An Investigation of the Collaborative Creation of Digital Stories by Students and in what ways it can enhance the learning of Physical Geography

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Declaration

I declare that the work described in this dissertation is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree at this or any other University.

Signed: _____

Róisín Ryan, April 2010

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Abstract

In recent times, research in the area of multi-media use in education has shifted from simply using it as an aid to comprehension to enabling students to use it to create student designed artefacts. Digital Storytelling is an aspect of multi-media which has become popular as a technical application in an educational context partly due to the fact it can accommodate user-contributed content and therefore can be easily used by students in creative processes and active learning. This dissertation explores the collaborative creation of Digital Stories by Primary School pupils based on aspects of Physical Geography. Creating a Digital Story is by its nature a constructivist activity with the learner required to complete a wide variety of tasks and therefore the activity naturally lends itself to collaboration.

Aspects of multi-media are particularly interesting to the study of Physical Geography as they facilitate the visualisation of complex concepts and terms through the use of sound, text, picture and movement in order to achieve the fullest learning experience for the student. The acquisition of spatial knowledge and knowledge of Physical Geography in particular is a highly visual process that requires great imagination and creativity on the part of the learner in order to fully understand it. Research suggests that students, especially at Primary School level experience difficulties formulating and understanding certain Geographical concepts and ideas. Therefore, by incorporating multi-media applications into Geographical education a multi sensory approach to learning can be established, thus providing a richer learning experience.

The field research was conducted over a period of six weeks with seventeen fifth class pupils between the ages of ten and eleven. They were divided into mixed ability groups with three participants in each. Each group was assigned an area of Physical Geography and were set the task of working collaboratively to produce a Digital Story based on that concept or topic.

A case study approach was used and data was collected using a number of methodologies ranging from observations, pre and post tests, student reflective journals, group interviews and evaluation of the physical artefact. The findings provide encouraging results and suggest that working as producers in a collaborative environment had a positive effect on the learning of the concepts and vocabulary of Physical Geography as well as providing a learning experience which was motivating and interesting for the students. The analysis also identified interesting areas for further research such as making Digital Stories based on other areas of the Primary School curriculum, creating Social Stories as an aid for children with Autism and using the stories created as learning tools for younger classes.

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1   Introduction

1.1   Background and context

There has been a vast amount of research conducted in recent years on the use of multi-media as a visual aid to learning (Mayer, 2003) (Madden, Chung, & Dawson, 2009). Some of these studies have suggested it improves comprehension and recall and overall motivation especially in Primary School children (Large, Beheshti, Breuleux, & Renaud, 1999). Recently, research in the area of multi-media use in education has incorporated projects where students have been the designers and producers of the multi-media applications as opposed to simply being consumers. The findings of these projects suggest that their constructivist nature appeals greatly to the students and leads to increased interest and motivation on the part of the learner and perhaps more importantly greater learning outcomes (Leahy, 2007; Zagal, Piper, & Brukman, 2004).

Digital Storytelling, the art of providing information digitally through the use of images, music, narration and captions, has become popular as a technical application in an educational context as it can accommodate user-contributed content and therefore is easily used by students in creative processes (B.R. Robin, 2008). The creation of digital stories can constitute a valuable context for social interaction and collaborative learning as due to the variety and amount of work required for the task to be completed a group situation is considered beneficial (Signes, 2008).

Physical Geography is viewed as a highly visual aspect of Geography and in order to provide students with an in depth understanding of its concepts and terms opportunities to view, describe and interpret the world around them need to be provided (NCCA, 1999). Research suggests that by enabling students to visualise aspects of Physical Geography, through for example the integration of multi-media applications such as Digital Storytelling, can enhance the learning experience and appeal to different learning styles (Hickey & Bein, 1996). The creation of Digital Stories based on Physical Geography by students in a collaborative environment is

believed to have the potential to enable positive learning outcomes including improved knowledge and awareness of the concepts and vocabulary of Physical Geography and provide students with a motivating and interesting learning environment.

1.2   Research Question

The following research question was used as a guide for this study:

In what ways can the collaborative creation of Digital Stories by students enhance the learning of Physical Geography?

In order to answer this question a learning experience designed on the principles derived from the literature was created and the following sub questions were posed:

- What role does collaboration play in the learning experience?
- In what ways has the learning of concepts and vocabulary of Physical Geography been enhanced?
- What effect does the active creation of Digital Stories by the students have on motivation, attitudes and interest in learning?

1.3   Thesis structure

Chapter 1, Introduction, provides a background to the research and outlines the research question. Chapter 2, the literature review, presents and discusses the relevant factors which influenced the nature of the research. Chapter 3, Design, gives details of the design of the study in light of the literature. A description of the participants, the site and the implementation of the project are undertaken at this point. Chapter 4, Methodology, focuses on the research methodology and data collection methods used during the research. Chapter 5, Findings and Discussion, contains a discussion of the findings and explains how the data was handled and analysed in order to address the research questions. Finally, Chapter 6, Conclusion, summarises the relevant findings, highlights the unexpected outcomes during the research process and addresses the significance of the research. Lastly, the author acknowledges the limitations of the study and suggests recommendations for future research

2   Literature Review

2.1   Introduction

The literature review begins with a discussion on group work and the elements associated with effective group work and the impact they have in an educational setting. It then moves on to a comparative discussion of collaborative and cooperative learning, defining each concept and identifying the differences and similarities between the two. The chapter investigates the use of multi-media in the classroom and if transforming children from consumers to producers of multi-media applications may be of benefit to education. Lastly, a discussion of problem areas in the teaching and learning of Physical Geography at Primary School level is discussed.

2.2   Group work

One of Piaget's fundamental insights was that social transmission or group learning stimulates an individual's personal construction of knowledge and therefore contributes greatly to their overall build up and acquisition of knowledge (De Vries, 1997). Many studies conducted recently highlight the benefits of social interaction on learning and indicate that group learning encourages shared decision making, diversity, communication, negotiation and creativity (Gros, 2001).Using social interaction between students as an indicator of learning has in turn lead to increased interest in the areas of peer tutoring and collaborative and cooperative learning (Blatchford, Kutnick, Baines, & Galton, 2003).

In terms of pupil's motivation, attitude and interest group work can establish a belief that success can come through their own efforts and application, rather then simply from instruction (Blatchford et al., 2003). Group work is also viewed as an environment in which students are provided with the opportunity to engage in higher order thinking skills in a unique and interesting way that is not often available through other pedagogical approaches to teaching (Gillies, 2004). However, in order for group work to be successful and result in the proposed learning outcomes, certain environmental conditions need to exist (E. Cohen, 1994). These conditions revolve

around group formation, the nature of the task and perhaps the most important indicator of success, group interaction.

2.2.1 Formation of Groups

The literature suggests that group composition has a major impact on group discussion quality and student achievement. Most models of group learning advocate the use of heterogeneous groups. In Webb et al (1998) study, they researched the effect of group ability composition on group processes and outcomes for Primary School children in the area of Science.   The results found that when students actively participate in group collaboration low ability students learn best in groups with high ability students (Webb, Nemer, & Chizhik, 1998). Even when the task requires higher order thinking low achievers appear to benefit from the instruction they receive and discussions they participate in with higher ability students (E. Cohen, 1994).

Lou et al suggests that high achieving students appear to perform equally well in both heterogeneous and homogenous group compositions (Lou et al., 1996). Galton et al go so far as to suggest that high ability students may even benefit from the opportunity to clarify their ideas in the role of instructor to weaker students in mixed ability groups (Galton & Williamson, 1992).

In contrast, further findings from Webb et al seem to contradict this slightly as their study indicates that high ability students generally performed better when they worked in homogeneous groups (Webb et al., 1998). However, even with these results, Webb et al. are still in favour of heterogeneous groupings, arguing that although higher ability students did not specifically benefit from this group composition there is no evidence to suggest their performance suffered as a result of them working in heterogeneous groups with below average students.   In other words, below average students had more to gain by working with higher achieving students than higher achieving students had to lose by working with them.

Interesting to note at this point is that the task structured by Webb et al was a well structured problem with correct answers and solutions and could be completed individually or by one competent individual in the group (Webb et al., 1998).

Therefore, the group composition may not have been as important as for an ill structured task where a heterogeneous group with multiple perspectives and areas of competence may be more beneficial than one single competent student who is unlikely to have all the necessary expertise to solve the problem (E. Cohen, 1994).

2.2.2   Group Task

A group task is a task that requires resources, i.e. information, knowledge, problem solving strategies, materials and skills that no single individual in the group possesses and therefore there must be some input from the other team members in order for the task to be accomplished or the problem to be solved (E. Cohen, 1994). Tasks can be roughly divided into two types, ones that have fairly clear procedures with right answers where the objective is routine academic learning and others which are termed "ill-structured problems" where the learning objective is understanding or conceptual learning (E. Cohen, 1994). These tasks, i.e. ill structured problems, generally involve reciprocal interdependence between group members and both the type of interaction and its frequency are vital to group productivity and task success (E. Cohen, 1994). Each student is responsible for helping to ensure the success of all members.

In contrast, group learning may also be used for routine tasks where achievement depends on the stronger students helping the weaker students. This relationship also exhibits traits of interdependency among members but the interdependence is sequential as opposed to reciprocal, i.e. one student's performance depends on another but the reverse is not true (E. Cohen, 1994). In conventional routine tasks one positive consistent predictor of achievement in a group learning situation is the giving of detailed and elaborate explanations i.e. the student who gives the explanation benefits as does the receiver (E. Cohen, 1994).

2.2.3   Group Interaction

The educational benefit of group work for the student depends mainly on the interactions between group members (Blatchford et al., 2003). Interaction is considered vital to productivity, especially when the task assigned is open, ill structured and discovery based and when group members are interdependent (Gillies, 2004). Different types of interaction, dictated by task and task instructions, are associated with different learning outcomes. In a task requiring higher order thinking skills and conceptual learning effective interaction must be more of a mutual exchange of ideas, speculations and strategies, more elaborate and less constrained than a task with low level learning outcomes such as acquiring information or the correct answer where limited interaction is adequate (E. Cohen, 1994).

However, simply placing students in a group situation is not sufficient to produce the desired interaction and it can be difficult to create an environment where effective interaction is achieved. The literature suggests that groups need to be structured and guided so that students understand what is expected of them and how they are expected to work together (Gillies, 2004). This guidance and structure is thought to enable the maximum learning benefits to be achieved.   To produce high level verbal interaction by students some researchers would argue that students will require specific development and deliberate instruction of skills for discourse, either in advance of group learning or through direct assistance when the groups are in operation (E. Cohen, 1994).

Therefore, it has been established that it is productive to prepare students, especially children, for group work by developing group work skills and giving them practice and training in the processes that lead to high performances (Webb et al., 1998). These skills and processes will enable them to communicate effectively through listening, explaining, questioning and sharing ideas and enable them to plan and organise their group work thus promoting active participation by all group members and encouraging the students to engage fully, autonomously and actively in their learning (Webb et al., 1998) (Blatchford et al., 2003).

However, although interaction is clearly vital to the success of group work, Cohen argues that unless there is a reason or motivation for the group to interact they may work as individuals especially if they are given different aspects of the task to complete (E. Cohen, 1994). In Galton et al study, although the children were encouraged to interact and collaborate on a task, the exchanges between students were short lived with the average communication lasting approximately twenty five seconds in duration and focused mainly on acquiring information as opposed to engaging in a detailed discussion (Galton & Williamson, 1992). It has been suggested that in order to ensure group interaction and interdependence it is important to establish a task which has positive goal interdependence and resource interdependence, i.e. that the groups will need to use each other resources to attain their group goal (E. Cohen, 1994) (Johnson & Johnson, 1999).

Some researchers have suggested that the frequency of the interactions within a group is the main indicator of higher learning outcomes (Gillies, 2004). When tasks are open-ended, conceptual in nature and require reciprocal interdependence of the participants some literature suggests that interaction frequency can indeed become a powerful predictor of learning (E. Cohen, 1994). The frequency of interaction may not play as significant a role in tasks which have clear procedures and correct answers (E. Cohen, 1994).

2.3   Cooperative learning and collaborative learning

A number of studies have investigated both collaborative learning and cooperative learning attempting to differentiate between the two. However, the debate surrounding these concepts is a complex one and depending on the researcher cooperative and collaborative learning can either be viewed as synonymous terms or used distinctively depending on the division of labour (Dillenbourg, 1999). The distinction between the two group learning situations is not always clear cut Therefore, one of the aims of this chapter is to attempt to offer possible distinctions and identify the similarities between the two.

2.3.1 Similarities and differences between the two concepts

One of the key similarities between the two is that collaborative and cooperative learning both involve groups of students working together. Panitz (1996) suggests that collaboration can be summarised as a tool that has little structure, is open-ended and is student centred whereas cooperation is built by a set of process, has a goal and is controlled by the teacher. It has been suggested that the difference between collaborative and co-operative learning depends on the task. Cooperative learning requires the division of tasks among group members, in others words partners or group members split the work, solve sub tasks individually then assemble the results into the final output. In contrast, in the collaborative learning process two or more people are required to learn something together, often an activity which involves problem solving and what has to be learnt can only be accomplished when the group works in collaboration, constructing a single joint outcome (Gros, 2001) (Galton & Williamson, 1992). However, it can be expected that even in a collaborative task, some spontaneous division of labour may occur which is considered to be more indicative of a cooperative learning environment, thus highlighting the complex nature of the terms (Dillenbourg, 1999).

2.3.2 Cooperative learning

The most common indicator of productivity as a result of cooperative learning is conventional academic achievement, the type of achievement which stresses basic skills and memorization of facts. As a consequence of this interaction and shared experience studies have shown that students who work in cooperative groups outperform students who work by themselves or in competition with each other (Johnson & Johnson, 1999). The literature would indicate that throughout the cooperative process learners are engaged in shared thinking, develop a better understanding of the perspective of others and have the opportunity to build on their contribution to develop new understanding and knowledge (Gillies, 2004).

2.3.3   Collaborative learning

Collaborative learning is not as clearly defined as cooperative learning. Perhaps this is due to the very nature of collaborative learning which is in essence an open-ended structure free from the constraints of specific guidelines, tasks and specific goals where participants are collaborating in a coordinated effort to solve a problem together (Dillenbourg et al. 1995). Vygotsky (1978) defines collaborative learning as a process by which small, heterogeneous and independent groups co-construct knowledge. Bruffee (1999) states that learning through collaboration replaces the traditional classroom social structure and enables students to become more autonomous, articulate, and more socially and intellectually mature.

2.4   Peer mentoring

Research suggests that one of the defining characteristics of group work is that the balance of ownership and control of the work shifts towards the pupils themselves. It is suggested that group work should involve children as co-learners, not simply one pupil helping another, as this form of relationship can provide motivation and interest in learning (Blatchford et al., 2003). When children work together, in contrast to adult and child relations, the power is more likely to be evenly shared, relations are more horizontal and they can often understand each other more directly (Blatchford et al., 2003) It has also been seen to improve pupils self-image and confidence as they begin to respect each other strengths and weaknesses (Galton & Williamson, 1992).

It has been suggested that when children work closely together in groups they develop a sense of each others needs and will often provide help when they perceive it is necessary (Gillies, 2004). This help may take the form of explanations, giving direction, pointing to errors or offering suggestions (Gillies, 2004). It is believed that by giving help, the helper learns to re-organise and clarify their own understanding which in turn may enable them to gain more from the leaning experience (Gillies, 2004). If children perceive they are successful in providing help their feelings of self-efficacy and capability are enhanced due to the recognition they receive from their peers as being helpful and knowledgeable (Reid, 2002).

However, the cognitive benefits of peer mentoring depend greatly on the quality of help given and received. If the help given is not explained or elaborated upon it does not require as much cognitive restructuring and is therefore of little benefit to either the helper or recipient (Gillies, 2004). The findings from the research conducted by Kutnick et al. found that the critical feature of peer interaction in group work was the level of elaboration of the help given or received and the appropriateness of responses to requests for help (Kutnick, Blatchford, & Baines, 2002).

2.5 Active learning

It had been well documented in the literature that learners show higher levels of persistence, enjoyment and display an overall better performance when they have controllability and input into the task at hand, in other words when they participate in active learning tasks (Kim, Yoon, Whang, Tversky, & Morrison, 2007; Leahy, 2007). The principles of active learning have their origin in the fact that learner's motivation and interest are enhanced to a greater degree during an active learning exercise as opposed to a passive task. The sense of control, ownership and self-determination experienced by students during an active learning activity can result in knowledge reformulation and encourage personal expression and creativity (Kafai, Carter Ching, & Marshall, 1997).

