

Evaluating geography learning in 11 – 12 year olds in Irish primary schools analysing  
messaging loops.

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## Declaration

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## **Abstract**

The purpose of this qualitative study is to evaluate geography education in 11 – 12 year olds in Irish primary schools analysing messaging loops. Messaging loops are interactions that originate from the student and return to the student irrespective of the technology or medium of communication. During a messaging loop the student ‘owns’ the interactions, by initiating them and completing them. This study seeks to investigate the cognitive changes that can occur in 11-12 year olds as they practice analytical skills as part of the primary school geography curriculum. Research shows that geography education provides opportunities for practice of skills considered necessary for developing higher order thinking skills. However there has been little focus on the cognitive changes that can occur in primary school students during geography lessons. Geography as a component of the primary school curriculum can provide practice of analytical skills considered necessary for the development of higher order thinking skills in primary school students.

This study implemented a constructivist learning model focusing on geography analytical skills development. The study was hosted online using a teamsite on Microsoft Sharepoint 2013. Over a period of two weeks, participants had to complete four tasks. These four tasks were expected to take approximately thirty minutes each to complete. The participants engaged in tasks that required them to practice analytical skills in geography. The resulting data was documented using the survey app on Microsoft Sharepoint 2013. The participants also posted comments onto a discussion board following the completion of each task. During the final reflection the participants engaged in a conference call using the Instant messaging app Microsoft Lync 2010. This data enabled the researcher to further explore themes that emerged during the study.

A range of data collection methods were used for this study. Documentation of the participants answers to assignments focusing on analytical skills were analysed through domain and taxonomic codes. The domain and taxonomic codes were selected from the suggested areas of study listed in the Irish primary geography curriculum. The analysis focused on the correct contextual use of vocabulary target words, for example ‘sort, group and classify’ and emotion target words, such as ‘feel’ ‘sad’ and ‘happy’. Documentation of a questionnaire that the participants could take after each assignment provided verification of the participants’ ability to understand the task and negotiate the activities correctly. The

questionnaire was analysed for accuracy and the participants understanding of the required tasks. Documentation of the participants' posts to the discussion boards were analysed for domain and taxonomic codes, and vocabulary acquisition to include target and emotion target words. The Instant Messaging conference was recorded using windows media player and then transcribed by the researcher.

The findings describe and explain how participants contextualise geography analytical skills in a more meaningful way while acquiring new vocabulary to support this change following participation in the study. The participants displayed affective and cognitive empathy during online discussions while learning about another international community where poverty and child labour is prevalent. These participants also developed existing cognitive skills and improved their analytical skills as they progressed through their tasks. Through self-directed learning, the participants also developed their ability to research and retrieve information online by completing assignments that necessitated the exploration and decoding of content hosted on the teamsite. These findings also demonstrated that tension experienced in traditional classroom discussion can be relieved by scaffolding the learning environment with discussion boards and instant messaging. The presence of discussion boards and instant messaging during geography activities can assist Irish primary school children structure answers and increase their interactions.

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# **1 Introduction**

The Geography component of the primary school curriculum is an important subject for developing an appreciation of other international communities. The experience of attaining good geography skills development can assist learners to develop higher order thinking skills. There is a paucity of research that focuses on the evaluation of geography education at primary school level (Edelson et al 2012, Catlin 2013). The convergence of technology provides affordances for capturing unique data during geography education within primary school study settings. Office 365 enables users' access to a wide variety of technology that can be designed to create new geography learning strategies and record the data produced. This case study evaluates 11 – 12 year olds practicing geography analytical skills analysing messaging loops.

## **1.1 Context and setting**

This study is situated within a constructivist designed online learning environment where participants aged 11 – 12 years practice analytical skills in Geography from the Irish Primary curriculum. The study focuses on geography skills development in 11 – 12 year olds learning about another international community, Tanzania. The study took place over a two week period. The participants were asked to complete four activities that involved the practice of analytical skills in geography. Each activity took approximately thirty minutes to complete. The participants could complete the activities in class and at home. The activities were hosted on a website that remained open for the duration of the study. There was full access to the website for these participants during this period of time. Finally, the participants were invited to engage in an instant messaging conference, one week after the study, to reflect on their experiences of participating in this study.

## **1.2 Research objective**

The main research objective is evaluating geography learning in 11 – 12 year olds in Irish primary schools analysing messaging loops.

The evaluation is formed using the following sub questions.

- What vocabulary and geography terms did the participants acquire in domain and taxonomic areas?
- What emotional themes emerge during the participants learning about other international communities?
- Is there any evidence of cognitive change during geography analytical skills learning?
- Evaluation of the learning experience for the potential of more demanding skills learning in geography.

## **1.3 Scope of the study**

The literature calls for evidence of primary school children practicing geography skills (Catlin 2013). Edelson (2012) and Catlin (2013) call for tools that can collect data of children practicing geography skills. This study focused on geography analytical skills practice by 11 – 12 year olds using some of the functions of office 365 to deliver an online learning experience. The data was collected using questionnaires, discussion boards and Instant messaging.

## **1.4 Overview of the dissertation**

Chapter two of this qualitative study begins with a review of the literature on geography education at primary school level. This includes a discussion on the need for new strategies for the development of geography skills prior to secondary school level. It establishes that a subset of Geography analytical skills from the Irish Primary school curriculum can engage participants in critical thinking. The use of online learning using a combination of questionnaires, discussion board postings and instant messaging has the potential to capture new data on geography analytical skills in primary school children. Chapter three demonstrates how an artefact was designed using a constructivist model to capture geography analytical skills learning about another International community. The artefact was used in combination with questionnaires, discussion board postings and a final reflection through Instant messaging. Chapter four describes the descriptive case study and defines the criteria

that set out how the data will be collected and analysed. Chapter five presents the findings following analysis in relation to the criteria set out in chapter four. Finally, chapter six concludes with a discussion and conclusions of the findings and makes recommendations for future research.

## 2. Literature review

### **Background.**

The literature review investigates how the use of technology can assist primary school teachers in the delivery of the geography curriculum to 11 – 12 year old children in the Irish primary school setting. First, the study explores geography syllabus at primary level. Next it argues for the importance of geography in students' development. Then it suggests new strategies for teaching, learning and assessing geography. Finally this literature review will demonstrate that the messaging loop provides periods of tension during interactions that can provide unique data of 11-12 year old children's insights into geography learning.

### **Review methods**

A systematic review of the literature was conducted using Google Scholar, The journal of geography online, Stella search engine, TCD Library catalogues, International research in Geographical and Environmental education. The search was confined to studies published since 2010 due to the increasing development of geography enhanced learning technologies. Key words used to carry out the literature research were, 'geography skills development' 'analysing skills' 'primary children' '11 – 12 year olds' 'Ireland', 'Irish primary schools'. There is strong evidence to include all of these categories in order to adequately explain the needs of geography skills development in Irish curriculum development.

The following categories emerged:

- Geography syllabus at primary level
- Geography Information systems in educational contexts (GIS)
- New strategies for learning geography
- The importance of geography for students
- Cognitive structuring and the messaging loop

## 2.1 Geography syllabus at Primary level

There has been little research into how geography is delivered to learners at primary school in the upper primary school level where students are mostly aged between 10 – 13 years (Catling, 2013). Geography is a subject on the Irish Primary Curriculum and teachers are recommended to spend on average one hour per week on the subject (NCCA 1999). However, given that Geography studies the interrelationships of people and places and can provide a conceptual link between the students' home, community and the wider world, it is an important subject for personal and interpersonal development. According to the Department of youth and family affairs (2012) the number of foreign national children in Ireland grew by 49.5% during the period 2006 – 2011. Assimilation of foreign nationals into Irish primary schools can be assisted by developing more awareness of other international communities, and their social and cultural practices to existing students. During geography lessons students are presented with information about other international communities and can experience feelings of affective empathy and cognitive empathy.

However, according to Catling (2013) there is a paucity of literature on data collected on primary school children's geography learning experience. Although there has been a higher concentration of geography research at secondary and high school level, typically targeting 12 – 18 years, it is mostly used to inform geography teachers' practice (Edelson et al., 2013). In a review of the literature relating to geography education research, Catling, (2013) and Edelson et al., (2013) suggest that investigating cognitive changes that can occur in 11-12 year olds during classroom teaching, could provide evidence to enhance the teaching, learning and assessment of Geography at primary level. This research could also provide guidance for instructors, improve resources for learning, and contribute data for curriculum development. The use of modern technologies to capture the experiences of 11 – 12 year olds could increase an understanding of geography learning. According to Millwood (2013) technology can enhance the recording of students' learning. Records can be compiled and data mined for new starting points and connections in the students' learning development. Modern communication such as Short Message Service (SMS) can capture unique interactions between participants. Currently this data is not traditionally available to teachers in Irish primary schools due to the limited use of modern communication technologies during lessons. Analysis of these students' recordings could be utilised to provide new insights into students' engagement with the geography curriculum.

## 2.2 Geography information systems

Vogt & Hodza (2013) have suggested that students should be exposed at a younger age to skills development activities that practice geospatial information technologies (GIT's) such as geography information systems (GIS). As the importance of geo-spatial skills increase, students need to be educated in these new information technologies (Lay, chen, chi 2013, Goldstein & Alibrandi, 2014). Although the use of GIS technologies in educational contexts have increased the participants motivation and the learners understanding of maps and globes Vogt & Hodza (2013), their focus has not addressed understanding of other international communities or critical analysis of their interrelationships focusing on higher order thinking development.

Given reduced spending in Irish primary schools (DYFA 2012), it is unlikely that Irish primary classrooms will be adequately resourced with the technology required to give primary school students full access to the wide range of apps necessary to fully benefit from geography skills development courses within the immediate term. With 100mb broadband speed not due to be completed in post primary schools in Ireland until late 2014 (National Broadband Plan 2012, National Digital strategy for Ireland 2013, Programme for government 2013). This will reduce the capabilities of the technologies, such as GIS, available in Irish primary classrooms that are not due to be upgraded until after the post primary schools are completed (National Broadband Plan 2012, National Digital strategy for Ireland 2013, Programme for government 2013). While the availability of increased internet connection has occurred for Irish consumers, the technological infrastructure of Irish primary classrooms does not have the necessary capabilities to upgrade thus widening the gap between the technological resources available in class and at home. Consequently, it is unlikely that Irish teachers or students will have sufficient engagement with GIS's to utilise innovative technologies in geography education thereby limiting future career choices for students.

The use of familiar apps that can increase interactions between students and assist in geography education can be used in the interim. Reid & Reid (2010) suggest that with the wider availability of apps using broadband, and an increase in global internet connectivity, Instant messaging (IM) apps such as 'Viber' and 'what's app', will become more popular and replace Short Message Service (SMS) for many students. Growing trends in IM show an expected increase from 7.9 percent currently to 30.9 percent in 2016, Instant messaging traffic



is predicted to increase from 1.6 trillion messages in 2011 to 7.7 trillion messages in 2016 while users are expected to exceed 1.3 billion by 2016 (Portio research 2013). However, Reid & Reid (2010) highlight the limitations of IM which include fragmented networks, and limited communication across IM apps. The use of office 365 can facilitate interactions for a single user mediated through Microsoft Lync and discussion boards hosted on Microsoft Sharepoint 2013 thereby scaffolding a technology mediated geography learning context. Evaluating geography learning activities, during student activities mediated by instant messaging and discussion boards, can provide unique data for analysis. This is necessary for the development of geography as a curriculum subject, and may provide missing elements for understanding geography skills learning (Catling, 2013 and Edelson et al, 2013). If geography is to be maintained as an important curricular subject for learning then a greater appreciation of its importance needs to be identified.

