too kind of like, it's no (...) You kind of just want the background music, don't you? (...). Can you scroll down for a second?
R: Rock happy?
S: Yeah, let's just see what (.) No, nah, the piano music (...) it's kind of making it kind of like a Broadway drama.
D: Yeah.
S: Maybe that first one probably? It's fine. What do you think?
D: Oh yeah, yeah . (...)
S: Rock/ Angry I think it's fine actually. Yeah, yeah .
S: What was that one even called?
D: Open Highway
S: Open Highway, let's have a listen to that one again, yeah . What do you think? Is that too dramatic?
D: Does get going after a while?
S: Yeah.
D: Alright. Yeah, (...) it would be the kind of thing at that setting I think, you know? In a pool bar, you know? [CK_Actual_MCC_Concurrence]
S: Yeah.
D: With guys (.)
S: It just seems, it just (...) we can change the volume to the background music   [TK_WMM_Aff_Editing]
D: And we can do the dialogue.(...)
S: For the ambience, that's great . [TCK_YT_Aff_Enactment] [CK_Actual_MCC_Concurrence]

Group 2, Brainstorming – Selecting Music

Figure 6.19 Group 2 – Brainstorming – Enactment of Affordances for Music

Both participants also discuss the lively rock song selected, *Open Highway*, as being at variance with the conversation between the two protagonists since the audio and the linguistic mode seem to follow a very different course without intersecting. In Excerpt 6.16 Dean explains the divergence, the incompatibility between these modes as creating a conflict in the story:

Excerpt 6.16 (Dean, post-course interview)

D: and music is, I know when we were choosing our music we wanted something because it did, (...) whatever we were actually saying, two old friends, you know, that met in an old pub that they used to meet twenty years ago so when we were choosing our music, we wanted something that would, the viewer, it gets two friends

meeting in a student bar so it's a little bit (...) but that's the story, story is twenty years after they graduated and they're going back to the student bar so **the scene doesn't match the characters and so the music was important to try and depict that, to try and help with that message**, that, yes, it's a student bar with heavy rock music that was going on, you know? And it wasn't quite, (...) at least the second guy, it wasn't really his place that he's comfortable with.

Along the same lines, Sean briefly comments on the divergence between the music and the narrative:

Excerpt 6.17 (Sean, post-course interview)

S:The music, yeah, the music was the kind of college feel, rock music.
R: I remember you chose Happy Rock [mood on YouTube audio library]
S: Rock, yes. But it didn't fit the story.
R: OK.
S: But it fit the bar. Yeah, **it fit the bar but not the story**.

Divergence does not figure much in the production of the videos by the two groups but it clearly has the important role of conveying the 'tension' and 'discomfort' of the story here.

Figure 6.20 below summarises the relationships realised by Sean and Dean through the enactment of various affordances embedded in *Second Life* and the music selected from YouTube before having actually written the script and produced the storyboard.

D: Maybe I'm becoming too ambitious here with the whole thing but I like the contrast you know of the story ...but it's the two guys, you know, the idea is that they are going back to their youth but when they meet **there is a big contrast between the conversation they have and the setting.** [CK_Actual_MCC_Divergence].But **the setting is where the youth was, it's a student bar, the music, the pool house** [CK_Actual_MCC_Concurrence] but then the conversation is, you know, not gonna work, you know? It's not a youthful conversation, your man is talking about the job and then he has got to go and the other guy is just looking at his beer.

Group 2, Brainstorming

Concurrence

Spatial ⟷ Audio
(Location)   (Music)

S: Can we just try again Rock? What about happy [mood on YouTube Audio Library]?' (...) Even though, you know, it's not a happy ...
S: Rock/ Angry I think it's fine actually. Yeah, yeah ,
D: Open Highway
S: Open Highway, let's have a listen to that one again, yeah
S: What do you think? Is that too dramatic? [...]
D: Yeah, um, **it would be the kind of thing at that setting I think, you know?** [CK_Actual_MCC_Concurrence]
D: **In a pool bar, you know?With guys** (.)
S: It just seems, it just (...) we can change the volume to the background music.[TK_WMM_Aff_Editing]

Group 2, Music Selection

Divergence

Spatial ← → Linguistic ← → Audio
(Location)   (Conversation)   (Music)

S: 'Oh yeah, great, yeah. It was great bumping into you yesterday. Oh man, is it 12 years since we were last here?'
D: 'Yeah, yeah. It hasn't changed that much, has it?'
S: 'Oh yeah, it used to be great, the gang in here. Remember Joe, Jerry and Paul used to play pool and have a great laugh'
D: 'Yeah, what's you been, what's you been up to now? Has life been good since?'
S: 'Oh yeah, this and that. Back and forth, you know I was in England, you know, I was doing the buildings over there but you know, I got sick of that, I came home.'
D: 'Oh construction so. What about that marketing degree you did?'
S: 'Oh yeah, I did a bit of that but it wasn't [...] in the end.'
D: 'And Gene, remember? You were with her for years.'
S: 'Yeah, I was. Gene, ah, Gene was great but you know I never got down on my knee and after a while it kind of faded away. And yourself? Kids now, I heard you say?'
D: 'Yeah, yeah, three kids now: 8, 6 and 3. I'll tell you they keep you busy, you gotta work 60 hours a week just to keep them happy.'
S: 'Oh yeah, oh yeah, good, good.' (phone ringing)
Group 2, Script

Figure 6.20 Group 2: Realising Mode Relationships through Enactment of Affordances

Visual Effects

Group 1

Figure 6.21 illustrates another example of the realisation of two mode relationships, complementarity and concurrence through the enactment of different affordances at the disposal of the participants in both *Second Life* and the editing software used, i.e. Windows Movie Maker.
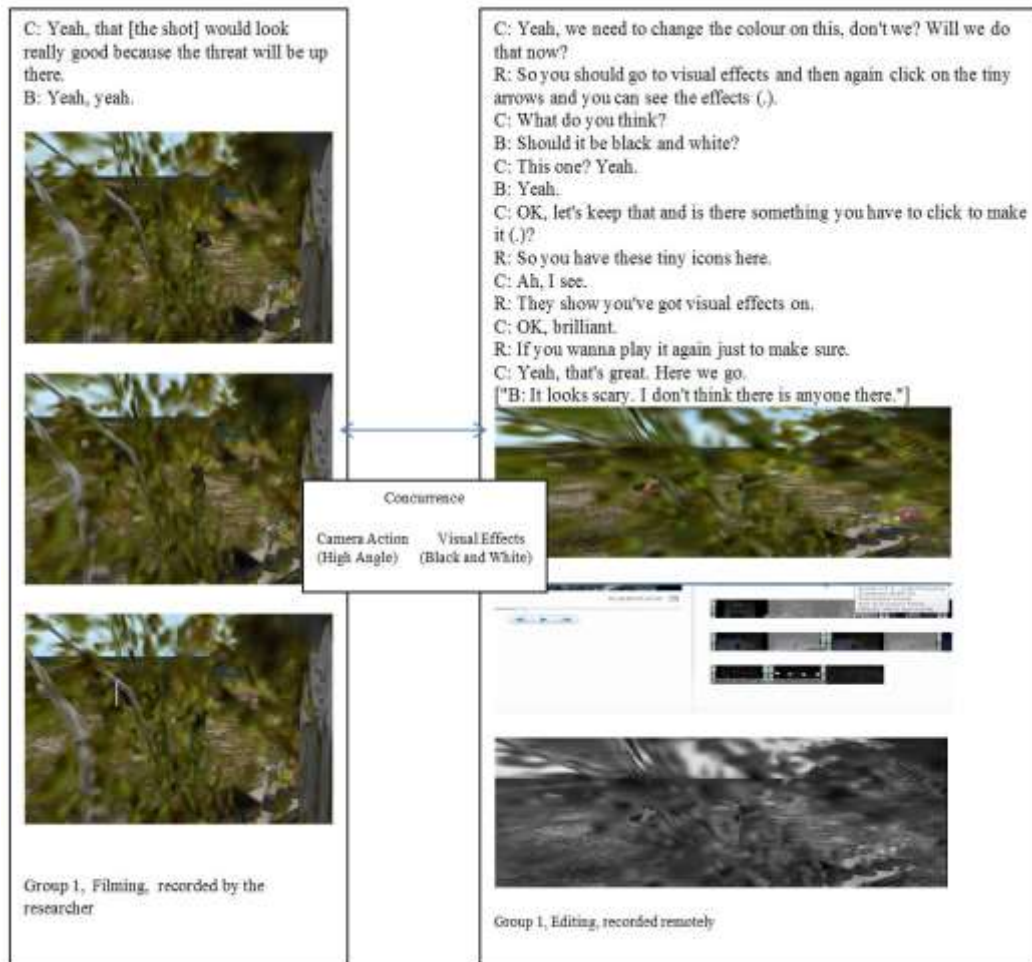
Figure 6.21 Group 1: Editing – Enacting Affordances for Visual Effects

The pictures on the left were in fact taken by the researcher who was sharing the screen of her computer with the participants in the computer lab where the course was taking place. Ciara acknowledged the shots as being 'useful' for their machinima video since they would materialise the idea of a 'threat' that watches the protagonists, thus adding a new element to the narrative and being in a relationship of complementarity with other existing modes. The 'behind the trees' shot was added to the video at the editing stage of the project when the two participants in Group 1 also discussed changing the colour of the snapshot. They both agreed to use the black and white effects afforded by the editing software Movie Maker. Their motivation for doing so is discussed during the post-course

interviews when both Ciara and Beth were asked to comment on the use of the

black and white effect. Their explanations offer insights into what they perceive to

be the overall role of the snapshot and that of the visual effect into the story.

Even though the two participants made the decision to use the black and white

visual effect together, their explanation for the enactment of this affordance

differs significantly. Ciara is adamant that the effect [TCK_WMM_Aff_Visual_

Effect] was used in concurrence with the high angle shot [TCK_SL_Designed

_Aff_Camera_Action] to reinforce the idea of a hidden threat that was 'up there':

Excerpt 6.18 (Ciara, post-course interview)

> R: OK and in terms of lighting and you mentioned the shot, the black and white
> shot. Why did you go for black and white as supposed to sepia for example?
> C: I think I had some kind of X-Files idea that when the**, when the camera is being
> the monster, the view is always different and sometimes the monster doesn't see
> colour or doesn't see things the way other people do**. So, I guess that if I had the
> choice I might have gone for fish eye. Yeah, so black and white was the creepiest, I
> think (...)

Beth, on the other hand, has a very different explanation for the use of the black

and white visual effect. She perceives the enactment of this affordance to be in

concurrence with the overall atmosphere of their video. In other words, the effect

was used, according to Beth, to fit the rest of the narrative.

Excerpt 6.19 (Beth, post-course interview)

> R: At a certain point you used a black and white picture [rewinding], I think it's just
> about here.
> B: Ah yeah, because again we have the genre as a horror one **and that picture is
> captured in midday so to match the overall atmosphere you have to change that
> into black and white to match the time setting of the day that we filmed.**

Beth seems to be more literal than Ciara when she discusses why they selected the

black and white effect. Ciara describes how the high angle snapshot and the visual

effect work together to materialise the idea of a threat, prompted perhaps by her recollection of the X-Files series whilst Beth sees the effect as transmitting the same feeling as some of the other visuals employed such as darkness and the moon.

Group 2

The last scene of the machinima video created by Sean and Dean shows the unsuccessful character alone at the bar again. The lag that the participants were experiencing, however, made the task of filming in *Second Life* extremely difficult. To overcome this major constraint, Sean suggested recycling one of the first shots they had taken of the unsuccessful protagonist, Steve, sitting alone at the bar by flipping the image. Thus, through creative and spontaneous improvising participants were able to once again overcome the shortcomings of the digital technologies they were using.

The visual effect 'mirror' [TCK_WMM_Aff_Visual_Effects] reinforces the idea of the loneliness of the character that is evoked through an intricate intertwinning of multiple modes [CK_Actual_MCC_Concurrence].

S: There is one last scene.(...) the guy has to look depressed at the bar by himself, that's all. (...)
R: So you only need your ...
S: My avatar looking depressed.
R: It looks like it's frozen.
S: What we could do, **we could just recycle**.
D: I was just (.) yeah (.) so it's the very first dimension? With you at the bar in the beginning?
S: **Can you flip an image? [TK_WMM_Aff_Visual_Effects]**
R: Yeah, you can rotate. So if you go to VIEW(..) Is this what you want? To rotate?
S: What I'll do is I'm gonna cut and copy.
S: I just copied.
R: Yeah, (...) if you go to HOME, ROTATE, yeah.
R: MIRROR (.).I wonder (.) if you go to VISUAL EFFECTS there is a MIRROR EFFECT, if you scroll down a little bit, MIRROR (.) is that what you want? (...)
S: Yeah, that's what I want. Perfect. So **that's doing the opposite angle of when he came in.[TCK_WMM_Aff_Visual_Effects]**

Group 2, Editing

Figure 6. 22 Group 2 – Enacting Affordances for Visual Effects

6.3 New ways of doing and relating

If Section 6.2 was concerned with understanding teachers' perception and enactment of affordances for multimodal communication of meaning made possible by digital literacy practices such as machinima, the concern in this section is with how participating teachers work in coaction during the production of the machinima video.

6.3.1 Coaction

Chapter 2 discussed the notion of coaction as conceptualised by Wenger and Sparrow (2007) and Zheng and Newgarden (2012). The latter propose that coaction in avatar-based virtual worlds manifests itself in two ways, 1) coaction taking place between the player, the gamer's physical body, and the avatar, the

participant's extended body and 2) between avatars/bodies or between participants

as they coordinate during game play (p. 343).

The concept of coaction is deemed relevant to the questions under investigation in

the current study as it was observed that at certain stages meaning was created to

accomplish the goal of producing the video by participants through highly

coordinated behaviour between the participants themselves or between the

participants and their avatars, a characteristic of coaction.

The scripting stage of the machinima production of both groups offers interesting

examples of coaction. In Sean and Dean's case, the latter worked on the script by

himself because he had written a similar story years back. Therefore, at a first

glance it might seem that he is the sole author of the script. However, Dean

himself fully acknowledges the major contribution Sean's ideas played in the

creative process of producing a script. Dean explains at the end of the course how

Sean's actions influenced his creation of the script that could, therefore, not be

fully attributable to him alone (Wenger & Sparrow 2007, p. 18):

Excerpt 6. 20 (Dean, Day 2)

> D: Like the whole week I was worried about 'Can't draw any ideas, you know?'
> 'Now, I've got a thing coming up Sunday' but then we clicked together and he
> mentioned something that got me thinking, I mentioned something that got him
> thinking, you know, so he mentioned the bar scene, I mentioned, OK, two
> characters, he said something that clicked with me, with another idea I had like
> twenty years ago when I was...I said 'Oh yeah, I used to do a similar script before'
> with the same idea, you know, one successful, one unsuccessful. He said 'Yeah,
> that's great!', and came together, you know?

Similarly, the storyboards created by both groups are the result of coaction

between the participants as each participant is influenced by the other at this stage

and the storyboards they came up with could not have been otherwise produced—

they are the outcome of the participants' coordinated interactions.

Coaction during the scripting and storyboarding phases takes place between the

participants of each group. However, coaction happening during the filming phase

involves both types of coaction discussed by Zheng and Newgarden (2012).

The example in Figure 6.23 shows participants in Group 1 enacting the

affordances for gestures and camera action. At the same time, it shows them

engaged in coaction through a highly coordinated behaviour as both of them have

to coordinate their actions, i.e. while Ciara enacts the 'scold' gesture and speaks

her line, Beth adjusts the camera angle and distance and films her.

Figure 6.23 Group 1 in Coaction: Filming and Enacting SCOLD Gesture

Nonetheless, coaction in Figure 6.23 takes places between Ciara and her avatar as well. Ciara can perform the gesture 'scold' for the machinima video only through her avatar. Therefore, the participant and the avatar act together to accomplish the goal of enacting the gesture for the particular scene that was being filmed.

Both types of coaction, between the participants and between each participant and their avatar, are evident in the process of acting out the 'shrug' gesture and filming it illustrated in Figure 6.15 in Section 6.2.4. In this instance, Beth is recording Ciara acting out the 'shrug' gesture and speaking her line. They both

have to coordinate their behaviour to film the scene which, in turn, constitutes the
outcome of their coordinated interactions.

Similar examples are evident in the interaction between the participants in Group
2. For instance, when filming the fifth scene of their machinima video, Sean and
Dean realise the actual enactment of the affordances for gesture and camera action
through coaction between themselves and between Dean and his avatar (Figure
6.17 in Section 6.2.4). The two participants have to coordinate their behaviour, i.e.
Dean is enacting the pose while Sean is recording and adjusting the distance of
the shot to a long shot and constructing an oblique angle which captures the
successful protagonist realising the wave.

6.4 Conclusion

The analysis of the data in this chapter revealed that multimodal meaning-making
was an important component of the various stages involved in the process of
making a video with machinima, particularly in the processes of scripting,
storyboarding, performing, recording, and editing. In designing the machinima
videos for this project, teachers first worked on their scripts. Next, they
storyboarded, recorded footage and took snapshots which were subsequently
edited together with music, audio narration, and other sound effects. A range of
digital literacies was embedded in the process, including the designing, recording,
and editing of the machinima video. As teachers designed their videos in pairs,
they mindfully made choices about various combinations of modes in
relationships of concurrence, complementarity and divergence. Thus, the design
of the machinima video project proved to be a collaborative venture that allowed a

focus on multimodality and new media, engaging teachers creatively with the increasingly popular digital literacy practice—machinima. Teachers combined multiple modes simultaneously and demonstrated appreciation of the range of multimodal semiotic resources available to them, making meaning in a plethora of ways, with a plethora of means. It also allowed teachers to engage in a range of processes, each deploying particular tools and other resources in different ways at different stages.

This chapter showed that language teachers possess untapped repertoires of multimodal meaning-making which allow them to use their imagination and creativity to not only perceive and enact the various affordances for meaning-making of the digital technologies employed but also to overcome the constraints of the same technologies. The revelation of this study is the way in which teachers managed the complex combinations of affordances and constraints of the technologies they were using. Moreover, if we take digital literacies to mean more than being able to operate tools and to encompass the ability to adapt affordances and constraints to particular circumstances, the findings in this thesis seem to suggest that teachers actually have such ability. The findings presented herein indicate that teachers are innately acquainted with making meaning multimodally as well as with other dimensions of digital literacies despite them stating the opposite.

In short, the findings demonstrate that:

- Participants have profound knowledge of multimodal communicative competence as illustrated by their construction of intertwined, complex mode relationships during the machinima production process; thus,

participants possess rich repertoires of multimodal meaning-making practices and are highly competent multimodal designers who draw on their existing knowledge creatively and innovatively to exploit the affordances of modes other than the linguistic mode when given the opportunity to focus on semiosis not just language

- Participants' existing knowledge of multimodal meaning-making shape the ways in which they perceive and enact the affordances embedded in the digital tools used in the production process; they achieve the construction of various mode relationships through the enactment of the affordances of the digital tools employed in the production process; the perception and enactment of the affordances for meaning-making draw on the participants' existing knowledge of multimodal communication of meaning and processes such as x-ray vision and synaesthesia which enables mindful modal choice. Coaction between the participants in each group and coaction between each participant and their avatar played an essential role throughout the production process as it enabled them to create meaning through highly coordinated behaviour

- Also, spontaneous improvising is used to creatively overcome constraints imposed by digital technologies, i.e. lag and time constraints. In sum, the study provides empirical evidence of how teachers' existing CK plays a role in the perception and enactment of the affordances of digital tools for meaning-making and a new perspective in the investigation of digital literacies for teacher education.

CHAPTER 7 OVERVIEW OF PARTICIPANTS' TPACK AS REVEALED BY THEIR PARTICIPATION IN THIS STUDY

Chapter 6 discussed the interplay between teachers' actual CK and TK in terms of the perception and enactment of affordances for new ways of meaning-making as well as new ways of doing and being facilitated by digital literacy practices such as machinima; it specifically investigated the processes and knowledge teachers drew on in order to realise the possibilities for multimodal expression of meaning afforded by machinima.

Chapter 7 outlines participating teachers' overall TPACK as it can be derived from their participation in this research project. While the main focus of this thesis is on teachers' existing CK in interaction with digital literacy practices, other TPACK domains have been addressed and discussed with the participating teachers in the pre- and post- *Multimodality and Machinima* course interviews. Thus, in this chapter participating teachers' assumptions about digital literacies are discussed through the TPACK lens. Section 7.1 explores teachers' perceived CK by reporting on their existing beliefs about the impact of digital technologies on the concepts of language and literacy. Section 7.2 reports on the participants' TPK by discussing their motivation for having enrolled in this study and how they believe digital literacy practices as they've experienced them could aid the processes of learning and teaching. Participants' views of the affordances and constraints of machinima for the language classroom are addressed and how they would use machinima with their students, i.e their TPACK domain, is discussed. Finally, this chapter looks at whether teachers' assumptions about the relevance of

the various dimensions of digital literacies to the language classroom were
challenged by the opportunity to experiment for their own authentic purposes with
how digital technologies transform basic aspects of our lives.