2.5.1 Benefits of Multi-Media Production

The creation of multi-media is by its nature a constructionist activity with the designers required to create or acquire images, script the scenes, add narrations, captions, video etc. The learner is building a knowledge base through the construction of something external and shareable. In the creation of any one multi-media artefact, there is a wide variety of tasks to be undertaken and therefore this activity naturally lends itself to collaboration, especially when undertaken in a classroom environment. Therefore, it is thought that by giving students an opportunity to construct multi-media applications as opposed to simply viewing or using them provides students with a unique and exciting context in which to learn (Kafai et al., 1997).

There is a growing body of literature that indicates that multi-media production can facilitate powerful learning experiences for the students involved (Kafai et al.,

1997; Madden et al., 2009; Mayer, 2003) (Byrne & Tangney). One such study was conducted by Zagal et al in which 11-12 year olds used a 3-D graphics programming environment called *Alice* to work collaboratively and create their own animations (Zagal et al., 2004). The workshop was very successful and highlighted the fact that it is possible for children to become creators of complex, multimedia projects. The findings also emphasised the importance and necessity of a collaborative environment with a supportive social context to prevent students from becoming distracted (Zagal et al., 2004).

In Kafai et al's study seven teams of elementary school students were involved in the design and creation of interactive multi-media artefacts based on aspects of Science. It was found that their scientific understanding improved greatly as a result of this activity(Kafai et al., 1997). This project required the students to comprehend a topic well enough to create a multi-media project of the whole phenomena as oppose to merely having a descriptive understanding of the topic. By enabling the students to become creators of multi-media applications allowed them to engage in the design and construction of personally meaningful artefacts and improve their understanding of the subject (Kafai et al., 1997).

In Schrand's study, which is based on students creating their own multi-media projects, "a high level of engagement" by the students was noted (Schrand, 2008). It was also found that the students involved communicated and shared knowledge with each other in a more spontaneous and authentic manner than they had in other learning activities (Schrand, 2008). Schrand suggests that activities which gives students the opportunity to own their learning and enables them to collaborate in an authentic and productive way in the classroom is valuable to the learning experience (Schrand, 2008).

In order to establish a learning environment which facilitates creativity, cooperative learning and self-expression students must be in control of their learning in the mode of creators and producers. Leahy, who conducted research which involved the construction of clay animation by groups of 10-11 year olds, found that the context and purpose of the project motivated and excited the pupils to such an extent that they persisted in their task whereas previously they became disengaged

with the class lessons (Leahy, 2007). Multi-media production projects support collaborative learning, problem solving, critical thinking and creativity while encouraging development of media literacy, communication and presentation skills, in other words they stimulate and encourage the development of multiple intelligences in participants.

2.5.2   Digital Storytelling

Digital Storytelling is the practice of using a computer application to combine images, narrative and music together to form an aesthetically pleasing, coherent and informative story for the viewer. The true potential for Digital Stories as a multi-media learning tool lies in the fact it can be used by students to create their own story, a constructive experience which can enhance a learning activity as the students experience personal ownership, engagement and accomplishment (B. R. Robin, 2006).

Digital Storytelling is an activity that facilitates group work and appeals to many learning styles. As a creative activity it can generate interest, attention and motivation for a generation of children who have been termed the "digital generation"(B. R. Robin, 2006). This creative process has the potential to enhance communication skills, creative talents and encourages the students to organize their ideas, ask questions, express ideas and opinions, construct narratives etc (B. R. Robin, 2006) The students are active participants in the multiple steps of designing, creating and presenting their Digital Stories which has a more meaningful impact on their learning as opposed to simple comprehension and information recall (B.R. Robin, 2008).

One of the technical benefits of Digital Storytelling is that is brings together a mixture of digital graphics, text, recorded audio or narration, video etc in order to present information on a certain topic. The material presented can be varied and includes historical accounts, personal narratives or informative and instructional digital stories (B. R. Robin, 2006). Digital Storytelling is associated with the development of multiple learning skills, including inter-personal problem solving and

is seen to promote 21st century learning skills, including cultural and visual literacy and technical skills (B.R. Robin, 2008) (Signes, 2008).

2.6 Physical Geography

Geographers have always been keen to explore, describe, explain and record the natural features of the Earth. Geographical education at Primary School level is concerned with examining how physical forces and processes have created the natural features on Earth and how they relate to one another (NCCA, 1999). It is at this level in education that pupils should be equipped with fundamental basic concepts such as time, space, causation etc. (Lopez, 2008). Opportunities to view, describe, understand and interpret the world around them need to be provided. One of the main aims of the Irish Primary school Geography curriculum is to "encourage an understanding and appreciation of the variety of natural conditions on Earth" (NCCA, 1999).

2.6.1 Concepts and Vocabulary

The literature suggests that student's knowledge and proficiency in some basic Geographical vocabulary, terms, concepts and ideas are essential for successful results and interest in Geography as a subject (Dal, 2008). Geography has a language of its own and it is largely through language that children describe and interpret their experiences, organise their thinking and attempt to make sense of the world around them. Therefore, the gradual introduction of Geographical terms and their meaning enables children to describe and discuss features of the environment and is a fundamental and basic element of the teaching and learning of Physical Geography (NCCA, 1999).

Dal (2008) conducted research on over four hundred and fifty three students of Geography ranging from sixth grade of Primary Education to third year in College (Dal, 2008). The aim of the study was to examine the student's understanding of basic vocabulary and essential concepts in the area of Physical Geography. The findings of this study would indicate that although Geographical definitions and vocabulary are being taught continuously throughout the educational system the same terms are being wrongly identified by students, especially in lower class levels. This would suggest that although the terms are being taught in class there is limited conceptual gain

experienced by the students and little or no connection made between the vocabulary and the meaning (Dal, 2008). Acquiring and understanding the vocabulary necessary to become interested and competent in a subject demands time to enable the student to analyse, break down, reconstruct, use and link the newly acquired vocabulary with pre existing conceptual knowledge and mental images (Entwistle & Ramsden, 1983). If this process is unable to occur due to time or curriculum constraints then the term and definition is forgotten.

Research suggests that students at all levels experience difficulties formulating and understanding Geographic concepts and ideas (Hickey & Bein, 1996). Hickey's study focused on the narratives from teachers concerning their students emerging concepts of Geography and the problem areas for the students. The teachers made attempts at instructional intervention to tackle some of these problem areas. The teachers who participated in the study agreed that textbook or paper and pencil tasks alone were insufficient instructional strategies whereas learning through hands on activities and visual models were found to be more effective (Hickey & Bein, 1996). The study also found that a student's Geographic learning can be enhanced through the creative process of making models, demonstrations or creating experiments. Visualising physical aspects of Geography, through video or multi-media can also be seen to enhance the learning experience for the student. These all add dimension to the teaching and learning of Geography that satisfies different learning styles i.e. visual, tactile and auditory (Hickey & Bein, 1996).

Findings from Lopez research, which focused on teaching Geography to children in public, private and Montessori schools in Metro Manila Philippines, would indicate that teachers "let students memorize facts and information without providing opportunities for the students to realise the significance and interconnectedness of these features" pg. 355. (Lopez, 2008). Lopez believes that this method of teaching could lead students to view Geography as an informative, dry and dull subject which has little of no relevance to their lives. In order to prevent this Lopez encourages practical work in class including model making, preparation of displays and the use of concrete materials in the class. Lopez suggests that students should be exposed to many different topographic features, including lakes, rivers and mountains by showing them videos, pictures and maps (Lopez, 2008).

2.6.2   Geography and Multi-Media

The acquisition of spatial knowledge and knowledge of Physical Geography is a highly visual process that requires great imagination and creativity in order to understand it fully (Jain & Getis, 2003). Traditionally, fundamental concepts were taught using static images in textbook however recent studies have suggested that the use of textbooks alone, of whatever quality, seldom provides sufficient opportunity for student inquiry (Jain & Getis, 2003; Lopez, 2008). Therefore, as suggested in the studies discussed previously, the use of a wide variety of instructional material including aspects of multi-media are important additions to the teaching and learning of Geography, especially in relation to the highly complex and visual aspects of Physical Geography (Jain & Getis, 2003; Lopez, 2008). Multi-media instruction would include the use of text, images, maps, diagrams, sound and video and represents an excellent way to reach multiple learning styles when compared with traditional static graphics and textbooks(Jain & Getis, 2003).

Learning activities which enable children to touch, see, hear and alter materials cultivate an inquisitive attitude towards learning as well as encouraging critical thinking skills (Lopez, 2008). It gives students the opportunity to describe and interpret the world around them and encourages them to organise their thinking and attempt to make sense of the physical world. It will also give them the opportunity to practice the Geographical skills of recording and communicating information and will enable and encourage the gradual introduction and practice of Geographical terms and language.

2.7   Conclusion

The literature review discussed in detail the concepts of group based learning and the factors involved in creating an effective group work environment. The literature suggests that a well processed and structured collaborative environment can enhance the learning, motivation and interest of students. The benefits of multi-media creation as a learning tool were discussed with particular reference to Digital Stories. Finally, literature relating to Physical Geography and the difficulties experienced by students in this subject area were examined in light of the literature.
The next chapter will discuss how the literature was used in the implementation of the project's design and the task involved.

3   Design

3.1   Introduction

Chapter two presented a review of the literature in relation to

1. Group Based learning, with a discussion on Collaborative and Cooperative learning and what effect it can have on a learning experience
2. The use of multi-media production, in particular the creation of Digital Stories, to promote Active learning experiences
3. The problems and difficulties associated with teaching and learning Physical Geography.

Arising from the literature is the proposition that the collaborative creation of Digital Stories by students will help address the difficulties and problems associated with the teaching and learning of Geographical terms and concepts. The focus of this chapter is to outline and discuss the design requirements and environment necessary to answer the research question.

3.2   Design Criteria Arising from the Literature

3.2.1   Group Based Learning

In the design of the learning experience a number of dimensions need to be considered, including the number of members in the group, the nature of the interaction between members and the type of learning task (E. Cohen, 1994).   If the relationship between group size, learning tasks and interaction is planned and designed strategically then the learning experience will be all the more effective (Blatchford et al., 2003).

Group formation and size

The literature suggests that group formation and composition has a major impact on group discussion quality and student achievement (Blatchford et al., 2003). The formation of heterogeneous groups based on ability is advocated by most researchers as most children learn more of their progress is not impeded in this group

formation (Blatchford et al., 2003; Webb et al., 1998). On balance most children learn more or their progress is not impeded in heterogeneous achievement groups(Lou et al., 1996).

Group Task

In the majority of group assignments, a task is established so that interaction and discussion takes place in order to solve or complete the task (Gillies, 2004). The task needs to be set up in a way which encourages all members to talk, contribute and work together (Blatchford et al., 2003). The task for this project can be considered an ill structured task as there is no clear cut answer and it is designed in such a way that interdependence will develop between group members and no one individual will be able to complete the task on their own. Interaction, discussion, brainstorming and cooperation are all vital to group productivity.

Group Interaction

The literature recommends that pre-training or processing of groups as they work on the task can be effective in improving the productivity of small groups (E. Cohen, 1994) (Johnson & Johnson, 1999). Cohen believes it can reduce interpersonal conflict and increase the probability of behaviours that have been linked to positive learning outcomes such as group discussion, expression of opinions, asking questions etc.

3.2.2   Geography as subject for Digital Stories

Throughout this research project, specific focus and reference is placed on the area of Geography and in what ways the integration of multi-media applications may benefit its development as a subject in Primary School. Many of the design features of this project may also apply to other subject areas, including in particular English, History and Science. However, in order to give an in depth and detailed analysis of this area of research it was considered important to focus on one subject as opposed to giving a broader more shallow overview of all suitable subjects. Geography and in particular Physical Geography is a suitable topic for research as the literature suggests

it is an area where students experience difficulty, especially with the associated terms and concepts (Dal, 2008). The literature also suggests that IT applications can quicken and enrich Geographic instruction in the classroom and that multi-media applications in particular are highly appropriate as they offer the opportunity of learning and teaching Geography with a multi-sensory approach using text, maps, picture, sound and video, thereby achieving the fullest possible learning experience (Fitzpatrick, 1990). Therefore, it is proposed that by presenting concepts and vocabulary from aspects of Physical Geography in a multi-sensory format such a Digital Stories greater learning outcomes will be exhibited by the students in that subject area.

3.3 Multi –Media Design Principles

A number of instructional design principles in relation to creating beneficial multi-media learning tools have been suggested by researchers. One of the objectives of this project was to use the Digital Stories created by the participants as multi-media learning tools for other students in the class and the school. Therefore the participants were creating their Digital Stories with an audience in mind which was thought to benefit the creation process (Burmark, 2004). The following design principles were suggested to the participants by the author with a view that they would be followed informally during the creation of their Digital Stories.

3.3.1 Contiguity Principle

Research suggests that when images are presented concurrently with narration, either in the form of audio or text, students demonstrate large improvements in retention and helps make abstract concepts more understandable (Mayer & Anderson, 1992) (Burmark, 2004). Therefore, presenting words and pictures contiguously rather than isolated from one another in time and space is thought to enable students construct referential connections more easily than conventional presentations which generally require learners to split their attention between different sources of information (Mayer, 2003; Mayer & Anderson, 1992)2003; Mayer & Anderson, 1992).

3.3.2   Coherence Principle

Following the coherence principle of instructional design all extraneous material should be excluded from multi-media presentations as research suggests it competes with the narration for processing capacity in the auditory channel (Moreno & Mayer, 2000).

3.3.3   Modality Principle

Research also suggests that information presented as speech rather than visually on screen is more effective in fostering meaningful learning (Moreno & Mayer, 2000). Students, especially weaker students, may miss part of the visual information while reading on screen text.

3.4   Technologies employed in the design

This section discusses and provides images of the multi-media application Microsoft's Photo Story 3, which was used by the students to create and produce their Digital Stories.

3.4.1   Photo Story 3

Robin suggest the true potential for Digital Stories as a learning tool lies it the fact it can be used as a creative outlet for children and enable them to create their own stories (B.R. Robin, 2008). Microsoft's Photo Story 3 was identified as the most appropriate technology to use for the creation of the Digital Stories as it is universally available in the school selected for this project. Teacher's Network.Org, a non-profit educational organization offering online multi-media guidance for teachers, considers Photo Story 3 to be a very user friendly application which would enable the children to work on their project without too much guidance and interference.