## **2.2 The importance of Geography for students**

Geography has long been established as a core component for assessment of a students' cognitive ability and plays a major role in a student's socio cognitive development (Piaget, 1958, Vygotsky, in Wertsch 1985, NCCA 1999, Gredler 2005). According to the Irish primary curriculum, geography is a subject that can help students develop their social and cultural awareness, necessary skills for an inclusive classroom and a harmonious society (NCCA 1999). According to the Central Statistics Office (CSO) in the republic of Ireland there are 27, 264 foreign national students aged between 10 – 14 years who attend primary schools (CSO 2011, DCYA, 2012). The overall increase in foreign national population in Ireland during the period 2006 – 2011 is 49.5 %. During the same period the number of traveller children increased by 30.3%. According to the DCYA (2012) foreign nationals and ethnic minorities such as travellers report the highest number of incidences of being bullied at school. Equipping learners with skills to learn about new people, new communities and how to develop interrelationships may reduce incidences of bullying and increase the likelihood of a more harmonious society (NCCA 1999, NCCA 2009, O'Moore 2012).

Vygotsky (in Wertsch, 1985, Gredler 2005, Lourenco 2012) discusses learning that occurs in the student's cultural and social environment. He suggests that mastery of the cultural and social environment enables the student to become a legitimate participant in his/her society.

Meaningful interactions with relevant artefacts, such as maps, tools and images can further enhance learning activities for students' and improve cultural and social awareness (Vygotsky in Wertsch, 1985). The multi-modality of technology enables information to be presented through a wider variety of media, visually and aurally, allowing students access to social and cultural information through their own individual learning preferences (Millwood 2008, Beetham & Sharpe, 2013,). Additionally, Piaget (1979) suggested individual cognitive development could be enhanced through constructive experience with materials and concepts such as geographical models and cultural tools. Automation in technology affords a low floor entry point where students can recreate complex images, for example through simple 'copy and paste' commands (Millwood, 2008). GIS's such as 'Google Earth' allow students to analyse complex environmental systems through user appropriate accessible media and gain an insight into cultural awareness. Students can create artefacts using office software such as Microsoft word and Microsoft Powerpoint often through simple 'copy and paste' of universal symbols. The artefacts can be appraised by peers online using noteboards, rating scales, and discussion boards. Automation in technology, therefore, affords students' the opportunity to promote their self-qualities effectively and can assist them to overcome traditional cultural and language barriers.

Although the importance of geography as a curriculum component has been discussed as a strategy for learning about new cultures in the primary school setting (NCCA 1999), Piaget (1958) argues that an individual cannot develop an appreciation of other cultures outside their own family and nationality until they reach adolescence. This view may be challenged considering Irish children in today's society have more exposure to other cultures due to changing demographics in Irish society (CSO 2011, DYACA 2012). Piaget suggests that feelings about ideals such as humanity and social justice are more prevalent in formal operational thinkers than concrete operational thinkers (Inhelder, Piaget, Parsons, & Milgram, 1958, Lourenco 2012). Exploring the interrelationships between people and their environments can provide opportunities for interactions and argumentation about humanity and social justice. This can lead to more experience for a larger number of students' discussing topics that are considered to require higher order thinking (Inhelder, et al, 1958, Cotterell 2012, Halpern 2012). The presence of familiar easily accessible apps during geography learning can facilitate larger numbers of participants to engage in dialogue. This may assist learners initiate interactions with peers focusing on geography content. Automation in technology can aid communication between students and record interactions during

geography education. The new data collected may provide new insights into learning by students in geography not currently available to teachers. This suggests that new strategies for primary school children learning geography are required in order to facilitate the integration of modern communication technologies into Irish primary schools.

### **2.3 New strategies for learning Geography**

Although Geography facts can be memorised through experience with books and stories the construction of understanding through individual discovery and shared tasks with peers deepens the learning experience (Bruner, 1964; Inhelder et al., 1958; Kolb, 1984; Wertsch, 1985). When students learning experience lacks meaningful interactions such as, involvement with peers, constructive use of materials and related concepts skills these students can suffer as a result, leading to poor development in geography literacy and analytical skills (Piaget 1979, Vogt & Hodza 2012, Catling, 2013). Analytical skills in Geography require learners to interpret patterns, categorise information and be able to offer explanations, for example, for the similarities and differences between other countries and Ireland and the interrelationships of their people (NCCA 1999). The level of understanding that an individual attains at analytical skills can be used to measure their actual cognitive level and forms part of a students' ability to engage in critical thinking and problem solving exercises. For Piaget (1979) mastery of analytical skills was necessary for developing formal operational reasoning, the final and most 'higher order' of Piaget's stages of development theory. The biological age for formal reasoning has been consistently reappraised (Piaget 1959, Piaget 1979). Recent studies (Shayer, 2009) suggest many people may never reach this stage. In Irish primary classrooms with high pupil teacher ratios, many students have limited opportunities to initiate interactions practicing higher order thinking skills. For foreign nationals or members of ethnic minorities who report being bullied, initiating interactions can be challenging. Technologies that provide different media for instigating interactions can encourage higher volumes of student participation. This can bring about a larger quantity of interactions where students' discuss higher order topics. The use of discussion boards and messaging provide opportunities for collecting data from higher volumes of participants' discussions. However, analysing student's messages for geography learning development would require a shift away from quantitative analysis, often measured through test scores commonly used for establishing

literacy and numeracy competency levels in Irish primary schools, towards qualitative assessment strategies.

Both Vygotsky and Piaget viewed cognitive change as a qualitative process not limited to simple reflexes (Beetham & Sharpe, 2013; Lourenço, 2012). Furthermore, Vygotsky and Piaget shared a non-reductionist view and were critical of early educational psychologists such as Skinner for their reliance on quantitative methods, for example the Wechsler test for measuring IQ (Wertsch, 1985, Gredler, 2005, Lourenco, 2012). Vygotsky and Piaget argued that IQ tests measure the quantity of intelligence not the quality (Lourenco, 2012). According to Piaget, a student's different answers on a set of questions may demonstrate the same cognitive structure, while answers that are the same may demonstrate different cognitive structure (Inhelder, et al 1958, Lourenço, 2012). Comparatively Vygotsky considered that the same external interaction could have different internal consequences (Wertsch, 1985, Lourenço, 2012). Discussion boards and Instant messaging apps are media that can be used for analysing qualitative change by examining a students' ability to argue in a logical process (Häkkinen, 2013). For students aged 11-12 years old engaging in geography learning that requires analysis and argumentation, qualitative data can be captured during interactions about higher order topics through the use of discussion boards and Instant messaging. If discussion boards and Instant messaging are to become widely used in Irish primary classrooms for geography learning then their value as educational tools that can provide unique data of students learning needs to be understood more clearly.

#### **2.4 The messaging loop and knowledge construction.**

'Messaging' including Instant messaging and posting messages on a discussion board includes an interactive loop that can be influenced by many external factors resulting in an internal cognitive change (Yacci, 2000, Markett et al, 2006). Messaging loops are student initiated interactions originating from and returning to the student reciprocated by teachers or fellow participants (Yacci 2000, Markett et al, 2006). According to Patten, Arnedillo Sánchez, & Tangney, (2006) messaging systems facilitate constructivist learning activities. Messaging is a 'low-floor' entry level application because of its ease of access with a 'high ceiling' threshold because of the possibilities that the interactions create. The affordances of messaging systems

facilitate interactions between higher numbers of students. Creating interactions, peer to peer, peer to teacher, peer to entity, is the goal of teaching strategies and enhances the potential for learning to emerge (Piaget 1979, Vygotsky 1979, Markett et al, 2006, Jonasson 2009). Yacci, (2000), Markett et al (2006), showed how messaging facilitates a messaging loop in the classroom beginning with and ending with the learner.

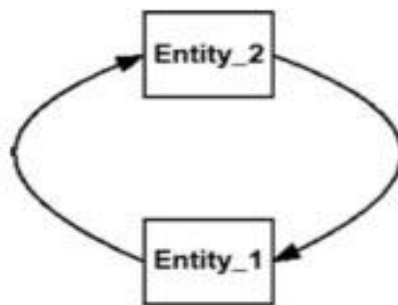


Fig 1.

The messaging loop.

(Yacci, 2000)

A messaging loop aids cognitive structuring allowing the learner to put concepts into context and stimulates interest and motivation while providing ongoing feedback for the teacher (Markett et al., 2006, Reid & Reid, 2010). Piaget believed that new information was processed through assimilation and accommodation and arranged in individually interpreted structured schema. Assimilation, suggested that an individual could adapt to new situations through use of their own existing cognitive organisations or Schema (Gredler 2005, Lourenco 2012). Accommodation according to Piaget enabled individuals own cognitive schema to adapt to the environment (Gredler 2005, Lourenco 2012). During this transition period cognitive change takes place during the search for equilibrium. Meanwhile during the messaging loop a cognitive tension arises while the student waits for feedback on their comment. According to Markett et al, (2006) Reid & Reid, (2010) during the process of the messaging loop, students can benefit from having opportunities to reflect on their message before sending it. This allows students to edit any mis-spelled words, rearrange sentences or

points of view and clarify expressions with the use of images such as emoticons. Reid & Reid, (2010) also report that students benefit from the anonymity of messaging even adopting new 'texting' personalities. Some students also report attempting to be 'more witty' or trying to sound 'more intelligent' during messaging interactions Reid & Reid, (2010). Therefore students uncomfortable during face to face interactions may be able to initiate interactions using discussion boards and Instant messaging and present a different image of themselves.

According to Alexander (2013) dialogical loops can be opened up between participants or between participants and instructor that encourage meaningful conversation. Answering questions with questions continues a chain of dialogue that encourages participants to continue dialogue thereby exploring topics and content deeper. Alexander (2013) argues that learning talk includes the ability to receive, act and build upon answers and analyse and solve problems. According to Alexander (2013) this type of discussion can be facilitated by teaching 'cumulatively' whereby participants in a conversation including teachers and children build upon each other's ideas and chain them into '*coherent lines of thinking and enquiry*' (pg. 48, Alexander 2013). Integrating dialogical loops with discussion boards and Instant messaging can encourage student initiated interactions. Combining this strategy with geography analytical skills practice, can focus dialogue on geography content. Analysis of the content can provide new insights into primary geography education.

The messaging loop can be influenced by many external factors on its cyclical journey back to the initiator. Vygotsky believed that information processing began in the interpsychological sphere before being transferred into the intrapsychological sphere, through a process of externalization and internalization (Wertsch, 1985, Gredler, 2005, Lourenco, 2012). Vygotsky argued that even intrapsychological transfers of knowledge were quasi-social because of their beginnings in the social environment (Wertsch 1985), and so individual development was more influenced by external factors including peers, culture and resources than the individual's current cognitive schema. Kolb (1984) argued that information was processed as a result of tension between apprehension, an individual cognitive process and comprehension which has social origins. Kolb considered that students' knowledge formed through a process of concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE). This cycle mirrors the process a student experiences during the messaging loop. Constructing and sending a message (CE), reflecting on the contents and

replies (RO), considering responses and modifying their initial expressions (AC) before expressing a new comment (AE) that reflects their changed cognitive state.