7.1 Participants' perceived Content Knowledge and Technological Content Knowledge

Chapter 6 looked at teachers' actual CK and its interplay with TK, TCK, as
revealed by the analysis of clips from the machinima production stages. It
illustrated the relationship between the participants' existing knowledge of
multimodal communication of meaning (CK_Actual_MCC), the goal-driven
perception of affordances (TK _Affordances) and the enactment of affordances
(TCK_Affordances). In other words, Chapter 6 showed that participating teachers
had knowledge of the CK and TK domains as defined in this study, namely, they
had knowledge of multimodal communication of meaning as well as knowledge
of how to use the software required to produce a video with machinima or,
knowledge of the technical dimension of machinima. Teachers showed not only
an ability to operate the tools but also a deep understanding of the affordances for
meaning-making embedded in the software thus demonstrating their TK. More
importantly, participants also demonstrated their knowledge of TCK by enacting
these affordances for meaning-making or, at times, using the technological tools
in ways different from their original design to overcome some of the constraints
imposed (or encountered during the production process). In other words,
participants' TCK has been revealed as including the 'higher level of conceptual
mastery' (Hafner 2013, p. 830) which involves using the different semiotic
resources of digital media for meaning-making. All participating teachers showed

the ability to enact the affordances provided by the technological tools for the digitally mediated multimodal representation of CK.

This section of Chapter 7 looks at how teachers themselves perceive their own knowledge of CK. This thesis recognises that trying to separate teachers' actual knowledge of the subject matter and their beliefs about it might result in a blurry distinction. Therefore, Chapter 6 illustrated teachers' actual CK as it emerged from their practice of making a machinima video. Section 7.1, on the other hand, describes what teachers' beliefs about their CK are.

The interviews held with the participants before the professional development course sought to investigate their perceived beliefs of language and literacy, their perceived CK, and of the impact of technology on the two constructs, their perceived TCK. It was quickly discovered that terms like multimodality, multiliteracies and digital literacies were not common terms for the participating teachers, particularly those outside academia.

Based on data obtained from the pre- and post- Multimodality and Machinima course interviews, screen recordings, artefacts such as scripts and storyboards, it became evident that participants' views and beliefs of literacy and meaning-making were in sharp contrast with their actual practices of multimodal composition that have been outlined in Chapter 6, Section 6.2. In other words, teachers' stated beliefs about their CK do not reflect their actual knowledge that was revealed by their complex production practices.

Both teachers in Group 1, Ciara and Beth, expressed similar views of literacy as referring to communication with words while technology was mostly viewed as a

tool to support language learning. Ciara even pointed out that to a certain extent
technology could make things worse for language learners.

The bolded parts in Excerpt 7.1 show Ciara's perceived knowledge of the role of
technology in the classroom and its impact on language and literacy, i.e. TCK:

Excerpt 7.1 (Ciara, pre-course interview)

> C: **In some ways they [technologies] can make things worse because people
> don't use proper English on them but in other ways they can make them better
> because it makes things more accessible to more people**.
> R: In what way?
> C: In the way that I can be on Facebook talking to someone from Brazil who never
> spoke English to me before.
> R: So how has that changed the literacy concept?
> C: I think **they get more practice at literacy, at reading English, writing English
> if they're interested in it. It's another opportunity for that**.

She then went on to describe her own use of videos in the classroom as a tool to
improve students' pronunciation in English:

Excerpt 7.2 (Ciara, pre-course interview)

> C: I have used videos, (...) I asked the students to do a dialogue or get up a drama.
> Sometimes, I'll record them and play it back to them. And they can hear their own
> pronunciation and what they need to improve. It's (probably) fun as well.
> R: So you film them?
> C: Yeah, I have filmed, now that I have a Blackberry it's easier (...) my husband has
> put it on to a DVD and I've played it back to them in class and discussed what they
> think of it.
> R: And do you ever get them involved in filming?
> C: No, (...) I've never done that cause I want them to concentrate on the language but
> that could be fun for them.

Beth, on the other hand, when asked whether she believed that the new
technologies changed the nature of literacy answered emphatically that they did
but she did not further elaborate on that point. Rather, she went on to discuss why
teachers should integrate different technologies into the classroom.

Excerpt 7.3 (Beth, pre-course interview)

> B: **Of course**, I'm thinking of, from the students' perspectives since nowadays they rely and spend so much time in these virtual worlds including like YouTube or blogs or online forums so it would be better if the teachers can, like, be part of that and develop the course and develop their teaching (...) to get this kind of, to get used to these kind of worlds and to be on the same side and same mind of the students, so that would be a great idea, yeah.

On her use of technology in the classroom, Beth added:

Excerpt 7.4 (Beth, pre-course interview)

> B: Right now I'm trying to combine other modes into my teaching, (...) in the first year of my teaching I would rely only on text-based (...) but right now I'm trying to develop like using other modes, like PowerPoints or videos to catch the attention from students.

Both Ciara and Beth's answers seem to indicate that they do not fully acknowledge the transformative power of technology in learning (Kalantzis et al. 2016) nor the profound impact of technology on language and literacy, namely how digital technologies give rise to new ways of making meaning, enacting identities and relating to others. Rather, they appear to think that changing the medium from textbooks to PowerPoint, for example, might equate with technological integration.

Similarly to participants in Group 1, Dean and Sean describe literacy in traditional terms maintaining that comprehension and use of words are central to the concept of literacy. Sean strongly emphasises the importance of words in his definition of literacy. In his words, literacy is:

Excerpt 7.5 (Sean, pre-course interview)

> S: The ability to communicate with words. To be able to construct meaning with words. And be able to transmit that in a form that people would understand. (...) for me it would be like to be able to communicate with words and to be able to construct meaning with words and transmit that to other people.

Dean, on the other hand, notes in Excerpt 7.6 that the concept of literacy has

evolved and what it means to be literate today is significantly different from what

it meant in the not too distant past. He acknowledges that there are several types

of literacies but limits his explanation to the description and importance of

computer literacy, which seems to refer mostly to the technical skills required to

use a computer:

Excerpt 7.6 (Dean, pre-course interview)

> D: Well there is numeracy, you know, writing, and also now there is computer
> literacy. So I used to teach that a little bit as well, so literacy is being able to manage
> and understand and communicate, I suppose, reading, writing, maths and now also
> computers.
> R: So you would add computer literacy to the concept of literacy?
> D: I think so, yeah, these days if you don't know how to use computers, you'd be
> lost, you know. You can't communicate now without a computer.

On the transformative effect of new technologies on the concepts of language and

literacy, participants note that technologies might have changed literacy but the

ability to read and write is still needed to develop other emerging literacies.

Excerpt 7.7 (Sean, pre-course interview)

> S: (...) In some ways [technology changed literacy], yes, but I think you still have to
> have like traditional literacy to interact with digital literacy, I don't think it replaces
> it, I think it adds a layer on top.
> R: And when you say traditional literacy what do you refer to?
> S: Like...just being able to read and write and be able to analyse text.
> R: OK, so you think these technologies add to that concept?
> S: Yeah, an extra layer but you can't, you can't develop digital literacy until you
> have a traditional literacy.

 Even though participants demonstrated profound knowledge of multimodal

communicative competence (Actual_CK_MCC) as illustrated by their

construction of intertwined, complex mode relationships during the machinima

production process, they express traditional beliefs of literacy during the pre-course interviews (Perceived_CK_MCC).

In other words, the analysis reveals that there is a mismatch between teachers' expressed beliefs and their actual knowledge. According to the views expressed by the participants during the pre-course interviews, literacy referred primarily to making meaning or communicating with words. It seemed, therefore, that their perceived CK was limited to traditional views of literacy. However, exposure to and interaction with the inherently multimodal digital literacy practice machinima revealed profound knowledge of multimodal communication of meaning which appeared to play a major role in the perception and enactment of the affordances for multimodal meaning-making embedded in the technologies used.

These beliefs have been well documented by researchers (Burn & Parker 2006; Kalantzis et al. 2016; Tour 2015) who point out that despite the rhetoric on the transformative effects of technology, education is in many ways still relatively untouched by technology and even when digital technologies are used they do not bring significant change (Kalantzis et al. 2016) because teachers are not using them to their full potential. In a review of research on the use of technology by EFL teachers, Jones (2014) shows that even when schools are generally well-equipped and teachers possess high levels of TK, technology use in the classroom is restricted to 'rather pedestrian applications like showing PowerPoint presentations' or a means of presenting information for reading or listening comprehension exercises (pp. 1-2).

Knobel and Kalman (2016) explain that integrating new digital literacy practices in the classroom entails embodying 'the new ethos stuff' of these literacies (p. 6).

For instance, asking students to post their thoughts about a book they had to read on a private discussion board does not contitute a new literacy practice even though the task does include some technical procedures. It does not, however, embody the ethos of digital literacies and could be successfully completed in dialogue or by using pencil and paper (p. 6).

Participants' perception of technology as a tool to support language learning is common among language educators (Tour 2015, p. 137). While stressing that there is nothing wrong with this perspective, Tour points out that it does 'limit and could potentially impede the development of students' digital literacies capabilities' (ibid), particularly because 'multimodal, digital composition is pervasive and this pervasiveness has implications for the logics undergirding literacy learning, logics educators today need to understand' (Sheridan & Rowsell 2010, p.11).

7.2 Technological Pedagogical Knowledge

7.2.1 Teachers' motivation for enrolling in the PD course

All teachers participating in this study enrolled in the professional development course because they perceived technology and its integration in the classroom as playing an important role in student engagement. Their views chime in with Lankshear and Knobel's (2008) observations about digital natives who unlike digital immigrants who 'prefer to handle knowledge systematically, logically and to inform discrete activities' (p. 60),

> like instant information, prefer graphics, animations, audio, and video to text, and naturally interact with others while multitasking. For them, doing is more important than knowing, and learning has to be fun and instantly relevant. (ibid)

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Similarly, Dean notices that his students tend to become immediately engaged

when he uses video materials in the classroom, even if only as a static resource. In

the pre-course interview he briefly explains the benefits of involving students in

production practices and notes that his own students are 'enchanted' and 'sucked

in' by the magic of 'moving images'. In his own words:

Excerpt 7.8 (Dean, pre-course interview)

> D: Students are becoming different, they're evolving, they are not the same as they
> were twenty years ago and they won't tolerate things that we tolerated in school (...)
> If I'm teaching the students, they go 'Oh, yeah, yeah.' **If I stick on a video and I
> say 'Now we're gonna watch a five minute clip, then they all focus**, and I go
> 'Oh!'. I turn it off and [mumbles imitating unhappy students]
> R: Is this something you have noticed in your teaching?
> D: Oh yeah, oh very much so (...) then putting on a camera and a video, it just
> enchants them, you know? It is something about the magic of moving images (...)
> And it just sucks them in and you can see them staring at it with their mouths open
> but it works, you know, and so much more so is getting them active in it as well,
> rather than just being passive. And that's the whole thing about language learning,
> isn't it? It's gotta be an active class not a passive class, eh, sit and listen to me or
> reading a book. (...) I have many ideas but unfortunately because of our pressure on
> exams, it's all 'I gotta finish this course', 'I gotta do this'.

All participants acknowledge in the pre-course interview that the integration of

technology into language teaching is essential.

Dean, for example, not only recognises that language learning is a 'step behind'

technology but also that the latter should be used more to facilitate students'

learning, especially since they are 'more fluent' in using various technological

tools than their teachers. Moreover, he notes in Excerpt 7.9 that practices such as

film-making, computer games, virtual worlds might have more potential to engage

students in the classroom than 'books printed twenty years ago' that might no

longer be relevant to students' interests:

Excerpt 7.9 (Dean, pre-course interview)

> D: I've always felt that language learning was a step behind technology and we should utilise more technology because the students are much more fluent than the teachers and in order to engage the students more we need to use the tools that they are already intrigued by. So rather than using textbooks and paper (boards) if we can use things like what you're suggesting, film-making devices and *Second Life*, avatars, I think that would really, you know, engage them.
> R: Alright, and when you say that students are more fluent, what do you mean by that?
> D: Well, students can use my iPad better than I can, I mean, they show me how to turn it on and what I should be doing with it. (...) I just think (...) this new generation has all these tools at their disposal and we should be utilising them in order to facilitate their learning. Because when we go back and use old style techniques like chalk and board, board and book, it bores them, they are not engaged. They're coming to school and they're fed up, (...) they don't want to learn but yet if you give them computer games, they want to learn. (...) If I'm coming to classes and old fool me was trying to teach them stuff from a book that was printed twenty years ago that's out of date and it doesn't really relate to them or their interests.

He shows awareness of the diverse 'digital media-rich online environments' (Alvermann & Eakle 2007 cited in Hafner et al. 2013, p. 814) learners are actively engaging in to make meaning and construct knowledge and identities thus orchestrating an array of literacy practices (ibid). In Excerpt 7.9, Dean also identifies schools' narrow focus on print-based literacy as a reason for increased levels of disengagement among language students. Therefore, he explains in Excerpt 7.10 that his decision to enrol in the professional development was motivated by an awareness that he needed to improve his own TPACK:

Excerpt 7.10 (Dean, post-course interview)

> D: I wanted to learn new things and I was thinking, yeah, technology in the classroom, I need to, you know, brush up on that.

Sean, on the other hand, does not explicitly mention student engagement as his main motivation for participating in the course. He explains that technology is an essential component of his teaching:

Excerpt 7.11 (Sean, pre-course interview)

S: I'm all about using technology when I'm teaching so I suppose that's why I decided to enroll in the course.

Like Dean, Beth enrolled in the course and the study motivated by the belief that

technology and multimodal materials might captivate students' atention more than

print-based materials:

Excerpt 7.12 (Beth, pre-course interview)

B: Oh, yes, because when I teach in Thai university I normally rely on a text-based course but now I think that if you add some more resources like technological or likes pictures, images or videos in my course that will be more interesting for students and catch their attention.

She also goes on to point to some potential benefits of engaging students in

production practices:

Excerpt 7.13 (Beth, pre-course interview)

B: If they could really create something in the course that would benefit them because I think that you can really learn something and, by experiencing them rather than seeing other people do but if you do it yourself, so that would be (...) more kind of entertaining.

Ciara's decision to participate in the professional development course was

prompted not only by the fact that the course sounded interesting and 'practical'

but, perhaps, more importantly, by her belief that employers of language teachers

value upskilling and participation in continuous professional development. She

explains in Excerpt 7.14 that the study:

Excerpt 7.14 (Ciara, pre-course interview)

C: It sounded interesting when I got the email from the director and employers are all about upskilling and doing courses so I thought this sounds like one that I'd like

to do. It doesn't sound like somebody waffling about psychological, theoretical stuff.
It's (like) something practical that could actually be useful (...)

When discussing what she expected to gain from participating in the study, Ciara

reiterated the importance of boosting her resume as well as gaining knowledge of

technological advances that she could eventually implement in her teaching to

meet her students' expectations:

Excerpt 7.15 (Ciara, pre-course interview)

C: (...) a new, a new feather to the cap [laughing] just an insight into what's out
there, what can be used.
R: OK, and what would you like to know specifically or what would you want to be
able to do once the course is finished?
C: Implement things, implement more technology into the classroom, if possible.
That's one thing that I'm not too good at. But students know me and technology, oil
and water.
R: OK, alright. And, so why is this an important goal for you?
C: Because it's in use so much more now. The classrooms are full of it so we really
have to be able to use it.
R: And when you say the classrooms, do you mean that the schools provide the
technologies or that the students use them?
C: Well, the school provides it and the students expect it.

On the same discussion points, i.e. motivation for enrolling in and expectations

from the professional development course, Dean reveals in Excerpt 7.16 that his

participation was highly motivated by the fact that the course was run completely

independently of the college where he was employed.

Excerpt 7.16 (Dean, pre-course interview)

D: I'd like a new skill, I'd like to do something different, you know, and advance,
you know, to continue to develop, you know? (...) I've been there for seven or eight
years, a few little changes here but I just need to do something radical now, to do
something different. And normally if it's within the school, I think this is important,
if it was within the school and my boss asked me to do it and I probably wouldn't do
it. I think I'd be saying 'Nah!'. I put myself forward for that, it will be expected of
me and then it's just gonna be a further responsibility for which I'm not getting any
appreciation or ...but because this is something independent of the school I think I'll
be more enthusiastic. (...) If there was my boss asking me to do it, she has asked me
to do a few things and I would do them but I don't really put myself forward for

things because I know, well, you know, I'm not getting paid for this. Eh, and without sounding too cynical, but I'll be 'Eh, let me just focus on things I know I'm gonna get right cause I know if I try something new and it doesn't work it's like a black mark against me but if it's my idea and I try something new and even if doesn't work, it's an experiment, it's new'.
R: There is no pressure.
D: Yeah, exactly, there's no pressure. It's not like I failed it when somebody asked me to do it, I don't know what they're asking me, it's not clear to me so you know, it's only going to be a mess. Here, it's not clear to me and maybe by the end of the course it still won't be clear to me but I'd still be giving it a go, you know? Because it's not an instruction. I'm not being told to do it.

Allowing teachers 'to muck around in a low risk environment' (Knobel & Kalman 2016, p. 16) and ensuring that they are 'at ease with mistakes and taking risks when trying to learn something new' (ibid) seem to be the points Dean is making in Excerpt 7.16 when he discusses his fear of failure and notes that not succeeding when trying something new can be held 'like a black mark' against him. He shows awareness of the fact that failure 'is often not welcomed or ignored in professional development contexts and classrooms' (Knobel & Kalman 2016, p. 15) despite it being an integral part of learning (ibid). This in turn points to the need to encourage educators to experiment in a low-risk environment to help them 'take more control over their learning and the choices they make and to take an experimental stance toward learning firsthand' (ibid).

7.2.2 Reflecting on the ethos of digital literacy practices—affordances and constraints for the classroom

Affordances

The initial enthusiasm about new technological tools and their potential for language learning and teaching expressed during the pre-course interviews was also evident throughout the video-making process. While producing the machinima videos, participating teachers experienced the very ethos of this

practice, i.e. coaction, intense participation, multimodal meaning-making and enactment of various identities. More specifically, teachers experienced both dimensions of machinima as a digital literacy practice that have been discussed in detail in Chapter 2, i.e. the technical dimension as well as its ethos as a collaborative, creative, multimodal practice.

Section 6.3.1 introduced examples of what has been identified as instances of coaction in the machinima production process. While the participants were not familiar with the actual concept of coaction, they did acknowledge that practices such as machinima allowed for really intense participation and collaboration among those involved in the production process. Dean, for example, admitted in Excerpt 7.17 that he struggled the week before the last day of the course to think of a topic for the machinima video but the 'synergy' he had with Sean solved the problems with creativity:

Excerpt 7.17 (Dean, Day 2 of the course)

> D: Because in the beginning I was thinking, I remember last week we were saying, OK, we work on the script, we work on ideas and just with the week and the exams I was doing, I didn't have a chance and then I thought (...) when I wrote the script there, I was just going (...) 'Right, that's done!' And with Sean as well cause it was grand working with Sean because we did have this, eh, synergy or something. After the first couple of minutes, 'What's he doing, what do I do?' you know? And then we just kind of clicked and he worked on the technical bits and I said 'OK, I'll do this stuff'.

While reflecting on the collaborative and creative dimensions of machinima, Dean recognises that the types of 'teamwork' and 'comradeship' afforded by digital literacy practices, in this case the process of making machinima videos, should be a goal for teachers in the classroom.

Excerpt 7.18 (Dean, post-course interview)

> D: I liked as well that there wasn't really so much focus on the movie-making, it was more the whole creative process, you know, that the, it wasn't just about the end-product, it was about getting there, you know? (...)
> And using a lot of other skills, you know, the computer skills, and the teamwork, you know and that was (...) so it was not just about the end product but about the process of doing it. And I think, eh, like I enjoyed, I know there was only the three of us in the second class, just you, me and Sean (...) But you could feel, eh, a comradeship, you know, a spirit of OK, you know, **let's do something fun here, let's get it done and that's the type of thing you'd like in a classroom, I imagine, you know, because learning is much more than just the end product**, isn't it?

Furthermore, he wonders whether using machinima in the classroom could lead to the same type of intense productive participation and coaction he experienced during the course among students.

Excerpt 7.19 (Dean, Day 2 of the course)

> D: **So just as something that can bring students.**

In Excerpts 7.18 and 7.19, Dean acknowledges the power of machinima for fostering much richer levels of interaction than other collaborative projects where tasks are usually divided among group members. In other words, he is able to analyse this practice from various angles, i.e. the knowledge required by the production process and potential benefits for students.

Dean's reflection on the ethos dimension of machinima, i.e. the creative, collaborative, participatory aspects might indicate that engaging teachers in hands-on experiences has the potential to prompt them to reflect on the potential of such practices for language learning and teaching. Knobel and Kalman (2016) point out that teachers need 'a conviction that what's being learned is going to be useful or beneficial to students' (p. 3). In the case of digital literacy practices,

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teachers need to be convinced that both the technical and ethos dimensions

discussed in Chapter 2 are useful and beneficial.

Most participants agree that employing digital literacy practices such as

machinima in the language classroom would be 'entertaining' for the students.