The chosen application allows participants to import, edit and enhance images and photos. They can add narration, captions, music and special effects to the images. It provides easy navigation and written instructions given at each stage of the design process. There are step by step directions in which important buttons and information are highlighted. There is a timeline located at the bottom of the page which can be

lengthened or shortened to control the pace of the story. Symbols and prompts are used throughout the creative process and there is a rollover effect on most icons. Users may also save their work and edit it at a later date or publish it and share it with the class and throughout the school. Once the stories are completed they can be exported to another application such as Imovie where video and further special effects may be added.
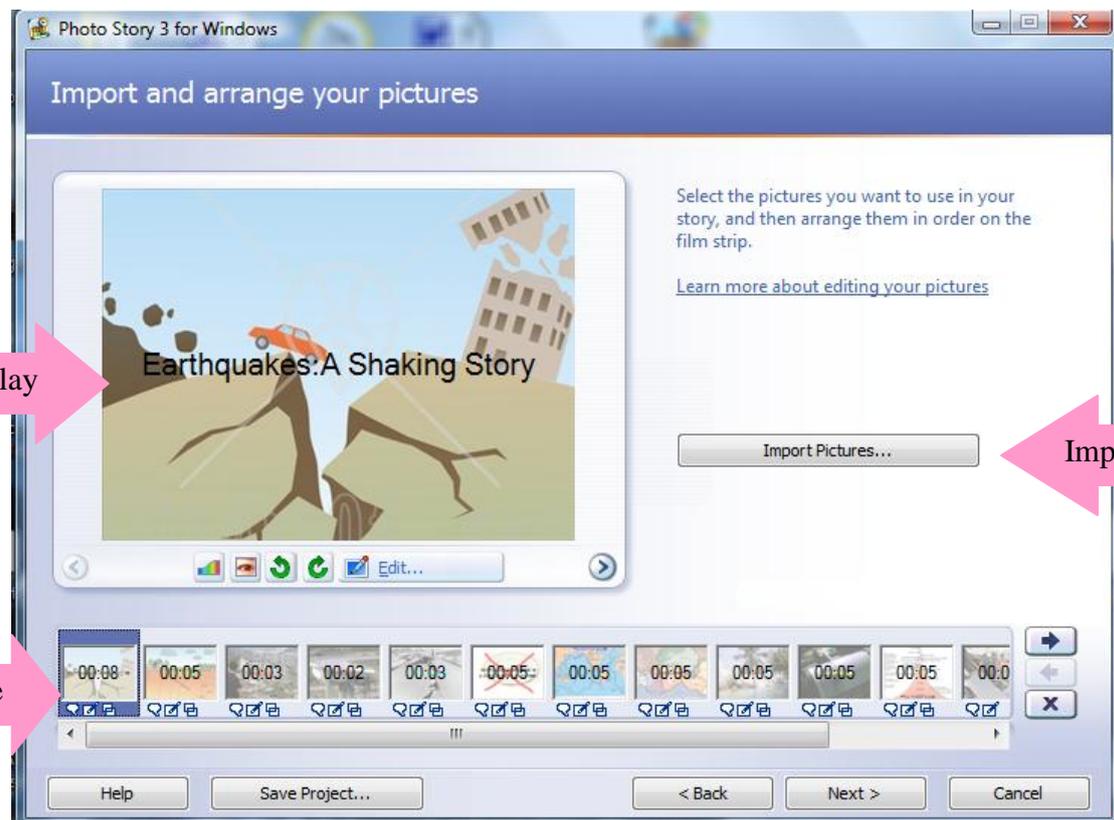
Figure 1: Screenshot of the application Photo Story 3 indicating timeline, import picture button and picture display.
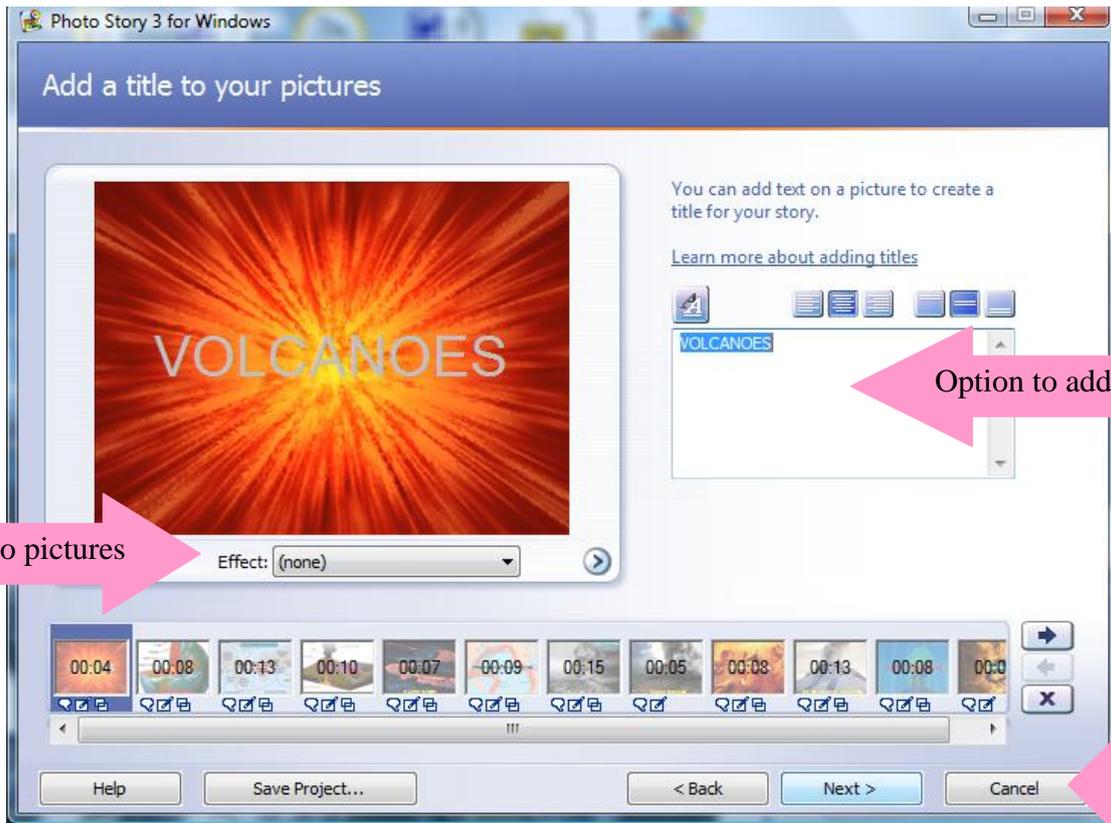
Figure 2: Screenshot of Photo Story 3 indicating the navigation button, and buttons to add effects, captions and titles to imported pictures.
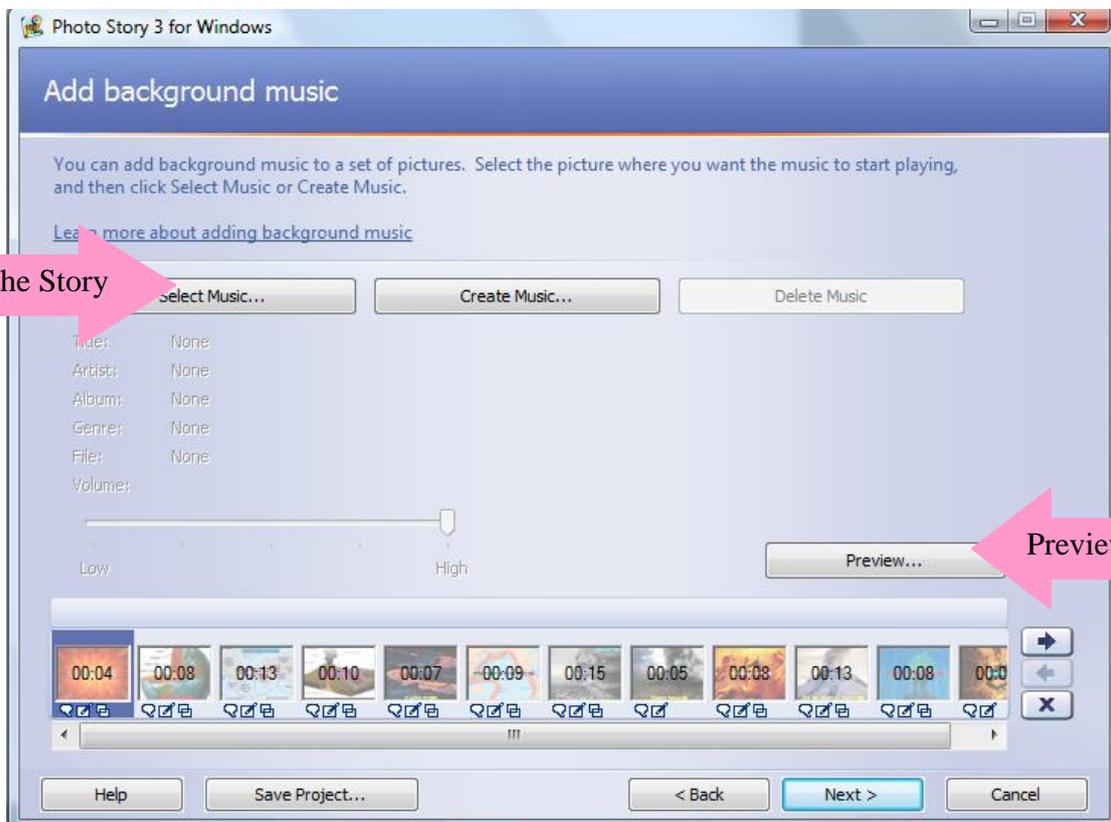
**Figure 3: Screenshot of Photo Story 3 indicating buttons to select music and preview the project.**
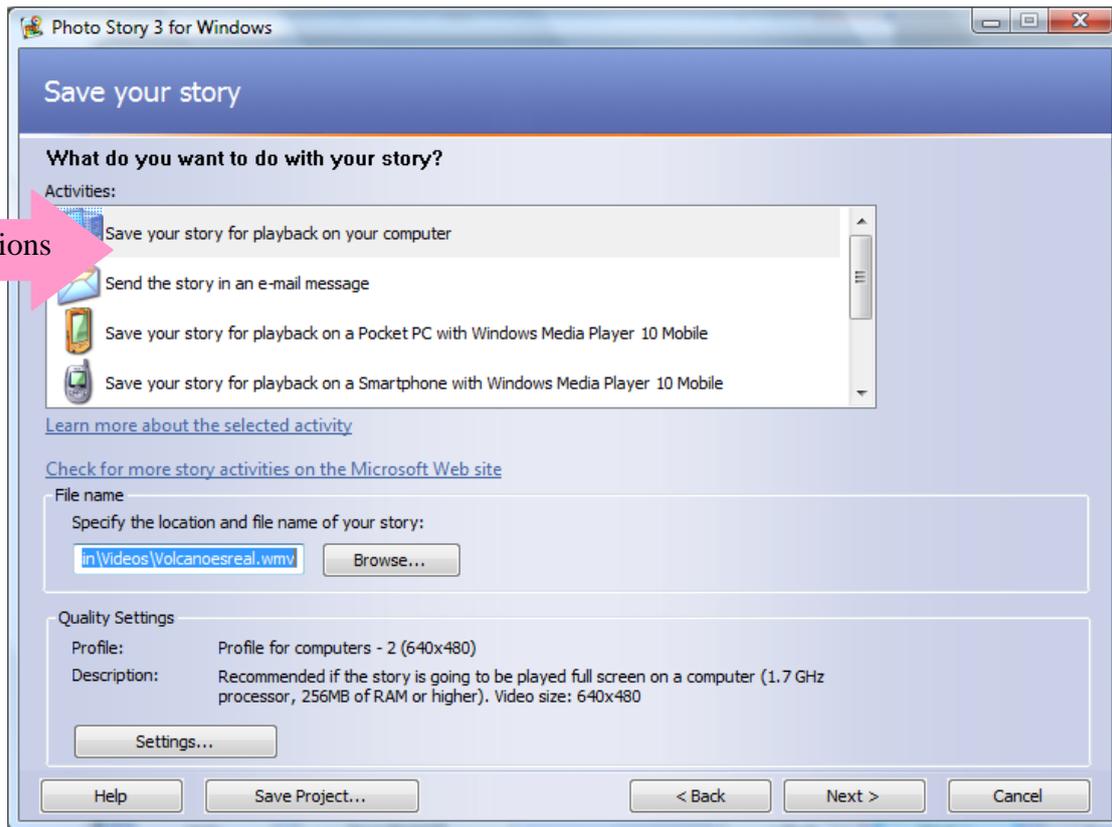
Figure 4: Screenshot of Photo Story 3 indicating publishing options for the finished product
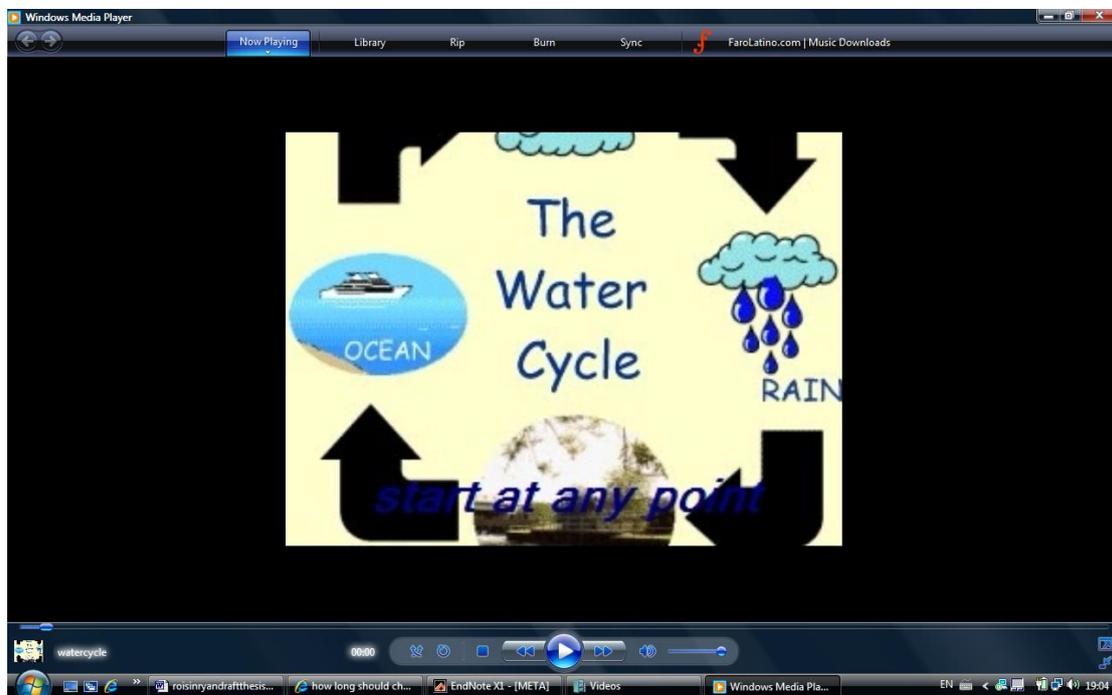
Figure 5: Completed Digital Story being played through Windows Media Player.

3.5 Implementation

The implementation aspect of this project took place over a six week period as it is centred on the design and creation of Digital Stories by students.

3.5.1 Site selection

The site chosen for the study was a boys Primary School located in Dublin 7 with approximately 188 students and 15 staff members. The classes range from second class to sixth class. It is a designated disadvantage school. The school was chosen as it is the author's place of work and the selected participants were students in the author's present class. Permission was sought and approved from both the Ethics Committee in the School of Computer Science and the Principal of the school. The participants and their Parents/Guardians also gave informed consent.

3.5.2 Participant selection

The participants were selected for a number of reasons, most notably due to the fact they were the author's class group and therefore the author had a good working relationship with the class and was in a position to constantly observe their progress. The class chosen was a fifth class group of seventeen boys between the ages of ten and eleven. The seventeen boys were divided into five mixed ability groups of three and one group of two. Five of the boys in the group of seventeen attend learning support daily. The ability level of each student was determined from a piece of work completed prior to the research and observations by the author during previous classes. In relation to group size, smaller groups were considered preferable as research suggests that in this formation participation by all members of the group is more likely (E. Cohen, 1994) . Although triad groups have been criticized as they allow the possibility of two group members dominating the third it is believed that the heterogeneous formation of the groups will deter this (Kutnick et al., 2002) (Blatchford et al., 2003).

Due to the nature of the task in this project the group work can be viewed as collaborative. In the collaborative learning process two or more people are required to learn something together, often an activity which involves problem solving and

what has to be learnt can only be accomplished when the group works in collaboration, constructing a single joint outcome, in this case a Digital Story (Gros, 2001) (Galton & Williamson, 1992)

3.5.3   The creation process

At the start of the school year, the students received instruction by the class teacher in the social skills needed to promote cooperation within the groups and were given an opportunity to practice these skills during group work assignments prior to the research project commencing. Therefore, when the project began group members were familiar with group work and the social skills necessary and were expected to interact with group mates, share ideas and materials, support and encourage each others academic achievements, orally explain and elaborate the concepts and strategies being learnt and hold each other accountable for completing the assignment to a high level of excellence (Johnson & Johnson, 1999).

To begin, the author introduced the application Photo Story 3 to the class which is accessible on the class computers. The participants were briefly shown how to search, upload and edit images, how to add sounds and special effects and save their work. The participants viewed Digital Stories created previously by other students in the school and participated in a class discussion about the quality and educational value of each one. From this class discussion each group was encouraged to follow the design principles discussed previously at 3.3 of this chapter. Although the formal terms for these design principles were not used by the teacher or the students during the creation process the Digital Stories created followed the contiguity principle as the images and narration were presented contiguously rather than isolated from one another in time and space. Once the Digital Stories were created audio was added on to the timeline which is an incorporated feature of Photo Story 3. This modality principle of instructional design also resulted in on screen text being kept to a minimum focusing on only the most important words and phrases.

During the next two days, each assigned group was given an opportunity to experiment with the application Photo Story 3 and create a small Digital Story based on Cambodia. The images and sound files were provided for them in a desktop folder

and the information they used was taken from lessons they had recently completed on Cambodia. This exercise not only enabled the participants to gain knowledge and confidence through using the application but it also allowed them to become familiar with their group. Any problems in relation to using the application were discussed at this point with the hope that the students would feel more confident and comfortable when it came to creating their Physical Geography Digital Stories. All the completed Digital Stories on Cambodia were viewed by the class as a whole and the merits of each creation were discussed with particular emphasise placed on the design principles established previously.