Piaget, (1958) Vygotsky (1979) and Kolb (1984) consider learning to be a qualitative process. Qualitative analysis of documents, discussions and context can give insight into messaging interactions (Hakkinen 2013). Analysing interactions during geography learning can give insight into geography as a subject. Yin (2009) suggests collecting documentation, examples of discussions and taking into consideration the context of learning when carrying out research and analysis into social phenomenon. Yin (2009) and Cresswell (2013) suggest that qualitative analysis and quality description of this type of data can help us to understand interrelationships between people, communities and their environment. Catling, (2013) and Edelson, et al, (2013) advocate research at primary school level in geography using activities that reflect modern society. Instant Messaging and discussion boards provide opportunities for higher volumes of interactions between peers, can enhance students' geography learning experience and provide unique data for qualitative analysis.

## **2.5 Conclusion**

Learning geography has many benefits for cognitive development in students. Analysing skills in Geography contain core skills such as information categorisation, data interpretation and hypothetico-deductive reasoning, mastery of which can be used to measure cognitive ability. Instant messaging provides opportunities for discourse and is another medium for creating interactions between students. Sending messages begins a loop that receives feedback from peers or an instructor before arriving back at the student. During the transition period of that loop a student experiences a tension found during cognitive change. Recording those interactions and qualitatively analysing them can provide insight into cognitive change during geography learning. Discussion boards provide opportunities for students to get involved in argumentation which is a key skill in the development of formal operation thinking. Scaffolding the learning context with cognitive tools, peer supports and through the provision of different media for interaction can increase the number of student initiated interactions that

take place during a teaching and learning activity for students. By analysing the interactions of students during geography lessons evidence of cognitive change can be examined. The use of technology in the delivery of the primary geography syllabus can assist teachers in delivering quality geography education to 11-12 year olds in upper primary schools.



### **3. Design of the learning experience**

#### **Design chapter:**

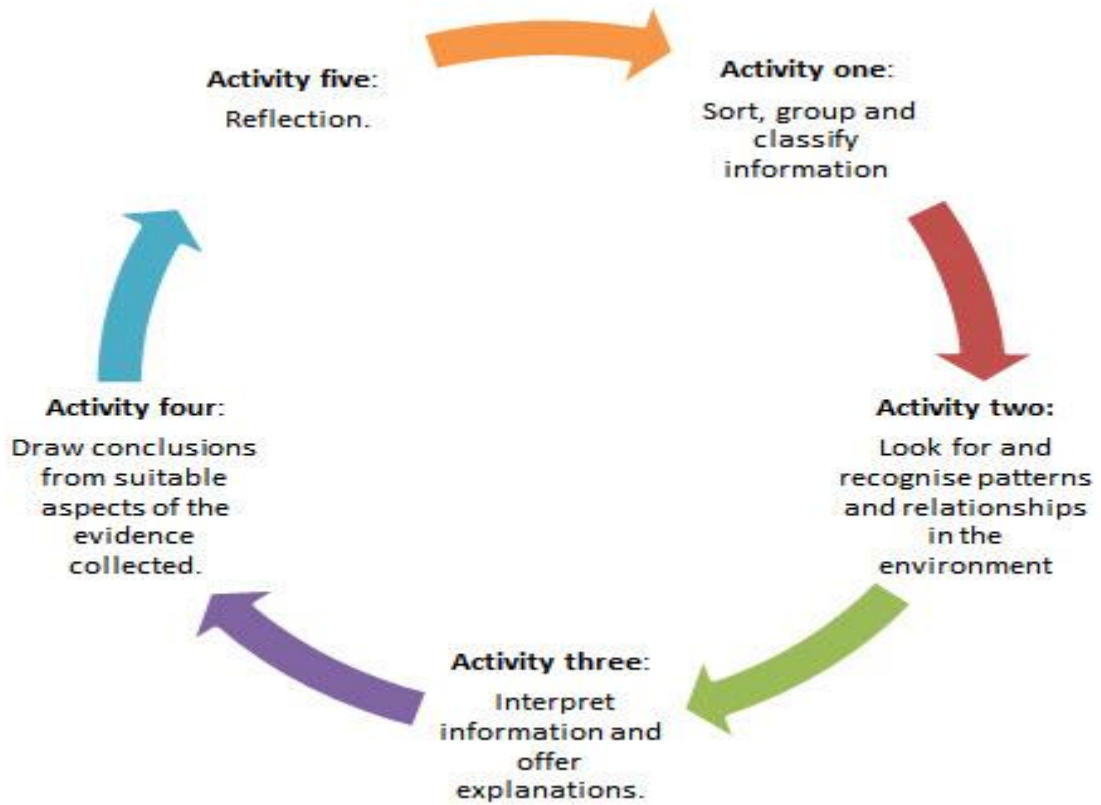
This chapter describes the learning experience designed to answer the research question of evaluating geography learning 11 – 12 year olds in the Irish primary school analysing messaging loops. The design consists of a geography project with four tasks that take approximately thirty minutes each to complete. The four tasks required the participants to apply analytical skills from the Irish primary geography curriculum to construct meaning from geography content presented on webpages hosted on a teamsite on Microsoft Sharepoint 2013. The participants could also post comments to a discussion board hosted on the teamsite on Microsoft Sharepoint 2013. During a reflection activity approximately one week after the project was finished the participants were encouraged to share their experiences during a conference using the Instant messaging system, Microsoft Lync 2010. The design table (Appendix A) provides a detailed account of the findings from the literature, their impact on the design and examples of the principles in practice. The design chapter begins with images that represent the order of the tasks and activities.

### 3.0.1 Setting

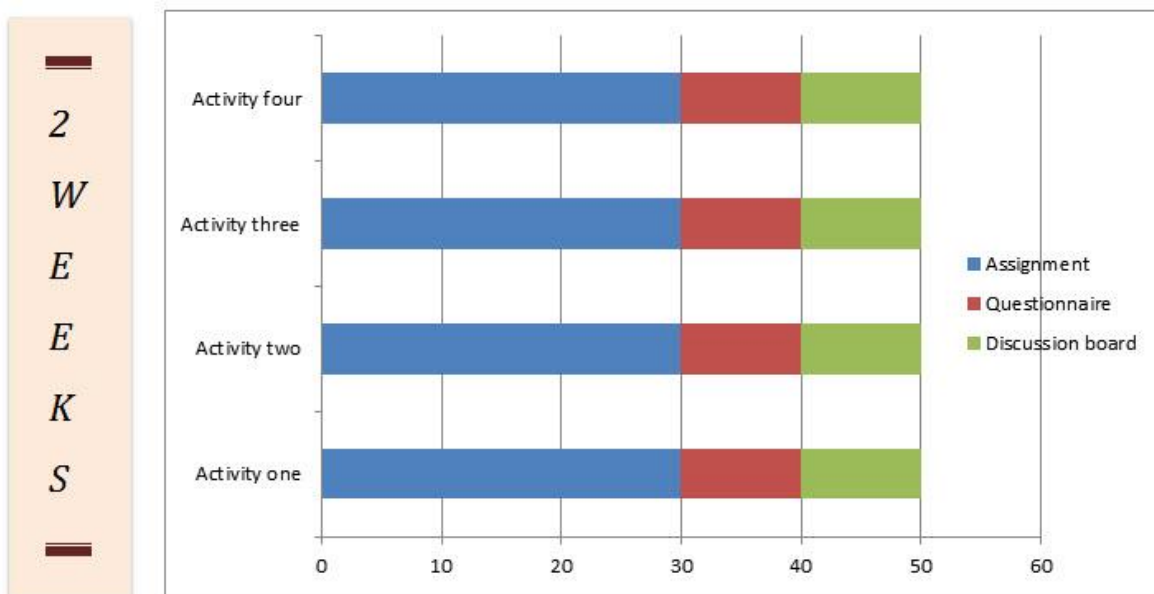
The setting mixed in class and at home online learning. In class the artefact was introduced to the participants and the navigation across the website was explained. Any questions were fielded and a demonstration of how to access information, questionnaire's and assignments was given. The participants were given instruction on how to post to the discussion board and reminded of the school's policy on appropriate behaviour. The participants could work individually or collaboratively while sitting in groups of three on laptops in a computer hub situated in the classroom. During this period the class progressed along it's normal curriculum timetable. Every participant was given approximately two hours time in class to complete the activities over a two week period Monday, 01/02/14 – Friday, 14/02/14. The participants could also complete activities at home during the two weeks. The instant messaging conference took place in class and included all twenty six participants.

### 3.0.2 Participants

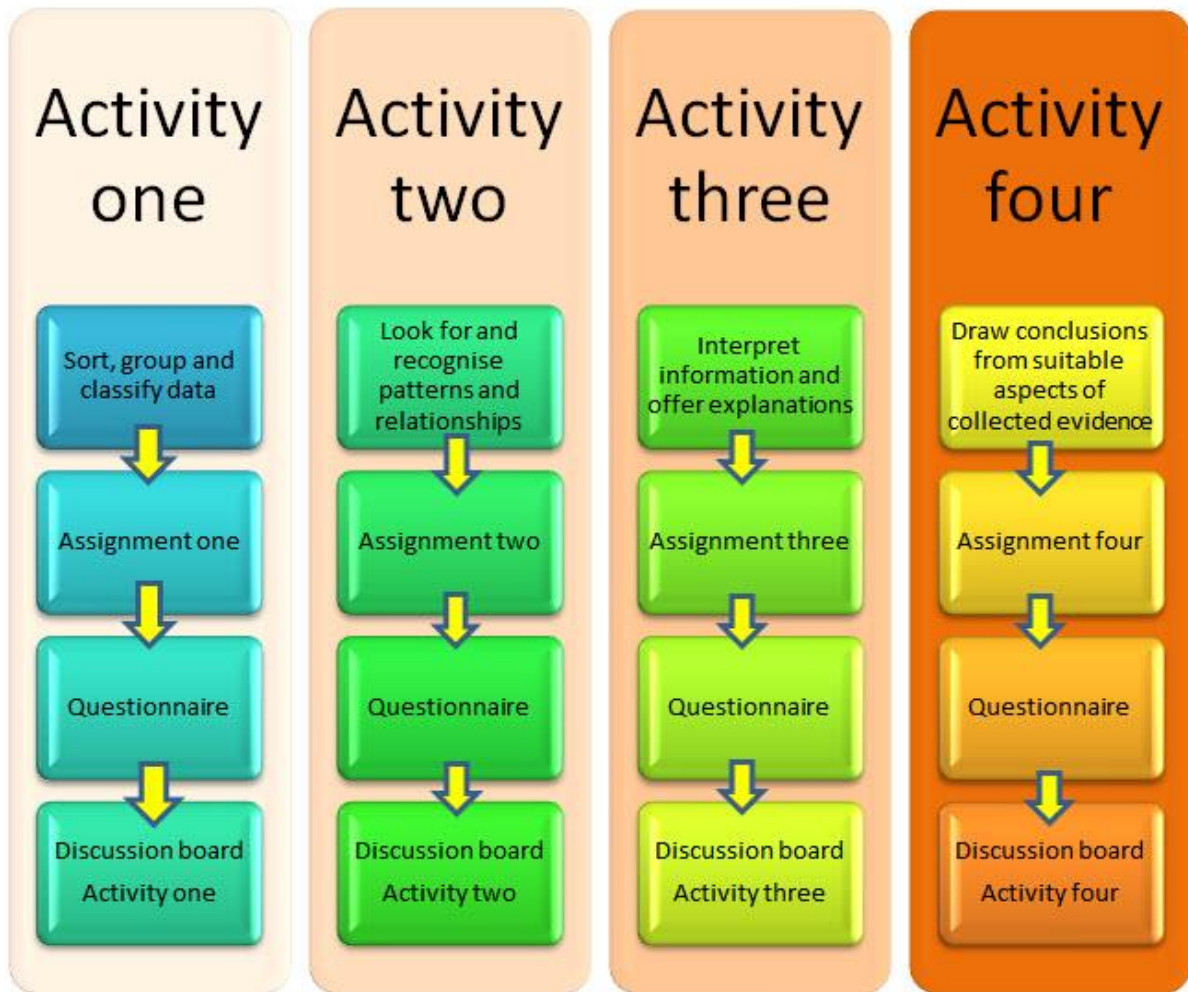
Twenty six participants aged 11 – 13 years formed the research cohort. One participant was aged 13 during the period of the research. The twenty six participants have prior experience of using a team site hosted on Microsoft Sharepoint 2013 for retrieving documents, watching learning videos and engaging in discussion board activities. No participant used Microsoft Lync prior to the study or had experience of using Microsoft Sharepoint 2013 for online learning as designed for this study. The study included 14 girls and 12 boys from a mixed socio-economic grouping. The cohort included a statistically average IQ grouping of mixed ability groups ranging from high end to low end STEN score measurements. STEN scores are calculated from the children's scores on tests such as the Drumcondra literacy test and the MICRA-T maths test taken annually. The group included five children with dyslexic tendencies, one child with autism and children with mild general learning disabilities who engage with resource teachers on a daily basis. This meant that there was 100% uptake from the class group for the participation in the study.