Ciara, for instance, notes that:

Excerpt 7.20 (Ciara, post-course interview)

C: To make it [machinima] in class would be entertaining, it's something new and
different for them [students]. They get to work in teams (...)

Beth points out in Excerpt 7.21 that machinima has the potential to engage

students more than other activities as well as offer them more opportunities for

both designing and understanding multimodal meaning-making:

Excerpt 7.21 (Beth, post-course interview)

B: The pros, of course that students can learn by, in a rich, of course, data, from rich
data and get more meaning and it would make the course more interesting for
students to follow.

Sean, on the other hand, views practices such as machinima as allowing teachers

and students 'to escape the classroom' (post-course interview).

In addition to machinima being entertaining, engaging, collaborative and

multimodal, it might have, according to Dean, the potential to offer students

validation for having produced a video themselves. He describes these practices in

Excerpt 7.22 as being 'multiengaging' when compared to standard traditional

teaching. In his words:

Excerpt 7.22 (Dean, post-course interview)

> D: Well, the pro is that it's different, it's exciting, it's much more engaging for the students and if it goes right I can see the students thinking of this, this was the best class of the week for them or the highlight of their year, you know. They think 'Yeah, yeah we made movies, we made machinima movies and now it's like on YouTube or whatever and I did the editing or I did the writing or I did the fashion, the wardrobe like.' you know? And I think that the validation that students get from doing something, it's then a production you know. It's their 'I did this.' and the process that they go through in order to make that production, so it's multiengaging in that way compared to standard traditional teaching.

Ciara believes that students would feel empowered and experience a sense of

'satisfaction' once they manage to produce a video:

Excerpt 7.23 (Ciara, post-course interview)

> C: It's an achievement for them. They get to look at what they've managed to make and I think that would give them a sense of satisfaction. That'd be something that we did that we've managed to make together, we can keep it, they could save it on their computer.

In Excerpts 7.22 and 7.23, Dean and Ciara acknowledge the value of allowing

students to take on identities of designers and producers of meaning. They

recognise the practice of producing machinima videos as being very engaging for

students. Gee notes that

> If people are to nurture their souls, they need to feel a sense of control, meaningfulness, even expertise in the face of risk and complexity. They want and need to feel like heroes in their own life stories and to feel that their stories make sense. They need to feel that they matter and that they have mattered in other people's stories. If the body feeds on food, the soul feeds on agency and meaningfulness. (2007, p. 10)

Intuitively, Dean and Ciara realised that engaging students in a production

process within the learning context of the classroom would offer them 'validation'

and a 'sense of satisfaction', thus encapsulating the essence of digital literacies as

social practices, i.e. agency and meaningfulness (Gee 2007, p. 10) and providing

students with experiences that might have powerful consequences for learning

(ibid).

Participants were also asked during the post-course interviews to comment on the

added pedagogical value of machinima when compared to digital video making

that some of the teachers had previously used in the classroom. Ciara notes that

often the environments within which machinima videos are produced offer more

possibilities than the classroom. For instance, she continues, *Second Life* makes

possible camera angles such as bird's eye views that are otherwise possible only

in professional productions with the help of cranes, drones or CGI (Burn 2009, p.

150). In her words:

Excerpt 7.24 (Ciara post-course interview)

> C: **The added thing would be the environment, the places that you can use, that
> you don't have access to in the classroom. (...)** And you can actually get different
> angles because I don't think I'd be able to get a bird's eye view on a cam corder, I'm
> not that tall. [laughing]. But, yeah, it's about the environment rather than the acting
> and movement ... they're better in real time.

Like Dean, Beth lauds the possibilities through which practices such as

machinima enable students to be creative producers of meaning. In Excerpt 7.25,

she also points to the affordances offered by the environments within which

machinima can be produced for meaning-making with various camera angles.

Beth also notes the affordances for enactment of various identities and the positive

impact it might have on students who lack the confidence to speak or perform a

role in front of an audience. In addition, 'avatars', 'the participant's extended

body in the virtual world' (Zheng et al. 2012, p. 343) offer students possibilities to

perform actions that sometimes physical bodies are either not capable of (ibid) or

students might not like carrying out in front of an audience, for example, dancing

or enacting certain gestures or expressions that might be reprovable in real life.

Excerpt 7.25 (Beth, post-course interview)

B: It [machinima] lets students create like actual setting for them. I think one part of it can give opportunities to students who are like shy or not confident in themselves to ease that part and to be willing to join and participate because they don't really have to show their face in front of the class, of course but just record the voice (...) They will have more scenes or more choices to make different settings instead of they have to choose only the settings in university or in language school, they can choose any setting they want in a pub or in tourist attractions they want to create the setting and like the conversation and that would be very helpful and useful, yeah?
R: So in terms of multimodality does machinima offer more [than digital video making]? (...)
B: Yes, of course, yeah, definitely. (...) Like you can apply like camera angles, of course that you can use and also gestures and postures that you cannot do in real life, you can do it in machinima video and again if you learn how to use camera angles in the program then you can make a lot more meaning than just with a normal, ordinary video making that you just record and you don't know how to zoom in or film a bird's eye view for example, that's, it would be impossible to do that in real life.
R: And when you say that it's easier to use gestures with machinima, why do you think that's easier than in real life?
B: For example, like dancing or something, again, yeah, if students are not confident to do that, machinima can provide the tools for them to do or even like afraid or like faces...
R: Facial expressions?
B: Yeah, facial expressions, of course, and something that if you do that in real life, the police can come or something, yeah, yeah, I think it would be useful.

Sean views machinima's affordances for identity construction as the main

advantage over digital video making:

Excerpt 7.26 (Sean, post-course interview)

S: It allows like for the, I suppose with the machinima it allows for the identity, a created identity as well.
R: What do you mean by that?
S: Because the, eh, because with *Second Life* you can be a man or a woman, you can be a vampire, you can ...
R: So character construction?
S: Yeah, characters, exactly, yeah, yeah, which is much more difficult in real life yeah, so (...)

Dean further elaborates on why machinima's affordances for the creation and enactment of various identities constitute an advantage over digital video making. He views the avatar as offering students the possibility to take on a second identity that is completely different from their real life identity, thus enabling them 'to play out of their personality'. Even though Dean acknowledges that acting plays a 'minor part' in the process of machinima making, he points to the benefits that taking on a different identity might have for certain students, i.e. the potential to boost their confidence and creativity since avatars offer 'a universe of different possibilities'.

Excerpt 7. 27 (Dean, post-course interview)

D: First of all, students because it's an avatar, because it's a second identity, they can be completely different than their first identity.(...) with the avatar I think it's easier for the students to play out of their personality (...) I've done role playing obviously in the classroom with teenagers and (...) sometimes they'd be 'Oh, I'm not saying that! Oh, no, that's stupid!' or whatever, you know? Because it's an avatar there's probably less you know, people aren't as, what's the word I'm looking for, they're not as precious. Precious I think, this is the word I'm thinking of. 'We want you to have red hair or green hair or something', and they'd be like 'Yeah, OK.' but if you ask them to do it on digital video 'No, not that, that's stupid!'
R: Because it's the actual person that you see on camera.
D: Now, I'm only speculating because I don't have much experience with acting in the classroom and of course none with the [machinima]...so I'm only thinking, yeah. (...) People are more willing to do things with an avatar than they would if it was just digital videoing and there is much more scope for more involvement in many ways than there would be in just digital [video making] (...)
D: I'd imagine (...) there is some people who'd just say 'Yes, I wanna be Cleopatra.' And some people are gonna be 'No, no. God. I don't want to', you know, 'Don't point the camera at me.' But with the avatar I don't think you're gonna have those issues, you know. I really don't think you are, because the acting, you know, which is actually a pretty minor part of it, it's not really them. (...) Compared to digital video where there would be a lot more of, eh, ego, I suppose (...) there is probably an infinity of things you can do with an avatar that you can't do in the classrooms so it allows more creativity, it allows more of a, it's just a huge, you know, a universe of different possibilities, isn't there?

Dean also points out in Excerpt 7.28 below that machinima's affordances for identity creation and enactment might give more opportunities for expression to

weaker or less extrovert learners who are used to 'taking a back seat' in the

classroom:

Excerpt 7.28 (Dean, post-course interview)

> D: One advantage would be that it's the dominant students [they] are not necessarily
> going to dominate which would happen if you were doing digital video camera
> cause it will be the extroverts that will say 'Oh yeah, I wanna be Cleopatra and I
> wanna be Anthony', you know? or whatever it is and the students that are used to
> taking a back seat or being a little bit more shy will say 'Oh,yeah OK, I'll just you
> know, hold the camera' or whatever it is. (...) So it does give that opportunity to
> weaker students or you know just less extrovert students to be on a level plain so I'd
> say that would happen, you know? While if you ask them to get up and act in front
> of a camera it would probably be very difficult for them, you know? Some students
> would just freeze and just say 'No, no! I don't wanna do it!' and just, they'd prefer to
> you know run out of the room than act. (...) But if it's in machinima, it doesn't
> matter because it's an avatar, you know. It's an avatar and you know it's, they can
> dress as they like or whatever it is so it just gives everybody a second life, doesn't it?
> It gives everybody a second identity that can be as similar or as different as they
> want to be, you know? (...)
> And then there are so many other skills required that it gives students like for
> example me and Sean, you know, I wrote the script and he did the editing, you
> know? And I felt very happy, 'Oh well, that's my script' or whatever it was (...) So
> yeah, but I'd say that it would be this thing that students who would normally be at
> the back can now be at the front, you know?

Furthermore, Dean notes the intensely participatory nature of machinima when

compared to other practices such as digital video making. More specifically, he

explains in Excerpt 7.29, learners producing machinima have to carefully

consider, plan and enact everything from the characters' hair colour to gestures,

time of the day, posture and so on when working in teams. While this aspect could

be considered 'tedious', it also requires the producers to discuss and agree on

various meaning-making modes, deliberately make multimodal choices and

construct mode relationships to convey their intended meaning.

Excerpt 7.29 (Dean, post-course interview)

> D: Now we've got to think of it, plan it and because they [students] are working in
> teams, I assume they gotta discuss it and then go into the program and say, 'OK, we
> wanted to have this kind of hair, or that particular gesture, this particular time', you

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know, 'sit on this seat or that sofa'. So almost everything has to be planned, everything has to be thought of, everything has to be critically analysed, rather than just assumed. (...) What it [machinima] does add is that everything from the how they look to what they do, you know, having a drink in their hand has to be, it has to come into the students' mind, the concept has to come in and then they got to, you know?

R: Find the resources?

D: Find the resources and do it and if they don't do it, it doesn't happen. And probably with the machinima (...) in some ways just for your, you know, kind of 'holistic' [multimodality] type of thing, if you don't think of it, it won't happen, you know.(...) So you gotta think a really broad picture. A real, you know...It's not just what are they going to say, it's gonna be everything, where are they gonna be, how are they gonna dress, how is the camera angle going to be (...). Every single thing, every detail that we take for granted, is it going to be sunny, is it going to be rainy has to be thought of and then improved upon and then eh you need to learn how to do it. (...) Everything has to be created, all the details have to be conceived, you know? So there is plenty of things there to work and hopefully, you know, it's stimulating for the students, you know, so they're thinking 'OK, you know, we've got to, you know, where is it going to be, who are they gonna be? what are they gonna say? what are they gonna (...), how are they gonna dress and then the gestures and the props and the editing'.

However, despite the entire process of machinima making being more 'tedious',

the end product and the process are more 'creative':

Excerpt 7.30 (Dean, post-course interview)

D: But the important thing, as well, I also look at, it's probably the same as you were talking about, I say, I use the word holistic and you use the word multimodality because these are the things that they'll need to, these are skills that they are learning and they are going to be using all the time, you know? Yes, everything has to be thought of, you know, nothing comes naturally, you should take, nothing comes for granted, you know. I think that's an important thing, that, yeah , you can't just allow things to pass by, you know? Every single thing has to go by you but you've got to ...

R: Consciously deploy that?

D: Consciously, that's exactly what, yes, to say this is what I want, this is what I don't want. So somebody just says 'Oh whatever, whatever, whatever!' and then they are not in control of their lives. Other people you know can consciously, eh, critically analyse everything and say 'No, no, I don't want that, I don't want this to happen.' (...) so I think that's the difference maybe between the digital and the avatar because the avatar, you have to control everything, everything has to be deliberately put there, has to be deliberately created, designed you know?

D: Well, it makes it more tedious I suppose as a minus but then the end product, you're more creative.

Constraints

The constraints imposed by such digital literacy practices seem to outweigh the

potential benefits according to the teachers participating in this study. Among

these, the demanding technical dimension, lack of access to technology and the

time required to teach the technology, when available, are perceived as the most

challenging aspects. According to Ciara,

Excerpt 7.31 (Ciara, post-course interview)

> C: The con, I think, the big one has got to be the technology and the amount of
> training it takes. And even if you have the technology, you don't have two days to do
> it in ... and...with the class the way I've experienced them, you can say 'We'll do a
> little bit every day' but tomorrow half the students didn't come in, the next day you
> got two new people who didn't start with it so (.) So it's not ideal (.) and the
> clunkiness as well is a disadvantage.

On the clunkiness of the environment, i.e. *Second Life* and the avatars she adds:

Excerpt 7.32 (Ciara, post-course interview)

> C: It's very clumsy. You can't always get the characters to do exactly what you want
> whereas a human actor can just do it and you don't waste three hours trying to steer
> it so (.)

Ciara acknowledges performance as constituting the feature that makes

machinima more similar to live action video making in which students would be

the ones acting. While to Ciara avatars are clunky and sometimes difficult to

manipulate, human actors are ideal to perform roles in real time since 'the acting

and movement are better in real time' (Ciara, post-course interview).

For Beth, one of the major constraints of machinima is the time required to teach

students to use the technology and then to make the video:

Excerpt 7.33 (Beth, post-course interview)

B: But for the cons, I think, you have to spend much time if you are not excel in the programs in making a video or to teach students to make a video. I think the time is the key word of the constraints.
R: Time. So do you think it's feasible to use such a technique in the classroom?
B: Again, it comes back to the time constraints, I think if you can manage time wisely, it would be very efficient in the classroom because instead of just let the students have a conversation in class, they can interact more in meaning of course, in modes and at the same time students can learn technology with language rather than only language at the end of the class, yeah.

Like Ciara, Sean points to the need to acquire all the technological tools involved in machinima making as being the main disadvantage of this particular digital literacy practice:

Excerpt 7.34 (Sean, post-course interview)

S: The con is that you need an investment of technology, even if you bring your own device, you need wifi.
R: And is that not the reality?
S: No, I'd say, I know people who work in different schools around Dublin and very few have wifi. (...) Strong enough wifi to go beyond using Facebook and *Second Life* definitely needs stronger than checking your Facebook.

Dean also views the time investment and potential technological problems as downsides of machinima. Additionally, he points out that integrating such practices in the classroom would probably require two teachers in order to support students' learning of the technical dimension and 'teamwork' as well as a rigorous, structured plan and objectives.

Excerpt 7.35 (Dean, post-course interview)

D: But the cons is that you need probably two teachers to teach ten students or whatever, you know? Until they just become familiar with it themselves, you need to support that, the teamwork that, that they're gonna work together but it is, there's a lot in it. A lot in it.
R: And when say that, when you mentioned the pros and you said that 'If it goes right', what do you mean by that? If there are no technological problems or (...)?

D: Yeah, no technological problems, if it goes without spending too long just trying to get, you know, the avatars to move or whatever it is and if you can move along smoothly from phase-to-phase, cause I think if I was teaching it, I would have that phase-to-phase thing simply because I'd be too anxious that it's just students going too far away and other students are too far behind. That's not gonna work, you know? So phase one, phase two, phase three, phase four and each phase might be only fifteen minutes or twenty-five or something and then in the next class, we're going to the next thing, maybe doing the scripts or coming up with the ideas, you know? So, yeah, it was, cause when I was working with Sean there were areas where you know, we were thinking, 'What do I do now?' [laughing] you know? OK, 'What we do?' So we needed that encouragement or that structure of 'Oh, wait, this is what we do now.' And I think that's the same in any good class, I suppose, there needs to be a structure, there needs to be objectives and you need to achieve those objectives chronologically, you know?

In sum, all participating teachers expressed concerns about the amount of time required for students 'to reach an effective level of use' (Hubbard 2013, p. 164) of technology as well as handle potential technical glitches that might disturb and 'disintegrate' the class by causing students 'to lose momentum'.

To sum up, this section reveals that participating teachers have built up a deep understanding of the affordances and constraints of digital literacy practices for the processes of teaching and learning. The technological tools employed during the machinima production process have not been designed for educational purposes. However, in the excerpts above, teachers identify affordances for coaction and enacting of various identities as having the potential to increase students' engagement and participation in the classroom.

7.3 Technological Pedagogical Content Knowledge

7.3.1 Using digital literacy practices to consciously deploy multimodality

As already shown in Chapter 6, machinima allows for consideration and conscious deployment of multimodality. All participants fully acknowledge the

affordances of digital literacy practices such as machinima for multimodality and discuss their implications for students' learning.

The fact that the teachers participating in the study realised the various affordances of digital tools employed in the machinima production process was shown in Chapter 6 of this thesis. They perceived and enacted a range of affordances for semiosis as well as overcame constraints imposed by the tools used. This should not, perhaps, be surprising since 'we humans are very good at finding meaning' (Gee 2005, p. xi). Humans are able to find meaning 'all over the place, even in the stars, with many people still believing in the medieval art of astrology' (Gee 2005, p. xi). Researchers such as Walsh (2007) and Thomas (2008) analysed digitally mediated multimodal artefacts created by children and identified complex evidence of careful multimodal texturing. Thomas, for example, shows that an eight year old boy has a deep understanding of film and media and of how and when to use particular resources in a machinima video. She argues that the machinima produced by the eight year old student is 'a highly sophisticated construction in terms of narrative originality and innovation' and is 'well matched in semiotic resource deployment with those constructed by adults' (pp. 181-182).

The analysis of the participants' machinima production process in this study revealed that they were consciously and carefully deploying multimodality by combining filmic devices with animated actions of characters, sound effects, music and language to convey the intended meanings of their narratives. Teachers in both groups identified and selected the modes that they deemed to be the most effective to transmit the meaning they wanted to convey.

What is perhaps surprising is the participants' awareness that, generally, language

teachers possess extensive knowledge of multimodality but not a metalanguage to

describe and discuss it. In Excerpt 7.36, Ciara points out that teachers have

knowledge about multimodal meaning-making but they might not have the

terminology to discuss or describe it. She also shows awareness of the affordances

that digital literacy practices have for multimodal communication of meaning:

Excerpt 7.36 (Ciara, post-course interview)

C: I think they [language teachers] have the knowledge [multimodality] but they
might not know the terminology for it. (...) We all know that gestures are important
but if we tried to put that into words, you might fail. So **when you do it in
machinima, you really have to know exactly what gestures go with what
meaning and be able to express that**. It's something that we know but we don't
always know how to express (...)
R: So as a language teacher this is not something that you are necessarily familiar
with? The terminology?
C: Not necessarily, no. There have been units in the book that would focus on it but
it would be a topic rather than a point, a grammar point or something like that. So
the only reason it might come up is if you've got a student from a culture where a
gesture means different things that it does to you. (...)   And then you'll have a
conversation but it wouldn't be seen as something really important for a lesson.

Similarly, Beth expresses her thoughts on machinima as a tool for multimodal

meaning-making in the classroom:

Excerpt 7.37 (Beth, post-course interview)

R: Can you tell me what your thoughts are about this idea of using machinima as
one technological tool for the creation of rich multimodal ensembles?
B: Again, like when, instead of a teacher standing in front of the classroom and like
and let students see or listen to only the teacher, it might be boring. Yeah, even
though the teacher would have gestures and smile and some kind of jokes but if you
can mix or add technology or a machinima video in a class or in a course, I think it
would be like more interesting for students to instead of seeing only the teacher but
seeing videos like I think it kind of (...) eases the atmosphere, serious atmosphere in
class and be more relaxed and when you have relaxed atmosphere it could be more
beneficial for students to be willing to absorb the knowledge and it could make the
course be much easier and to help students to have a better understanding about the
course by using video in class, yeah?

Dean, on the other hand, discusses in detail the conscious deployment of

multimodality in the video he produced with Sean reinforcing Ciara's belief that

teachers possess knowledge of semiosis:

Excerpt 7.38 (Dean, post-course interview)

> D [discussing meaning-making in their video]: I think generally what it was, it was
> trying to get the message across clearer. So the gestures and the clothes and the bar,
> it was all to get this meaning, you know, this message that these are two guys they
> used to be friends but their lives have gone in different directions and there is a
> tension there. There is a tension and, you know, tension is obviously intangible so
> how would you try and make something intangible into something visual, you
> know? So we do that by gestures, by different clothes, we do that by how they're
> sitting, their voice as well as by what they're saying. So hopefully, I think in my idea
> now, is that they all sounded like they were saying things to each other but by all
> those other modalities you could see that actually there was tension there and they
> weren't really hitting it off. It sounded like they did, so that was just the audio but
> when you add in the video and you see that one is already there, one comes in, the
> one that just comes in then just goes out. I mean that expresses a rudeness or an
> inequality, so the first is waiting and he's then abandoned actually, they don't leave
> together, they don't, you know, I mean the conversation is quite abrupt and they
> don't really communicate, you know?