At this point, each group was assigned a topic from Physical Geography for their Digital Story and were encouraged to choose a name for their group related to the topic in order to form a sense of group identity which is thought to have a positive impact on the effectiveness of a group (Johnson & Johnson, 1999). The work was completed in the classroom, either on a PC computer or at their group desk, depending on the stage of the process. Each group was assigned approximately twenty minutes per day to develop, edit and re-draft their Digital Story as this caused minimum time disruption to other curriculum requirements.

3.6   ADDIE instructional design model

In Kafai et al research project , which involves the construction of Scientific multi-media applications by students, it was found that students needed more support in their collaborative work in order for the design process to be an effective learning context for each individual team member (Kafai et al., 1997). Therefore, in the case of this research project, in order to ensure the engagement and participation of all students the ADDIE instructional design model was used to scaffold the task. The children were informally introduced to the design model and the author encouraged the implementation of this model over the six week period as follows:

Analysis
To begin, the participants viewed Digital Stories and established best practice for design of instructional learning tools. The participants also became familiar with the application Photo Story 3. The skills and processes considered necessary for

effective group work were revised and discussed. Following this, each participant was assigned a group and each group were given a topic from the area of Physical Geography and were set the challenge of completing a Digital Story based on this topic to be used as a learning tool by younger classes in the school. If the students needed help they were encouraged first to ask their team-mates for assistance, next their classmates and finally the teacher. This was thought to encourage peer mentoring

Design Phase

Each group was then given an opportunity over a period of two weeks to research their topic on the Internet and in books, to design their story board and collect the necessary images and information. The storyboards included sketches of the images they wished to use, the narration and information to be included, Geographical vocabulary and technical design. The author was present to observe this activity and details of these observations are discussed in Chapter 5, Findings and Discussion. The students also made entries in their Student Reflective Diaries throughout this process, the analysis of which is also discussed in Chapter 5.

Development stage

At this point in the instructional design model the children created their Digital Stories on the computer based on the content discussed and written in the design phase. This development stage took place over a three week period with each group creating their Digital Story for approximately twenty minutes per day. However, due to the nature of the school day some groups received more time than others over the three week period due to absenteeism, learning support and resource teaching. The children edited and redrafted their projects on a daily basis when possible with elements being added in and deleted as they found necessary. The author gave feedback as necessary as did other members of the group and members of other groups in the class. Participants were encouraged to seek help from group members or other groups if necessary. This developed a positive peer mentoring environment not only within each group but also within the class.

Implementation Phase

Six Digital Stories were created in total and each one was viewed by the project participants, which totalled seventeen students. The completed Digital Stories are to be uploaded on the school website at which point the whole school community will have access to them and it is hoped other class levels will use them as learning tools.

Evaluation

After each Digital Story was viewed by the participants constructive comments and feedback were expressed in the classroom. The author created an evaluation rubric which analysed each Digital Story and is discussed further in Chapter 5, Findings and Discussion.

3.7   Conclusion

This chapter set out to describe the design implications emerging from the literature and discussed how they were employed in this study. This chapter considered a number of factors which contributed to the development of the artefact and the learning experience, including group formation, interaction, the technology used in the creation of the Digital Stories and the implementation of the project. The next chapter will describe the research study, the formation of research questions and the methodology used to interpret the findings.

4 Methodology

4.1 Introduction

This chapter outlines the strategies and approaches used to conduct the research and the methods used to collect the appropriate data. This research project was conducted using qualitative research methods as they offer the best option for depth of understanding in real life contexts. Qualitative methods enable you to carry out research into the processes leading to the results rather than simply the significance of the results themselves (Gillham, 2000).   Children, who are the participants of this study, represent an excellent source of the kind of data at the heart of qualitative research i.e. rich descriptions in words and pictures. This type of data is thought to capture children's experiences and level of understanding better than figures and numerical analysis (Greig, Taylor, & MacKay, 2007).

4.2 Case Study Method

This research project was conducted using qualitative methods of data collection and a case study approach in order to develop a detailed intensive insight and knowledge into a small number of related cases. Case studies are the preferred choice when asking "why" or "how" questions which are the main focus of this project (Yin, 1989). The justification for the use of case study approach was not only due to the fact this research project utilises multiple sources of evidence to justify the findings but also because it sets out to examine complex multi-variant conditions which Yin suggests requires the use of the case study method (Yin, 2002). Case studies are intended to be used for small scale research to investigate contemporary phenomenon within a real life context which is exactly what takes place within a classroom on a daily basis (Gillham, 2000). Therefore, the rationale for a case study approach in this research project was that the author was investigating students in a real-life educational setting.

4.3   Research question

The initial research question is of great importance as it acts as a boundary for the study while still enabling some scope for growth and change (Creswell, 2008). The research questions guide the researcher in the field (Stake, 1995). For this study, the main research question is:

In what ways can the collaborative creation of Digital Stories by students based on Physical Geography enhance learning?

Sub questions of this main research questions are:
- What role does collaboration play in the learning experience?
- In what ways has the learning of concepts and vocabulary of Physical Geography been enhanced?
- What effect does the active creation of Digital Stories by students have on motivation, attitudes and interest in learning?

Multiple research questions are proposed so that an in-depth and detailed investigation of the topic can be fully explored.

4.4   Ethics

Due to the nature of case study research it is acknowledged that ethical issues will arise (Creswell, 2008). Therefore, ethical approval for this study was sought and received from the School of Computer Science and Statistics Research Ethics Committee and from the Principal of the school involved. Participation in the project was voluntary and was conducted in an opt-in manner with each member giving their informed consent. Due to the fact the participants were Primary school children it was necessary not only to receive consent from the participants but also from their Parents/Guardians. Two different consent forms were issued; one for participants and one for Parents/Guardians, which gave information on the research project (see Appendix E). The participants, school and Parents/Guardians were all fully informed prior to the study about the objectives and purpose of the research. They were also given the opportunity to withdraw at any time from the study. It was important that all aspects of the research process were discussed with the participants and the school

involved. Consent was also sought and received from the school management for the study.

4.5   Pilot project

In April 2009, a pilot study was conducted by the author with a class group of eighteen students. They were aged between eleven and thirteen and were in Sixth class. The objective of this project was to examine the use of technology in project based learning and to evaluate the learning outcomes of using a collaborative constructivist approach to learning. The project involved the children producing and creating animations based on Mathematical concepts and language using a web based animations application, www.anamates.com. The participants were observed throughout the process and interviewed after the completion of the project to evaluate their overall perceptions and assess any learning outcomes.

4.5.1   Pilot project result

Data was obtained from all participants. In general, the results of the pilot project indicated that the students enjoyed being active participants and producers of their own learning material. They were highly motivated and engaged with the process as a whole. Additionally, the results indicate that the collaborative constructivist nature of the project had a positive effect on learning outcomes with the participants developing a positive outlook and increased knowledge of Mathematical concepts and language.

4.6   Research Bias

The choice of research question reflects the author's research bias as the author believes strongly that the creation of Digital Stories by students is an effective project based learning activity which could have positive learning outcomes. The author is of the opinion that the participants in this study have a valuable insight to give to the research question and is confident that the relationship between the author and the participants is strong enough to ensure all participants play an active role in the research process.

4.7   Data Collection

Due to the fact case studies aim to explore complex multi-variant conditions from different angles and perspectives, a number of research methods and data collections methods are used to gather information and data, the combined analysis of which provides an understanding about the complexities under study (Yin, 2003). The collection and interpretation of different types of data bearing on the same phenomenon is used in order to improve the depth of inquiry into and conclusions drawn from the process of the study. Using a variety of data sources provides rich material for examination and enables more concrete and trustworthy conclusions to be drawn from the overall process (Yin, 2003). Bearing this in mind, five different data collection methods were used in this study. The research was conducted over a six week period and the following data collection methods were employed:

Table 1: Data Collection Methods

Data Method	Time Frame	Research Objective
Pre-test	Pre-research	To determine the level of understanding of Physical Geography concepts and vocabulary
Teacher/Author Observations	During Research	To determine level of collaboration/communication/higher order thinking/motivation etc
Student reflective diaries	During research	To gain insight into the thoughts and difficulties experienced by the participants on an individual level
Group Interviews	Post research	To determine overall attitude and perception of project and learning experience by the participants. To examine any knowledge transfer in the area of Physical Geography concepts and vocabulary
Physical Artefact and expert feedback	Post research	To determine level of understanding of Physical Geography concepts and vocabulary and examine technical development
Post test	Post research	To determine if concept knowledge and vocabulary of Physical Geography was enhanced

4.7.1   Pre and Post Tests

Pre and post tests were used to assess the student's descriptive Geographical concept knowledge and vocabulary. The pre-test were administered to the participants prior to the design process. The pre and post tests were adapted from Physical Geography tests on www.seomraranga.com for Fourth and Fifth class students and the content was influenced by Dal's investigation into student's difficulties in the area of Geographical Concepts and Vocabulary (Dal, 2008). The pre-test included true/false statements, open ended questions and closed questions to test for different orders of thinking for example recall, comprehension, application and knowledge (L. Cohen, Manion, & Morrison, 2007). Pre-tests were used as a data source in Kafai, Y. B., Carter Ching, C., & Marshall, S (1997) research project which also involved children as designers of Multi-Media products.

The post tests were designed in a similar manner to the pre-tests and distributed after the Digital Stories were created. The two tests were compared and conclusions were drawn from these comparisons which will be discussed further in Chapter 5, Findings and Discussion. The post test was also used to establish evidence of retention, recall and near and far transfer of knowledge. Post tests were used in Dalacosta, K., Kamariotaki-Paparrigopoulou, M., Palyvos, J. A., & Spyrellis, N. (2009) research project to assess knowledge transfer and recall in relation to scientific animations used in Elementary school.

4.7.2   Teacher/Author observations

Observation is the process of gathering first-hand open-ended information through the observation of people (Creswell, 2008). Observation is seen as an important data source as participants, especially children, may not recall accurately their actions and feelings at a later date and therefore it is important to observe the activities and interactions as they are happening and make notes about what is observed (Tashakkori & Teddlie, 2002). Observation appears to be a popular method of data collection for collaborative constructionist projects as it is used by Madden, M., Chung, P. W. H., & Dawson, C. W. (2009) and Schrand (2008) in their research projects which involved children creating their own multi-media applications.

In the case of this project, an observation template was created by the author whereby notes on time, date, group, activity etc could be recorded as they were happening (see Appendix C). This observation template was designed using elements of the collaboration and student's observation rubric from Kathy Schrock's guide for educators at www.schooldiscoveryeducation.com. During the observation process particular attention was paid to group interaction, language use, artefact construction and overall atmosphere. The researcher attempted to minimize the intrusion on the creation of the Digital Stories as it was felt the best results could be achieved when the children acted as naturally as possible (Stake, 1995) (Tashakkori & Teddlie, 2002). The researcher observed the participants over the six week period in their natural structured environment. One of the advantages of this data collection method was that the researcher had the opportunity to record information as it occurred in a real life setting. The results of the observations are discussed in detail in Chapter 5.

4.7.3   Student reflective diaries

During the project, the students kept diaries which enabled them to reflect as individuals on the process of creating their Digital Story. Due to the fact the students were working in groups the diaries were an important element in the learning process as they enabled each individual student to reflect on their own learning and express thoughts and feelings which they may not have expressed to the group. The literature suggests that reflecting on a learning process can provide deeper understanding of the process and provide an opportunity to "make sense" of what occurred during the activity (Casey et al., 2000). The author used codes and themes to analyse the reflections for evidence which would indicate enjoyment and engagement with the activity as well as opinions and ideas about Physical Geography, working as a group and being in the position of creator as opposed to consumer. The use of participant's individual reflections as a data source was also used by Kafai, Y. B., Carter Ching, C., & Marshall, S. (1997) in their multi-media project.

4.7.4   Group interviews

The group interview may be described as a group conversational encounter with a research purpose (Lewis, 1992; Moyle, 2006). Group interviews have the potential to stimulate discussion which will lead to a wide range of opinions, responses and comments from the participants (L. Cohen et al., 2007). However, in order to discourage "group think" it is important to distribute the questions so that all group members have a say and to create an environment where participants feel comfortable expressing their opinion (L. Cohen et al., 2007).

Lewis believes that group interviews, especially with children, obtain greater depth and breath in responses than individual interviews (Lewis, 1992). Children are less intimidated when speaking in a group, especially to an adult and in group situation some responses may trigger off ideas from others. Group interviews also give the children "thinking time" while another child is speaking (Lewis, 1992). The literature suggests that group interviews provide a comfortable environment for children to communicate in and therefore can be seen as a valuable data collection method (L. Cohen et al., 2007).

The author had initially hoped to video these interviews for later analysis but after further consideration revised this idea as the video may have caused a distraction and perhaps may have made the participants nervous and unwilling to speak freely. The narrative of the group interviews was recorded and transcribed by the author. In total three group interviews took place with six students in each group. The students were eager to voice their opinion and thoughts during these interviews.

Initially, there was a structure of five questions to ask each group. The questions covered a range of topics from how the children made their Digital Stories, what aspects they enjoyed most and least about the project, how they felt about working in a group etc. To begin with, the questions were very general and broad in order to stimulate discussion and multiple responses.   However, as the group interviews developed the author asked questions which further developed the ideas discussed by the students in each group. This resulted in very interesting and informative data. As stated above, the author transcribed the interviews, (see Appendix D) and from this

codes and themes were developed to analyse the group interviews, the findings of which are discussed in detail in Chapter 5.

4.7.5   Physical Artefact/Expert feedback

Creswell suggests that to ensure the validity of findings in a case study external individuals should review the project (Creswell, 2008). Bearing this in mind, once the children had created their artefact the finished Digital Stories were examined and evaluated by both the author and external professionals, in this case lecturers in Multi-Media use in Education and Geography from St. Patrick's College of Education. The Digital Stories were evaluated using an evaluation rubric (see Appendix B) which was developed and influenced by the evaluation rubrics for web quests and scientific understanding taken from www.schooldiscoveryeducation.com. During the evaluation process the following elements were examined: evidence of Geographical understanding within the Digital Stories, the presence of an appropriate and informative narration accompanying a picture and an awareness of an audience. The use of the physical artefact as a data source is a popular research method which was also used by Dalacosta, K., Kamariotaki-Paparrigopoulou, M., Palyvos, J. A., & Spyrellis, N. (2009) and Madden, M., Chung, P. W. H., & Dawson, C. W. (2009) in their studies of multi-media creation by students.

4.8   Conclusion

This chapter discussed the research and data collection methods used during this project. The next chapter will draw upon the findings that were generated during the analysis process and will develop a discussion of these findings

5   Findings and Discussion

5.1   Introduction

The previous chapter described the data collection methods and the research methodologies used. This chapter attempts to analyse the data collected, discuss the findings and describe how they relate to the study being undertaken. A case study was chosen as the most appropriate way of answering the research questions as it enabled the author to observe the students throughout the process of creating the Digital Stories in an appropriate real life learning environment.

As stated in previous chapters, this paper aims to address a number of research questions, the main one of which is:

In what ways can the collaborative creation of Digital Stories by students based on Physical Geography enhance learning?

Sub questions of this main research questions are:

- What role does collaboration play in the learning experience?
- In what ways is the learning of the concepts and vocabulary of Physical Geography enhanced?
- What effect does the active creation of Digital Stories by students have on motivation, attitudes and interest in learning?

The use of multiple forms of data collection serves to corroborate the evidence from other sources. The data sources analysed were:

Data set 1: Pre/Post tests

Data set 2: Author/Teacher observation

Data set 3: Documentation in the form of student's reflective diaries

Data set 4: Group interviews

Data set 5: Physical artefacts, i.e. the Digital Stories produced by the students

Each of these will be discussed below and analysed in an attempt to answer the research questions above.

5.2   Data set 1: Pre/Post tests

The purpose of the pre and post test was to assess the students' descriptive Geographical concept knowledge and vocabulary prior to and after the project in order to identify any change or improvement in this area. The literature suggests that multi-media presentations, whether created or simply viewed by students, can enhance the learning of Physical Geography (Hickey & Bein, 1996). One of the main aims of this project was to examine the effect of the creation of Digital Stories by the students on the learning of Physical Geography. Each group was also provided with opportunities to view the Digital Stories created by the other groups. It was thought that by enabling each group not only to create a story of their own but to view and evaluate the other Digital Stories created would encourage peer mentoring and develop a broader base of Geographical understanding as each story focused on a different aspect of Physical Geography. Therefore, the pre and post tests examined all the topics covered by the Digital Stories created by the students. They were analysis using an evaluation rubric created with the aid of www.teach-nology.com, (see Appendix A). Sixteen students in total completed the pre and post tests as one student was absent on both occasions.