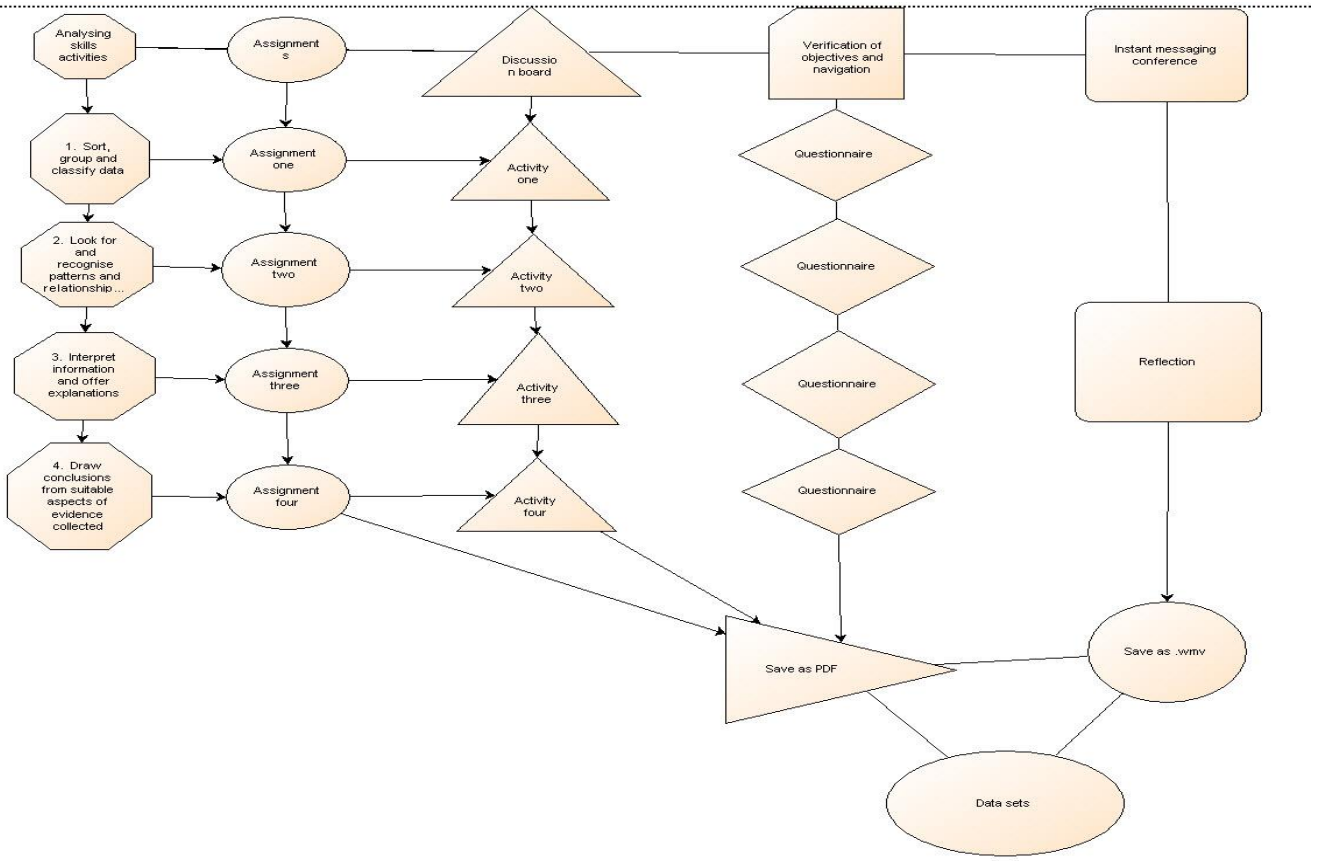
**Figure 2:** Activity cycle and objective.



**Figure 3:** Minutes per activity and duration of the study.



**Figure 4:** Activity objective and activities undertaken by the participants.



**Figure 5:** Data sets and data collection methods.

### 3.1 Analytical skills in Geography.

In response to (Edelson et al., 2012 and Catling 2013)'s call for more evidence of primary school geography education that focuses on core skills development, a project was designed using the geographical investigation abilities of analysing skills from the Irish primary geography curriculum fifth and sixth classes (NCCA 1999). Although there are eight listed geographical investigation skills, Questioning, Observing, Predicting, Investigating and experimenting, Estimating and measuring, Analysing, Recording and communicating and Evaluating, this project focuses on Analysing skills because it required practice of the following sub-skills:

- Sort, groups and/or classify data on people, events and natural phenomena using a range of appropriate criteria.
- Look for and recognise patterns and relationships in the environment.
- Interpret information and offer explanations.
- Draw conclusions from suitable aspects of the evidence collected,

These sub-skills are suggested by (Inhelder et al., 1958, Piaget 1979, Gredler 2005, Cotterell 2012) for generating evidence of people thinking critically. Figure 2 shows a screenshot of the top link bar from the site where the project is hosted. The sub skills listed above are separated into four activities and a link is placed on the top link bar of the site. The top link bar was included to aid navigation throughout the site. Any page on the site can be accessed within two clicks.



**Figure 6.** . Top link bar.

The table below demonstrates the core objective behind each activity the participants interacted with to practice analytical skills. The order was chosen so the students would practice breaking down information before putting it all back together with a new perspective.

Activity one	<ul style="list-style-type: none"> <li>• Sort, group and/or classify data on people, events and natural phenomena using a range of appropriate criteria.</li> </ul>
Activity two	<ul style="list-style-type: none"> <li>• Look for and recognise patterns and relationships in the environment.</li> </ul>
Activity three	<ul style="list-style-type: none"> <li>• Interpret information and offer explanations.</li> </ul>
Activity four	<ul style="list-style-type: none"> <li>• Draw conclusions from suitable aspects of the evidence collected.</li> </ul>

**Figure 7.** Activity number and analytical sub skill objectives.

On each activity page there is a link to an assignment that the participants are encouraged to complete. The assignments contain questions that focus on each of the four sub-sets of analytical skills listed above in figure 3. This information is then documented and available for analysis by the researcher. The assignments were designed using the questionnaire app from Microsoft Sharepoint 2013. The layout of the question boxes are sized appropriately to assist the participants knowledge of how much text is expected when answering each question and the text is sized at 30 px to assist reading (Dillman, Smyth, & Christian, 2009). In order to resize the text some script had to be written into the text editor of the survey app. The script is included in appendix I.

1. What is the name of the country you are studying?

2. What continent is the country in?

- Africa
- America
- Asia
- Australia
- Europe

3. Name some of the people and communities that live there.

4. What art and culture have developed in your country?

5. Can you name some customs and traditions that your country celebrates?

6. What games do the people in your country play and what pastimes do they enjoy?

Figure 8. Assignment, Activity one.



### **3.2 Strand: Human environments Strand Unit: People and other lands.**

The strand ‘Human environments’ and the strand unit ‘People and other lands’ were the focus for designing the content of the intervention. According to (Inhelder et al., 1958, Piaget 1979) feelings of humanity and social justice are more prevalent in people who have developed higher order thinking skills. Tanzania is a country where children of 11 – 12 years of age live under different conditions than children in Ireland and was chosen as an International community that may provoke empathetic feelings for the participants’. Tanzania provides a wide demograph of society with urban, rural and nomadic groups and communities. Urban dwellers in large cities such as Dar es Salaam, experience financial extremes from slums and shanty towns to luxurious mansions. Both Piaget (1979) and (Vygotsky 1985) argued that the surrounding environment plays a large impact on an individual’s cognitive development. Many rural areas lack running water and electricity while much infrastructure is outdated due to economic limitations. Comparing and contrasting information from the individuals own perspective and from the perspective of others further assists individuals develop critical thinking skills by opening up new perspectives that aid information processing (Piaget 1979, Vygotsky 1985, Cotterell 2012). The school involved in this study has links with a parish in Easo in Tanzania. A large contrast exists between the life experiences of the twenty-six participants and the life experiences of the groups and communities presented in the content during the project. The country was chosen to encourage empathetic feelings from the participants.

Figure 9. shows how the strand and strand units influenced the design of the artefact.

<b>Strand:</b>	Human environments
<b>Strand unit:</b>	People and other lands
<b>The child should be enabled to:</b>	Study some aspects of the environments and lives of people in one location in another part of the world.
<b>Suggested areas for study:</b>	<ol style="list-style-type: none"> <li>1. Location of these areas.</li> <li>2. Peoples and communities that live there.</li> <li>3. Languages.</li> <li>4. Art and culture, customs and traditions.</li> <li>5. Clothes.</li> <li>6. Play and pastimes, leisure interests.</li> <li>7. Population growth or decline.</li> <li>8. Major features of the natural environment.</li> <li>9. Interrelationships of the lives of the people and the major features of the environment.</li> <li>10. Homes and settlements.</li> <li>11. Settled and nomadic lifestyles.</li> <li>12. Major cities and shanty towns.</li> <li>13. Work and workplaces.</li> <li>14. Transport and communications.</li> <li>15. Similarities and differences between these places and Ireland.</li> <li>16. Trade, historic and other links with Ireland.</li> </ol>

**Figure 9.** Strand, Strand unit, objective and suggested areas for study.

The suggested areas for study listed in the Irish primary geography curriculum (NCCA, 2009) were used as sub topics for the participants to explore and gather information from the artefact. Figure 6 shows a webpage from the artefact where Tanzania is chosen as the international country to research and the suggested areas for study are amended to form page headings for sub topics for the participants to explore during the activities or when accessing the site independently which remained open for the entire duration of the study, two weeks.

## Geography Project Index

Tanzania

Location	People and communities	Languages
Art and culture, customs and traditions	Clothes	Play and pastimes, leisure interests
Population growth or decline	Major features of the natural environment	Interrelationships
Homes and settlements	Settled and nomadic lifestyles	Major cities and shanty towns
Work and workplaces	Transport and communications	Similarities and differences with Ireland
Trade, historic and other links with Ireland.		