When asked to discuss the potential of machinima for multimodal meaning-

making, Sean points out that it is a cost-effective medium compared to real

cameras in the real world:

Excerpt 7.39 (Sean, post-course interview)

> R: Good and then what are your thoughts for using this technique for the creation of
> rich multimodal ensembles?
> S: Yeah, it's good because it's cost-effective. (...)You wouldn't be able to, it's very
> difficult to use cameras with groups.
> R: Right. Cameras as in digital cameras?
> S: The real cameras, in the real world. I think *Second Life* allows you to go to
> different environments in an easier way and camera angles are stable as well. Like
> you know, if you are an amateur with the camera, it's like, yeah. At least with the
> computer, there is level, you know what I mean?

Despite participants' existing 'epistemologies to production logic' (Sheridan &

Rowsell 2010, p. 101), when asked during the post-course interviews whether

they would consider integrating multimodality into their teaching and whether knowledge of multimodality was important, their initial enthusiasm that was evident not only during the pre-course interviews but during the *Multimodality and Machinima* course as well gave way to reflection. Teachers did not seem enthusiastic to replicate the production process with a focus on multimodality with their students. Therefore, in spite of the complex multimodal practices highlighted in Chapter 6, participants'views of whether the multimodal communication of meaning is relevant to the language classroom remained relatively unchanged. They did not seem to perceive the digital tools nor their affordances for multimodality as necessarily relevant or beneficial to the language classroom.

For example, when Dean was asked whether he would focus on various modes of meaning in the classroom while integrating digital literacy practices, he hesitated:

Excerpt 7.40 (Dean, post-course interview)

D: Not sure, I think, yeah, it depends on the interpretation of (.)
R: But would you want them [the students] to be aware of [these modes]?
D: To me the gestures were (...) It also depends on you, on the whatever skills the teacher has or something. To me, the gestures, they were important but it was a thing to put on at the end like there is, 'Oh yeah, let's have a wave, or let's have (...)' but then another teacher, you know (...) gestures are hugely important in language, these are very important so maybe one group would say 'Yeah, yeah we want lots of gestures' and another group might just get very little gestures and focus on, you know, vocabulary and another group might just focus on something different but I suppose it's important that you (...) that teachers remind them 'Oh yeah, what about gestures, you know?' so then you'd have to give them all those skills first, this is your inventory, is that what we call it?
(...) And then these are your gestures and these are parts of your wardrobe, this is the music that you could use.
R: So you would point them to the resources ? (...)
D: It would be interesting to see if they came up with that themselves, wouldn't that be? You know, if they say 'Oh yeah and we want music, we want (...)'
R: And camera angles? Would you teach that explicitly?
D: Yeah, yeah. There is a lot of, well, that's the thing to teach that explicitly or implicitly and the students caught on to it themselves. I might just mention it and then maybe they will make a big thing about it. **Because you could go on forever,**

you know? (...) So I suppose that the good thing about it is that all these students will find a niche themselves that they'll like or probably have no experience of but they'll say 'Oh, yeah, yeah! I'm liking this editing.' You know. With me and Sean we could have stayed there for hours: 'I'm still not quite, let's edit it again, let's add in more gestures, let's make it more realistic.' It depends on how the students get on, like you don't want to become too tedious like, oh my god, we haven't done any, we're still looking at gestures and I think that if we do gestures for two and a half hours, you know ...

D: Hopefully it's there but that we need to move on so that we do get our final product (...) If the class is going really well, we won't need to have it that structured, we could just, you know, they'd know themselves, OK, music and gestures. So there is a balance there between having it too open where people stop doing and they just mock on (...), you know, which is learning but again we want to have an end in sight. And if having it too structured and saying 'Now we're looking at gestures, these are the five gestures you can use, and now we're looking at music, these are the four tracks you can use.', you know. Because if you have it too open ended, it could go on for hours and then again it depends on the diligence and the teamwork of the students, you know. Are they getting it done? So therefore, for me structure is important, preparation is important. I'd love to have it open ended but with certain limits, time limits, right? Say, you got three minutes to choose your music, or maybe more than three minutes but the important thing is to choose your music and upload it or download it, you know(...) But it just depends on the student groups and how well they are doing but I just know for some particular students you just need to say 'Right, you have five minutes to do this, two minutes to do that.' (...) To keep it moving forward, you know, specifically with this thing, some students, you know seventeen or eighteen just go off task.

Similarly, Ciara points out in Excerpt 7.41 that she does not believe teachers need to emphasise knowledge of multimodality to students but that the former need to be aware of it. Thus, she acknowledges that teachers should have knowledge of multimodality but she questions the relevance of emphasising it in the classroom:

Excerpt 7.41 (Ciara, post-course interview)

R: Right, and in terms of again maybe just enhancing their [students'] awareness, (...) would you emphasise that?
C: I don't think it would be necessary to emphasise it to the students. It's probably just something that you should be aware of yourself as a teacher but maybe if it came up cause they wanted an idea 'How can we convey this?', we could use it as discussion point but it wouldn't be a lesson in itself. (...) That's more technical, professional stuff.

Sean understands the affordances for multimodality that tools such as digital editing offer and, also, provides specific examples of how various modes can sometimes convey meaning more quickly and effectively than writing:

Excerpt 7.42 (Sean, post-course interview)

> R: OK. And can you comment on this phrase that 'digital editing allows for writing with moving images and sound'?
> S: Yeah, I suppose, it's true like you want to, **you can create an atmosphere with a moving image much quicker than writing,** it you'd have to, you'd spend ages describing the set, in two seconds you have the image and you know where they are. And you have the music as well to re-emphasise the environment. (...) So that's, yeah, you know like instead of writing 'It's a rock song.', it's not the same as getting a rock song.

While he does not reject the idea of addressing multimodality in the classroom, he does point out that language should take precedence over all other modes of communication. For instance, his answer on how camera angles should be discussed with students when integrating machinima reinforces the point above:

Excerpt 7.43 (Sean, post-course interview)

> R: So how would you go about the angles then? Would you teach them separately, not in *Second Life*?
> S: Yeah, I think you could, you'd think you could talk about movies and how movies work and you could show different movies on YouTube to kind of educate people that way and use movies as a way of communicating and still bring language into the classroom.(...)

7.3.2 What TPACK should entail according to participating teachers

Teachers argued for the importance of both Technological Knowledge and Technological Pedagogical Knowledge when asked by the researcher what knowledge a teacher should have to employ practices such as machinima for the creation of multimodal ensembles with students or what their TPACK should entail.

The excerpts below also seem to indicate that generally teachers are used to being in control in the classroom and integration of digital literacy practices could cause a loss of control which in turn might undermine their authority. Ciara, for

instance, notes emphatically in Excerpt 7.44 that it is essential for teachers to be entirely comfortable with the technical dimension of digital literacy practices. She only views the technical dimension of digital literacy practices as being problematic, stating that 'apart from that', meaning apart from the technical aspects, the other elements involved, i.e. the ethos dimension, the CK and PK are not new to teachers. On the contrary, according to her, 'most teachers would have that side of the knowledge':

Excerpt 7.44 (Ciara, post-course interview)

R: Can you tell me, after having taken the course, what knowledge, in your opinion, what knowledge do language teachers need to use machinima in the classroom?
C: Eh, **first and foremost**, **Technological Knowledge** (...) They would probably have to spend time on their own going into *Second Life* and finding out how to do all the stuff that we did: making their avatar and that's the main thing and the camera thing as well (...) **They need to get that completely right before they go near the** ... But apart from that, you have the knowledge to use it for teaching anyway because it's basically like role-playing on screen. **Most teachers would have that side of the knowledge**, it's just the technical part that they might not have.

When reflecting on the knowledge language teachers need to have to employ machinima in the classroom, Beth points to the importance of Pedagogical Knowledge as well as knowledge of the technical dimensions of digital literacy practices, i.e. TK. In her view, teachers need to learn the technology so as to be able to teach it to students and handle potential difficulties on their own without disrupting the class and (wasting valuable teaching and learning time). In Excerpt 7.45 Beth notes that when using such practices, teachers' lack of Technological Knowledge might lead to the obstruction of the learning process.

Excerpt 7.45 (Beth post-course interview)

R: Can you tell me, now, in your opinion, what knowledge do language teachers need in order to use machinima in the classroom? What is it that they need to know to use machinima in the classroom?

B: (...) They need to be efficient in using language both in real life and also in an academic way. Another thing is that it would be beneficial if teachers know how to teach, so Pedagogical Knowledge is very important to get students' attention and everything and know which methods they can apply in the classroom and another thing is about technology, of course. (...)
R: So to actually make machinima in the classroom with the students, what is it that the teachers need to know?
B: Of course the first thing is how to use the programs, yeah. (...) Like, eh, the software to make the video, editing the video and again if you want to create a video you have to know like *Second Life*, for example, that the software that you can use characters and everything to make the content for the students to learn and then when you have the programs that you can make the content you have to learn the program. (...) They have to learn and know how to use the programs or the software because in the classroom again if they don't know how to handle the difficulties that may occur when they teach, it would obstruct the learning atmosphere and instead of, students can get the content of the course and also that they have to spend more time in solving the technological problems that occurred and I think it wastes time for both teachers and students.

On the same point, i.e. the knowledge teachers need to use machinima in the classroom, Dean is adamant that teachers need to be aware of 'all possible glitches' as well as be the person that students go to when they encounter difficulties. Moreover, teachers should have 'an immediate answer' in such situations. Dean's views could indicate that often teachers position themselves as the ultimate authority in the classroom (Lotherington et al. 2016, p. 77), hence the need to be in control. What Dean views as loss of control has the potential to undermine teachers' authority in the classroom. Being facilitators or enlisting students' help does not seem to be part of the participants' mindset.

Excerpt 7.46 (Dean, post-course interview)

R: What knowledge, what other skills do you think teachers need to have to use machinima in the classroom?
D: Well, I would think and again this is coming back to what I was saying, we'd need to know all the possible glitches, you know?
R: Everything that could possibly go wrong.
D: Everything that could possibly go wrong just like if I'm teaching grammar, I need to know all the exceptions, you know? [laughing] Because teaching, you know, with a tool like that if it works, it's great, students are going to be very focused and very engaged in it but when things start going wrong when it doesn't work or whatever then it's very easy for the class to lose momentum. And therefore, as a teacher, particularly with this type of thing, you do need to be able to be the person

that students go to and have an immediate answer, you know? Or at least have a plan B, you know rather than just you know, sitting around for half an hour and waiting for something to fix itself. I think, just you know, because from my experience, you know, particularly with computers, that's what you need and when I'm teaching ICT or something I have to have two or three plans, you know, in case this doesn't work because particularly with the younger students they just go on the Internet or (...) and I don't want, I wouldn't like the class to get distracted and disintegrate like that, you know?
D: Because for this to work you need the students to be focused, you need the momentum in the classroom and you don't want anything to break that momentum. Now, maybe I'm being overanxious, you know, but you know if students get you know bored, you know, I mean you have to keep them engaged you know? So if it works, it's great but they are all gonna, inevitably there's gonna be a hundred questions from ten different students, you know, inevitably, there is going to be glitches, inevitably you're gonna have to shift students from one computer to another, you know?

In Excerpt 7.46 above, Dean expresses genuine concern about technical glitches inherent in digital practices. More specifically, he voices his concerns about the impact that technical glitches might have on the teaching and learning process, namely that technical problems could impede the learning and teaching processes. Students could lose momentum, they could get distracted, the class could 'disintegrate' or the teacher could end up being filtered out by learners who might 'just go on the Internet'. Therefore, in order to make sure students are kept invested in their project, Dean believes that teachers need to be aware of and have a solution for absolutely anything that could go wrong when employing a tool such as machinima. It seems that, similarly to Beth, he prefers the idea of 'rigour' and is not willing to leave anything to chance fearing that students might be distracted from educational goals. While some fear is legitimate and some concerns are justified as they are based on emotions and, sometimes, on insecurity (Sheridan & Rowsell 2010, p. 67) rigour or lack of flexibility on the other hand, might impede the creativity afforded by digital literacy practices. Students need to be allowed to be active learners, even leaders and/or producers' in their learning since 'in their own productions, students are more engaged' (ibid).

Teachers' fear of losing control in the classroom is explained by Lotherington et al. (2016) as 'a displacement of teachers' who must now work with students in new ways, 'be facilitators and lose some authority' (p. 77). In their words:

> Learning with digital technologies mitigates classroom power relations because digital competencies can privilege learners' knowledge. Knowledge and learning in this case are distributed, with the learner taking on more agency and authority than is normally expected (or allowed) in the public school classroom. The potential displacement of teachers from their traditional position of authority into a position where they are co-learner or facilitator is an important paradigm shift; it is also a challenging situation for inexperienced teachers who fear that they might lose control of the class. Because most teachers have been taught (and continue to learn) to position themselves as the ultimate authority in the classroom, it can be uncomfortable adjusting to having students self-direct their learning and learn with technologies that teachers are unsure of using themselves (ibid).

While Dean's fear of losing control of the class might not be caused by a lack of teaching experience since he has more than twenty years experience in ESL and EFL teaching, the thought of being in a 'co-learner' or 'facilitator' position seems to make him uncomfortable as shown in Excerpt 7.47 below.

Excerpt 7.47 (Dean, post-course interview)

> D: Something like that [like machinima] would, where the teacher isn't so familiar, it would just, I mean I've seen other classes, not mine but other teachers', **classrooms crazy because the teacher just couldn't control their or didn't have the expertise for the (...) whatever they were teaching and students, like the students knew more than the teacher about technology and** (...) (unintelligible) 'I don't know how to do this' or 'I'm asking students how to do it.' It's very hard then to keep them focused on a particular project.

He further elaborates on the knowledge teachers would need in order to employ digital literacy practices in machinima. Aside from Technological Knowledge detailed in Excerpt 7.48, he emphasises that teachers need Pedagogical Knowledge that encapsulates classroom management skills so as to ensure that students don't go astray and are focused on the project which in turn has to be set out very clearly with clear instructions. Dean details the Technological

Knowledge required of teachers as well as elements of Pedagogical Knowledge that would, according to him, prevent the class from disintegrating:

Excerpt 7.48 (Dean, post-course interview)

D: So there are four, five different skills that you need to be familiar with, all these things that are brought into this, into this project. So how many did we open? We had *Second Life*, we had oCam, we had YouTube, we had, eh, probably two or three other things that. (...)
D: Movie Maker and we had another thing we had to open up for some other reason, I can't remember(...).You could change your location, the time of the day, eh, meet people, holo..., eh, holo...what's the word?
R: Holodecks?
D: Holodecks, yeah, yeah and transport, teleport you know, cause it's very handy. So I think those skills I think they'll be able to pick up quite easily, you know cause it's literally point and pick you know, eh. And I'm sure there's a huge amount, a range of stuff that we didn't touch up.
D: So you kind of learn exponentially, I as, you know, it would be fun I suppose. But again I think, I'm always wanting, it's management, I suppose as well keeping your students focused on the task at hand and that they don't kind of go astray with it, you know? They can do whatever they want home but I think the project has to be set out clearly with clear instructions you know? And I said, get a good momentum going, get a good team spirit.
D: So what a teacher would, I mean the technical skills yes but also I said the class management is important, you know.

Excerpt 7.48 indicates that Dean sees the lack of technical expertise or limited digital competencies as a major barrier to successful integration of digital literacy practices in the classroom. Therefore, despite acknowledging the added value of machinima, i.e. the ethos dimension and its potential benefits for students, limited competencies in the domains of technology and pedagogy are seen as representing serious challenges to digital literacies integration in the language classroom. Consequently, teachers need to be provided with a TPACK model and hands-on practice on how to integrate digital literacies. The focus should be on all domains of knowledge so that teachers are given the opportunity to enhance their awareness of the transformative impact of technological tools' affordances on CK

and PK and of how these intersections can ultimately lead to successful integration, i.e. TPACK.

Another concern for teachers is that training students to use the technical dimension of digital literacy practices leaves limited room for paying attention to language learning. Teachers are concerned that they would not be able to cope with this problem as long as there is pressure on them to teach for exams.

Sean and Ciara also stress that knowledge of movie making such as 'angles and stuff' is more important than knowledge of any of the other tools involved in the machinima production process. Put differently, they view the grammar of moving images, making meaning with filmic devices as being an essential aspect that teachers would need to be aware of when employing machinima in the classroom.

Sean believes that while familiarity with the software used to make machinima is important, the focus in the classroom should be on the communicative side of the project.

Excerpt 7.49 (Sean, post-course interview)

> S: I **think they need to know how to make movies, like have enough knowledge of making movies**, like, you know, I think even when you have a passive interest in movies, in how movies work, they'll be fine. I think that if they have no interest in movies, it would be very difficult.
> S: I think it's a kind of combination of, an interest in movies and in English language, you know, like if you want,..., it's a communicative tool so it allows you to communicate with your students but if you didn't have an interest in movies, I don't think it would be very useful.
> R: And in terms of actual knowledge when you say they need to know how to make movies, what do you mean by that?
> S: (...) to construct, like you just said the thing about the grammar of images and the structure of video. If you have this and even basic knowledge of that, it makes it very easy to make a simple movie. (...)So only **if you kind of (...) concentrate when you're watching a movie or computer games or things like that where did the angles and stuff**, you know, yeah.

R: So what do you think they [teachers] should be able to do before they can use machinima to create these rich multimodal ensembles (...) with students? In terms of actual skills? (...)

S: Yeah, I see, I don't think that the *Second Life* part is that important, I think it's more constructing a story, the narrative part, that's the important part because I think that when we made the movie we focused on the background story, we came out from a distance and then focused in (...)

I don't think *Second Life* is so important like it's, you need to know how to move the people around but after that I don't think...cause I think for a teacher, for example, you would never be able to get shots of [avatars] flying or ...You know, it's general, just basic movements (...)

R: But in terms of camera angles and constructing that in *Second Life*, and adjusting, using the camera controls to construct angles? (...) Do you think that is important for a teacher to know when making a machinima video?

S: I think that thinking about the angle is more important than doing, getting the angle? You think about why you want an angle (...) I think the focus should be on the communicative side of it. And the communicative side is on the construction (...) Not on the product (...) What I find when I used, if did a blog with students, we would have like a week before we'd never go near a computer, one because I knew I wouldn't be able to get the computer running for a long time and two I wanted them just to be writing creatively but we did all the background, we did all the lexical work, long before we ever reached the lab. And so in the lab it was just producing the information, but they talked about everything before (...).

Similarly, Ciara points out that to use practices such as machinima, teachers would need cinematic knowledge:

Excerpt 7.50 (Ciara, post-course interview)

R: So now going back to this idea of using machinima to make rich multimodal ensembles, apart from gestures, what else would teachers need to be familiar with or to be able to do so as to create these rich ensembles?

C: They need some kind of cinematic knowledge, like how the angles can make different meanings, like we had the sheet that showed the bird's eye view and how it related to the character. (...) You might understand that in a film but you might not actually know how to make it yourself. So that would be useful to have.

R: Alright, and in terms of what *Second Life* has to offer? You mentioned gestures (...)

C: Yeah, the camera controls are useful for that.

Despite certain differences, there is a general consensus among the participants that knowledge of the technical dimension of digital literacies is essential in order to prevent 'loss of momentum' among students and keep the class under control.

Another common thread is that all participants agree teachers generally possess knowledge about the ethos of digital literacies, i.e their participatory, collaborative, multimodal nature. Additionally, all teachers perceive these aspects as being beneficial and useful to students. They not only perceive the affordances of machinima for collaboration, intense participation, coaction, synaesthesia, multimodality and enactment of various identities but also discuss these affordances from a pedagogical perspective during the post-course interviews. While participants acknowledge that 'technology in and of itself does not constitute a transformation mechanism or a vehicle for change' (Angeli & Valanides 2009, p. 157), they make the point that teachers need to have a good grip on the technical dimension of machinima to prevent classroom disruptions.

7.3.3 Relevance of digital literacy practices to the language classroom

When participants were asked whether they believed it was feasible to employ machinima in schools and whether they would use it in their own language classes, they raised questions of relevance and pointed out that the pressure to teach for exams made it difficult to integrate such digital literacy practices. Rather, they envisioned the use of machinima as an add-on course or a summer course.

However, even integration into add-on courses requires enthusiasm. According to Dean, it is feasible to use machinima as long as there is enthusiasm. In his view, teachers would need to be passionate about embarking on such a project and they themselves need to want to employ machinima:

Excerpt 7.51 (Dean, post-course interview)

D: Yeah, it is, with enthusiasm. The teacher needs to want to do it. I don't think you can ask a teacher to do it if he doesn't want to do it, you say 'Alright, Joe, you're doing the machinima today.', but that's I suppose that's the same with every class. But, however, you do get teachers who don't want to do things, you do get teachers who don't want to do anything new, they just wanna do the same thing, teach the same class, the same level, the same, eh, the same material, etc, you know? So you need a teacher who says 'Yeah, yeah, I want to do this,' you know. 'I'd like to try something new here.'