**Figure 6: Results of Pre and Post test on topic of Rivers.**
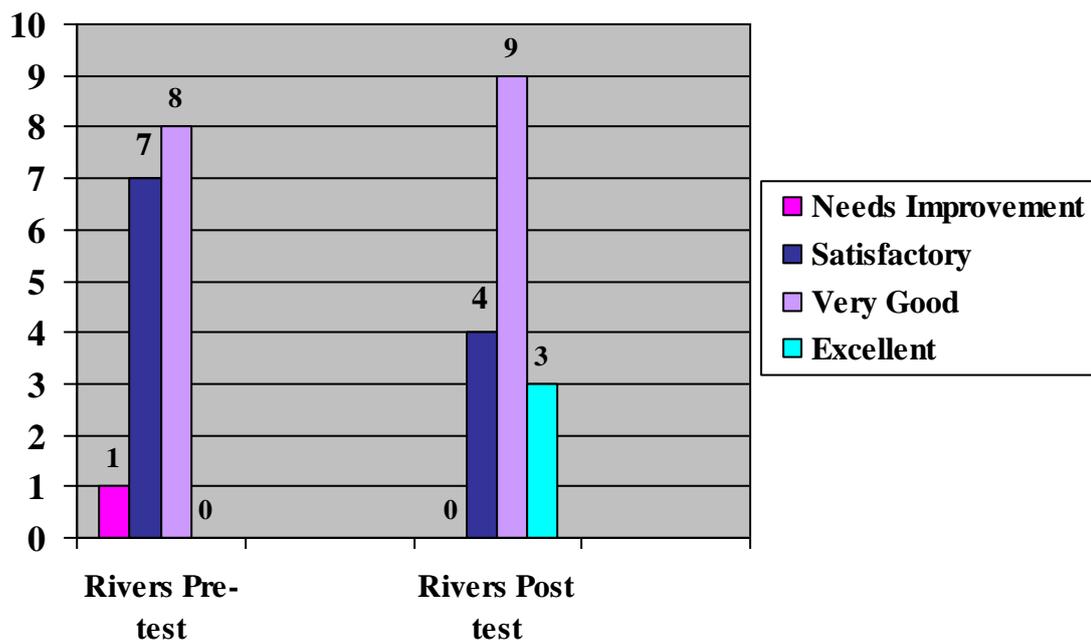
**Figure 7: Results of Pre and Post test on topic of Volcanoes**
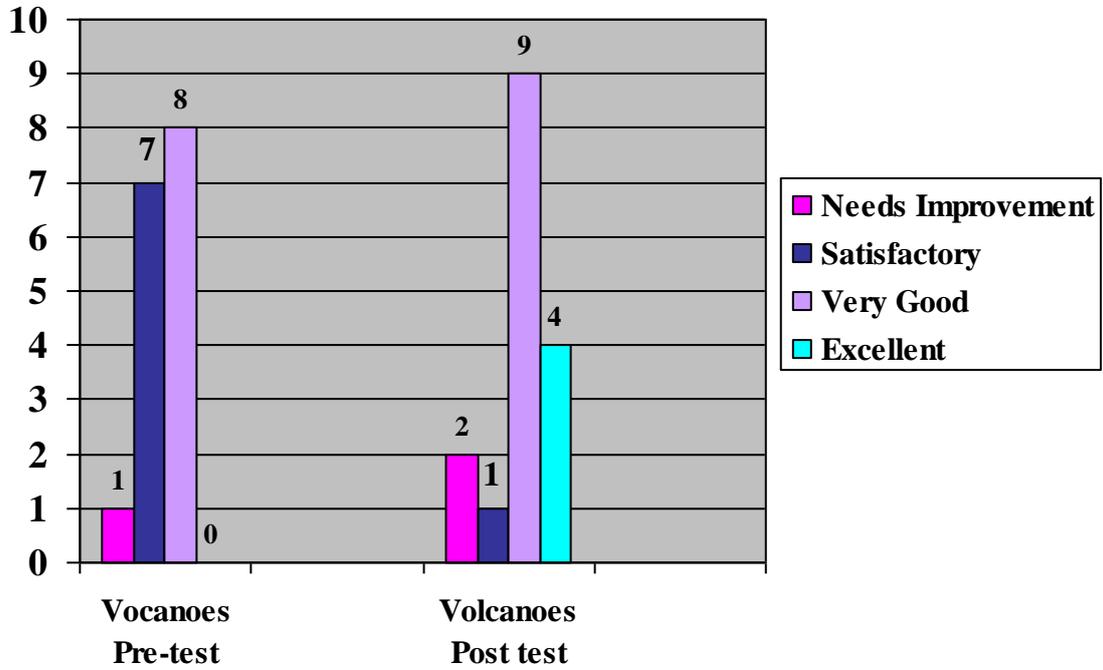
**Figure 8: Results of Pre and Post test on topic of Earthquakes.**
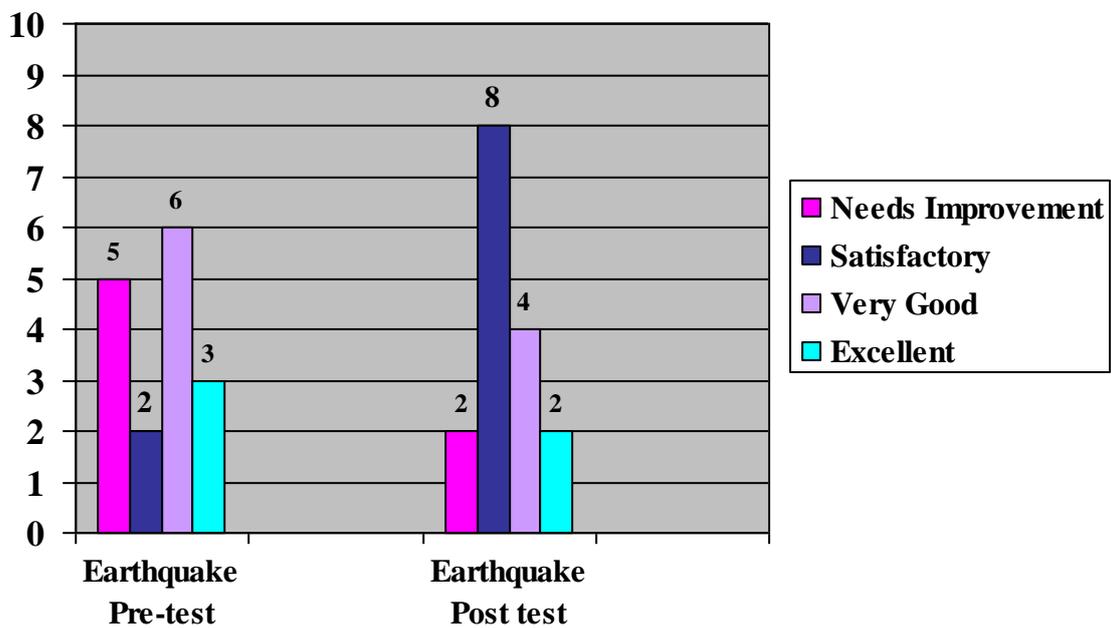
**Figure 9: Results of Pre and Post test on topic of Water Cycle and Drought.**
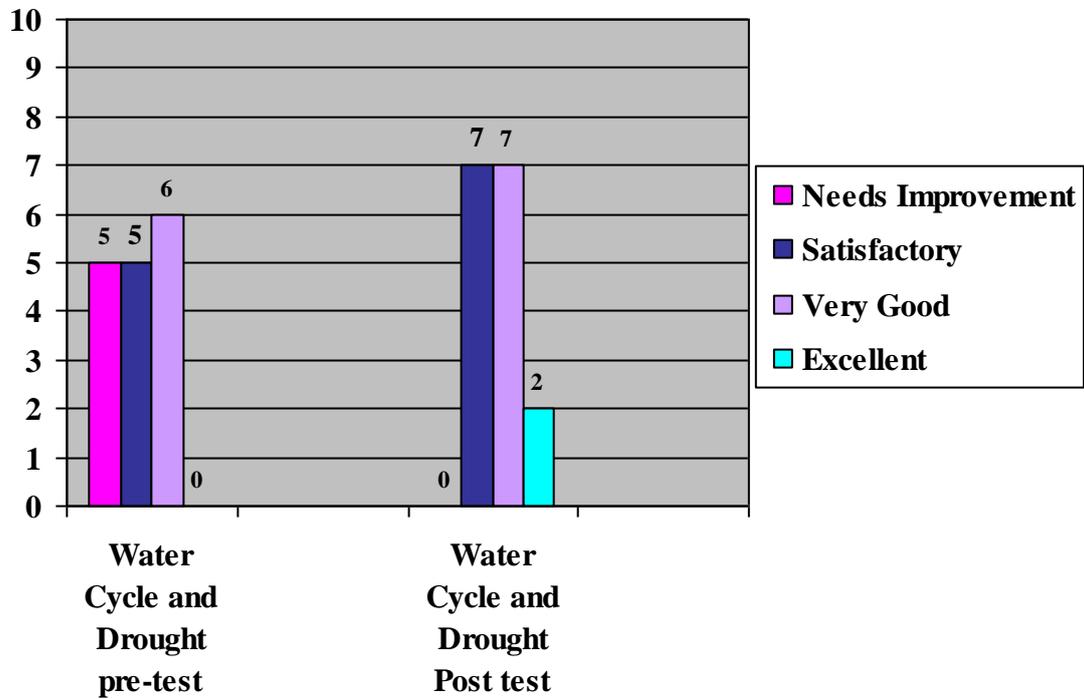
Figure 10: Results of Pre and Post test on Geographical Vocabulary.
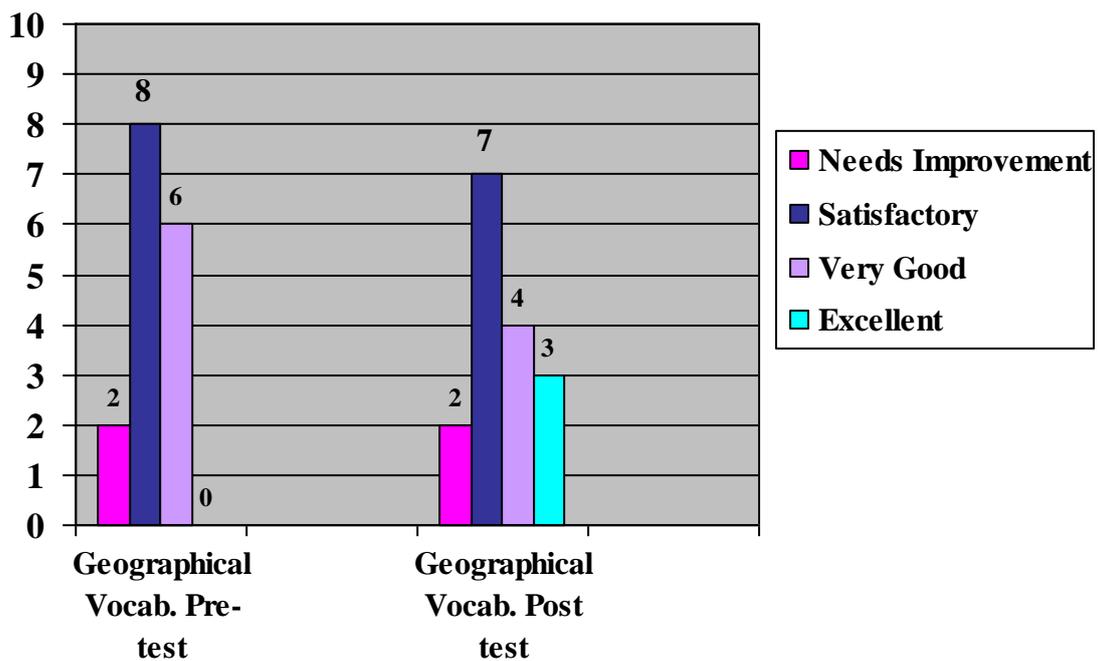
Overall, the findings of the pre and post tests indicate an increase in the number of students in the *Excellent* category for all topics based on the evaluation rubric created for these tests (see Appendix A). There is also a notable decrease in the number of students who scored in the *Needs Improvement* category for most topics, including Earthquakes and The Water Cycle and Drought sections, where the number of students registering as *Needs Improvement* on the pre-tests was significantly high in comparison to other topic sections. Of particular interest in this regard are the results from The Water Cycle and Drought section of the tests as the number of students who scored in the *Needs Improvement* category during the pre-test stage totalled five, which was the greatest number out of all topics. This would suggest a certain amount of confusion and difficulty for students in this area. On a positive note, this decreased to zero in the post test perhaps indicating less confusion and some clarity in relation to this topic.

During the evaluation of the pre and post tests it became evident that the topic of Earthquakes was an interesting area from a research point of view. In the pre-test five students scored in the *Needs Improvement* category and three in the *Excellent*, which meant there were a significant number of students at opposing ends of the spectrum in relation to this topic. However, in the post-test although the number of students rated as *Needs Improvement* decreased from five to two, the number of students categorized as *Excellent* in this area also decreased from three to two, as did the *Very Good* category from six to four students. To add further complexity to this area the number of students rated as *Satisfactory* increased dramatically from two to eight. To explore this result further it is necessary to examine the answers to the questions on Earthquakes by the students. In the post test the question was asked

Question: We have Earthquakes in Ireland? True/False

Why?

Although all the students answered the first part of this question correctly there is clear evidence of confusion when answering the second part of the question. The answers given by students as to why we do not have Earthquakes in Ireland included statements such as the following:

"… because we don't touch any other countries"

and *"…because we're not in the centre of the Earth"*

One student in particular, when asked about the location of tectonic plates had correctly answered

"Tectonic plates are below the Earth's surface".

However, it appears he was unable to transfer this knowledge to the aforementioned question about Earthquakes in Ireland. In this case he answered

"....because we have no tectonic plates".

This level of confusion would seem to confirm Dal's belief that although some basic terminology is taught and understood there is still some misunderstanding in relation to Geographic concepts (Dal, 2008).

5.3 Data set 2: Author/Teacher observation

The aim of author/teacher observation was to investigate the level of interest and motivation demonstrated by the students, what role collaboration played in the creative process and if an increase in knowledge of Physical Geography was evident. In relation to observing and measuring the collaborative behaviours in a group the participation of each group member was rated on a scale from High Level Participation to Low Level Participation using a scale adapted from Webb et al (Webb et al., 1998).

Table 2: Measurement of group participation adapted from Webb et al(Webb et al., 1998)

High Level Participation	Medium Level Participation	Low Level Participation
Making Suggestions	Copying another group member's suggestion	Listening/ Watching
Resolving conflict	Simply agreeing without elaboration	Making little or no contribution
Expanding on another group member's idea	Repeating someone else's suggestion	Making little or no inquiry
Asking questions		
Paraphrasing		

.

The author also used a template designed using elements of an observation rubric from Kathy Schrock's guide at www.schooldiscoveryeducation.com,

(See appendix C). The academic ability of each student in the group, which was determined by the author through previous observations and projects, was rated as High, Medium or Low. The analysis of the data proved very informative and insightful. As previously stated, the students were divided into six mixed ability groups with three students in every group and one group of two. The observational findings for each group are discussed below.

Rivers

The number of participants in this group was three and the academic ability of the group members was rated as High, Medium and Low. The high academic ability student was frequently absent which had an impact on the group at the beginning as they lacked direction and were progressing slowly. There was poor communication within the group and some members had expressed, in their reflective journals, a desire to work on their own. They were showing very little interest or motivation and appeared to be confused by the topic, the vocabulary and concept. In the group interviews conducted later, one group member stated that he thought the topic would be mundane and was therefore unenthusiastic about the project in general. One member of the group was contributing very little and causing a lot of disturbance within the group. To begin with, the low ability student was very quiet and did not seem too interested so the group was literally at a stand still. Each group member had a different idea on what they wanted to do and this was causing conflict.

However, after intervention by the author and some discussion on how their disagreements could be solved and in what direction the project could go their communication skills improved greatly. Once work began on the computer they appeared to collaborate to a greater extend and encountered very few disagreements. They became interested in the topic of rivers and through their own investigations they discovered lots of additional information. There was a more relaxed atmosphere in the group and the low ability student began to contribute greatly. At the start of the project all three group members were exhibiting Low Levels of group participation based on the scale in Table 2 above. However, by the end of the project two members were at a High Level of participation with the low ability student rated at Medium Level participation.