**Figure 10.** Site index page with suggested areas for research as content headings.

### 3.3 Constructivist learning environment.

According to (Gredler 2005, Lourenco 2012, Beetham & Sharpe 2013) Piaget, Vygotsky and Kolb can be considered constructivist theories. Constructivist theorists argue that learning is more meaningful when individuals are set tasks that require them to construct meaning from stimuli in their environment through discovery and comparison with their own cognitive scaffolding as opposed to learning models suggested by theorists such as Skinner (1953, 1972) who demonstrated students successfully learning through the accurate replication of modelled tasks. The design of the artefact maintains a similar line of reasoning that although learning can be successfully demonstrated by the replication of modelled activities learning is more meaningful when students actively discover information and are given opportunities to develop and argue their own hypothesis. Jonasson's constructivist model (1991) was chosen as the design for this learning activity. Jonasson's model was chosen due to its contextual flexibility and ease of integration with the technologies available to the participants during this study.

Jonasson cited by Reigeluth (1999) lists four major values and six major methods in his theory. **Figure 11.** presents Jonasson's theory and how the values and methods influenced the project implementation.

<b>Jonasson's model.</b>	<b>Geography project design.</b>
<p><b>Goals and preconditions:</b> Ill defined or ill structured domains.</p>	<p><b>Goals and preconditions:</b> The students will practice analysing skills through the exploration of people in other lands in the country of Tanzania.</p>
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>a) Ill-defined or ill-structured problem.</li> <li>b) Goal owned by the learner.</li> <li>c) Experiences which facilitate meaning making.</li> <li>d) Learning that is active and authentic.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>a) Suggest solutions to problems in Tanzania.</li> <li>b) Learner may suggest any problems and solutions.</li> <li>c) Layout of website pages.</li> <li>d) Laptops, tablets, instant messaging, discussion boards.</li> </ul>
<p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>1. Select an appropriate problem.</li> <li>2. Provide related cases or worked examples.</li> <li>3. Learner selectable information 'just in time'.</li> <li>4. Provide cognitive tools.</li> <li>5. Conversation and collaboration tools.</li> <li>6. Social/contextual support.</li> </ul> <p>Enter sub-category here:</p>	<p><b>Methods</b></p> <ul style="list-style-type: none"> <li>1. Learn about another country.</li> <li>2. Articles in document folders.</li> <li>3. Information from strand units on web pages &amp; access to peers and teacher.</li> <li>4. Images, video, peers, documents folder, noteboards, IM, Discussion boards.</li> <li>5. Noteboards, Im, Discussion boards.</li> <li>6. Peer, teacher, messaging loops.</li> </ul>

**Figure 11.** Jonassons values & methods and their impact on the project design.

The following section lists the four activities that the participants had to engage in. A different activity was created for each sub-set of analysing skills. The four activities focused on each sub-set of analysing skills and were constructed guided by Jonasson's values and methods.

### 3.3.1 Activity one

<p><b>Goals and preconditions:</b> Ill defined or ill structured domains.</p>	<p><b>Goals and preconditions:</b> The students will practice sort, group and classify data through the exploration of people in other lands in the country of Tanzania.</p>
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>a) Ill-defined or ill-structured problem.</li> <li>b) Goal owned by the learner.</li> <li>c) Experiences which facilitate meaning making.</li> <li>d) Learning that is active and authentic.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>a) Sort, group and classify data from information on Tanzania.</li> <li>b) Learner may suggest any information.</li> <li>c) Layout of website pages.</li> <li>d) Laptops, tablets, instant messaging, discussion boards.</li> </ul>
<p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>1. Select an appropriate problem.</li> <li>2. Provide related cases or worked examples.</li> <li>3. Learner selectable information ‘just in time’.</li> <li>4. Provide cognitive tools.</li> <li>5. Conversation and collaboration tools.</li> <li>6. Social/contextual support.</li> </ul> <p>Enter sub-category here:</p>	<p><b>Methods</b></p> <ul style="list-style-type: none"> <li>1. Sort, group and classify data..</li> <li>2. Articles in document folders.</li> <li>3. Information from strand units on web pages &amp; access to peers and teacher.</li> <li>4. Images, video, peers, documents folder, noteboards, Instant Messaging, Discussion boards.</li> <li>5. Noteboards, Instant Messaging, Discussion boards.</li> <li>6. Peer, teacher, messaging loops.</li> </ul>

**Figure 12.** Activity one plan.

### 3.3.2 Activity two

<p><b>Goals and preconditions:</b> Ill defined or ill structured domains.</p>	<p><b>Goals and preconditions:</b> The students will look for and recognise patterns and relationships through the exploration of people in other lands in the country of Tanzania.</p>
<p><b>Values:</b></p> <ol style="list-style-type: none"> <li>Ill-defined or ill-structured problem.</li> <li>Goal owned by the learner.</li> <li>Experiences which facilitate meaning making.</li> <li>Learning that is active and authentic.</li> </ol>	<p><b>Values:</b></p> <ol style="list-style-type: none"> <li>Look for and recognise patterns and relationships in Tanzania.</li> <li>Learner may suggest any patterns and relationships.</li> <li>Layout of website pages.</li> <li>Laptops, tablets, instant messaging, discussion boards.</li> </ol>
<p><b>Methods:</b></p> <ol style="list-style-type: none"> <li>Select an appropriate problem.</li> <li>Provide related cases or worked examples.</li> <li>Learner selectable information ‘just in time’.</li> <li>Provide cognitive tools.</li> <li>Conversation and collaboration tools.</li> <li>Social/contextual support.</li> </ol> <p>Enter sub-category here:</p>	<p><b>Methods</b></p> <ol style="list-style-type: none"> <li>Look for and recognise patterns and relationships in Tanzania.</li> <li>Articles in document folders.</li> <li>Information from strand units on web pages &amp; access to peers and teacher.</li> <li>Images, video, peers, documents folder, noteboards, Instant Messaging, Discussion boards.</li> <li>Noteboards, Instant Messaging, Discussion boards.</li> <li>Peer, teacher, messaging loops.</li> </ol>

**Figure 13.** Activity two plan.

### 3.3.3 Activity three

<p><b>Goals and preconditions:</b> Ill defined or ill structured domains.</p>	<p><b>Goals and preconditions:</b> The students will interpret information and offer exclamations through the exploration of people in other lands in the country of Tanzania.</p>
<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>a. Ill-defined or ill-structured problem.</li> <li>b. Goal owned by the learner.</li> <li>c. Experiences which facilitate meaning making.</li> <li>d. Learning that is active and authentic.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>a. Interpret information and offer explanations about Tanzania.</li> <li>b. Learner may suggest any patterns and relationships.</li> <li>c. Layout of website pages.</li> <li>d. Laptops, tablets, instant messaging, discussion boards.</li> </ul>
<p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>1. Select an appropriate problem.</li> <li>2. Provide related cases or worked examples.</li> <li>3. Learner selectable information ‘just in time’.</li> <li>4. Provide cognitive tools.</li> <li>5. Conversation and collaboration tools.</li> <li>6. Social/contextual support.</li> </ul> <p>Enter sub-category here:</p>	<p><b>Methods</b></p> <ul style="list-style-type: none"> <li>1. Interpret information and offer explanations in Tanzania.</li> <li>2. Articles in document folders.</li> <li>3. Information from strand units on web pages &amp; access to peers and teacher.</li> <li>4. Images, video, peers, documents folder, noteboards, Instant Messaging, Discussion boards.</li> <li>5. Noteboards, Instant Messaging, Discussion boards.</li> <li>6. Peer, teacher, messaging loops.</li> </ul>

**Figure 14.** Activity three plan.



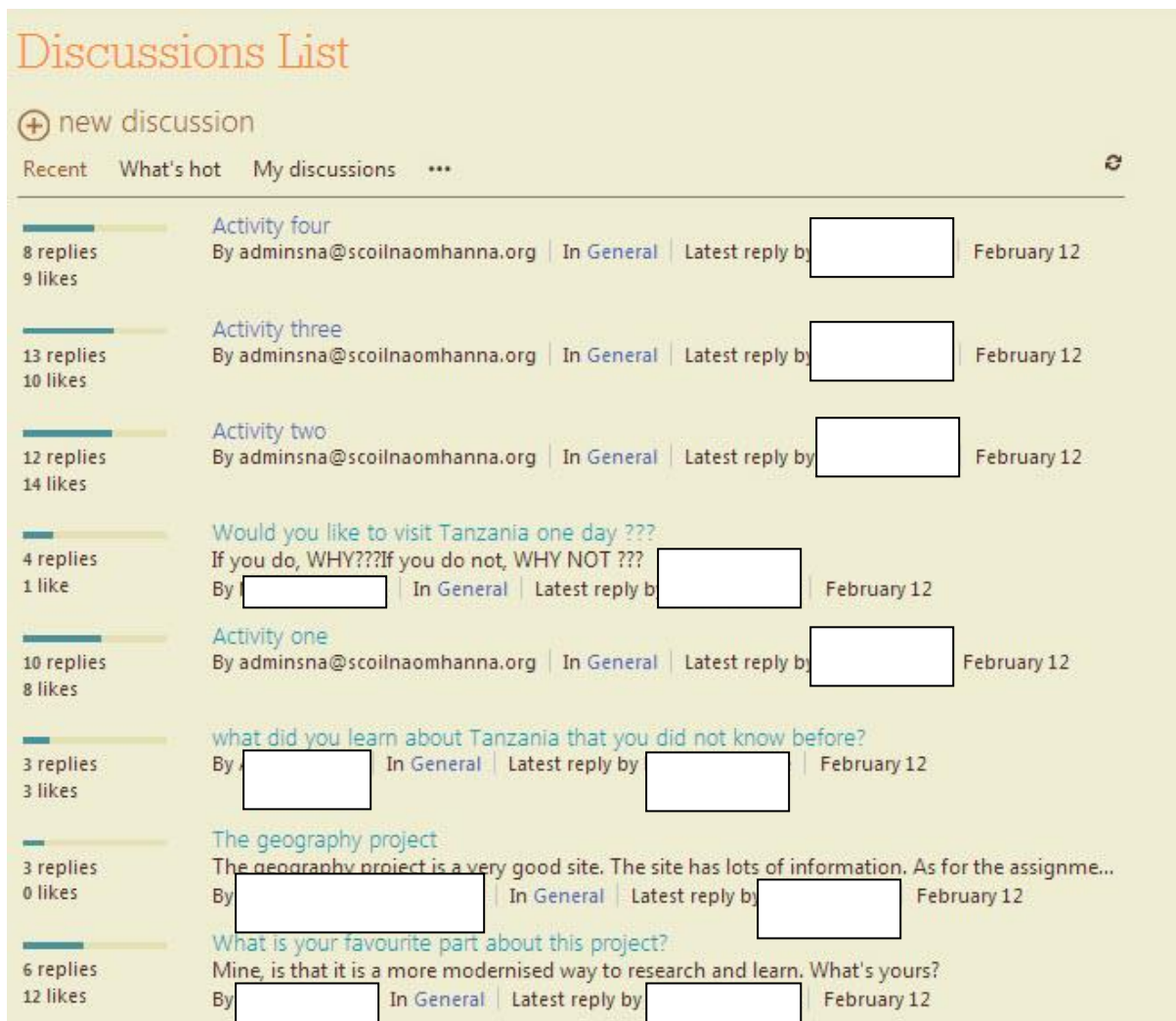
### 3.3.4 Activity four

<p><b>Goals and preconditions:</b> Ill defined or ill structured domains.</p>	<p><b>Goals and preconditions:</b> The students will draw conclusions from any suitable evidence collected through the exploration of people in other lands in the country of Tanzania.</p>
<p><b>Values:</b></p> <ol style="list-style-type: none"> <li>Ill-defined or ill-structured problem.</li> <li>Goal owned by the learner.</li> <li>Experiences which facilitate meaning making.</li> <li>Learning that is active and authentic.</li> </ol>	<p><b>Values:</b></p> <ol style="list-style-type: none"> <li>Draw conclusions from any suitable evidence collected in Tanzania.</li> <li>Learner may suggest any patterns and relationships.</li> <li>Layout of website pages.</li> <li>Laptops, tablets, instant messaging, discussion boards.</li> </ol>
<p><b>Methods:</b></p> <ol style="list-style-type: none"> <li>Select an appropriate problem.</li> <li>Provide related cases or worked examples.</li> <li>Learner selectable information ‘just in time’.</li> <li>Provide cognitive tools.</li> <li>Conversation and collaboration tools.</li> <li>Social/contextual support.</li> </ol> <p>Enter sub-category here:</p>	<p><b>Methods</b></p> <ol style="list-style-type: none"> <li>Draw conclusions from any suitable evidence collected in Tanzania.</li> <li>Articles in document folders.</li> <li>Information from strand units on web pages &amp; access to peers and teacher.</li> <li>Images, video, peers, documents folder, noteboards, IM, Discussion boards.</li> <li>Noteboards, Im, Discussion boards.</li> <li>Peer, teacher, messaging loops.</li> </ol>