Dean himself would consider using machinima with his students as an add-on to his main course and emphasises that he would use such practices as a 'fun', 'different' thing to do. Dean adds that he would prefer the course to be 'short' and 'very structured':

Excerpt 7.52 (Dean post-course interview)

R: If you decided to use this in classroom, how would you be using? What would you be teaching with it?
D: Yeah, I think I would present it as a type of project, I'll say 'OK, we're gonna make movies' and I think a lot of the skills they learn, I wouldn't necessarily, I think I'd present it more as a fun thing, this is something different, we're gonna try this, you know, make a movie, to learn how to use *Second Life* and probably they're probably actually more familiar with it than I am, of course, eh, and so it would be a team or group work mostly, you know ? (...)
D: If I happen to have maybe two hours a week where they want to slot me in because you know my contract is for twenty-five hours (...). If I have these two hours spare, it's fine, you know? But I'd like it to be short though. I don't want it to be an ongoing thing, I'd like it to be very structured as I said, that maybe the first hour we just kind of, you know, go on, like what you did, you know? Students know how to use the cursor cause some students don't actually. Some students don't even know how to send an email. (...) And then the next level, and then the next level, and the next Tuesday, so maybe for four Tuesdays for two hours or an hour and a half or whatever it is. (...) Usually we're looking for things to do and often actually their [students'] feedback session is 'Oh, you know, we paid so much money and in the end we only got four hours teaching every day.' you know so some students do want to do more, learn more.
R: A project?
D: Project type of work so if we get four or five people, yeah, I wanna do this you know?

He then goes on to explain how he would use digital literacy practices such as machinima in the classroom with his students:

Excerpt 7.53 (Dean, post-course interview)

D: From the beginning, you know, like what you did, you have done, I'll be just, 'OK, let's see if you can log on to avatars' so there would be those digital skills as well as computer skills and then being able to manipulate it and then showing them the different resources that are there in *Second Life* and how to use it you know. And then I think I'd have to switch focus and say, 'Right, now we're gonna try and create a movie.' So now it's switched all together to a much more creative process, different type of lesson. I'm gonna say 'Right, we need a plot.' So this is what I was saying with the structure, I think if you just left it open-ended, and I know with me and Sean it was grand because we were mature and we wanted to do it, you know, but I think that if you just go 'OK, just come up with a plot or scenario or whatever.'
R: So it would give them a topic, right?
D: Yeah, either. I remember we were talking about this in the class, you know, what will you start with and I would just, I think I would prefer to give them a start. However, if a student comes and says 'Well, actually, I want to do such and such' and once it's not plagiarised I would go 'Great!' I'll probably give them a starting point and if they deviate from that starting point, great, you know? (...)
D: Because what I would like is for them to start flowing, you know about the whole creativity and teamwork and them to get excited about it themselves and all the aspects that are in there, creativity and technological, the digital literacies. Now, it doesn't always happen but it would be great just to see the three of them there arguing with each other. [laughing]
D: Although we teach adults, they are all (...) seventeen to twenty-one but still there is a lot of secondary school issues, just trying to keep them focused so I'd be nervous just to leave it open ended. I think, again, I'd have it structured and I'd give them a plot or something 'Let's, what about this idea?' you know, 'There would be three characters' 'What about...?' I'd give them maybe a scenario (...) Or something like that, you know. Again, to give them an objective and a structure. If you leave it too open ended it could just fall apart you know? Somebody wants to do this, somebody wants to do that and somebody something else but if you give them 'This is what you're gonna have to end up with or start with' you know? (...) If they are deviating and they say 'Oh, we wanna continue, we wanna have a second scene on it, you know, that first scene inside and now I wanna move', 'Go for it you know?'

Sean also questions the relevance of digital literacy practices such as machinima

to General English courses like the ones he teaches. However, he too, would use

machinima as 'a separate course' or 'a summer camp' only, primarily because of

the time investment required:

Excerpt 7.54 (Sean, post-course interview)

R: Yeah, yeah, OK. And how feasible, do you think it is to use it, let's say you have the technology, how feasible is it to use this in the classroom?
S: It would be feasible but I think you'd nearly need to use it as a separate course, I don't think you would go into a general English course. It could be used as a summer camp (...)

S: Or you know as an add-on course but I wouldn't try to put it, if I was designing a syllabus, I wouldn't have a *Second Life* part, no ...
R: And why not?
S: Just the investment of time, it just takes, it would take too long.
You know, maybe something similar to *Second Life* and something similar to machinima but not the actual video making, maybe even like digital photos or something like that, going around neighbourhoods and taking candid photos (...)
R: And then putting them together in Movie Maker ?
S: Put it together in Movie Maker, yeah, something like that, maybe I'd do that, I wouldn't ...
R: Film in a virtual environment.
S: No, I think it just, just where I'm working now, maybe in the future, yeah (...)
R: And, would you yourself like to try this in the classroom?
S: Yeah, I would but not in my, this classroom, I would. No.

While Sean is adamant that he could not integrate machinima in his mainstream classes, he envisions using certain technical elements of machinima with students to emphasise meaning construction but, he adds, meaning construction with language. Put differently, Sean acknowledges that digital literacies are important but explicitly states that developing meaning-making with language should be the priority:

Excerpt 7.55 (Sean, post-course interview)

S: Yeah, I think I, I don't think I'd start with the *Second Life* part, I think I'd start with how to construct a story first. I'd just focus on the construction of meaning and stories and characters and narratives and narrative tenses and then expand from narrative tenses to constructing a story and visualisation and then from that visualisation, maybe I'll introduce the technology part.
R: OK, so you'd start with scripting or coming up with an idea first ?
S: Yeah, yeah or even just the language, like the grammar of a narrative, do you know what I mean, so how to construct a story.
R: So that was my next question about what you would use it to teach?
S: Narrative tenses, I'd use it for and visualisation of stories so if you wanted to get them to write creative writing essays, the good thing about images is that you get visualisation so you can an image for visualisation cause a lot of students find it difficult cause it's not natural, people don't sit down, or I don't know, maybe some people do, but people don't sit down and go 'OK, I'm gonna write a five hundred word story out of my mind', you need some tools, visualisation tools.
R: And what tools would you be using?
S: Well, it can be something basic as a picture, showing a picture and visualising out from that, what's happening, what's the contacts, who are these people, what's happening, why are they here, what's gonna happen next, what happened before. Cause in a narrative you have to, like, sometimes the first line and the last line are connected and you, they, maybe they'll never think of the last line cause normally

when I read my essays, they're clearly just thinking as they write, you know and try
to get them to go beyond that which can be hard.

Ciara, on the other hand, endorses the relevance of employing digital literacy practices in language classes but like Sean, she does not see any possibilities for integrating them in her current classes. More specifically, she notes that even though she would like to try to use machinima in her classrooms, it is not 'feasible' or 'doable' because the technology is not available and, moreover, teachers do not have enough time. However, she reiterates what she believes is an essential element of the ethos dimension of machinima, namely it motivates students to communicate:

Excerpt 7.56 (Ciara, post-course interview)

> **C :** I'm not sure it's actually feasible the way things are at the moment in these language schools because everyone needs a computer**,** you need to have enough time (...) so it just wouldn't work the way most classrooms are but I think in the future it may be possible. As we go to a more technological-based classroom. (...) It's gonna be the way but at the moment it's not doable.(...)
> C: I would [use machinima] if I had all the stuff that I needed, I would like to do it. (...)
> R: How would you be using it in the classroom?
> C: For various things, if you had a grammar point you could try make a film that used it.(...) But on the wider scale it's all about communication so they'd have to communicate in teams to make this together. (...) And even if I didn't teach them anything about computers and they already knew all that, this would be the point. (...) So everything, it comes down to communication.

Similarly, Beth states that she would like to try to integrate practices such as machinima in the classroom but she would need to practice the technical aspects, perhaps even make machinima videos by herself to master the technology before using it in the classroom. Beth also re-emphasises what she perceives as being machinima's affordances for student learning, i.e. collaboration, shared responsibility and boost in confidence.

Excerpt 7.57 (Beth, post-course interview)

> R: And, how about yourself? Would you like to try to use this technique in the classroom?
> B: Yeah, of course, yeah, if I go back to Thailand I think, yeah, I would apply maybe one but at first maybe I have, I may try to create a video myself first so in the classroom rather than let the students make the video themselves because of the time constraints but if I can manage the course by myself, I would love to try, yeah and let students make video.
> R: So how would you be using it in the classroom then?
> B: In Thailand that would be like a listening and speaking course for students at, in the first year in the university, I think that would be very useful for them. They can make the video themselves and I think to let, they can learn how to speak without worrying about again the accents or the action they make in front of the classroom and they don't have to like hide their notes while presenting in front of the class but they can use technologies to represent themselves freely in front of the classroom. And I think it would make other students to see and watch how other groups work, I think it's yeah, it's beneficial in terms of collaborative learning, yeah, that students can share responsibilities at the same time and practice their language and can learn about technologies, I think, yeah. It would be useful for this course.

Teachers' views of machinima as not 'feasible' in a main language course but rather as an 'add-on' or 'summer camp' course indicate that the time required by the integration of such technically challenging practices constitutes a constraint, mostly because of the pressure of the curriculum and existing assessment paradigms. Thus, while teachers acknowledge several of machinima's benefits for learning and appreciate the transformative impact of digital literacy practices on how students can relate to each other, do things in new ways and enact various identities and there is consensus among them that machinima can be a cost-effective tool that enables participation, multimodal meaning-making and enactment of various identities, they nevertheless identify significant obstacles that must be overcome.

Participants seem to be more reluctant to acknowledge the relevance of the affordances of digital literacy practices for multimodality. This might be because despite views of these practices as a 'fun', 'collaborative', a 'different' thing to

do, teachers do not perceive them as practices that could necessarily prepare
students to pass their language exams. Hafner et al. (2015) point out that the best
way to assess students' participation in innovative, collaborative, multimodal
digital literacy practices remains generally unclear (p. 5). In other words,
assessment of digital literacies in the language classroom has not really been
addressed (ibid) and no clear guidelines exist. Unsurprisingly then, the relevance
of the multimodality of practices such as machinima is questioned perhaps
because there are no clear guidelines on what constitutes good multimodal
communication. As a result of the lack of standard principles and materials
outlining what good multimodal communication entails and how to incorporate it
into the curriculum, second language teachers are not prepared to teach and assess
the multimodal dimension of digital literacy practices (Jones 2014, pp. 10-11).
Jones argues that even though the possibilities for multimodal communication of
meaning are dramatically increased by new digital technologies and new
expectations that communicators use these resources effectively are created (ibid),
digital literacy practices remain marginalised in mainstream classrooms (ibid)
'where instruction remains primarily focused on a curriculum conceived to
promote the language skills necessary to operate in print-based environments or
unmediated, face-to-face settings' (Hafner et al. 2015, pp. 812-813).

To further compound the problem, Hafner et al. (2015) argue, 'relevant national
language and literacy standards reflected in public examinations remain largely
unchanged' (pp. 812-813). Consequently, language teachers like Dean and Sean
will continue to 'perceive digital literacies as more of an add-on than an integral
part of the curriculum' until CK for language teaching is reconceptualised and
high-stake examinations are altered (ibid). More specifically, knowledge of

combining the target language with other modes of communication in various relationships to make meaning should be an important part of the second and foreign language classroom and of the Content Knowledge domain. Communicating has become less about 'speaking' or 'writing', and more about 'designing' (Kress 2003) texts and interactions using a range of resources (Jones 2014, pp. 10-11).

The data in Section 7.3 seem to indicate that participants have a deep understanding of the complex web of relationships between content, pedagogy and technology. Teachers understand how the domains interact with one another helping to create effective teaching. However, while teachers' assumptions about the transformative impact of TK on CK have been somewhat challenged, their beliefs about the relevance of such practices to the language classrooms have remained relatively unchanged.

Teachers describe and discuss the affordances of digital literacy practices for intense participation, coaction and performance of various identities and how these affordances could positively influence students' learning. Because teachers' views of what CK is, namely the language skills necessary to operate in print-based environments or unmediated, face-to-face settings, has remained unaltered, it cannot be argued that they possess a fully developed digital literacies TPACK.

A digital literacies TPACK entails an understanding of the interaction of the three domains as well as an understanding of how the affordances and constraints of digital literacy practices such as machinima can influence students' learning of digital literacies and their inherent multimodality, knowledge of how to use machinima to provide students opportunities to create and interpret multimodal

ensembles and the ability to assess students' learning with machinima. Because of issues such as the lack of standard principles and materials indicating what 'good' multimodal communication is, lack of assessment guidelines for students' digital literacies and, perhaps, most importantly, because national language and literacy standards promote mainly the language skills necessary to operate in print-based environments or unmediated, face-to-face settings, language teachers' TPACK cannot easily develop into a digital literacies TPACK which necessarily entails an understanding of how digital literacy practices facilitate multimodal ways of communicating meaning.

7.4 Conclusion

This chapter provided an overview of participating teachers' digital literacies TPACK. The findings reported here seem to indicate that even though participants possess rich repertoires of multimodal meaning-making practices and are highly competent multimodal designers who can use their existing knowledge creatively to exploit the affordances of modes other than print when given the opportunity to focus on semiosis not just language, they have technocentric, traditional views of technology and its use in and impact on the language classroom, i.e. a tool to support language learning. There seems to be a mismatch between teachers' stated beliefs and actual knowledge. In other words, what teachers think or report that they know or do not know when discussing the CK domain does not correspond to what the recordings of their machinima production practices reveal.

The findings presented herein indicate that teachers are acquainted with and recognise the 'ethos' dimension of digital literacies and its pedagogical value.

They demonstrate their TPK by explaining how digital literacies affordances for coaction, creativity, intense participation and enactment of projective identities can increase students' engagement.

Teachers also acknowledge the affordances of digital literacy practices for new ways of meaning-making, or for the multimodal communication of meaning. They do not necessarily see the value of this dimension of digital literacies for the language classroom. The implications are that while teachers themselves possess digital literacies if these are defined as enactment of affordances and overcoming of constraints of digital literacies, their TPACK remains mostly centred on effective integration of technology. In other words, because the two layers of CK identified in this study, teachers' perceived CK and their actual CK, do not really intersect, teachers fail to see the relevance of multimodality for CK and hence for TPACK.

In short, the findings show that teachers in this study are familiar with the ethos dimension of machinima but they hardly have the time to spend on the technical dimension in the classroom. Also, teachers perceive the added value of practices such as machinima for classroom use but question its relevance because of the language curriculum that is designed to promote primarily the linguistic mode of communication.

Consequently, their TPACK requires first and foremost an explicit reconceptualisation of the CK domain to include knowledge of combining the target language with other modes of communication in various relationships to make meaning.

Chapter 8 revisits the two research questions of this thesis and proposes a reconceptualisation of the TPACK model so as to include knowledge required for effective integration of digital literacies. This could serve as a model on how to use digital technologies for integration of digital literacies which could potentially constitute a powerful means for helping teachers in the classroom.

CHAPTER 8 CONCLUSIONS

This thesis presented a case-study aimed at investigating language teachers' TPACK and their cognition in relation to digital literacies as they experienced digital literacy practices themselves during a professional development course entitled *Multimodality and Machinima*. The study situated itself within the field of digital literacies and ecological CALL. This concluding chapter draws on the theoretical arguments made in previous chapters to discuss the empirical analyses in Chapters 6 and 7 and pull them together by revisiting the two research questions.

The experience discussed in this study has not only allowed for a better understanding of how teachers' TPACK could benefit from experiencing digital literacy practices for the design of multimodal meaning but also of the domains of the TPACK framework that need to be addressed to better equip teachers with the knowledge and understanding required to integrate digital literacies in the classroom. In this chapter, the TPACK framework is adapted so that it can be applied to help improve teachers' abilities to meet students' needs from a digital literacies perspective. Therefore, the aim of the next section is to answer the two research questions of this study, i.e. to discuss what the investigation of language teachers' TPACK reveals about their assumptions about digital literacies and the implications of the findings for existing TPACK models for world language teacher education.

A reconceptualised TPACK model is introduced that includes a broad coverage of the principles and concepts which are deemed to be relevant to a discussion of

digital literacies within language teacher education programmes. This section also proposes the expansion of the CK domain to include ecological perspectives on language and language learning and teaching and a metalanguage that would enable teachers to discuss and explain the creation of various mode relationships enabled by digital tools. The TPACK model proposed herein allows for the consideration of concepts such as multimodal meaning-making and synaesthesia and new architectures of participation such as coaction and intense collaboration. This section brings arguments together into what is hoped will be a coherent perspective on TPACK and its reconceptualisation for digital literacies in language teacher education and the classroom, i.e. a TPACK model to equip teachers with knowledge of how digital tools facilitate new ways of meaning-making and interacting with others.

In short, this chapter first discusses teachers' assumptions about digital literacies and potential causes of their disengagement with digital literacy practices. It then proposes a reconceptualised TPACK model for professional development courses designed to develop language teachers' awareness of the transformative effect of digital tools on language learning and teaching. Finally, the last two sections discuss the limitations of this study and note implications for an agenda of ongoing research on the development of TPACK for integration of digital literacies in world language teacher education.

8.1 Research questions revisited

Successful integration of digital literacies in the language classroom is closely tied to teachers who are the gatekeepers, determining whether technological tools enter the classroom at all and, if they do, teachers are the ones selecting the tools

to support their teaching (Hubbard 2008, p.176). Therefore, teachers' understanding of digital literacies and language learning, i.e. their TPACK for digital literacies integration is paramount. Fostering teachers' understanding of both the ethos and technical dimensions encompassed by digital literacy practices through experience plays a critical role in the process of integrating such practices in the classroom. Only after teachers have developed knowledge of the affordances and constraints of digital literacies and of the complex web of relationships between technology, content and pedagogy, can they be expected to successfully integrate and implement digital literacies in the classroom. However, teachers are often identified as one of the main factors impeding the actual integration of digital literacies and research findings indicate that not much attention is given to the knowledge that language teachers need to have in order to introduce digital literacies in the classroom.

This study sought to understand teachers' TPACK in relation to digital literacies by examining their interaction with a digital literacy practice, machinima. It set out to investigate teachers' TPACK with a view to proposing an updated TPACK model for integration of digital literacies in world language teacher education and the language classroom. The focus was on the two following research questions:

Question 1: What does the investigation of teachers' TPACK in the context of engaging with digital literacy practices such as machinima reveal about their assumptions about digital literacies? Also, what are teachers' views and practices of meaning-making and what knowledge and processes do they draw on when the focus is on semiosis?

Question 2: What principles for the design of professional development framed by TPACK and aimed at effective integration of digital literacies can be derived from the case study results?

The investigation of language teachers' TPACK in relation to digital literacies and their transformative affordances that facilitate new ways of making meaning and new ways of relating to others was carried out through an analysis of teachers' production of a machinima video preceded and followed by opportunities to engage in critical reflection on the affordances of digital tools and their transformative impact on the construct of literacy.

Observing teachers while they participated in a digital literacy production practice and analysing their crafting process allowed for an understanding of how they approached the complex process of multimodal composing and how they assigned meaning to the semiotic resources used in their machinima video. The TPACK framework was introduced to guide the process of investigating what language teachers' direct interaction with an inherently multimodal practice such as machinima entailed and tools from multimodal and unified discourse analysis were employed to identify the knowledge and processes teachers drew on during the production process.

8.1.1 Question 1

What does the investigation of teachers' TPACK in the context of engaging with digital literacy practices such as machinima reveal about their assumptions about digital literacies? Specifically, what are teachers' views and practices of meaning-making and what knowledge and processes do they draw on when the focus is on semiosis?

Chapter 6 showed that teachers engaged in machinima making detected properties of the technological tools used that provided opportunities for multimodal meaning construction. The data analysis in Chapter 6 revealed that during the machinima production process participants made choices about various combinations of modes mindfully. The analysis of their actual CK as revealed by their production practices showed that teachers have profound knowledge of multimodal communicative competence as illustrated by their design and construction of intertwined, complex mode relationships which in turn allowed them to perceive and enact the various affordances for meaning-making embedded in the technologies they were using as well as overcome the constraints of the same technologies. The enactment of the affordances for meaning-making drew not only on participants' existing knowledge of multimodal communication of meaning but on processes such as synaesthesia which enables mindful modal choice. Coaction between the participants in each group and coaction between each participant and their avatar also played an essential role throughout the production process as it enabled them to create meaning through highly coordinated behaviour. In particular, the study identified affordances for multimodality, synaesthesia and coaction of digital technologies as realised by the participants during the machinima production process. These affordances are consistent with previous research by Jones and Hafner (2012) that documents how digital technologies have the potential to transform people's ways of doing things, interacting with others and making meaning.

Finally, findings in Chapter 6 suggest that if digital literacies are seen as encompassing more than the technical dimension to actually include the ability to adapt affordances and constraints of digital technologies to particular

circumstances, then participating teachers possess digital literacies. They enacted affordances and overcame constraints through synaesthesia, spontaneous improvising and coaction. In other words, teachers' own digital literacies were highlighted by the opportunity to assume identities of producers and designers of meaning, identities which are generally denied to them by labels such as digital immigrants.