Volcanoes

There were three members in this group and they were rated as High, Medium and Medium and were therefore one of the strongest groups academically. From the start this group was highly motivated and had a great interest in the topic. One participant in particular got books on two occasions from the public library on the topic of volcanoes to assist the group. During their discussions there was great use of Geographical vocabulary with the occasional misuse of terms.

This group had difficulty making decisions on how to progress as each member had a different idea and they had numerous disagreements and heated discussions. Perhaps this was due to the fact this group was one of the strongest academically and therefore each group member felt his opinion was the best. However, when asked about these conflicts and disagreements in the group interviews conducted after the project, the students stated that they believed the disagreements helped them decide on the best choice for the project perhaps proving that conflict, discussion and disagreement can enhance the productivity of a group. This level of disagreement, questioning, suggestions etc meant that all three members of the groups participated at a High Level. Interestingly, all three participants scored higher on their post test in the areas of Volcanoes. This finding can be seen to support Webb et al suggestion that high and medium ability students perform better when grouped together (Webb et al., 1998).

Earthquakes

Due to student numbers there were only two members in this group. Their academic ability was rated as Low and High. They both appeared to be highly motivated and on three occasions the high ability student brought in work completed at home for the project. During the design and discussion phase the majority of decisions were undertaken by the higher ability student with the lower ability student simply agreeing and saying very little, thus exhibiting a Low Level of Participation. Therefore, it can be said that the higher ability student took on the role of leader. As suggested in the literature this group dynamic gave the higher ability student the opportunity to clarify his ideas and the lower ability student the chance to benefit through his explanations (Galton & Williamson, 1992).

Once work began on the computer the tasks appeared to be shared with both group members contributing to the project. The lower ability student appeared to be gaining confidence and was voicing his opinions and thoughts and contributed greatly during the narration phase of production. The higher ability student participated at a High Level throughout the project with the lower ability student progressing to Medium Level participation during the production phase.

Water Cycle

There were three members in this group rated as Low, Low and High academically. Once they were assigned a topic this group displayed great motivation and interest. Two group members brought in information from after-school clubs and home. At the start there appeared to be great communication and division of tasks within the group with all members working at a High Level of group participation. However, the student of higher ability was absent frequently which left the lower ability students to work on their own which appeared to be difficult for them. At this point the group was operating at a Low Level of participation with the two remaining students barely communicating. The group was making very little progress and displayed very little understanding of the topic with participants confusing some of the words and concepts. The images they were selecting for their story had very little to do with the concepts they were explaining. This observational finding would appear to support the literature which suggests that low ability students benefit from the instruction and guidance they receive from higher ability students in the group (Galton & Williamson, 1992) (E. Cohen, 1994).

Throughout this period of difficulty the group's motivation and interest was still evident and they were very determined to complete the project. Unfortunately they appeared unable to do so as they lacked the skills and direction needed. At this point the teacher guided the group with some suggestions and direction which appeared to motivate them further and enabled them to finish their project.

Floods and Drought

There were three participants in this group and they were rated as Medium, High and Medium, which made them one of the strongest groups academically. From the beginning this group were highly motivated and had great communication within

the group. They were all at a High Level of group participation. All members appeared to understand the topic and were using the vocabulary associated with it during group discussions. There appeared to be equal distribution of tasks within the group with all group members contributing to the project and there was no evidence of conflict or disagreement which was later confirmed in their group interviews and reflective logs.

River Liffey

There were three members in this group rated as Medium, Low and Medium academically. To start, there was slight unrest in this group as there appeared to be one member dominating the process. The literature suggests that this can be a disadvantage of a triad group formation (Kutnick et al., 2002). However, as time progressed and after two explosive disagreements good communication developed within the group with all members contributing and expressing thoughts, ideas and opinions which effectively promoted active participation as suggested by Webb et al (Webb et al., 1998). All three members were participating at a High Level. The group was highly motivated with two members expressing a desire to spend their free time researching the topic on the internet.

From the analysis of the observations in relation to the literature a number of interesting findings agree with the literature. There is evidence of a strong sense of group based learning from all of the groups with some performing at a higher level than others. This was achieved through a number of criteria such as group formation, group interaction and the nature of the task, which are thought to lead to effective group learning (E. Cohen, 1994) (Webb et al., 1998).

5.4 Data set 3: Student reflective diaries

Over the course of creating the Digital Stories the children kept reflective diaries in their free writing copies which they wrote in frequently. The purpose of the reflective diaries was to give an insight into the thoughts and feelings of the students during the creative process as opposed to the learning outcomes which were analysed in greater detail through the data collected from group interviews, post tests and

physical artefacts. In their diaries, individual students had the freedom to reflect on the creative process and write about their learning experience throughout the project. The data supplied by these reflective journals was analysed and codes and themes were derived from the data. Coding can be defined as segmenting and labelling text to form descriptions and broad themes in the data (Creswell, 2008). A total of forty two codes were identified and they were broken down into three themes. The codes and the themes are as follows:

Table 3: Codes and Themes from Student Reflective Diaries.

Perception of Project	Group work	Geography as a topic
We had a great time	I'm glad I'm in my group, we're having loads of fun	We know a trick to show the water moving on a mountain
It's more enjoyable making the stories than doing school work	In my group we always think hard and X is very good at thinking and nearly knows everything about Geography	When the leaves are wet on the trees the water starts to evaporate
You can put in what you want	It's good having two smart people in my group, it's helpful to me	Volcanoes can be dangerous cause the lava moves very fast
You learn more making it	We worked well together today, we talked a lot and there was no fighting like usual	We were writing about how volcanoes work, how the pressure builds up inside and then they explode
Making it is the fun part	I like my group but sometimes I wish it was bigger, there are only two of us	We looked at the globe to find the Amazon River, the biggest in the world, I didn't know where it was
You learn more by doing it yourself instead of the teacher	We talked about what we were going to do	Earthquakes are fun
I can't wait until tomorrow	I feel I'd rather work on my own because I like doing things on my own	Earthquakes can cause tsunamis
I get to explore images	We all listened to each other today and we got our work done faster	The Ha'Penny bridge used to be a tolled bridge and you paid a half penny to cross it
We did so well	I don't like my group at the moment because me and my friend aren't doing any work and I wish I could do more in the group	Volcanoes are mountains, I didn't know that
We have a laugh	Y was shouting at me, I don't want to work with him anymore, if things aren't better tomorrow I would like a new group	People and animals can die from Drought
Our story is coming together	Z was giddy today and I think me and T	The ground cracks during drought,

now	should work on our own	we found a picture of it
I hope it looks good when it is finished	All of us come up with different ideas, its good	It s called lava when it reaches the surface
Really great	X didn't like my picture but the two of us talked to him and then we all agreed	
	I think we are a good team, we have good ideas and we never fight	
	The other people in my group aren't getting along, I want them to stop it or else one of them leaves	
	There is the right amount of people in the group	
	All of us come up with stuff, different ideas, it's good.	

As illustrated in the table above three main themes emerged from analysis of the student's diaries. Each of these themes will be discussed below.

5.4.1 Perception of the Project

The findings from the reflective diary entries suggest that the majority, if not all of the participants, enjoyed creating Digital Stories in the area of Geography. The participants viewed the project as exciting as they anticipated what their next step in the creation process would be. They found the project was fun, great and enabled them to learn as they were creating their stories. The data from this theme area indicates the importance and value the students placed on creating the artefact themselves. This appeared to play a significant role in their overall perception of the project as many of the participants mention that they enjoyed the responsibly of making choices about the artefact for themselves as opposed to the teacher or someone else doing it. This is an important finding as the literature suggests that enabling students to create and design their own multi-media artefact can contribute greatly to the enjoyment and interest of a learning experience, which in turn can improve the overall learning outcomes (Kafai et al., 1997).

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5.4.2   Group work

In general the findings from the reflective diaries suggest that the student's attitude and opinions on the collaborative aspect of this project were very positive. The majority of participants worked well in a group; they found it was fun and that it contributed to the overall enjoyment of the project. The literature suggests that in order for group based learning tasks to be successful the students must practice the skills necessary for positive group interaction, such as listening, questioning, offering suggestions, making contributions etc. (Webb et al., 1998). The findings appear to support this suggestion as many students mention the fact that when they talked about their ideas and listened to other group members they worked better as a group and made faster progress. That been said, there is also clear evidence to suggest that some groups, if not all groups at some point, experienced disagreements and tension between group members, some students even suggested they would rather work on their own or in a different group because the disagreements were preventing the group from progressing. However, it appears both from the observations made by the author and from the evidence of the group interviews that all groups solved their conflicts and developed strategies to enable the group to progress as each group completed their projects successfully.

5.4.3   Geography as a topic

The topic and subject of the Digital Stories created was very important in answering the research question as the subject of each Digital Story was an aspect of Physical Geography and one of the main aims of this project was to assess how the creation of Digital Stories by students could enhance the learning of Physical Geography. The literature suggests that student's knowledge and proficiency in some basic Geographical vocabulary, terms, concepts and ideas are essential for successful results and interest in Geography as a subject (Dal, 2008). Within the reflective diaries there is evidence to suggest that not only are Geographic terms and concepts being discussed within the group during the creative process but the data collected displays that they are also being analysed at a deeper level as a great number of students discuss them further in their reflective diaries. There are also clear connections being made between the terms the students use and its meaning which would suggest that their conceptual understanding of the term is correct. On many

occasions students make reference to the fact they were unaware of either the word or its meaning prior to the creation of the Digital Stories. This therefore highlights the positive effect the creative process had on their use of Geographical terms and also their understanding of them, which according to the literature is a key element for success in the area of Geography (Lopez, 2008).

5.5   Data set 4: Group interviews

In total, three group interviews took place. Initially it was hoped that two topic groups i.e. six students would be placed together in each interview group. However, due to absenteeism it turned out that one interview group had six participants, one group had four participants and the final group had three participants. The author kept the questions very open and general in order to encourage comments and conversation. The main aim of the group interviews was to evaluate the participants' perceptions of group based learning, their level of engagement with the project and their knowledge development in the area of Physical Geography. The data generated from these interviews was analysed and main themes were derived from the data which verified many of the themes and codes established in the other forms of data, in particular the student's reflective diaries. The interviews were recorded in order for the author to fully engage with the students during the interview and to enable the interviews to be transcribed at a later date (See Appendix D). The main themes identified are the following:

1. Group based learning experience
2. Development of Geographical Knowledge and Vocabulary
3. Perceptions of active learning

Each of these themes will be developed and discussed in turn.

5.5.1   Group Based learning experience

Group based learning is an important element of this study. The literature suggests that group work and social transmission can contribute greatly to the build up and acquisition of knowledge as well as lead to an increase in motivation and enjoyment on the part of the student (Blatchford et al., 2003). The findings from the group interviews appear to confirm this as one student states:

S7 "*Yeah it was more fun working in your group than on your own*"

Another student highlights the cognitive benefits of working in a group:

S5 "*I wouldn't have been able to make a Digital Story on my own cause you get more information from the people in your group and you have people to back you up*".

The same student continues to endorse the benefits of group work by indicating how group members can help other group members by giving explanations and suggestions:

S5 "*Like say if I didn't know something about a volcano and someone else in the group knew it they could help you but if you were on your own you wouldn't have that*".

This feeling of security is echoed during another group interview when a low ability student states:

S12 "*Yeah it was better working in a group cause if I was on my own I'd be nervous and I wouldn't know what to do but a group can help you*".

Another student of low-ability states that:

S6 *"Your group can give you more information and help"*

This idea, that low ability students benefit from working in a group with higher ability students is suggested in the literature by Lou et al (Lou et al., 1996). Other research suggest that not only do low ability students benefit from the explanations given by higher ability students but higher ability students also benefit by giving these explanations and taking on the role of instructor (Galton & Williamson, 1992).

This idea of co-learning and students receiving help from one another in the form of explanations and suggestions is thought to be an element of group based learning which contributes to the motivation and interest on the part of the student as they can often understand each other more directly (Gillies, 2004). The literature suggests that for conceptual learning to take place within a group then effective interaction must occur (E. Cohen, 1994). The findings from the group interviews indicate plenty of group interaction in the form of explanations, questions, sharing of ideas and even arguing which is put forward as effective group communication by Webb et al (Webb et al., 1998).

S13 *"we decided most things between us"*

However, not all groups were getting on so harmoniously which lead to some discontent within the group

S11 " at the start I didn't really like the group because I was doing all the work by myself but then we all started helping out more and talking more and we were getting a lot more done".

Another group, who were creating a Digital Story on Volcanoes, were noted during the observations by the author as having difficulty interacting and were frequently arguing. This interaction was discussed further during the group interview stage. When asked for the reason behind the arguments one group member stated:

S7 "*Just say I wanted to say something about a volcano and the other two didn't like it then there'd be an argument*"

This idea that two groups members would dominate the third member is highlighted in the literature as a potential disadvantage to triad group formation (Kutnick et al., 2002). However, the group seemed to think these arguments lead to a greater result and simply saw them as part of the communication within the group:

S7: "*If we didn't have arguments we wouldn't have got the real good stuff for our story, the real good sentences*"

The same student goes so far as to say that the arguments were his favourite part of the whole creative process:

S7 "*My favourite bit was the arguing, I think you learn more from arguing*".

It is suggested in the literature that shared decision making, negotiation and creativity are all positive aspects of group activity and it would appear from the above examples that negotiation and conflict added to the creativity of the group and enabled them to enjoy the experience all the more (Webb et al., 1998)

5.5.2   Development of Geographical Vocabulary and Concept Knowledge

When the students were asked questions to establish knowledge acquisition as a result of making Digital Stories the results were varied. Some groups appeared to have gained a huge understanding of the subject area and acquired the vocabulary associated with it. For example, S5 was working on the Volcano project and he states

S5 "*You're learning more and more about volcanoes everyday as you're making the story cause you're talking about it, going on the internet to check information, checking for pictures and it's all going into your head*"

This statement seems to be supported by the findings of Lopez's research which suggests that in order for children to truly engage with Geography as a subject they need opportunities to engage in hands on activities which enable them to see the visual aspects of Physical Geography, in this case images (Lopez, 2008).

S13 agrees with the above sentiments as he comments on his subject, Earthquakes:

S13 "I *learnt loads about Earthquakes, especially the one in Haiti and that Earthquakes can cause Tsunamis*"

The same student had initially expressed disappointment when he was assigned the topic of Earthquakes:

S13 *"Well, at first I didn't want to do Earthquakes as a Digital Story, I didn't know much about them and I thought Volcanoes were more interesting"*

A similar sentiment is expressed by another student who was assigned a topic on Rivers:

S11 *"I wanted to do Volcanoes too instead of rivers at the start but when I started finding out about rivers I began to like it and that they are interesting and important too".*

However, both students went on to say how interesting they found their assigned topics and how much they learnt about them

When one student from the Drought and Floods group was questioned about his knowledge of the topic he was very eager to display his new found knowledge:

S2 "at the start I didn't know what drought was, I just thought it meant dry but now I know it means when the weather is hot and there is no rain and the plants and animals can die and the ground cracks and bush fires happen"

When questioned about how he knew the meaning of the word now his response was:

S2 "Of course, we just did a whole story on it"

Therefore, it appears that his participation and involvement in the creation of the Digital Story clarified the meaning of the word for him.

This perception of certain areas of Physical Geography, especially the less explored area such as rivers, as being uninteresting and dull is a concern expressed by Lopez which she believes is a result of repetitive and uninventive teaching methods in the area of Geography (Lopez, 2008). However, as demonstrated above once the children had an opportunity to engage with the topic and visualise and analyse the

terms and concepts associated with it the topic became interesting and they learnt a lot.

However, there still appeared to be confusion between certain terms and their meaning.

S10 "I *still don't know what tectonic means but I know they are plates"*

S1 "I *know precipitation means rain and I think run off is where it all starts at the top of a mountain"*

This confusion between the Geographical term and their meaning was also a key finding in Dal's research where he found there was little connection being made between the vocabulary and the meaning (Dal, 2008).