**Figure 15.** Activity four plan.

### 3.4 Messaging loops

In order to facilitate dialogical teaching (Alexander, 2013) suggests that interactions should be open ended. Open ended questions facilitate entry points for a wide variety of thoughts compared to closed questions that often facilitate only those in the know. Similarly responses that are inquisitive or that add further questions to the dialogue are more likely to continue the messaging loops compared to answers that finish off conversations or close arguments. Marrkett et al, (2006) argue that messaging loops are initiated by the participant. Throughout the study the participants initiate all interactions with the content by clicking on the links across the site to access questionnaires, assignments and the discussion boards. Located at the bottom of each activity page the discussions list provides participants the opportunity to engage in discussions on the main discussion board while exploring content throughout the site. When messaging on the discussion board the participants are asked to answer the previous question and then create a question for the next participant to answer. According to Alexander (2013) this strategy assists participants create dialogical loops and encourages interactions.



**Figure 16.** Discussions list.

During the final activity the participants were given the opportunity to interact through the Instant messaging system Microsoft Lync 2010. Instant messaging provides unique opportunities for users to participate in conversations that are not available during traditional face to face interactions. Instant messaging provides opportunities for normally shy individuals to enter dialogue and aids cognitive structuring by affording opportunities for participants to edit, revise, clarify or add humour to their comments. Instant messaging can record real time interactions from participants and provide data for teachers to analyse. This activity revisited the participants thoughts on the project and explored any emerging themes from the data. Microsoft Lync 2010 was chosen because the participants had existing office 365 logins and the range of technologies available during the conference limited the use of more modern versions such as Microsoft Lync 2013.

[redacted]	13:08
o can you all introduce yourselves please so I know you are online	
[redacted]	13:09
o okay. I am online	
[redacted]	13:09
o I'm online	
[redacted]	13:09
o hello world	
[redacted]	13:10
o wuaa	

**Figure 17** Microsoft Lync 2010 conference.

### **3.5 Web page design:**

In order to facilitate an online learning activity that the participants could engage with independently a web page that broke the information down into accessible learning steps was designed . Scaffolding a constructivist learning experience is an important value to consider during design (Jonasson, 1991, Gredler 2005, Beetham & Sharpe 2013). The central column of the web page follows Gagné's nine events of instruction (Gagné 2005) to break the information down into smaller units for the participants and aims to reduce cognitive load. Gagné's nine headings are modified and replaced by more user friendly, age appropriate terms. The right hand column contains a video directly related to the unit of study, a noteboard for participants to leave comments and a document folder for any artefacts created during the project.



### Activity four

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Dar Es Salaam</b>												
Max Temp (°C)	30	30	30	30	29	29	28	28	28	29	30	30
Min Temp (°C)	26	26	25	24	22	20	19	19	19	21	22	24
Rainfall (cm)	7	7	12	30	19	4	4	3	4	4	8	9
<b>Arusha</b>												
Max Temp (°C)	29	29	28	25	22	21	20	22	26	28	28	28
Min Temp (°C)	10	10	12	15	11	9	9	9	9	10	10	10
Rainfall (cm)	6	9	18	38	20	3	1	2	2	4	10	10
<b>Zanzibar</b>												
Max Temp (°C)	30	31	30	30	29	28	27	27	28	29	30	30
Min Temp (°C)	27	27	27	26	25	24	23	23	24	25	26	27
Rainfall (cm)	9	8	15	35	25	6	5	4	5	9	20	15

Maximum temperature, minimum temperature and rainfall in Zanzibar, Arusha and Dar es Salaam.

**Objective**

- Draw conclusions from suitable aspects of the evidence collected.

**Recall**

Can you recall a time when you were watching a movie and all of the excitement and tension was tied up together in the conclusion?

**Information**

We draw conclusions from the evidence we have been presented with and from the feedback we get from others about our explanations. Our conclusions connect the patterns and relationships with our classified data and the feedback from our explanations. This learning cycle leads to more information, more recognising patterns and relationships, more explanations, and more feedback.

Drawing conclusions helps us to put together all of our information and explanations and agree on some consensus for the problems that have occurred. Drawing conclusions also helps us to make a plan that people can agree on. With an agreeable plan put together we can move forward and fix the problems that we identified in the beginning.

As you know, many of our decisions are made by governments. During the planning process problems that have been identified are researched and discussed before conclusions are made. The conclusions are then turned into plans which are carried out. As the plans are being carried out researchers begin to identify any

Video

Why should I study geography?

Click play for video

00:00 / 00:00

---

Note Board

Post

Previous / Next

There are no notes posted yet. You can use notes to comment on a page, document, or external site. When you create notes they will appear here and under your profile for easy retrieval. Other people can also view the notes you post.

Right click or drag and drop this link to your browser's favorites or bookmarks toolbar to use notes to comment on external sites.

---

Documents

+ new document or drag files here

- ▼ Name
- Activity four ...
- Activity one ...
- Activity three ...
- Activity two ...
- Nathan's project.tanzania ...
- tanzania project BY NATHAN ...
- tanzania project ...

problems within the new plans and suggest ways of making the new policies better. This important process helps society to develop and improves conditions for the population. For example, every year the government holds a budgetary review to decide on the areas to invest their money. During the year, monthly accounts are published. By examining the monthly accounts, officials can make conclusions about the successes and failures of their budget. This allows them to rearrange any investments and make budget readjustments.

Can you make conclusions based on all of the evidence that you have collected during the previous three activities and suggest improvements in the living conditions of that countries population?

**Guidance:**

Here is the link to the other country:

[Tanzania](#)

**Performance:**

You can fill in your answers here:

[Assignment](#)

**Feedback:**

The purpose of this activity is to draw conclusions from any evidence that you have collected. Geographers collect a lot of data from investigation skills. It's important to be able to assemble all of the evidence and then make conclusions. This helps to identify problems and solutions supported by strong evidence.

**Questionnaire:**

**Discussion:**

Discussions List

new discussion

Recent My discussions Unanswered questions ... 0

---

**Activity four**  
By adminna@uzlibooks.com | Latest reply by Geor O'Leary | 4 hours ago

**Activity three**  
By adminna@uzlibooks.com | Latest reply by Louis Kelleher | 4 hours ago

**Activity two**  
By adminna@uzlibooks.com | Latest reply by Louis Kelleher | 4 hours ago

**Would you like to visit Tanzania one day ???**  
If you do, WHY??? you do not know TDT ???  
By Maku Aoto Soto | Latest reply by Louis Kelleher | 4 hours ago

**Activity one**  
By adminna@uzlibooks.com | Latest reply by Eve Brennan | 7 hours ago

**what did you learn about Tanzania that you did not know before?**  
By Abiona Casey | Latest reply by Maku Aoto Soto | 8 hours ago

**Figure 18.** Activity four central column and right hand column.

### 3.6 Questionnaire:

On each activity page there is a questionnaire. The questionnaire gathers data from the participants on their understanding of each task and their ability to navigate the site. One question seeks to evaluate the participants experience of online geography learning in comparison with traditional textbook learning. The questionnaire remains the same for all four activities. The layout of the questionnaire follows Dillman (2009) guidelines for suggesting the appropriate amount of information to be entered by the participant.

1. What did you have to do in this activity?

2. Was it easy to navigate around the site? Please give some reasons to support your opinion.

3. Did you find learning using this site any different from learning using a textbook?

4. What rating would you give this activity?

Rating	Dislike		Average		Like	N/A
	1	2	3	4	5	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure 19.** Questionnaire.

This chapter describes the learning experience design to answer the research question of evaluating geography learning 11 – 12 year olds in Irish primary schools analysing messaging loops. The next chapter will describe the data collection methods and methodologies used in the study.



## **4. Methodology**

### **Methodology**

The purpose of this qualitative study is to evaluate Geography analytical skills in 11 – 12 year olds in Irish primary schools. The study details the reasons for selecting a qualitative research design and the selection of a descriptive case-study methodology to provide an in-depth description of emerging phenomena. The study then details the data collection process and addresses the issues of reliability and validity. A description of the data collection methods is provided. The section on data analysis lists the data collected and a table is provided that displays the codes and themes used in analysing the data sets. A description of the participants and steps involved in the implementation of the study follows. Finally a reflection on the researcher bias is provided.

### **4.1 Approach**

A qualitative approach was undertaken to analyse the participants learning. Creswell (2013) recommends using a qualitative approach when the researcher aims to capture data of a learning experience where emergent themes are expected and when an issue needs to be explored. Piaget (1979), Vygotsky, in Wertsch, (1985), Kolb (1984), and Lourenco (2012) suggest that collecting evidence of children practicing higher order thinking skills is more suited towards qualitative data collection tools. Although pre-defined quantitative measures have been applied in case studies (Creswell 2013) this study aims to examine the quality of participants online talk using thematic analysis.

### **4.2 Case study design.**

Yin, (2009), Creswell (2013) recommend descriptive case studies when studying activities or events that are bounded by time as they can provide in depth understanding of cases. Case studies are particularly concerned with who and why questions that aim to examine particular issues in depth. A case study is also recommended when studying more than one individual participating in the same activity. A strength of a case study is the ability to deal with multiple sources of data including documentation, observations, archival records and

artefacts. In consideration of the participants, settings and learning content during the activities the researcher selected the case study design to capture the volume of data produced during a traditional primary school learning activity. The data collection methods are explained in the next section.

### **4.3 Data collection methods.**

The study used convenience sampling to recruit participants to collect data on 11 – 12 year olds practicing geography analytical skills. The collection of data includes questionnaires after each activity, assignments for every activity, discussion boards posts and interactions during an instant messaging conference designed to further explore any emerging themes during the activities. The collection of multiple sets of data assists the construction of validity and enables pattern matching. Capturing multiple sets of data also creates a large database of evidence that can be revisited by the researcher or peers during the review process (Yin, 2009, Cresswell 2013).