Allowing participating teachers to experience digital literacies hands-on in the *Multimodality and Machinima* professional development course also challenged them to reflect on what it is they are actually teaching, that is, the very CK domain of their TPACK as well as the impact of TK on CK. Putting them in the roles of user and producer of a digital literacy practice challenged their assumptions about the impact of technology on language and literacy and raised their awareness of the transformative impact of affordances for meaning-making and interacting with others as well as of the pedagogical value of the ethos dimension of digital literacy practices. Thus, engagement with digital literacy practices challenged teachers to reflect upon the transformative impact of the affordances of digital technologies for various aspects of our daily lives. More importantly, it challenged them to reflect on their own assumptions about the impact of technology on language and literacy, hence challenging them to reflect on whether the nature of what they are teaching is indeed changing.

Chapter 7 showed teachers reflecting upon how digital practices can aid the processes of teaching and learning. The findings in Chapter 7 showed teachers were able to understand more intimately what is involved in using practices such as machinima, i.e. its inherent multimodality and the intense participation and coaction it allows. The experience brought participating teachers closer to their

students' experiences and raised their awareness about the pedagogical value of such digital literacy practices.

Teachers also gained an understanding of some of the constraints such practices impose. Machinima, like all the cultural tools people use in their daily lives, involves complex interactions and combinations between the various affordances and constraints it introduces. While teachers overcame the constraints imposed by the technological tools employed through spontaneous improvising, they also identified constraints on the pedagogical dimension of TPACK that make machinima or other similar practices difficult to integrate in the classroom, namely their relevance to the language curriculum, time investment, lack of access to technology as well as the classroom management skills required.

The findings presented in Chapter 7 suggest that placing teachers in the role of the learners to experience digital literacies holds great potential for increasing their awareness of the transformative effect of affordances on the concept of literacy and on classroom practice. Chapter 7 showed teachers reflecting on the transformative effect of the affordances of digital literacy practices for students' collaboration patterns, i.e. new architectures of participation, enactment of various identities and multimodal representations of the subject matter. Findings suggest that teachers perceived a wide range of affordances of digital literacy practices for the language classroom, from seeing these as useful teaching tools to recognising the transformative affordances for coaction, joint authorship, empowerment, increased engagement and new ways of making meaning. Such an experience points to the need to further research teachers' often untapped existing knowledge of multimodal meaning-making as well as incorporate their voices into the design of language learning curricula.

Findings in Chapter 7 also showed that teachers' meaning-making practices unravelled knowledge that sharply contradicted the beliefs expressed by them in the pre-course interviews. Chapter 7 highlighted instances of inconsistencies between teachers' reported CK and their observed practices during the machinima production process, their actual CK. Practices opposed to their beliefs that CK refers primarily to knowledge of the linguistic mode were observed for each of the participating teachers. The examination of teachers' processes of meaning-making and collaboration in Chapter 6 points to significant differences between teachers' expressed views and their actual knowledge.

This study shows a small shift in teachers' TPACK and a progression from views of literacy as referring to the ability to decode spoken or written text to an acknowledgement of the transformative impact of digital technologies on the concept of literacy. Therefore, through a hands-on experience, teachers had the opportunity to develop an understanding of the ever-evolving nature of the concept of digital literacies.

However, what this thesis highlights is that the participants do not necessarily recognise the relevance of all of these affordances for the language classroom, particularly the relevance of the affordances for multimodality. All participating teachers see the pedagogical potential of digital literacy practices but also emphasise that traditional literacy should not be replaced by digital literacies.

Therefore, findings suggest that teachers' beliefs about their CK, what it is they are teaching in the digital age, are resistant to change even when they are engaged in production practices themselves. This may be because teachers' beliefs about the nature of their CK are deeply engrained in conceptualisations of CK that view

language and literacy as mainly being aspects of human cognition or the decontextualised cognitive skills of encoding and decoding words and sentences. In short, while the findings of this study do not suggest that significant changes in teachers' assumptions about digital literacies took place, they do indicate that teachers gained an enhanced awareness of the transformative impact of the affordances of digital literacy practices on the way meaning is represented.

While participating teachers see digital literacies as useful, 'fun', 'different', they believe that digital literacies should be integrated mostly as extracurricular additions to their main language courses. Even though teachers were quite positive about the benefits of digital literacies and were able to highlight their potential for language teaching and learning, they also raised concerns about the relevance of some of the affordances of digital literacies to main language courses because 1) literacy standards and assessment paradigms have not changed; 2) lack of access to technology and 3) the time investment required by such practices.

Consequently, the findings here highlight the importance of 1) reconceptualising what the CK domain for language teaching in the digital age entails; 2) addressing linguistically dominant assessment paradigms and 3) providing teachers with opportunities to reflect on the affordances of digital tools and how these transform what they are teaching, i.e. their Content Knowledge, because teachers' 'assumptions about different affordances of technologies may facilitate or hinder the incorporation of new literacies in the language classroom' (Tour 2015, p. 136). If formal recognition is given to digital literacy practices, they would no longer be perceived by teachers as mostly extracurricular activities. On the contrary, they might be acknowledged as relevant to the curriculum.

To sum up, participants' reflections on the pedagogical potential of machinima for intense collaboration and enactment of various identities illustrate that digital literacy practices might best be understood by teachers through direct meaningful engagement in such practices that incorporate both the ethos and the technical dimension of digital literacies. They might then feel empowered to integrate such literacy practices into their classrooms. The findings reported here extend understanding of the factors influencing how digital literacies are viewed by language teachers after they have experienced digital literacy practices themselves

8.1.2 Question 2

What principles for the design of professional development framed by TPACK and aimed at effective integration of digital literacies can be derived from the case study results?

A digital literacies TPACK and implications for TPACK professional development

Figure 8.1 below represents a schematic conceptualisation of TPACK for digital literacies within which the basic concepts discussed in this thesis play a pivotal role. The domain of Content Knowledge includes the notions of affordances, semiosis, synaesthesia and mode relationships. Thus, a digital literacies TPACK attempts to bridge perspectives of digital literacies scholars with those of ecological CALL. Although this model is a work in progress it offers a starting point for teachers looking to integrate digital literacy practices in the classroom offering a lens through which to assess the transformative affordances of the respective practices.
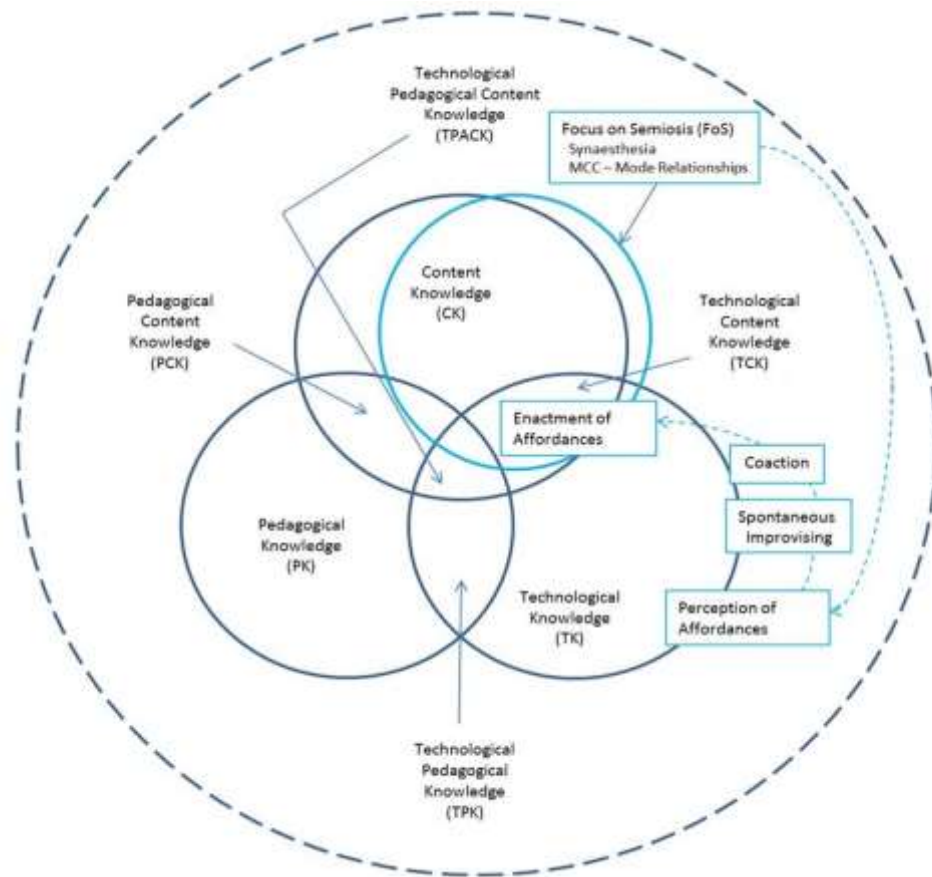
Figure 8.1 A Digital Literacies TPACK Model

Principle 1: The reconceptualisation of CK for a digital literacies TPACK should include ecological perspectives on language and language learning

Chapter 2 reviewed literature that discusses what it means to be literate today and how the concept of literacy has evolved to be fundamentally different today from what it was in the not too distant past (Coutt 2015) when the mere ability to decode spoken or written text was considered sufficient. Today literacy is viewed as including multiple dimensions and involves the ability to create meaning from a multitude of text types, formats and modalities (ibid). The implications for world language teacher education are significant. The new digital literacies require that language teacher education programmes offer structures to help

teachers support their students as they 'navigate a labyrinthine world of meaning' (ibid).

As already mentioned in Chapter 2, the main ideas of digital literacies studies are that language cannot be separated from the social and cultural contexts within which it occurs and language learning is not a matter of mastering an abstract code or a set of decontextualised skills, but of becoming competent in particular social practices such as Facebooking, Instagramming, memeing, Tweeting, gaming of various kinds and so on. The main differences between digital literacies and traditional CALL approaches to language learning have been discussed in Chapter 2, Section 2.3. In digital literacies, 'language' defies labels like 'English' or 'French' to include unstable hybrids or 'remixes' of codes and modes (Jones 2016, pp. 286-287) and is viewed as one of the many resources for participation that people employ to show themselves to be competent members of their communities (ibid).

Similarly, ecological perspectives to CALL avoid 'a narrow interpretation of language as words that are transmitted through the air, on paper, or along wires from a sender to a receiver' as well as 'seeing learning as something that happens exclusively inside a person's head' (van Lier 2000, p.258). On the contrary, ecological linguists propose a theory of language that 'sees language as activity in the world, and as relationships between and among individuals, groups and the world' (van Lier 2004, p. 53). Furthermore, the ecological perspective proposed by van Lier (2000; 2004) strongly emphasises the need to study language in a contextualised manner because language 'cannot be separated from the totality of ways of communicating and making sense of the world' that people use (van Lier 2004, p. 24). An essential aspect that differentiates ecological from 'generative or

other abstract theories of the Chomskian kind' is the view that gestures, expressions and movements cannot be stripped away from the verbal message, and 'meaning-making cannot be boiled down to syntax or lexical constructions' and 'language in its essence is both embodied and dialogical' (van Lier 2004, p. 24). In short, the approach proposed by van Lier (2004) takes a Focus on Semiosis (FoS) perspective arguing that

> there must be rich resources for meaning-making in the classroom and the wider social environment' as well as 'access to these resources, and the learners must be engaged in activities to want to pick up these resources (p. 158).

van Lier points out that 'when learners are engaged', 'affordances of various kinds (direct, social, cultural, conversational, cognitive) become available to be incorporated into the meaning-making process' (ibid).

The concept of 'affordance' is of paramount importance to an ecological perspective to language and language learning and teaching as is to a digital literacies framework. van Lier (2000) suggests that the notion of 'input' that is part of the dominant 'input-output' metaphor of learning and cognition in which the mind and the brain are seen as the 'containers' of both learning processes and learning products (p. 257) should be replaced by the ecological notion of 'affordance'. In his conceptualisation, 'affordances' refer to relationships between properties of the environment and an organism, in the case of language learning, the active learner (ibid), 'relationships that signal an opportunity for or inhibition of action' (van Lier 2004, pp. 4-5). Unlike 'input' which comes 'from a view of language as a fixed code and of learning as a process of receiving and processing pieces of this fixed code', or from 'the view of learners, especially their brains as a computer, into which data is 'inputted' (van Lier 2004, p. 90), 'affordances are

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relationships of possibility, that is, they make action, interaction and joint projects possible' (van Lier 2010, p. 4). Importantly, 'affordances are not pieces of language 'input', they are relations between the active learner and elements in the environment' (van Lier 2004, p. 53). Van Lier argues for 'a shift from an input-based view of learning to an activity-based view' (ibid).

> Within an activity, language is part of action, of physical artifacts, of the actions of others. Learners pick up information from all these resources—physical, social and symbolic—and use them to enrich their activities. In this way, learners are socialised into the social and cultural practices of the language and the people who use it for various purposes (ibid).

Proponents of ecological perspectives understand the environment as including 'all physical, social and symbolic affordances that provide grounds for activity' (van Lier 2004, p. 5) and see the learner as 'immersed in an environment full of potential meanings' which 'become available gradually as the learner acts and interacts within and with this environment' (van Lier 2000, pp. 246-247).

Learning as viewed by ecological perspectives is 'the development of increasingly effective ways of dealing with the world and its meanings' and not 'a holus-bolus or piecemeal migration of meanings to the inside of the learner's head' (van Lier 2000, pp. 246-247). Importantly, language learning does not mean possessing 'a store of linguistic structures, rules, words, phrases and so on' nor 'a process of representing linguistic objects in the brain on the basis of input received' (van Lier 2000, p. 253). Learning a language is not a 'matter of putting things in the head' and is not limited to 'internalising pieces of language that are selected, sequenced and transmitted in language curricula' (van Lier 2004, p. 53). Ecologists reject such narrow views and argue that language development 'occurs

as a result of meaningful participation in human events' and that such 'participation involves perception, action and joint construction of meaning' (ibid). In such socioculturally organised action, affordances 'become available as resources for further action' (ibid).

This study proposes a revised TPACK model for World Language Teacher Education. More specifically, it argues based on fundamental changes of the concept of literacy that a digital literacies TPACK would necessarily include a 'Focus on Semiosis' within the Content Knowledge domain so as to allow for the perception and enactment of the complex affordances for multimodal text production. These affordances, when perceived and acted upon, enable the creative and innovative combination of the linguistic mode with various other semiotic resources made available by digital technologies.

The TPACK model suggested here attempts to reconcile the two approaches discussed above, namely the digital literacies and ecological CALL by bringing them together and focusing on the common elements. In other words, the model discussed here builds upon existing TPACK models, and empirical findings of this study while also adding to the body of work attempting to bridge the gap between digital literacies paradigms and CALL approaches to language and language learning. The model distilled here aims to provide a broad coverage of the concepts relevant to the discussion of digital literacies and pave the way to foster digital literacies among language teachers.

The first common aspect that should be included in the reconceptualisation of the Content Knowledge domain is that language learning is a matter of becoming competent in various social practices. Digital Literacies research takes 'literacies'

as the object of study instead of language learning and define them as 'participation in concrete social practices in ways that allow social actors to show themselves to be competent members of communities' (Jones 2016, p. 287).

Moreover, the CK of a digital literacies TPACK should move beyond a view of communication that favours the linguistic mode to see human semiosis as inherently multimodal. This move is endorsed by both digital literacies scholars and proponents of an ecological perspective on language learning who present compelling arguments for the need to increase awareness of the complex means through which meaning is made in multimodal composition.

The reconceptualisation of the CK domain does not, however, imply that language learning is of little importance or that attainment of proficiency in the linguistic mode is no longer a pressing matter. Rather, it situates language learning in the context of situated digital literacy practices and is concerned with how language learning occurs in the context of situated social practices in relationships of concurrence, complementarity and divergence with other modes of meaning-making.

Principle 2: **Professional development for language teachers framed by the digital literacies TPACK should include a metalanguage to discuss mode relations**.

TPACK is widely regarded as an effective framework for integration of technology in the classroom due to accounting for the interplay between Technological Knowledge, Pedagogical and Content Knowledge. However, current TPACK models for language learning and teaching do not account for the affordances of digital technologies for synaesthesia and multimodal meaning-

making despite repeated calls from digital literacies researchers (Hafner et al. 2013; Jones & Hafner 2012; Jones 2014; Lankshear & Knobel 2008) who argue that digital tools affect the way language is used and, new digital literacy practices make possible new forms of representation and interaction by drawing on the affordances of digital media (Hafner et al. 2013). Digital tools change the kinds of meanings that can be made with language and the types of reading, writing, and communication that occur in online, digitally mediated contexts which demand different skills from those traditionally taught in language classrooms (ibid). Communication is constantly changing, experiencing seismic shifts and 'technology and multimodality are inextricably linked to those changes' (Nelson 2006, p. 72) 'from the world told through the medium of writing on the page of the book, magazine or newspaper, to the world shown through the medium of the visual on the screen' (Cope & Kalantzis 2009, pp. 14-15). These changes in the communications environment 'add urgency to the call to consciously deploy multimodality in learning' (ibid).

While language and traditional literacy have staying power, teachers must become competent in the multimodal communication of meaning. Now more than ever, they are required to have a deep understanding of the affordances of modes of communication as well as affordances of digital technologies for multimodality so as to be able to facilitate students' effective design and production of meaning.

Despite the general consensus among researchers that knowing how to combine the linguistic mode with other modes of communication is an important part of efficient communication, this knowledge has not been explicitly added to the CK domain of TPACK models for second and foreign language learning and teaching. Thus, language teachers question the relevance of the increasingly multimodal

aspect of communication to the language classroom, perhaps, because they feel unprepared to teach and assess this aspect. While teachers participating in this study recognise the affordances of machinima for multimodality, this thesis highlights that there are differences in how teachers view the need to explicitly address multimodality in the classroom. For instance, Dean, Sean and Ciara believe that allowing students to draw on synaesthesia, i.e. to think about the modes that would best convey their intended meaning in multimodal composition is more beneficial and more engaging than explicitly teaching these aspects. These findings point to the urgency to prepare language teachers to take on the role of explicitly teaching learners various modes of communication such as images, music, gestures, language and so on as well as how they interact and work together in various combinations to construct meaning.

The lack of guidelines, standard principles and materials that encapsulate what 'good' multimodal communication is and how it can be systematically taught and assessed constitutes another reason why teachers are reluctant to emphasise the multimodal component of communication to their students and fail to see the immediate relevance of multimodal digital literacy practices to the language curriculum. In other words, teachers have difficulty seeing the link between the affordances for multimodality of digital literacy practices, their existing language curriculum and the fact that student achievement will increase as a result of integration of the multimodal dimension of digital literacies in the classroom.

Ciara points out in the post-course interview, that language teachers possess knowledge of multimodality. However, she adds, they might not have the language to talk about it. In other words, Ciara notes that there is a lack of a metalanguage, a specific vocabulary, to discuss and describe multimodality

among teachers. Therefore, a reconceptualisation of the CK domain would necessarily include a metalanguage that would enable teachers to explicitly discuss and teach multimodality and the relationships that can be designed between and among the various modes of meaning-making. A metalanguage will act as a 'scaffold' (Coutt 2015) and will empower the teaching of digital literacies because it can provide a language with which teachers can describe and discuss the new multimodal representations of meaning afforded by digital technologies. Furthermore, a metalanguage such as the one proposed by Unsworth (2006) and employed in this thesis to analyse the machinima production process can provide coverage of the concepts that are relevant to a discussion of multimodal ensembles. It would ensure that teachers are exposed to notions such as concurrence, complementarity and divergence while also gaining access to an appropriate metalanguage to present and analyse these relationships.

In Chapter 6 of this thesis, the focus was mainly on how participating teachers perceived and enacted affordances for multimodal communication of meaning as well as how they used various modes to design and construct relationships of concurrence, complementarity and divergence. This in turn points to the need for a metalanguage and a framework that significantly support teachers when they endeavour to adopt multimodality in the language classroom. Thus, a reconceptualisation of teachers' CK should include a specific vocabulary that enables multimodal logic and practice. New views of literacy which no longer confine the concept to the realm of language alone entail the development of a metalanguage that accounts for the ubiquitous multimodality of contemporary texts. In other words, reconceptualisations of literacy need to account for the role of all modes of meaning-making in new digital media texts. Multimodality is

integral to the texts produced and consumed today and the various modes of communication can be combined to make meaning in new ways as well as make meanings separately. As a result, teachers need to be provided in their teacher education courses with a metalanguage that will develop both their metatextual awareness of various mode relationships and methods that can facilitate the explicit teaching of this metalanguage.

To date, none of the existing TPACK models for world language teacher education provide accounts of a metalanguage that describes the meaning-making resources of the various mode interactions that are often present in ensembles produced with digital media. While researchers such as Kress and van Leeuwen (1996) have developed a 'grammar of visual design' extrapolating from systemic functional linguistic accounts of language, current conceptualisations of CK for language teachers (van Olphen 2008; Silva 2012; Tai 2015) lack a comprehensive description of possible combinations and interactions between and among the various meaning-making resources afforded by digital technologies.