5.5.3   Active Learning and motivation

The literature suggests that students show high levels of persistence, enjoyment and motivation when they have controllability and input into a task and the findings from this project would seem to support this conclusion (Kim et al., 2007) (Leahy, 2007).   When questioned as to whether they preferred making the Digital Stories themselves or watching one made by someone else, which they did at the start of the project, every student interviewed said they preferred making them themselves as "*you learn more and its more fun"* (S5*).* The findings also suggest that the aspect of ownership and controllability was important to the participants:

S7 " *I'd rather make it myself in a group cause it s not as much fun when you are just watching it and getting information told to you instead of finding it our for yourself"*

S11 *"when you are making it you get to look up the information and see the images for yourself"*

S2 *"talking was my favourite part when you get to hear your own voice"*

This idea of ownership and controllability is one of the key benefits of active learning which enables a collaborative valuable learning experience (Schrand, 2008).

The students also stated how their involvement in the design process improved their understanding and appreciation of the subject:

S1 *"when you are making it you are writing the information and picking the images so you remember it more"*

S11 "If the teacher just told you what things were there is no point cause you ll just forget it but making it you figure things out for yourself".

The students' interest, enjoyment and motivation are also evident:

S13 *"I brought some pictures in from home on my memory stick that I liked and then I got loads more from the internet"*

S9 *"You're able to see all the cool images and find them yourself"*

One student went so far as to believe the project had no connection to school work at all, that it was purely for enjoyment purposes

S3" I liked making the stories cause you get time off school work".

5.6   Data set 5: Physical artefact

In total six Digital Stories were created and published and can be viewed on the DVD accompanying this document. The physical artefacts created gave great insight into the connection made by the students between Geographical Vocabulary and their meaning which was one of the main aims of this project. They also indicated the extent to which the group understood the language and concepts and how well they explained them to the audience. The author devised an evaluation rubric which can be viewed in Appendix B of this project. The rubric was designed using elements of the evaluation and assessment rubric from Kathy Schrock's guide for educators at www.schooldiscoveryeducation.com. The finished Digital Stories were examined and evaluated by both the author and external professionals, in this case lecturers in Multi-Media use in Education and Geography from St. Patrick's College of Education. Below are the results of this evaluation.

Table 4: Evaluation of Digital Stories created by the students

Topic	Language used	Images	Information provided for viewer
Rivers	Very Good There was a clear connection made between the terms used and description of the river. However, some important aspects of the path of the river were missing such as	Satisfactory There was an excellent use of maps and zooming in to highlight river paths. However, some of the images used were unclear.	Very Good There was plenty of factual information provided for the viewer with images to match the narration. However, the narration was difficult to understand at points

	tributaries and meanders.		and some images provided too much information for the viewer
Volcanoes	Excellent A connection was made between the image the Geographical term and its meaning. The language was varied and covered all important aspects of volcanoes and eruptions. The language used described the whole process clearly.	Excellent Great choice of images with a wide variety of pictures chosen to illustrate many aspects of volcanoes. The students also used footage of their own which showed them conducting and experiment which mimicked a volcanic eruption.	Excellent The narration was clear and related to the images it accompanied. It was short but factual. The experiment which was a feature of the story was described in detail and added greatly to the viewing pleasure of the audience.
Earthquakes	Excellent The language use throughout was of a high standard with detailed descriptions accompanying terms. There was a wide variety of Geographical language used ranging from factors causing earthquakes to equipment used to measure them	Excellent The images were clear, colourful and illustrated the term or concept being described by the narrative. The story also contained images which were designed and created by the group themselves which indicated a interest and understanding of the concept they were describing.	Very Good The narrative was easy to understand for the most part and was related to the image it accompanied. However, there were one or two images where the narrative was not clear enough and the language was slightly confusing.
Floods and Droughts	Very Good There was great detail in the language used with lots of Geographical terms used and concepts explained clearly. However, there were certain aspects of drought that were not discussed, such as the impact it has on farming.	Very Good The images were clear and were appropriately selected to illustrate the concept of either flooding or drought. However, there were only a few images and it is felt that the story would have benefited from more images.	Satisfactory The narrative describes the images it accompanies. However, at times the narrative is difficult to understand and there is not much information given on where drought or floods can occur which may cause confusion for viewers.
Water Cycle	Satisfactory The main terms associated with the water cycle are used and described. However, the descriptions are very brief and on occasion leave out important aspects of the concept	Needs Improvement There are very few images used, with no introductory image or concluding image. The images selected however do relate to the concept described in the narrative and caption.	Needs Improvement As stated there are no introductory or closing images to guide the audience or introduce the topic. There are only a few images used to explain and illustrate very complicated concepts. The narrative, although present and appropriate to the images is short.

River Liffey	Very Good The language used is informative and the terms and concepts used relate well to each other and to the images selected.	Satisfactory The images selected are appropriate to the terms and Geographical areas mentioned. Some of the images are pictures taken by the group themselves. However, some images are unclear and they could have used a few more images to illustrate their topic more conclusively.	Very Good The images are pleasant and familiar. The narrative is easy to understand and clear and connects well with the images selected. Plenty of quality information given.

5.7 Conclusion

This chapter discussed the findings and data gathered from the different sources. The author believes that using multiple data sources lead to greater reliability and validity to the findings. The next chapter will draw conclusions from these findings in context with the literature.

6 Conclusion

6.1 Introduction

This study set out to explore the ways in which the Collaborative Creation of Digital Stories by students can enhance the learning of Physical Geography. The literature discussed the elements of group based learning including group formation, the nature of the task and group interaction and in what ways they can be used to promote effective group work. The benefits of an active learning environment for students were also discussed in light of the literature. Aspects of Geography which appear to cause difficulty and confusion for students were also highlighted. This chapter discusses a summary of the findings with respect to the research questions posed.

One of the most significant findings was the fact that in both the group interviews and the reflective diaries all the participants stated that they preferred being involved in the creative process of making the Digital Story as opposed to having someone else make it for them or simply viewing it. The importance of this finding not only lies in the fact that all the participants are in agreement on this issue but also because it confirms suggestions in the literature that active learning environments show higher levels of enjoyment and interest on the part of the learner (Kim et al., 2007). High levels of persistence and motivation are also mentioned in the literature as by products of active learning environments which is also supported by the findings of this project as each group completed the task they were set and all six Digital Stories were created by the students (Leahy, 2007). The participants appeared to enjoy the constructivist nature of the project and preferred being in control and working in an environment where they made the decisions. They also claimed that by creating the Digital Stories themselves helped them to learn more about the topic and the technology and have more fun.

In relation to the interest levels of the students involved in the project the findings indicate that the overwhelming majority of students viewed the project as

enjoyable and fun. The learning environment described by the students was one of freedom and creativity, where they were able to take control and make decisions. The findings also indicate that nearly half the participants embarked on some independent learning by seeking information for their Digital Story from outside sources such as an after-school club, a library or their own computer at home. This would confirm the suggestion that the ownership and controllability felt by the participants led to high levels of interest and motivation on their part.

The collaborative aspect of this project was significant as all the students questioned agreed that they felt a level of comfort and confidence while working as part of a group. It is established through observations, group interviews and the student's reflective diaries that not all participants were enthusiastic about the collaborative nature of the project at the start. There is plenty of evidence in the findings that indicate there were disagreements among group members initially and that some participants expressed a desire to work on their own. However, once the project commenced and the groups discovered how to interact with each other successfully all participants acknowledged certain benefits to working as a group, including having people to help them, have fun with them and offer suggestions.

Although group interaction, group formation and the nature of the task are all important aspects of group based learning the findings indicate that in the case of this project the most significant factor in relation to effective group work was the formation of the groups. The participants were placed in groups of mixed ability for the most part. However this meant that some groups had a higher overall academic ability level due to the number of participants and their individual ability levels. The findings indicate that the groups with a higher proportion of medium or high academic ability students performed the best, meaning that those groups with the higher proportion of lower ability students performed at a lower level. This finding can be seen to confirm Webb et al suggestion that low ability students perform better when grouped with higher ability students as they benefit from their instruction and guidance (Webb et al., 1998). However the levels of interest, enthusiasm and motivation appear similar for all students, regardless of group formation or ability level.

In relation to assessing the learning benefits for students in the area of Physical Geography the findings suggest an increase in their awareness and knowledge of the vocabulary and concepts associated with the subject. Their reflective diaries indicate the development of confidence and comfort when it comes to discussing and using the terms and concepts associated with Physical Geography. The evaluation of the physical artefact i.e. the Digital Stories, for the most part indicate a correct association between concept, description and image. The majority of participants claim, in both the group interviews and in their reflective diaries, that they learnt more about Geography as a result of constructing a story on it and this is confirmed by the results from the post tests and the evaluations of the physical artefact.

6.2 Unexpected outcomes

There were a number of unexpected outcomes most notably the fact that all of the participants were of the view that designing and creating the Digital Stories themselves was more enjoyable and beneficial to the learning of Physical Geography. Although it was expected that the majority of participants would engage enthusiastically with the project due to its constructivist nature the level of interest and the unanimous agreement of the participants in favour of creating the Digital Stories themselves was unexpected. Additionally, the significant role that group formation played in the learning outcomes for each group was unexpected. Although the literature suggests that low ability students benefit greatly from the presence of a higher ability student in the group the impact this formation had on the overall interaction and learning outcomes of the groups was remarkable.

6.3 Limitations of the research

The research had a number of limitations. Firstly, the sample size is not representative and therefore the case study can not be generalised. The time scale of the project can also be viewed as a limitation as the author would suggest if more time was available perhaps a bigger sample size could have participated in this project. The author would have liked to enable more classes to view the Digital Stories created by the students to gather more feedback on the Geographical terms and concepts presented in the Digital Stories.

6.4   Significance of the research

The findings of this study are significant as they indicate that the constructivist nature of this project was highly motivating for the students involved. They also suggest that an active learning environment is of great interest to students and is seen as an enjoyable and fun environment to work in. The study also has practical implications for educators in the field of Geography, at Primary school level in particular, and especially those seeking to develop new ways of teaching Physical Geography in a multi-sensory way as suggested in the literature (Hickey & Bein, 1996; Lopez, 2008). This study, along with the others discussed throughout, highlight the importance of projects which incorporate visual aspects of Geography in order for children to develop a complete and in depth understanding and interest in the subject.

6.5   Future research

Future research could be undertaken to investigate what ways the Collaborative Creation of Digital Stories by students can contribute to other areas of Primary Education, for example History, English or Science. It may also be interesting and significant to investigate how Digital Story creation could be used to approach sensitive issues such as bullying, substance abuse or family issues. Additionally, by enabling the Digital Stories created to be used as a resource by the rest of the school would provide a further insight into peer learning and mentoring. Particularly valuable to investigate would be the use of Digital Stories in an area such as Social Stories. Social Stories are tools for teaching social skills to children with Autism and related disabilities. They provide students with accurate information and pictures about certain social situations in order to facilitate understanding. By using Digital Stories students could create Social Stories about their own experiences of certain situations as well as view those created by others.

6.6   Final Note

Using multi-media applications as learning tools in educational contexts has been well documented in recent years. Many of the research papers have established that using aspects of multi-media in this manner not only sparks the interest and enthusiasm of the students but can also lead to greater learning outcomes (Kim et al.,

2007; Mayer & Anderson, 1992). Recently, the focus has changed from students simply being consumers of multi-media to facilitating a learning environment which enables the students to be producers and designers of multi-media applications (Leahy, 2007; Zagal, Piper, & Brukman, 2006). It is thought that the constructivist nature of this type of learning environment has even greater potential for an increase in learning outcomes. It was one of the main aims of this project to examine the possible benefits for students of engaging with the concepts and terms of Physical Geography in an active learning environment. Physical Geography is seen as a highly visual subject area and therefore it is thought to benefit greatly from incorporating a multi-sensory element into its teaching. The sense of ownership and controllability felt by the participants as producers of their own learning clearly had a dramatic effect on their level of interest and learning outcomes. The overall findings of this study are positive and demonstrate that the experience was not only enjoyable for the students but also resulted in greater learning outcomes.

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8 Appendices

8.1 Appendix A: Evaluation Rubric for Geography Pre-test and Post Test

Topic	Excellent	Very Good	Satisfactory	Needs Improvement
Rivers	Correct use of term and related concept. Awareness of national and international rivers. Excellent insight into the path of a river and its features.	Correct use of terms slight confusion between more difficult terms. Awareness of national and international rivers. Good awareness of the path a river but evidence of some confusion and misunderstanding of certain terms.	Some misunderstanding and confusion in relation to terms and concepts. Able to give one or two examples of national and international rivers. Some misuse of terms in answering questions.	Very little awareness of the journey a river takes including confusion on where it starts and finishes. Misuse and misunderstanding of terms relating to rivers and very little knowledge of national or international rivers.
Volcanoes	Correct use of terms associated with Volcanoes and excellent awareness of where and why they occur and the damage they can cause. Lists many examples of Volcanoes and where they are located.	Correct use of terms but slight confusion with more difficult terms. Good awareness of where they occur and the damage they can cause. Slight misunderstanding of how they happen. Good examples of volcanoes given.	Some misunderstanding and confusion in relation to terms and concepts. Awareness of damage volcanoes can cause but slight confusion as to where and how they occur. Few examples of volcanoes given.	Very little awareness of how and where volcanoes occur. Confusion and misunderstanding of basic terms and concepts. No examples of volcanoes given.
Earthquakes	Excellent awareness of how and why Earthquakes occur. Excellent use of terms and awareness of related concepts. Examples of recent Earthquakes included. Great awareness of damage caused by Earthquakes, including tsunamis.	Correct use of terms but slight confusion in relation to more difficult terms. Very good awareness of why and where Earthquakes occur. Good use of terms and vocabulary. Very good awareness of damage caused by Earthquakes.	Overall a basic understanding of Earthquakes. Some confusion of main terms and concepts. Awareness of the damage caused by Earthquakes but little knowledge of how or why they occur.	Very little awareness of where, how or why Earthquakes occur. Misuse and confusion of basic terms and vocabulary. Some knowledge of damage caused by Earthquakes.
Water Cycle and Floods/Drought	Excellent awareness and use of the terms associated with the Water Cycle and what occurs at each point. Correct use of terms associated with Drought and Floods. Great insight into the damage caused by both Droughts and Floods and how they occur.	Correct use of terms but slight confusion in relation to more difficult terms. Good awareness of main terms of Water Cycle. Knowledge of where and why Drought and Floods occur and they damage they cause.	Some basic understanding of the main events in the Water Cycle. Some confusion on the more difficult concepts. Awareness of the damage cause by Droughts and Floods and a good understanding of how and why they occur.	Very little awareness of the stages of the Water Cycle and obvious confusion between terms and concepts. Very little knowledge of why or how Drought and Floods occur or the damage they cause.
Geographical Vocabulary	Correct use of Geographical terms in and excellent understanding of the terms and concepts.	Correct use of Geographical terms in most cases and overall a good understanding of the	Basic and more important terms were used and understood in the questions. Some evidence of	Very little use of Geographical terms and many examples of incorrect connections made

	Makes correct connections between Geographical term and concept.	term and concept with correct connections made in general.	misunderstanding between terms and concepts.	between term and concept.

8.2 Appendix B: Evaluation Rubric for Physical Artefact

Aspect of Digital Story	Excellent	Very Good	Satisfactory	Needs Improvement
Language use	Excellent use of Geographical terms associated with the topic and good explanations given. All important and most basic terms included.	Very good use of Geographical terms with nearly all the basic and important terms covered with appropriate explanations given.	Some basic terms included and evidence of understanding between term and explanations. Some important terms associated with the topic were absent.	This artefact was missing some of the most basic and important terms related to the topic. The explanations given did not explain the topic sufficiently.
Images	Excellent choice of images which informed the narrative. Clear and easy to establish what was being illustrated and explained.	Very good choice of images which gave very good illustration of topic that was being covered. The images are clear for the most part.	Good use of images however some are unrelated to the topic and it is difficult to see how they compliment the information given in the narrative. Some unclear images	The images selected are unclear and difficult to make out what they illustrate. Very little connection between the narrative and picture and some images may cause confusion as they are irrelevant.
Information for viewer	Plenty of correct information given in the Story with great connection between image, text and narration. The audio is clear and easy to understand.	Very good amount of correct information provided for the viewer with appropriate images selected to compliment this information. Audio is clear for the most part	Some good correct information provided. However some images are unrelated to the topic and therefore may cause slight confusion for the viewer. The audio can be difficult to hear on occasion.	The information provided is incorrect in parts. The images are unrelated to the narrative and may cause confusion for the viewer. The audio is unclear and difficult to understand.

8.3   Appendix C: Observation Note Template

Date:
Time:
Group:
Location:

Collaboration:

Technical Language and use

Communication:

Geography terms and language use:

Other notes:

8.4 Appendix D: Group Interview Transcripts

Floods and Drought/Water Cycle

T: So you recently finished your Digital Stories, can you tell me how you made them, what did you do first?