According to (Yin 2013 Cresswell 2014) some of the weaknesses in documenting evidence is accessibility. This design, using Office 365, provides a simple procedure for documenting evidence and being able to export it to another tool, in this case NVIVO for further analysis. The data was documented through questionnaires and discussion boards and through a recording of the Instant Messaging conference. The questionnaires and the discussion boards data were saved as a pdf files and downloaded to the desktop for importation into analysis software, in this case NVIVO. The instant messaging conference call was recorded from a function within the Microsoft Lync 2010 app and exported as a .wmv file. The file was imported into analysis software, in this case NVIVO. The conference was transcribed into a word document and added to the NVIVO database for analysis. According to Catlin (2013) and Edelson (2012) capturing primary school children learning geography is important for research into the value of geography as a subject for curriculum study. The technological elements of office 365 are used in this project to frame the learning experience and record interactions of 11 – 12 year olds practicing geography analytical skills learning.

What?	Why chosen	How relevant?
Assignments (Documentation)	To provide individual responses.	Individual assessment.
Questionnaires (Archival)	For evidence of understanding and ability to navigate the site.	Ability to understand tasks accurately and negotiate tasks.
Discussion board (Documentation)	To provide asynchronous interactions.	Reflective thoughts on learning geography.
Instant messaging (Documentation)	To provide synchronous interactions during a final reflection.	Real time reflective thoughts on learning geography.

**Figure 20.** Data collection methods.

#### 4.4 Invitation to study

A letter of invitation (appendix b) was distributed to one class of 26 students in a national primary school. The letter was an invitation to participate in the research. An information sheet outlining the activities, research focus and ethical considerations was given to the participants who had to return a signed copy of an individual consent form (Appendix D) accompanied by a parent/guardian signed consent form (Appendix F) before being accepted into the study.

#### 4.5 Questionnaire

The questionnaire (Appendix G) included six questions that could be completed by the participants following each of the four activities. The questions focused on ascertaining the participants ability to navigate the site and understand the activity objectives. One question focused on the participants views on learning geography online compared to traditional text book learning.

## **4.6 Assignments**

As the participants encountered a lot of information without the presence of a teacher, four assignments were designed to provide guidance. The four assignments (appendix G) were designed using the sub-sets of analysing skills listed in the Irish primary geography curriculum as their core objective and supported by questions that explored the domains further. The participants were given approximately thirty minutes each in-class time to complete each assignment. The site remained open for two weeks and the participants had access through any internet device with internet connection.

## **4.7 Discussion boards**

After completing each activity the participants were encouraged to post to a discussion board. The participants were encouraged to answer any question that immediately preceded their entry on the discussion board and then pose a question for the next participant to answer. The initial question on each discussion board activity was posted by the researcher. The question was in the form of an open ended question. Each question focused on one of the four sub sets of analytical skills listed in the Irish Primary geography curriculum (1999).

## **4.8 Instant messaging conference**

One week after the site was closed an instant messaging conference was held reflecting on the project. During the conference all twenty-six participants were invited to engage in a reflective session focusing on themes that emerged during the study. These areas included their views on the technology used, their opinions on the learning activity, the impact of core elements of geography learning and any suggested improvements and future projects they would like to see held using Instant messaging in the classroom. The conference also provided for ‘everyone to have a voice at once’.

## 4.9 Data analysis

The design of the research resulted in the collection of the following data sets:

- Documentation of the questionnaire's, discussion board postings, Instant messaging conferences, completed assignments and the final questionnaire resulted in the collection qualitative data.
- Archival record of times and dates from records on the Sharepoint team site can be used to determine setting and volume of posts.

Data set:	Code:
Questionnaire	Pattern, frequency, emotion.
Instant messaging	Vocabulary acquisition, frequency, emotion, domain and taxonomic, discussion skills.
Discussion board	Pattern, frequency, emotion, domain and taxonomic, discussion skills.
Assignment	Domain and taxonomic, vocabulary acquisition, frequency.

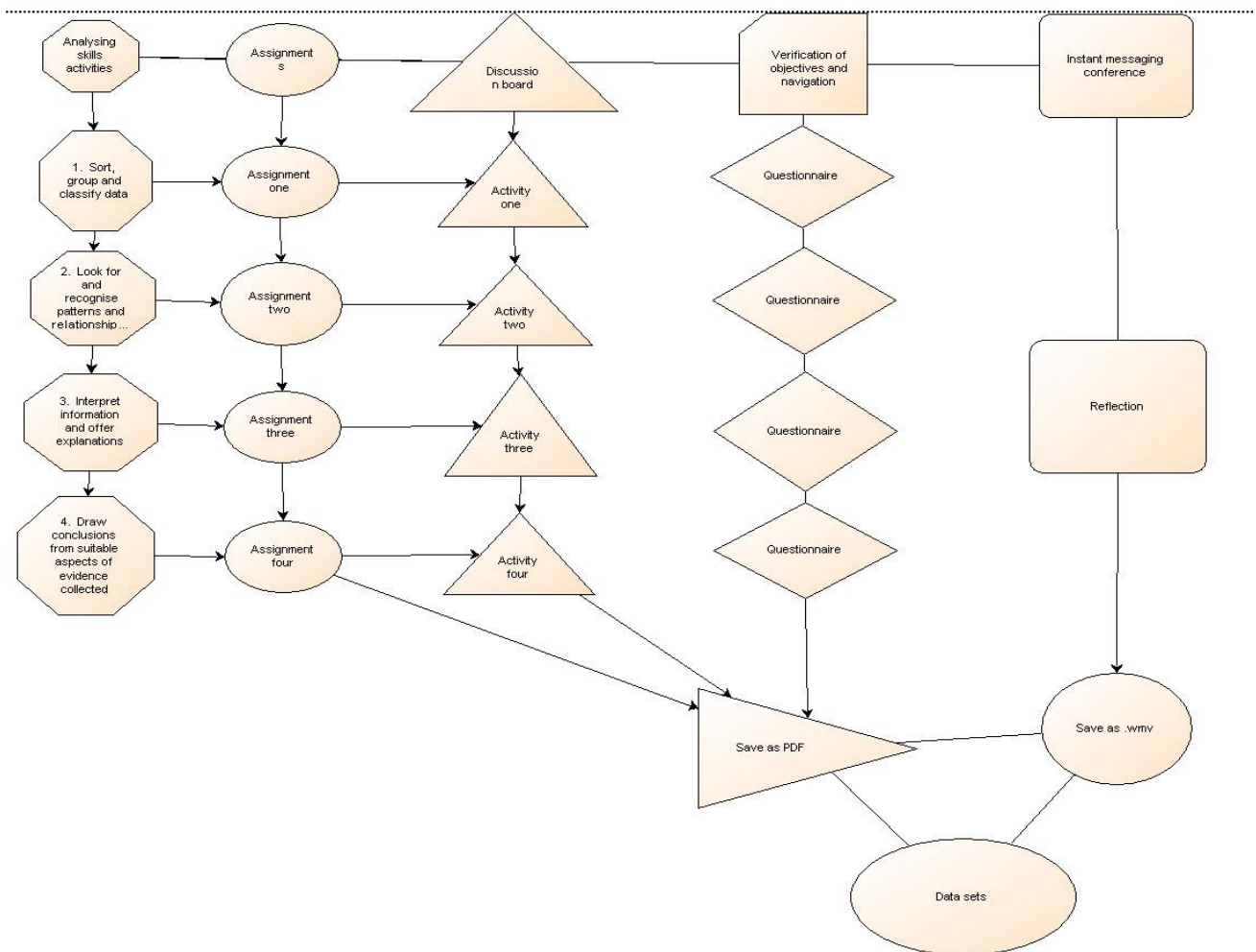
**Figure 21.** Data sets and initial codes. (codes adapted from Salander 2012)

To establish emotional coding the text from the data sets were analysed searching for specific words that suggest empathy. According to Bryant (1982) empathy has an affective and cognitive domain. Words that demonstrated shared feelings such as 'sad' 'happy' 'feel' were understood as affective empathy and relevant sentences that included words such as, 'know' 'understand' and 'think' were interpreted as cognitive empathy.

Vocabulary acquisition was compared with the categories listed in the domain and taxonomic areas that made up the content for the webpages and are the suggested areas of study in the

Irish primary curriculum (1999). Vocabulary acquisition was analysed for words that were picked up in context as there was no direct instruction of vocabulary during the study. Direct instruction was limited to the introductory session where the navigation and the layout of the site was explained. Vocabulary acquisition was analysed for target words that were selected from the core objectives that made up the activity pages and the discussion board topics. According to (Penno, Wilkinson & Moore 2002) vocabulary can be picked up incidentally and the contexts that the participants experience the new vocabulary influence the participants ability to understand the new vocabulary. The vocabulary was analysed for accurate spelling and correct contextual use. The associated sentences containing the vocabulary were coded for correct sentence structure or incorrect sentence structure.

Word frequency was established by running a word frequency query from NVIVO on all of the data sets collected which were categorised according to specific questions, assignments, questionnaires, discussion board topics and Instant message conferences. The word frequency queries were limited to words with five letters or more in respect of the participants age 11 – 12 year olds.



**Figure 22.** Data collection methods. (For questions see Appendix G)

#### 4.10 Ethical consideration

Ethics application recognised the need for informed consent, voluntary participation and an understanding that technologies not usually used during classroom activities would be experienced. The ethics application was made to the Ethics Committee of the School of Computer Science and Statistics at Trinity College Dublin on 25, October 2013 and was granted on the 23, December 2013. The application recognised potential issues surrounding the use of the technology involved and provided reasonable steps to ensure safeguarding of the participants. The site content was selected ensuring no offensive or inappropriate material would be available. The site is contained within a ‘walled garden’ that only the participants have access to. The participants must log in to the site using a password and username. The participants comments and interactions record their username, date and time

which can be analysed for the setting, in class or outside class, that the comments take place in.

#### **4.11 Study setting and duration**

Twenty six participants aged 11 - 13 took part in the study. The participants had access to a team site hosted on Microsoft sharepoint 2013 for two weeks. The participants were presented with four assignments to complete. The assignments were expected to take approximately thirty minutes each to complete. On completion of the assignments the participants could take a questionnaire that was expected to take approximately ten minutes to complete. On completion of each assignment the participants were also asked to make a post to a discussion board. A demonstration of how to access and navigate through the site was given to the participants prior to opening of the study. Any questions from the participants were taken. Demonstrations of how to access and complete the assignments, questionnaires and discussion board posts were given. Every participant was given approximately two hours in class time over a period of two weeks to engage with the project. In class the participants worked in a small hub with three laptops. Some individuals worked as a group and some worked independently. The cohort also worked on the assignments outside of school as access was possible through any device with internet connection.

#### **4.12 Participants**

The invitation to the study was opened to all of the researchers class group. From the twenty-six members who applied to take part in the study twenty five students fell within the age range of 11 – 12 year olds and their data is the focus of this study. The participants had previous knowledge of Microsoft Sharepoint 2013 for retrieving documents, accessing learning videos, creating web pages and posting onto discussion boards. None of the cohort had used Microsoft Lync prior to the study although many were familiar with Instant messaging apps such as ‘What’s app’ and ‘Viber’. The study group included fourteen males and 12 females from a mixed socio economic background. A review of the participants STEN scores revealed a statistically average group containing high end to low end IQ measurements.



### **4.13 Researcher value**

Recognising the multiple roles of the lead researcher as the classroom teacher, implementer of the research and facilitator of the learning experience, it is important to recognise the many areas for bias that may influence any element of the research. (Yin 2009, Cresswell 2013) encourage a researcher to adopt a philosophy towards research design. In this case the researcher maintained adherence to method and accurate reporting while adopting a participant interaction policy that focused on providing questions not supplying answers. The selection of this topic was informed by the researcher's involvement in Irish Primary education with an interest in online learning as a strategy to enhance primary school education.