Effective integration of digital literacies in the classroom requires teachers to address the multimodality inherent in digital literacy practices. However, language teachers are faced with the absence of a theorised description of possibilities for meaning-making that would enable them to develop students' composition and comprehension of multimodal texts. Therefore, Unsworth's work on mode relationships (2006; 2008) addresses this challenge by formulating a metalanguage of image/verbiage interaction which can be usefully extrapolated to various other mode combinations. Unsworth's (2006) account of mode relationships was not intended to specifically help language teachers describe and explain multimodality to their students. Rather, he noted the increasing role and

importance of images in school science materials and pointed to the need for a comprehensive account of image/verbiage interactions and the necessity to extend students' reading abilities to include processing images. Nonetheless, his exploration of intermodal meaning-making between images and language can be usefully employed in language teacher education programmes to describe and explore the various mode relations that can be constructed with the help of digital tools thus providing an appropriate scaffold for teachers as they approach multimodality.

Principle 3: Professional development for language teachers should enable teachers to experience the new architectures of participation afforded by digital literacy practices.

The different affordances and constraints of new digital media have been divided into different kinds, namely affordances and constraints on what people can 'do', what and how people can 'mean', how they can 'relate' to others, and, finally, who they can 'be' (Jones & Hafner 2012, p. 5). Therefore, participating in digital literacy practices always involves not just new ways of making meaning but also new ways of doing things, relating to others, being a certain kind of person (Jones 2016, p. 287).

Current TPACK models for language learning and teaching do not account for digital tools affordances for intense participation and coaction between participants and between participants and their avatars when practices such as machinima are employed. A digital literacies TPACK would also view learners as 'participating intensely' in literacy practices with their peers 'rather than learning' (Jones 2016, pp. 286-287).

Chapter 7 showed that the teachers participating in this study recognise the value of the new architectures of participation afforded by digital literacies for their students as well as the importance of allowing the latter to create their own content. Teachers in this study acknowledge the sense of achievement that practices of production entail. They show awareness that the level of engagement, satisfaction, and learning that happens when students produce a multimodal ensemble is much more advanced and beneficial when it is shaped around activities and practices students like.

Digital technologies and the prosumer movement make production means accessible to everybody. The idea of 'prosumer education' involves a shift in teachers' role in the classroom, challenging them to change both what they are doing and how they are doing it by placing a strong emphasis on learners creating their own content (Robbins in Sheridan & Rowsell 2010, p. 43). Schooling needs to be based on practices that allow learners to become competent in the multimodal, non-linear literacies available in digital environments instead of paper-based literacy (ibid). Educators, on the other hand, need 'to step aside' and act more as travel guides thus allowing students to be 'active learners', 'lead the way' and be producers in the classroom as well (ibid). In this way, students can become 'architects of their own learning trajectories' (Hafner et al. 2013, p. 814). Furthermore, the type of activities that they do for fun in their lifeworlds, the forms of media that they engage with and the content they create voluntarily in their own time for fun should be given 'prime center seat in the classroom' (Robbins in Sheridan & Rowsell 2010, p. 43). In other words, language practitioners should seek to capitalise on new digital means of production and communication and learning that students already know (p. 67) and 'leverage their

interest in and knowledge of those technologies into carrying out innovative CALL activities' (Lafford 2009, p. 691). Teachers need to employ innovative digital literacy practices that foster greater student participation, in part 'by tapping the types of learning students are already doing' (Robbins in Sheridan & Rowsell 2010, p. 43) in their lifeworlds. Thus, teachers need to create spaces that facilitate 'collaborative, open, and especially peer-powered knowledge-making participation structures' (ibid). These new participatory production practices challenge existing teaching paradigms but are more engaging to students (Sheridan & Rowsell 2010, p. 43). If teachers want to encourage learning with communities of creative and engaged participants, they need to:

> design environments that encourage creative and engaged ways of acting and thinking. These environments should be thought of as architectures of participation that provide legitimate sites of learning where people can meaningfully contribute, receive constructive feedback, and shape the community—often as producers who are ratified, valued members of their community (Robbins in Sheridan & Rowsell 2010, p. 69).

A digital literacies TPACK should offer teachers the possibility to understand and experience the affordances of digital literacy practices for these new architectures of participation and coaction for their own authentic purposes. Participating in professional development courses that offer a safe space and room for teachers to explore, experiment and develop tolerance for failure is an essential element in developing a TPACK for digital literacies.

Implications for TPACK professional development

The reconceptualised TPACK offers a model for digital literacies following the one proposed by Jones and Hafner (2012) that shows how the affordances of

digital tools facilitate new ways of meaning-making and doing things in coaction with others.

The TPACK presented here draws on the theory of affordances as outlined by van Lier (2004) and, while embryonic and provisional, it can serve as a useful starting point for teacher educators and teachers who are interested in understanding and experimenting with digital literacies to effectively embed them in the language curriculum. It should encourage teachers to consider the task of going beyond the current emphasis on technology integration to also look at affordances for new ways of making meaning and doing things in collaboration with others.

The reconceptualised TPACK for digital literacies embodies the new 'ethos' of digital literacies so as to ensure that teachers do not strip them of their newness or colonise them to existing teaching practices (Knobel & Kalman 2016, p. 6). Awareness of the ethos dimension of digital literacies can be best acquired through immersion in a range of digital literacy practices. Ideally, teacher education programmes should expose teachers to a wide range of digital practices to enable and encourage them to identify the various affordances for transformation of digital tools since they are tasked with preparing their students for an uncertain future. Such exposure and immersion should be provided during preservice teacher education programmes because teachers' prior language learning experiences establish cognitions and beliefs about learning and language learning which form the basis of their initial conceptualisations of L2 teaching during teacher education, and which may continue to influence them throughout their professional lives (Borg 2003, p. 88).

With the above in mind, it is, however, important to remember that digital literacies are 'transient' (Belshaw 2012, p. 204) since 'the nature of literacy in a culture is repeatedly redefined as the result of technological changes' (Hannon 2000, pp. 22-23 cited in Belshaw 2012, p. 204). In other words, digital literacies change over time and may require users to employ different tools or develop different habits of mind, and almost always depend upon the context in which individuals finds themselves (Belshaw 2012). Digital literacies 'can' be scaffolded and developed but to do so involves more than training, it involves 'education' (ibid).

Providing teachers with hands-on experiences of innovative and unknown digital literacy practices that are mapped onto the TPACK framework to show a reciprocal relationship between existing knowledge domains challenges them to take a critical stance towards technology and avoid both utopian and dystopian views of digital literacies. A digital literacies TPACK should offer teachers the possibility to experience digital literacies themselves and encourage them to discuss and reflect on their experience as a digital literacies user. The findings of this study also highlight that professional development courses should feature components such as reflection on the concepts to be introduced, hands-on practice, experience with the transformative affordances of digital literacy practices as well as contact with other teachers.

This thesis suggests a model of professional development and learning that takes into account teachers' personal experiences with technologies and provides them with opportunities to examine and challenge their dominant assumptions. Teachers also need opportunities to extend their understandings about affordances

of digital technologies in creative and innovative ways (Tour 2015). In turn, these experiences can help in re-thinking approaches to language teaching.

This thesis also proposes that a digital literacies TPACK framework recognises digital literacy practices 'as a catalyst for transforming or reconceptualizing classroom teaching and learning in some way' (Knobel & Kalman 2016, p. 8). Digital technologies should be employed to do things differently, to initiate teaching and learning processes that would not be possible in the absence of these technologies. In other words, integration of digital technologies should not be about using technologies 'to do the same but better, faster or easier or even more efficiently' (Coll 2008, p. 124 cited in Knobel & Kalman 2016, p. 8) but about identifying and enacting the affordances of technologies for transformation of practice, i.e. the resources that allow people to make meaning in new ways and to do things with others in coaction and through intense participation.

A digital literacies TPACK would push teacher educators and teachers 'to rethink the knowledge that the latter should have' (Doering et al. 2009, p. 334). The TPACK model should be used as a metacognitive tool that teachers make use of to enhance integration of digital literacies into their classrooms. The model presented here has the potential to help teachers 'visualize how their knowledge of technology alongside their skills work in tandem with their other knowledge domains about teaching and learning' (Doering et al 2009, p. 335). Additionally, thinking about TPACK through visual representations prompts teachers to be metacognitve about their teacher knowledge strengths and areas of growth. This metacognitive awareness of TPACK allows teachers to set learning goals for themselves and, subsequently, make thoughtful decisions for integration of digital literacy practices (ibid).

The examination of the participating teachers' TPACK has exposed their knowledge of the ethos dimension of digital literacies. In other words, it exposed their ability to design and convey meaning multimodally in coaction with their partners. The examination of the relationships between teachers' existing knowledge and digital literacy practices such as machinima revelead teachers' conflicting beliefs or cognition about what they think the CK of their TPACK is. These findings complement research by van Olphen (2008a; 2008b) and Silva (2012) who argued that TPACK should be specifically conceptualised for second and foreign language teaching domains. The TPACK model discussed in the thesis is aimed at enhancing teachers' awareness of digital literacies, especially of their ethos dimension and its benefits for students. This in turn could pave the way for the integration of digital literacy practices in the classroom. Both digital literacies and TPACK researchers argue that providing teachers with models to explore digital literacy practices on their own constitutes a powerful means to prepare them for using such practices in the classoom. In sum, the TPACK model proposed here guides teachers towards understanding how the affordances of digital media make possible new forms of creating meaning as well as new way of doing things in collaboration with others. Putting teachers in the role of users of digital literacies and designers of multimodal meaning is vital because it enables them to become acquainted with the concept of multimodality, challenge their assumptions about the impact of technology on language and literacy as well as gain awareness of the practices their students use in their lifeworlds.

8.2 Limitations of this thesis

The study described in this thesis provided language teachers with opportunities to reflect critically on their dominant assumptions about digital literacies. Teachers were given opportunities to extend their understandings about the affordances of digital literracy practices in creative ways.

This thesis investigated teachers' TPACK by examining their practices of meaning-making during the machinima production process and their beliefs about the affordances of digital literacy practices through self-reported data. It did not, however, examine teachers' TPACK from the aspect of classroom practice and this constitutes one of its main limitations. This means that the PK component and its implicit interactions with the other TPACK domains have not been thoroughly addressed beyond self-reported data.

Another significant limitation is that only a limited number of teachers took part in and contributed to this study. This may have resulted in bias in the findings since only language teachers that were genuinely interested in the topic of the study participated.

8.3 Directions for future research

This study reflects findings from the mainstream literature on digital literacies as it shows that teachers view the CK domain of their TPACK as consisting primarily of knowledge of language as a discrete and purely linguistic system of meaning-making and, moreover, question the relevance of digital literacies and their inherent multimodality to the language classroom.

Findings in this study have also shown that while teachers possess the ethos dimension of digital literacies, they view the technical dimension as being overwhelming and do not feel sufficiently prepared to use digital technologies in the classroom. While some of the causes may be their existing conceptualisations of language and assessment paradigms that are based on views of language as an abstract code or a set of decontextualised skills, teachers' exposure to the use of digital technologies for learning, particularly in low risk environments, could shape the ways they view and use digital literacy practices in the classroom. Teachers' awareness of the transformative effect of the affordances of digital literacy practices is important and should assist them when deciding what digital practices to employ in the classroom. This should in turn help teachers avoid colonising new digital literacies to existing classroom practices. Thus, this study suggests that an area deserving further research concerns professional development courses that provide teachers with opportunities to confront their pre-existing beliefs, challenge their 'conceptual inflexibility' (Borg 2003, p. 90) and investigate the actual processes through which language teachers' actual beliefs and practices are transformed (Borg 2003, p. 98).

This study highlights, therefore, a need expressed by other new literacies researchers, namely 'to develop and share professional development models that support and scaffold teachers in their shift towards a 21st century educational paradigm where the use of digital tools is synonymous with learning' (Lotherington et al. 2016, pp. 73-74).

The experience of the teachers participating in this study also suggests that current conceptualisations of the second and foreign language curriculum alongside the pervasive power of language-dominant assessment paradigms often dictate what

is taught in the language classroom. The linguistic mode is considered essential to assessment and, consequently, attracts teaching emphases leading to the neglect and sometimes exclusion of visual, audio, gestural, spatial and tactile meaning-making modes. The overemphasis on accountability and standardised tests in current language education milieus causes teachers to feel overwhelmingly pressured to teach for tests thus deviating from the initial goal of education, that of 'teaching for education' (Tsai 2012, p. 17).

Despite promising research findings and reconceptualised TPACK models, existing assessment paradigms and 'the narrow test-based accountability culture' (van Lier 2004, p. 161) remain some of the major impediments to effective integration of digital literacies in the language classroom. There is then an imperative need for research that re-examines relevant language and literacy standards reflected in examinations that have remained largely unchanged as well as current assessment practices that 'attempt to locate success in the solitary performance of a learner' (van Lier 2000). An education system that is dominated by a particular view of intelligence and a narrow curriculum that 'focuses only on the individual in isolation' is bound to discourage possibilities for collaboration and creativity (Sheridan & Rowsell 2010). If such high-stakes examinations are not altered, integration of digital literacies in the language classroom will continue to be viewed as an add-on to mainstream courses.

The findings of this study complement previous digital literacies research findings that indicate that the greatest contribution to language teacher education will be a reconceptualisation of the CK domain and implicitly that of the curriculum from a curriculum conceived to promote a view of language as an abstract code or a purely linguistic system of meaning-making that tends to marginalise digital

literacy practices to a curriculum that includes new ways of theorising language (Jones & Hafner 2012; Hafner et al. 2013; 2015).

Language teachers' TPACK is not frequently interrogated and there is a need for research that delves more into what it means to be a teacher in the digital age as well as into what it is language teachers are actually teaching, i.e the CK domain of TPACK. Ecological theory offers new perspectives on 'what language teachers should be in the business of doing' (Kramsch 2008, p. 405) that can be reconciled with a digital literacies approach to language and language learning. While 'ecological theory doesn't offer a blueprint for what to do on Monday morning' (ibid), the deep way of approaching ecology adresses the underlying causes of problems by examining them and advocating deep changes (ibid). In many institutions languages are taught 'according to a 19th-century modern view of language as a structural system with rules of grammatical and lexical usage' despite the fact that the 21st century is all about meaning, relations, creativity, subjectivity' (ibid). From an ecological perspective, teachers of second and foreign languages are 'teachers of meaning' and not just 'teachers of a linguistic code' (Kramsch 2008, p. 403).

Studies examining the classroom aspect of teachers' TPACK would be an important addition to the research presented herein. Language teachers' implementation of digital literacy practices that they have previously experienced during professional development course is essential to further research on how they choose to integrate such practices in the classroom. In other words, continued research can benefit from attention to teachers' actual implementation of digital literacy practices in the classroom.

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APPENDIX A - BACKGROUND QUESTIONNAIRE

1. Name:
2. Gender
      a) Female
      b) Male
3. Age range
      a) 20 - 25
      b) 26 - 30
      c) 31 - 35
      d) 36 - 40
      e) 41 +
4. Native language:
6. Years of experience:
7. Language(s) you teach:
8. Levels you have taught (select all that apply)
      a) A1
      b) A2
      c) B1
      d) B2
      e) C1
      f) C2
9. Age groups you have taught (select all that apply):
      a) Under 12 years old
      b) 12 - 17
      c) 18 - 24
      d) 25 – 30
      e) 31 +
10. Responsibilities you have in the school where you teach (select all that apply):
      a) Plan classes
      b) Design materials
      c) Design tests
      d) Supervise teachers
      e) Train teachers
      f) Select textbooks
      g) Other
11. Materials you use in your classes (select all that apply)
      a) Textbooks
      b) Computers
      c) Board
      d) Overhead projector
      e) DVD player
      g) Audio tapes/CDs
      h) TV
      i) Other:

APPENDIX B - PRE-COURSE INTERVIEW QUESTIONS

1. Why did you decide to enrol in this course? What was your motivation for taking this course? Were you interested in the topic? If so, why?

2. Are you familiar with the concepts of virtual worlds, machinima, multimodality and multimodal competence? If yes, how did you become familiar with such concepts?

3. What counts as literacy in your opinion?

4. In your opinion, what do the more recent technologies such as blogs, social networking sites, video-sharing sites such as YouTube mean for being literate in the 21st century?

5. What modes of communication (explain or exemplify) are you familiar with and which ones do you use when teaching?

6. What is your understanding of how language, gestures, image and sound work together to create a text? Can you give a brief example of this?

7. What do you hope to gain from this course? What would you like to know and/or be able to do once it is finished? Why is this an important goal for you?

8. What do you think of the argument that 'machinima can help create rich multimodal experiences?'

9. Do you have any questions for me?

APPENDIX C - POST-COURSE INTERVIEW QUESTIONS

1. Can you compare your initial expectations to the actual experience?
2. What knowledge/skills do language teachers need to have to use machinima in the classroom? What should they be able to do before they can use machinima for the creation of rich multimodal ensembles with their students? E.g. navigate in SL
3. What are your thoughts on using machinima for the creation of rich multimodal ensembles in the classroom? What do you think it offers when compared to digital-video making, for example? (a role play is not a rich multimodal ensemble)
4. Do you find editing on the computer similar to writing in any way? Can you comment on the following phrase: Digital editing allows for writing with moving images and sound (Payne 2011)
5. What would be the pros and cons to using machinima in the classroom?
6. How feasible do you think it would be to use such a technique in your classroom?
7. Would you like to try to use this technique in the classroom? How would you be using it in the classroom, you must have been thinking about this as a teacher, how would you be using this technique in the classroom?
8. What is your overall opinion about the Multimodality and Machinima professional development experience? What did you like about it? What can be improved?
9. Do you think the materials and activities helped you get prepared to teach using machinima? How helpful were the instructions and the set up, i.e. the projector showing the facilitator's screen?
10. In terms of professional development, what do you think you have gained?
11. Let's have a look at the machinima you produced with your producer:
    a. What type of story is it? What genre? I remember that one of the first things you did was to decide on a genre…how did that influence the rest of your decisions in the making of this video?
    b. What is the story about and where is it happening? Who are the participants involved and what circumstances are represented in the video? (what is the relationship between the viewer and what is viewed?)
    c. What are some of the modes used to tell the story? Can you tell me a little bit about your choices for meaning making? Gestures? Lighting? Music? Sound effects? Camera angles? Black and white pictures?
    d. Would you have needed more time? For what part? What would you do differently? How would you use the video you produced to teach? What would you teach with it?
12. Do you feel there's anything you'd like to add?
13. Do you have any questions for me?

APPENDIX D - TRANSCRIPT OF POST-COURSE INTERVIEW WITH CIARA

R: OK, so my first question is about your initial expectations? Can you compare them to the actual experience?

C: Well, I kind of just expected that we'd learn how to use Second Life and the computer and that was pretty much what we got. Maybe a bit more theory, which was good, I kind of expected mostly practice but it was good to have the theory as well.

R: And when you talk about the theory, what part are you talking about?

C: The terminology and examples of that and where the word machinima came from and all that kind of thing.

R: Alright.

C: I think we spent the first twenty minutes or something on that?

R: Alright, alright.

C: That was interesting.

R: OK. And now since you mentioned that, can you tell me, after having taken the course, what knowledge, in your opinion, what knowledge do language teachers need to use machinima in the classroom?

C: Eh, first and foremost, technological knowledge

R: OK.

C: They would probably have to spend time on their own going into Second Life and finding out how to do all the stuff that we did: making their avatar and that's the main thing and the camera thing as well that was on a different [unintelligible]. They need to get that completely right before they go near the (...)

R: Alright.

C: But apart from that, you have the knowledge to use it for teaching anyway because it's basically like role-playing on screen.

R: Hm, alright.

C: The most teachers would have that side of the knowledge, it's just the technical part that they might not have.

R: So, by that, you mean the environment where to go, the machinima, the filming part and how about editing? Is that...? Do you think they need to know that?

C: I think they would need to know it by maybe not till later, maybe once they've got the actual filming part out of the way, then they can go and learn that for the next session.

R: Alright.

C: It would be necessary but it wouldn't be you first concern.

R: OK, alright. And (.)

C: I found that the easiest part to be honest so (.)

R: The editing part?

C: It wouldn't take that long.

R: Have you done any type of editing before?

C: Never.

R: And you thought that was the easiest part?

C: I really did. It was just like snipping things with an actual scissors and gluing them together. It was so easy.

R: Alright. OK. My next question is about the knowledge that teachers need to have to use machinima for the creation of these multimodal ensembles that we talked about? Because as you say you can use machinima to just record role-play and that's multimodal in itself.

C: Yes, it is.

R: But we tried to do more than that. We tried to add meaning by focusing on other modes as well. So, what do you think teachers need to know to use this technique for the purpose of creating rich multimodal ensembles?

C: I think they have the knowledge but they might not know the terminology for it.

R: Mhm.

C: We all know that gestures are important but if we tried to put that into words, you might fail. So when you do it in machinima, you really have to know exactly what gestures go with what meaning and be able to express that. It's something that we know but we don't always know how to express.

R: So as a language teacher this is not something that you are necessarily familiar with? The terminology?

C: Not necessarily, no. There have been units in the book that would focus on it but it would be a topic rather than a point, a grammar point or something like that. So the only reason it might come up is if you've got a student from a culture where a gesture means different things that it does to you.

R: Mhm?