S1: We wrote a plan of what we were going to do.

T: Did you do this by yourself?

S1: No, we were put into groups.

S2: We were the sea group but the sea was kinda boring cause we all know about the sea so I'm glad we changed, we got floods and droughts.

T: So you preferred the topic of floods and droughts

S2: Yeah, cause with the other one you just have pictures of the sea but flood has pictures of people, buildings cars and all.

T: So when you were in your groups you were given your topic, then what?

S3: We wrote a plan of out story in our copies.

S2: We were sitting with out group to do that.

T: Where were you getting the information from for your plan?

S2: Our brains

S2: Ohh and information sheets, we highlighted the bits we thought were important

S!: And we put them on a story board, a piece of paper, the bits we wanted to use.

T: Did you do all that with your group?

All: Yeah.

T: What did you do next?

S2: We sat down in our groups and Ty was our writer and we thought of the pictures to use and the things to say.

T: So did you each have a different job or role in the group?

S2: Yeah, we were telling Ty. Information and he was writing it down. We took turns on the computer too.

T: What type of things were you doing on the computer?

S2: We were finding pictures and information; say if I found two pictures the others would then find pictures they wanted to use.

T: So you were taking turns, how did you decide to work like that?

S2: We just said we'd take turns, just makes sense.

T: and everyone agreed to do this?

S2: Yeah, cause its kinda unfair if you don't take turns, we did one picture each.

S1: We picked two pictures each as well

T: How did you decide what to write?

S2: From the plan in our copy.

T: So you did this all as a group. How did you find working in a group?

S2: It was good working in a group cause say if you were thinking something that was good but wasn't really good and you said it to your group the other person might help you to make really good.

T: Okay, can you give e an example of when that happened in your group?

S2: Well, if you were on your own thinking about stuff to say you d be on your own with just your ideas but in our group Ty had lots of different ideas for things to write and to say, I'd start saying something and then Ty would say a longer sentence, it s better.

S3: Yeah and in case you can't do everything yourself your group can help you.

S1: yeah but in our group K just kept on talking and not doing his work and he kept picking things that we didn't want in.

T: And what would happen then.

S1: Well the two of us would tell him not to use the picture and to change it

T: Do you think it would have been different if there had only been two of you in the group?

S1: Well, K got to pick loads of pictures and me and Sc. Said they had nothing to do with the water cycle, like one of a cow.

T: What about you ? Did you enjoy working as a group?

S4: yeah, cause if you got stuck on something and you were working on your own there'd be no one to help, in a group someone can help you.

T: If you did get stuck on something at some point, would you prefer to ask the teacher for help or people in your group?

S2: The group first but if they didn't have the answer the teacher

S3. People in my group, it s easier to ask friends you feel more comfortable instead of bothering the teacher.

S2: What's the point of having a group if you are not gonna ask them things!

S4: I'd ask my group first, cause they are beside you.

S2: The bad thing about a group sometimes, well this didn't happen with us, say if one person wants one thing and another wants something else then there could be a fight.

T: Okay how do you think you could stop this from happening?

S1: You could take turns

S2: It depends on the picture, if there was a good reason for picking it, whatever is best to show floods and droughts, I'd do that.

T: Okay, so did you learn much from creating your Digital Stories?

S2: Yeah, I learnt how to make a photo story, I'd never done one before, I learnt how to do transitions and add talking and all.

T: And do you learn anything about Geography?

S1: yeah, I learnt when the suns rays touch the sea the water turns to vapour and goes to the sky and gets heavy and makes dark clouds and the clouds come down.

T: Do the clouds actually come down?

S1: No, all the water vapour in the clouds come down, like rain.

S3: I learnt that snow melting can cause a flood, I knew that camels could survive drought but I didn't know much about bush fires and drought or that the ground can crack when there is a drought.

T: So how did you learn all these new things?

S3: By being able to see it, with the pictures on the computer.

S2: I kinda knew a lot about floods but I didn't even know about drought and that cracks in the ground can happen from it, I just thought drought was vary hot weather.

S4: I learnt that drought is when it gets really hot and there is no rain and that bush fires are caused by drought.

T: What do you think helped you to learn about these things?

S2: Getting the pictures on the computer and the information on the sheets.

T: Did you enjoy designing and making them yourself or would you rather let the teacher show you pictures and other Digital Stories?

S2: I prefer making it cause you are doing it yourself, it s yours.

S3: Yeah, yourself cause you get to pick all the stuff you want yourself and you get the hang of it and it is fun in the group.

S2: Yeah, if it someone else's work or pictures in a book there might be pictures and that that you don't even like but if you pick them and you like them then you like the whole thing more.

S4: When you are doing it yourself you are writing in the information and picking the pictures so you remember it all more.

T: Did you enjoy making the Digital Stories?

S2: Yeah, definitely.

T: What was your favourite part?

S2: Having fun in our groups, looking at the pictures, writing stuff down and that.

S1: Yeah and getting time off your school work

S4: I liked picking the pictures and looking at them

S1: Talking was my favourite part, when you heard your voice on the story.

T: Did you learn any new words?

S2: Yeah, I didn't know what drought was, I just didn't know that word, I just thought it meant dry.

T: Do you know what it means now.

S2: yeah, of course, cause I did a whole story on it.

T: Okay, what does it mean?

S2: When it is very hot and there is no rain and plants and animals can die and people and the ground can crack and bushfires.

T: What about you A?

S1: Yeah, condensation, evaporation, run-off and precipitation

T: Can you remember what they mean?

S1: Yeah, precipitation means rain and run off it where it all starts up on top of a mountain.

T: And what about evaporation?

S1: When the sun touches the water it turns to vapour

T: The whole sea or river turns to vapour?

S1: No, just a small bit.

Volcanoes/River Liffey

T: So, you recently finished your Geography Digital Stories, tell me how you made them, what did you do first?

S6: We planned it in our groups

T: Okay, how did you plan it?

S5: We wrote on a sheet what information and things we were gonna talk about in the stories.

S6: Yeah it was a storyboard sheet with nine little boxes on it.

S8: Yeah they were picture boxes

T: Okay and where did you get the information from?

S5: All the books we'd read on volcanoes

S7: And from the information sheets

S6: On the storyboard page we wrote down the facts and drew pictures like the pictures we wanted to use.

S8: Our group decided not to fill in all the boxes so we could talk about just a few pictures instead of having too many pictures.

T: How did your group decide what pictures and information to use?

S8: Well, I picked two pictures and found out the information for them and then Ca. picked his and then Sh.

T: So you took turns, why did you decide to do this?

S8: Well, I think C. suggested it and we all thought it was a good idea.

T: Why?

S8: Well then everyone get s a shot

S7: We did the same thing in our group, taking turns to pick the pictures, but we added the information together at the end, we all decided on what information to put in together.

S10: But if two people wanted a picture or some piece of information then that would normally go in even if the other person didn't want it in.

T: Okay, did that cause any problems or arguments?

S5: Yeah, a few problems we messed up a few times.

S7: Just say I wanted to say something about a volcano and the other two didn't like it then we'd just have an argument.

T: Did you manage to get past the argument and solve the problem?

S5: Yeah, that s when we started taking turns.

T: Do you think having some arguments and disagreements was a bad thing?

S5: I think it was cause we would have got our work done faster if we didn't argue so much and stuck to the one idea.

S7: Yeah but if we didn't have the arguments we wouldn't have got the real good stuff, the good sentences and that

S6: You should have done a picture each that s what we did.

S7: We did that but we all had different ideas about what was good for the overall story.

S5: If we all had the same ideas we would have flown through it.

T: So do you think working in a group was a good thing?

S7: Yeah, it was more fun working in a group than on your own.

S10: When you're on your own you get your work done faster.

S5: Definitely in a group, I wouldn't have been able to make a Digital Story on my own cause you get more information from the people in your group and you have people to back you up. Like say if you didn't know something about a volcano and they knew something like if you were on your own you wouldn't have that.

S6: Your group can give you more information and help.

S10: You can share who is doing the talking.

S5: And you can have fun and a laugh in your group.

S8: In a group it is better cause there are loads of ideas and opinions, not just yours.

S6: Like say if you were on your own you only have a little bit of information but if you have a group or a lot of people they probably know more things.

T: Okay, super, so if you had some difficulty or a problem while you were making the Digital Story would you have asked the teacher for help or the people in your group?

S5: You'd go to someone in your group first, cause if you go straight to the teacher that s just the same as saying to the group I'm not depending on you, you'd make them feel down by not asking them first, they wouldn't really feel like they were doing well then.

S9: I'd ask my group first just in case they might know it

T: Did you learn anything from making the Digital Stories?

S5: Yeah, definitely

S7: Yeah, loads.

S6: I didn't know that the new bridge on the Liffey was called the Samuel Beckett Bridge.

S8: I learnt that Daniel O' Connell has a statue, bridge and street named after him.

S6: I learnt that the Ha'Penny Bridge was once a toll bridge.

S5: I learnt that the Earth's core is 4, 000 o C

S7: No, it's 5, 000-6,000 o C

S7: I learnt about St. Helen's Volcano in Washington, that it hadn't erupted in 123 years and then it erupted.

S10: and that Krakatoa is still an active volcano.

T: What does that mean?

S7/S5: That is can erupt at any time.

T: Did you learn any new words or the meanings of words you had heard before but didn't understand?

S5: I knew a lot of the words from 4th class.

T: Did you learn more by making the Digital Stories?

S5: Yeah, you're learning more and more about volcanoes everyday as you're making the story.

T: How?

S5: Cause you're talking about it and you re going on the internet checking all the information, checking for pictures, it's going into your head.

T: Did you prefer making the story yourself or looking at ones already made?

S7: Doing it yourself, you learn more and it s more fun.

S6: Doing it myself cause I learnt loads about the Liffey and how to make a photo story.

S5: I'd rather do it myself in a group cause it s not as much fun when you are just watching something and getting information told to you instead of finding it out yourself.

S9: Yeah you re able to see all the cool images and find them yourself

S5: Yeah I learnt loads about the Magma chamber and what's it called.......

S7: The crater

S5: No, I know that, the vents and pipes.

T: Did you enjoy the project?

All: Yeah

S7: I liked doing the talking over the pictures, talking about them

S5: Mine favourite bit was all the arguments, I think you learn more by arguing

S8: Talking was my best bit, it was a great laugh and very funny

S9: I liked searching for pictures cause you got to see some great pictures

S6: I liked the talking

S10: The transitions was more favourite bit I liked learning how to do them and picking one

T: Did you learn any new words?

S8: I thoughts the quays on the Liffey was spelt Keys

S10: Tectonic, still don't know exactly what it means though but I know they are plates.

<u>Rivers and Earthquakes</u>

T: So you recently completely Geography Photo stories, can you tell me how you made them, what did you do first?

S11: We did a spider web plan, we put in things like water, estuary, they were all the things we knew about rivers already.

T: Can you remember more of the information you used?

S11: yeah, we used things like the source of the river, tributary

T: Do you remember doing that with the group Dar.?

S12: Yeah and then we did the storyboard with the nine pictures.

T: Did you know the words and information that you used on the spider web and story board?

S12: Yea I know some of them, don't know how

S11: Then we got information sheets you gave us and we had to decide what the important stuff was and we highlighted it

S12: We got pictures and images from the internet then and we saved them and imported them into out photo story.

T: what type of pictures did you choose?

S11: Ehh the source of a river in the mountain, map of the Amazon River

S13: I brought in some pictures from home on my memory stick that I liked and then we got loads more from the internet, one that showed the ground shaking and the epicentre.

T: Had you heard the word epicentre before?

S13: No

T: So how did you find out what it meant?

S13: It was on the information sheet

T: SO do you know what it is now, what is an epicentre?

S13: It's the point where an earthquake starts

T: So did you do all this work in groups?

All: Yeah

T: Did you think it was good to be working in groups?

S11: At the start I didn't really like it because I was doing all the work

S12: but then we all started to help out more.

T: Why do you think that change happened?

S12: We saw that all the other groups were getting along with each other and getting their work done.

T: So when you started getting along better and working better together did you notice the difference?

S12: Yeah, we were getting a lot more done

T: And what about you Dav?

S13: At the start I was a bit the same, I would have liked to be on my own or maybe have a bigger group cause there was only two of us in our group but then we got really into it and start really enjoying it

T: and what made you get really interested in it do you think?

S13: Well I first I didn't want to do earthquakes, I didn't know much about them and I thought volcanoes were more interesting

S11: Yeah, I wanted to do volcanoes too instead of rivers at the start but then I started finding out more about Rivers and that they are interesting and important too

S12: Yeah, like I didn't know the Nile or Amazon even existed

T: So how did you find working as a group?

S13: We decided most things between us but sometimes K. would pick something that he really wanted to put in or that I wanted to but having one more person would have been better cause we would have had more ideas.

S11: We got our work done quicker cause we were in a group

S12: Yeah it was better working in a group cause if I was on my own I'd be nervous and I wouldn't know what to do

S11: Yeah and you might have a good idea sometimes and then someone else might have a idea but you mightn't so it s better

T: and if you had a question or problem would you have asked the teacher or someone in your group for help?

S12: I'd ask the people in my group first case they'd probably know

S13: Group first yeah cause like if they know the answer what's the point in asking the teacher, if you ask the teacher straight away it might look like you want to do it by yourself and not with the group

T: what helped your group to work well together?

S13: Well, we had so much information about earthquakes and we both had different ideas about it and we put it together.

T: Did you learn more about Earthquakes or Rivers from making the stories?

S11: Yeah, like I didn't know rivers start in a mountain, I knew it finished at the sea though. I didn't know that little rivers join big rivers either.

T: can you remember what those little rivers that meet bigger rivers are called?

S12: An estuary

S11: No, a tributary

S13: I learnt loads about earthquakes, especially the one in Haiti and that earthquakes can cause tsunamis

T: Did you like making it or would you have preferred to just watch a story on Earthquakes or Rivers?

S12: Making it cause you get to look up information and see images of rivers yourself

S13: Doing it myself cause if you learn how to make a photo story and you can figure things out for yourself

S11: Making it cause if the teacher just told you there is no point cause you ll just forget it but making it you can figure things out for yourself.

T: Did you enjoy the whole experience?

All: yeah

S13: Yeah, it was fun and then you can learn about what you are doing, like earthquakes

S12: Yeah, it was brill doing it, I liked the talking, it was funny

S13: Yeah, I liked the narration too cause you can have fun with it, talking differently and all and it was cool hearing you own voice.

8.5   Appendix E: Consent forms

Dear Parent/Guardian,

  Ms. Ryan's 5th Class will be participating in some additional IT class work this year. This will involve creating and viewing Digital Stories based on the theme of Physical Geography which overlaps with their Geography syllabus for 5th class.
    The creation of the Digital Stories will take place during school hours with the class teacher present to help and observe the process over a period of approximately two months from November until January 09/10. The children will work within their own class in groups of three. It is hoped that the finished Digital Stories will be uploaded on the school website to be viewed by other school teachers and pupils.
    Ms. Ryan is participating in a Masters programme in Technology and Learning and it is hoped that the data collected and analysed during this project can be used in her dissertation and related work to research the use of multi-media as a learning tool. We would like to assure you that pupils who choose to participate in this project will remain anonymous in the analysis, publication and presentation of the resulting data and findings.
    Participation in this activity is completely voluntary and if you wish your child to participate please sign the consent form below.
Thank you for your co-operation,
Yours sincerely,
Ms. R. Ryan

I agree that my child_____ can participate in the above described project.

Parent/Guardian signature:_____

Date: _____

Dear Student,

   Ms. Ryan is looking for students to participate in creating and viewing Digital Stories based on the theme of Physical Geography. The Digital Stories created will be based on areas of the 5th class Geography course work including the water cycle, volcanoes, earthquakes etc.

     This project will take place for a short amount of time every day from October to January and it will take place during school time. The finished Digital Stories will hopefully be uploaded on the school website for others teachers and students to view.

   Ms. Ryan is hoping to use the results from this project to see in what ways Digital Stories can be used to help learning in the classroom. Any student who participates in the project will remain anonymous throughout the publication and presentation of the results of Ms. Ryan's project.

   Students will work with other students from Ms. Ryan's 5th class in groups of three. If you would like to participate in the project please sign the consent form below and return it to Ms. Ryan.

Thank You,

Ms. R. Ryan

I _____ would like to participate in the project.

Signed:_____

Date:_____