C: And then you'll have a conversation but it wouldn't be seen as something really important for a lesson.

R: So, the gestural mode though would be something that you would have discussed in the classroom.

C: Yeah.

R: Because students come from different backgrounds.

C: And you're checking if your gestures don't mean something dirty to them [laughing]

R: Right, OK. So now going back to this idea of using machinima to make rich multimodal ensembles, apart from gestures, what else would teachers need to be familiar with or to be able to do so as to create, again these rich ensembles?

C: They need some kind of cinematic knowledge, like how the angles can make different meanings, like we had the sheet that showed the bird's eye view and how it related to the character.

R: Mhm.

C: You might understand that in a film but you might not actually know how to make it yourself. So that would be useful to have.

R: Alright, and in terms of what Second Life has to offer? You mentioned gestures (...)

C: Yeah, the camera controls are useful for that.

R: Alright, OK. Good, and now can you tell me, what are your own thoughts about using this technique, machinima, for the creation of rich multimodal ensembles in the classrooms? You've used videos in the classroom before, right?

C: Yeah, I have.

R: Right?

C: I'm not sure it's actually feasible the way things are at the moment in these language schools because everyone needs a computer, you need to have enough time to set everyone up on Second Life so it just wouldn't work the way most classrooms are but I think in the future it may be possible. As we go to a more technological-based classroom.

R: Yeah.

C: It's gonna be the way but at the moment it's not doable.

R: Because the technology is not there.

C: The technology isn't there but you can always use this stuff to make things in the classroom without Second Life. You can use the stuff that we gathered to make it in real time with the students as the actors.

R: OK?

C: You could still do that. All you need is a cam corder or a mobile phone.

R: Right, and you, you have done that.

C: I have but I think I could maybe be even more successful with some of these ideas.

R: Which ideas?

C: Like planning it out more fully

R: Mhm.

C: Storyboarding and maybe just using the angles (...) that I just used, hold up the camera and that was it so. You could go further with this.

R: Alright, so, now when comparing machinima to just plain digital video-making which is what you've been doing in the classroom, do you think machinima has more to offer, is there an added value?

C: I think the added thing would be the environment, the places that you can use, that you don't have access to in the classroom but on the other hand it's very clumsy. You can't always get the characters to do exactly what you want whereas a human actor can just do it and you don't waste three hours trying to steer it so (.) There is both sides to this.

R: So it's more about where you film and it's more about the virtual world?

C : Yeah, and you can actually get different angles because I don't think I'd be able to get a bird's eye view on a cam corder, I'm not that tall.[laughing] But, yeah, it's about the environment rather than the acting and movement ...they're better in real time.

R: OK very interesting. Now, you said that you found editing to be the easiest part, right?

C: Yeah [laughing].Once I knew how to do it, it was simple.

R: Right, do you find it similar in any way to writing?

C: A little bit, yeah. And I do do a lot of that.

R: You do a lot of writing?

C: Yeah.

R: OK.

C: So if I'm reading over what I wrote, it's, if I wrote it, it's harder but if I typed it, it's really easy just delete what you don't want, move things around, put in extra things that fit.

R: OK.

C: But it's so much easier than you'd have to scribble it all out and start again on a piece of paper.

R: OK, but in terms of writing in the traditional sense, not in terms of writing on the computer, just the idea of writing.

C: I think, yeah, because it's linear in that sense. You got to see each scene in a row where it should be and, I don't know, somehow because I'm organised and I didn't realise it, I'd actually given all the scenes that we were going to use numbers.

R: You were flying through them!

C: So when we went there, they turned up in the right order so that was perfect, it was easy in that sense.

R: So you made it linear, right?

C: I think I did. Because I have a linear mind.

R: Yeah, yeah, very interesting. And can you comment a little bit on this phrase that "Digital editing allows for writing with moving images and sounds?"

C: That sounds exactly right.

R: OK, why is that?

C: Because the actual scenes, when you get them in linear format would be the writing and then the other things, the sounds and the other, the music and things like that, stuff that you hang on it to make them mean more, like decorating your writing in a way.

R: Alright. Decorating your writing, that's very interesting.

C: It's like a comic book because you don't just have the words, you always have the pictures as well and the sound effects "bang".

R: Yeah, and how does this in your opinion, how does this impact the concept of literacy?

C: I don't think it does (...) Because you still have to have all the literacies to do all the pieces of the job. You just put them all together.

R: And when you say all the literacies, what do you mean by that?

C: You need the computer literacy to do it in the first place.

R: OK. So you're not talking about reading and writing, right?

C: Normal literacy, yeah. To be able to storyboard and plan you need that.

R: Mhm?

C: So basically, you need different different types that you put them together in the process

R: Different types of literacies?

C: Mhm [confirming]

R: OK, so I guess my question was more about whether this expands the very narrow way of looking at literacy as simply referring to reading and writing?

C: Reading and writing, yeah. I guess it does in that sense because you include computer literacy

R: Mhm?

C: And the other ones that I can't remember but they are there, laughs

R: They are there.

C: They are there, even if I don't know the names for them.

R: Alright, and OK, now going back to machinima, what would be the pros and cons to using machinima in the classroom?

C: To show it would be really interesting because you can, it's shorter than getting a DVD and showing a film, you can get straight to the point with it. And to make it in class would be entertaining, it's something new and different for them. They get to work in teams but the con, I think, the big one has got to be the technology and the amount of training it takes. And even if you have the technology, you don't have two days to do it in ... and...with the class the way I've experienced them, you can say 'we'll do a little bit every day' but tomorrow half the students didn't come in, the next day you got two new people who didn't start with it so (...)

R: Yeah.

C: So it's not ideal...and the clunkiness as well is a disadvantage.

R: Yeah.

C: But it is interesting.

R: Yeah, right, OK.

C: It would be great if all the situation was ideal but that's never gonna happen.

R: OK, yeah. So as a pro, you would use ready made machinima?

C:Yeah, I would, from YouTube like we saw there and I'd be able to do that fairly easily in my school cause the computer hooks up to the projector.

R: Oh?

C: And I don't have to do that. I just press play and there it is. [laughing]

R: Right, so, I guess, you've answered my next question which is about the feasibility of (...)?

C: In a way, it's not but the ready made ones certainly are

R: Yeah.

C: Definitely.

R: And would you consider making machinima yourself for your students? Or you think that ideally your students would be making them?

C: Yeah.

R: If the technology was in place?

C: But I'd definitely consider it especially if I had someone to be another character because it wouldn't be easy on your own. Yeah, it would be something to keep in mind

R: Alright, eh...so, now again, you answered my next question which was whether you'd like to try to use this in the classroom.

C: Yeah, I would if I had all the stuff that I needed, I would like to do it. And even if I don't, I'll use some of it.

R: How would you be using it in the classroom?

C: For various things, if you had a grammar point you could try make a film that used it.

R: Mhm?

C: But on the wider scale it's all about communication so they'd have to communicate in teams to make this together. And even if I didn't teach them anything about computers and they already knew all that, this would be the point. So everything, it comes down to communication.

R: So to make the movie they would have to collaborate and communicate?

C: Exactly!

R: And how about the final product, would that be of interest to you? Or is it more about the process of making it?

C: Yeah, it's an achievement for them. They get to look at what they've managed to make and I think that would give them a sense of satisfaction. That'd be something that we did that we've managed to make together, we can keep it, they could save it on their computers.

R: Right, and in terms of again maybe just enhancing their awareness, because as you say everything we do is multimodal, would you emphasise that?

C: I don't think it would be necessary to emphasise it to the students

R: Hm?

C: It's probably just something that you should be aware of yourself as a teacher but maybe if it came up cause they wanted an idea "How can we convey this?", we could use it as discussion point but it wouldn't be a lesson in itself.

R: Right, right.

C: That's more technical, professional stuff

R: OK and going back to the actual course, what is your overall opinion about the Multimodality and Machinima professional development experience?

C: I think it was really interesting and useful. So I'm glad I did it, I think I've learnt something.

R: I'm glad to hear that.

C: I think I've learnt a little bit more about computers which, you know, it wouldn't be hard cause I started at zero.

R: Right.

C: But, yeah, it was good.

R: So can you tell me what was it that you liked about it and what parts can be improved?

C: Hm. I guess the only real way to improve it would be to get the computers to run faster, [laughing] but I'm not sure how possible that it. I didn't really think anything else needed improvement so it was as it should be, I suppose.

R: OK, now (...)

C: There was no point where I was bored or anything like that, didn't notice the time going so really the technology again was the only point.

R: OK, so having faster computers but well (...)

C: It would help in all these departments [laughing]

R: Eh, and do you think that the materials and the activities, eh, that we did, helped you get prepared to teach with machinima?

C: I think the storyboarding one definitely did, but maybe some of the others would just help us to learn what we were doing with the computer, like the Second Life shortcuts, things like that, they were useful for us but we wouldn't need them in the classroom.

R: So do you feel, for example, if you had the technology (...)

C: Yeah, and the know how.

R: Do you feel, would you feel prepared to use this in the classroom?

C: I would, I'd have to practise more on Second Life but yeah I think I would.

R: So, eh, learning how to go about Second Life was (...)?

C: Was the big thing, yeah

R: The big thing.

C: It was the main thing.

R: And, what did you think, can you tell me how helpful, if at all, the instructions were and the set up with my screen being also shown on the projector?

C: Oh yeah, that was really helpful!

R: Did you find that helpful?

C: Yeah, because if I couldn't see it I could just watch what your cursor was doing.

R; Hm, alright.

C: It's sometimes not so easy to follow an oral direction when you're looking at the screen and looking at all these various things so if you just see what someone wants to point at, it's easier.

R: OK, alright.

R: Eh, alright, in terms of professional development what do you think you have gained?

C: Eh, another idea basically, more ammunition, more things that are in the bag that you can pull out if you have the opportunity.

R: Alright, OK. Now, as I mentioned, my plan was to have a look at the machinima you produced?

C: Yeah.

R: And discuss it so hopefully (...)

C: We just kept coming up with ideas on the spot [laughing]

R: Yeah, did you feel that you would've needed more time?

C: Yeah, to do the voices especially because the voices came out very unevenly so if we had more time I think we both would have wanted to re-record that.

R: Alright, the voices?

C: Beth was so quiet and I was so loud [laughing].

R: That was also because of oCam, right? Because it's, you know, it's free software, it's not ideal but it does the job.

C: Yeah, I guess that's the thing that's wrong with it.

R: Yeah, yeah.

C: Can't do anything about it so...

R: Exactly, yeah.

P1: So even that in itself could be a discussion point when you watch back with the students, how could you have fixed this, what would you prepare to do, what will you improve next time.

R: Exactly, yeah, alright, yeah.

R: [after having watched the machinima together with C] OK, so tell me a little bit about the story, to start out with, what kind of a story is it? What genre?

C: We were going for a horror story

R: OK, and how did you decide on that? Or why did you decide on that?

C: Well, I think it's because we were looking at these areas, the places and we got to this place, it struck us or it struck me anyways and I said "This would be great for a horror story"and she agreed with me and we decided to go for that.

R: Alright, so (...)

C: But we first just agreed that we were going to go for entertainment rather than anything grammatical, rather than we try to teach something cause we just wanted to play with the technology rather than make something educational.

R: Alright, now would you use this in your classroom?

C: I think we could. It depends on the level and what we were doing but, at the time, but I think there is a place for anything that's real.

R: I'll get back to that cause that was one of my questions actually, right. So I remember that you basically decided on the genre first?

C: Yeah, we did and then fit everything else within that. So, because we had one man and one woman we decided that we should be a couple and she was in a party dress so we were coming home from a party and the place was isolated so we were lost or stuck or something.

R: So you created the story based on the location?

C: Yeah, exactly and it kind of grew organically from there.

R: Alright.

C: Cause we started to make the script before we did any actual scene references so while we were scripting, it was just improvisation and then we fixed it as we went along.

R: Right, OK. So you mentioned that you were a couple, can you tell me a little bit more about that? So what is the story about and where is it happening and?

C: So basically we were coming home from a party and either the car ran out of petrol or we got lost and she blamed me because I was the guy, obviously guys never ask for directions, it's always their fault when you're lost [laughing].

R: Right.

C: So from that we grew into a kind of an argument, we were arguing in the first scene and then we saw the house and we thought we should go over there and see if anyone can give directions or whatever. And then we decided that we were going to make it so that there was some kind of monster or something but the viewer would never see that. So we only ever refer to it by the shot through the trees.

R: Right.

P1: And by her being scared, "It looks scary, I don't think I want to go there."

R: OK?

C: But that in the end she just goes "What's that?" but we never see what that is so we were making suspense by not showing things.

R: Alright, OK. Eh, so again the participants involved, eh, they were a couple and the circumstance represented in the video (...)?

C: Yeah, we didn't actually come right out and say "We're lost." but she goes "This is all your fault!" so you can infer what happened, everything is, the whole thing is about inferring rather than showing.

R: So it's a lot about making meaning without using language, is that right?

C: Yeah, but it wasn't planned that way, it grew that way.

R: Now, before I move on to the other questions, can you tell me what the relationship between the viewer and what is viewed is? What is the relationship between the audience and what is happening on the screen?

C: I suppose they are trying to work out all along what's happening, so they're really participating because they don't know anymore than we know, than the characters know.

R: And how did you create that impression of not knowing and (...)?

C: Just by not showing what the threat was, you could see that there was one and you could see hints of it but you couldn't tell what it was. I think the closest we came to give (the real thing - unintelligible) was through the branch shot that you did.

R: Alright.

C: But for everything else, we didn't show anything at all which was partly because we didn't have anything to show them. You use what you've got.

R: Alright, OK so tell me a little bit about the modes you used, you mentioned that you didn't rely on language a lot so what were some of the other modes that you used to tell the story?

C: We tried to get into gestures because we wanted to really work with that because we had it so we showed our attitudes and feelings through the gestures.

R: As complementary to language or...

C: Even extra, more than language because sometimes she did the big scared face and there weren't many words, just one word that didn't convey much in itself. "But" could mean anything but the way it goes with that scared face and the big gesture meant more. And then we had the shots, we tried to use camera angles but maybe not so much.

R: Mhm.

C: And the music that we tried to pick was supposed to give a creepy kind of meaning.

R: Those were some interesting choices because you chose the Moonlight Sonnata for the first part?

C: We chose it from the name not from actually listening to it because we didn't have time to listen to them all.

R: Alright?

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C: So when I look back now the one where he's walking off into the distance, everything makes him look like some kind of Indiana Jones type.

R: So the second bit, right?

C: Yeah, what we were going for was that he was going off in a huff and hoping that she was just left to follow whether (unintelligible) or not and something was watching basically, that's what we were going for but it's more of an Indiana Jones kind of song. [laughing]

R: So the music, because of these time constraints, the music didn't really convey what (...)?

C: Not exactly but I think it could work, it could make him seem like "I'm gonna check it out, I'm the big strong man."[laughing] Rather than "I'm pissed off with you, stay there or come with me, I don't care." [laughing]

R: OK and in terms of sound effects?

C: We did, we did the knock on the door and the creaky door and the creaky door is a horror story prop really.

R: OK and in terms of lighting and you mentioned the shot, the black and white shot. Why did you go for black and white as opposed to sepia for example?

C: I think I had some kind of XFiles idea that when the, when the camera is being the monster, the view is always different and sometimes the monster doesn't see colour or doesn't see things the way other people do.

R: Alright.

C: So I guess that if I had the choice I might have gone for fish eye.

R: Oh good, very interesting.

C: Yeah so black and white was the creepiest, I think.

R: Yeah, OK and it terms of the lighting, because it was quite dark?

C: Yeah, we went for midnight because horror films happen at midnight.

R: OK, so you?

C: We were really working with the props and the genre as well as making stuff up ourselves.

R: So that was quite intentional?

C: Yeah, because you only have this much time so you have to set scenes by some kind of universal meaning. Like you say "balcony" and everybody thinks Romeo and Juliet, romantic. You say "midnight, creaky door" instantly horror movie so you set that, you give the audience their expectation.

R: Alright, OK.

C: I think if it was daytime and there were birds singing or whatever and somebody goes "God, what's that?", you don't necessarily think it's a ghost or it's a monster but when it's midnight and the door creaked and there are frogs, you definitely do.

R: So that added to making the movie a horror movie?

C: Yeah, exactly.

R: It worked towards that, OK. Very good and now, eh, you mentioned that you would have liked to have more time for this, for what part in particular?

C: For fixing the voices, for picking music with more time, like more relaxedly [laughing] but that's really the main thing.

R: Would you have done anything differently, so you mentioned the voices and the music. In terms of camera angles, for example, how did you use those? I actually have your storyboards with me. I have Beth's and yours. You worked really hard on this, right?

C: Yeah, we wanted to show the scene as well as the characters. We wanted to really set up the scene.

R: So you started out with...?

C: A wide angle to get everything in and then we closed in to get the emotional pieces. What else did we do? [laughing] Oh yes, this bit was the big one for us because he had to steer and walk [laughing]

R: So you found that difficult?

C: It was, it was really clunky. I think it was just pure luck that he got up the ramp instead of walking into a tree, otherwise we would've been doing it ten times. [laughing]

R: OK, so you used a few close ups?

C: Yeah, to get the emotion. When anyone was speaking, we wanted to get how they were feeling and what kind of attitude they had while they said their lines.

R: And in the relation to the viewer, you used high angles or low angles?

C: Mainly face.

R: So was it (...)?

C: We didn't really go up or down that much, we just looked at faces dead on so that they, so most of the viewers would feel that they participated in the argument in a way.

R: So you wanted engagement and involvement from the viewer. And do you feel that when you watch the video, do you feel that you get that? The engagement and the involvement?

C: I think so, I think they do, I think sometimes the scenes are, they're running on too long into each other, maybe a bit more snipping. But on the whole I think we didn't do too badly considering it was the first time.

R: And one more question, how would you use this video that you produced, to teach? How would you use it in the classroom?

C: I was thinking of a couple of options, actually. First one, if we were doing a unit on film and genres and what makes different genres, (unintelligible) you'd show it and then go "What do you think it's gonna happen next?" and they ca finish the story. Or something like that.

R: Oh, very interesting.

C: I don't think we've used enough language for it to be a grammar point. [laughing]

R: Alright, yeah.

C: Or "arguing" if you want to do a topic on how to get your point across, how not to get your point across. [laughing] Don't call your girlfriend a baby, it doesn't work.

R: Right. So you would use it to teach genre or film vocabulary?

C: Or more just as a creative exercise, what did they see, what's gonna happen next? Flex your vocabulary.

R: Alright, OK, I think that was pretty much all I wanted to ask. Is there anything you'd like to add? Anything you wanted to ask me?

C: I don't think so, I think that's really comprehensive [laughing]. You must have spent ages doing that.

APPENDIX E - INVITATION TO PARTICIPATE IN THE RESEARCH STUDY

Dear teacher,

My name is Alina Horlescu. I'm a fully qualified English teacher and a PhD student in the School of Applied Language and Intercultural Studies at Dublin City University. I'm conducting a study which examines the knowledge that should be part of language teachers' Technological Pedagogical Content Knowledge (TPACK) in order for them to be able to effectively integrate a technological tool called machinima into their classrooms. Machinima is real world film-making techniques applied within interactive virtual spaces. The main benefits of employing machinima in the classroom include: empowering students and increasing their creativity, motivation, participation and collaboration, supporting student-centred, authentic learning experiences, accommodating students with different learning styles and reducing their anxiety, especially when speaking in front of an audience.

You are invited to participate in a course that I have developed as part of my research project. The course starts in July, takes twelve hours to complete and is arranged in a flexible format in consideration of your schedule such as over two weekends. The first few hours will provide an introduction to *Second Life®*, one of the many virtual environments where machinima can be used, so as to give you an understanding of its potential for video-making. You will then work in groups to produce your own machinima video.

I'm also conducting interviews before and after the course to capture your thoughts and perspective on using this video-making technique in the language classroom. All the necessary ethical procedures will be followed to ensure your anonymity and confidentiality.

As a language teacher you are ideally positioned to participate in this study and your contribution will be a valuable addition to this research. It is my hope that the course will also be beneficial to you in providing you with a new perspective in teaching and informing you of some of the latest developments in language teaching. Certificates of completion will be issued to teachers who have produced a machinima video.

APPENDIX F - APPROVAL FROM THE RESEARCH ETHICS COMMITTEE

Oliscoil Chathair Bhaile Átha Cliath
Dublin City University

Ms Alina Horlescu
School of Applied Language and Intercultural Studies

13th February 2014

REC Reference: DCUREC/2014/008

Proposal Title: Reframing Language Teacher Education: Bringing
Multimodality to the Core of the Curriculum with
Machinima

Applicants: Ms Alina Horlescu, Dr Françoise Blin, Dr Minako O'Hagan

Dear Alina,

Further to expedited review, the DCU Research Ethics Committee approves this
research proposal. Materials used to recruit participants should note that ethical
approval for this project has been obtained from the Dublin City University Research
Ethics Committee. Should substantial modifications to the research protocol be
required at a later stage, a further submission should be made to the REC.

Yours sincerely,

Dónal O'Mathúna

Dr. Donal O'Mathuna
Chairperson
DCU Research Ethics Committee

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