### **4.14 Directed content analysis**

The study used a directed content analysis to develop codes and assist the analysis of emergent themes. Domain and taxonomic coding was guided by the suggested areas for study from the Irish Primary curriculum (figure 26). Emotional coding looked for examples of empathy and injustice in the participants text. Accuracy coding examined the participants answers and understanding of the objectives. Directed coding based on Kolb, Piaget and Vygotsky' theories that suggest the existence of cognitive tensions looked specifically for any text where participants mentioned experiencing tension or suggested that the technologies used provided opportunities for cognitive structuring.

This chapter has described the methods and methodologies used by the researcher during the project. The next chapter will demonstrate the findings from the study.

## 5. Findings

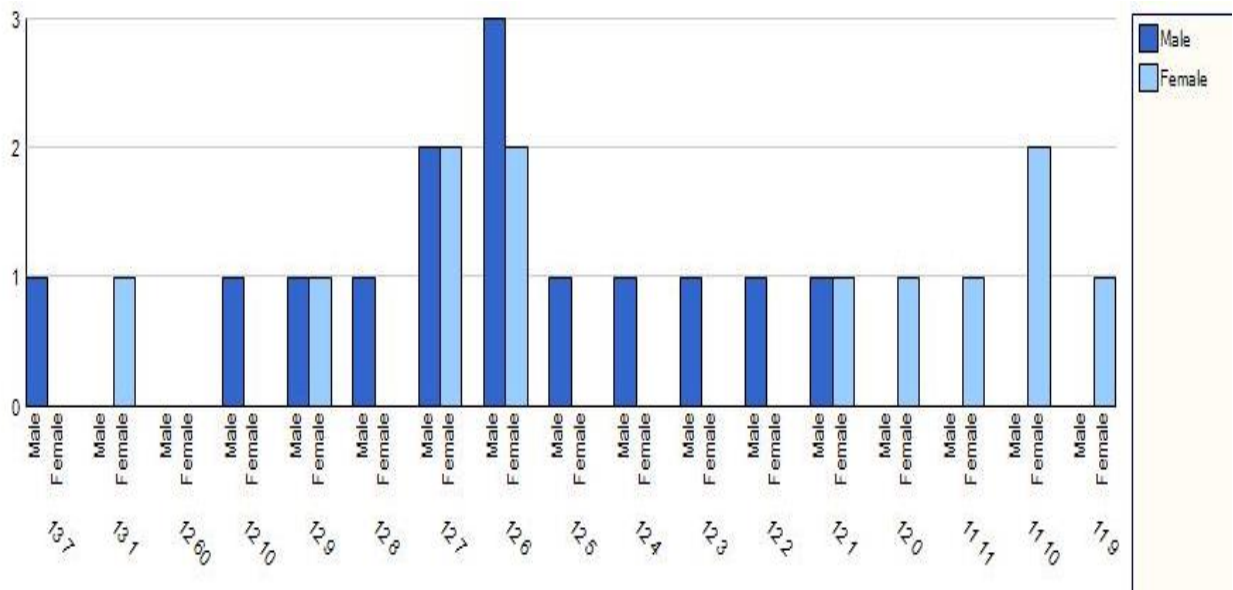
The findings are presented through a linear analysis approach. The context of the study is presented followed by a presentation of the participants answers to the assignments and their comments on the discussion boards. Then the questionnaires are presented. Finally a brief sample from the Instant messaging conference is displayed.

Within the limitations of this study, 11 – 12 year olds practicing Geography online using messaging loops has proven to be a reliable approach for participants practicing analysing skills. The assignments, questionnaires, discussion boards and Instant messaging system proved reliable in capturing the interactions that took place. The data analysis developed themes and codes from the interactions captured during the activity.

The research question focuses on evaluating messaging loops during geography learning while the participants practice analysing skills. The related sub-questions are:

- What vocabulary and geography terms did the participants acquire in domain and taxonomic areas?
- What emotional themes and patterns emerge during the participants learning about other international communities?
- Is there any evidence of cognitive change during online geography analytical skills learning?
- Evaluation of the learning experience for the potential of more demanding skills learning in geography.

## 5.1 Context:



**Figure 23: Age and gender of the respondents**

### 5.1.1 Age and gender, (Years, Months)

Twenty-four participants, aged between 11 – 12 years participated in the geography project. Two class members were older than 12 years and participated in the project but their data is not included in the findings. The project consisted of four assignments, four questionnaires, four posts to a discussion board and an instant messaging conference. The participants were informed of the activities but were under no obligation to complete all of them. The project site was opened for two weeks and the participants were given time in class over the course of the project to practice the activities. The participants also had access to the site from outside of class for the duration of the project, two weeks. In class the participants engaged with the content individually and in groups while sitting in a small hub that had three laptops. Before the participants were given access to the site they were familiarised with the content and navigation during a demonstration by the facilitator.

Setting		
Name	Sources	References
In class	82	293
Outside class	20	89
In class discussion board	5	28
Outside class discussion board	4	15

**Figure 24:** Setting: Assignments, questionnaires and discussion boards in class and outside class.

### 5.1.2 Methods used:

The methods used to collect the data included four assignments, one questionnaire that the participants could take after each activity, a discussion board where the participants could post their findings and finally an instant messaging conference reflecting on the learning experience.

### 5.1.3 Findings from the data collected:

The findings from the data collected will be presented in the following order. First the findings from the assignments, then the findings from the questionnaires, after the findings from the discussion boards and finally the findings from the Instant Messaging conference will be presented.

## 5.2 Assignments:

The assignments focused on the participants practicing analytical skills. Each assignment focused on a sub skill of analytical skills listed in the Geography Irish primary curriculum. Assignment one concentrated on the sub skill of sorting grouping and classifying data from analytical skills. The assignment required the participants to search for relevant information on the site in order to answer six questions. Assignment two concentrated on the sub skill of recognising patterns and relationships in the environment. Assignment three focused on the sub skill of interpreting information and offering explanations. Assignment four focused on the sub skill of drawing conclusions from suitable aspects of the evidence collected.

Assignment	Response
One	19/26
Two	15/26
Three	9/26
Four	15/26

**Figure 25:** Assignment responses

## 5.3 Domain and taxonomic

Under domain and taxonomic coding the following nodes (**figure 26**) were created, these nodes follow the suggested areas for study from the geography primary curriculum when learning about other international communities. They also provided the headings for the webpages hosted across the site. Any text containing words that could be categorised into the domain and taxonomic list were coded under the appropriate heading and analysed for correct contextual use.

Domain and Taxonomic		
Name	Sources	References
Location	60	91
Peoples and communities	49	78
Languages	0	0
Art and culture,	20	26
Customs and traditions	15	19
Clothes	0	0
Play and pastimes, leisure interests	19	21
Population growth or decline	24	31
Major natural features	21	26
Interrelationships	18	27
Homes and settlements	26	37
Settled and nomadic lifestyles	2	2
Major cities, shanty towns	17	27
Work and workplaces	13	13
Transport and communications	9	9

**Figure 26:** Domain and taxonomic areas the students reused in their answers.

The analysis of the participant’s answers showed that they had made reference to thirteen out of the fifteen suggested areas for research used in this study. The two nodes that did not receive references were languages and clothes. Figure 28 shows the use of the terms by the participants during assignment one. The data shows that the participants can sort group and classify data and when answering questions on domain and taxonomic focused questions. The data shows the ability of the participants search for specific information from categories and retrieve information from sources. The analysis of the data confirmed examples of correct contextual use of the newly acquired vocabulary.

#### 5.4 Assignment one:

Assignment one			
Name	Sources	References	
What is the name of the country you are studying	19	19	
What continent is it in	19	19	
Name some of the people and communities that live there	19	19	
What art and culture has developed in your country	16	17	
Can you name some customs and traditions that your country celebrates	12	13	
What games do the people in your country play and what pastimes do they enjoy	18	18	

**Figure 27:** Assignment one questions.

<b>Suggested area for research</b>	<b>Vocabulary examples:</b>
<b>Location</b>	Tanzania, Africa, Ireland, Europe, equator,
<b>Peoples and communities</b>	Poor, poverty,
<b>Languages</b>	
<b>Art and culture</b>	Makonde Art, Tingatinga Art,
<b>Customs and traditions</b>	Dhow, dancing, storytelling,
<b>Clothes</b>	
<b>Plan and pastimes, leisure interests</b>	Football, cricket,
<b>Population growth or decline</b>	Population increase,
<b>Major natural features</b>	Mount Kilimanjaro, Lake Victoria
<b>Interrelationships</b>	Hot climate, drought, lack of water, poverty, poor education, over farming, over population,
<b>Homes and settlements</b>	Need for safe hygienic homes in underdeveloped slums.
<b>Settled and nomadic lifestyles</b>	Masaai, Hadzabe,
<b>Major cities, shanty towns</b>	Dodoma, Dar es saleem
<b>Work and workplaces</b>	Banking, farming
<b>Transport and communications</b>	Roads, trains, airports

**Figure 28:** Examples of the vocabulary used by the participants in domain and taxonomic areas.





An examination of the word cloud demonstrates the participants' use of vocabulary that can be categorised against domain and taxonomic criteria in figure 26. Examples such as, 'Makonde', 'Masaii', 'communities', 'ethnic', 'traditions' and 'classify' evidence vocabulary acquisition which were analysed for correct contextual use.

## 5.5 Assignment two:

Assignment two			
Name		Sources	References
<input type="radio"/>	What country have you been researching	15	15
<input type="radio"/>	Has the population been increasing or decreasing	15	15
<input type="radio"/>	What are the major features of the natural environment in the country	15	16
<input type="radio"/>	Discuss the different homes and settlements in your country	13	14
<input type="radio"/>	Discuss any relationships between the natural environment and the homes and settlements	10	10
<input type="radio"/>	Suggest some solutions to any problems that exist in the country you have been studying	9	9

**Figure 30.** Assignment two questions

The themes that began to emerge during the assignment to look for and recognise patterns and relationships included the negative impact of overpopulation and its relationship with poverty. Similarly, poverty was associated with a perceived lack of education across the population and especially in rural areas. The participants also suggested that the continuously hot climate due to northern Tanzania's location along the equator was a major cause of drought in some regions and the participants considered this to be a contributing factor towards poverty. The participants suggested that conditions have been improving in Tanzania and that improvements in education and health contributed to increased living conditions. The data shows children's abilities to identify climactic patterns, socio-economic interrelationships and physical geographical location. The data supports learning human and physical geography simultaneously.

### Quote:

*'I think, the government should build safe, hygienic homes for people who live in the current underdeveloped slums. The only difficulty with my solution is how to raise the money to do this'*

*(Female, aged 12 years 3 months).*

*"Tanzania is very near the equator. This position leads to a hot climate, which can cause drought due to lack of rainfall"*

*(Female, aged 11 years 9 months).*

**Discussion board activity two:** What patterns and relationships did you identify in the environment?

In assignment two on the discussion boards the topic focused on patterns and relationships in the environment and the participants continued to discuss climate, weather and the likelihood of there being a lack of resources in impoverished areas. The participants also began to compare conditions in Ireland and Tanzania and wonder if we fully utilised our resources here. The children's answers show an improvement in vocabulary compared to assignment one

**Quote:**

*In response to (participant x) post I think that the developed and modernised areas of Tanzania may have sporting grounds similar to ours, but in undeveloped slums and impoverished areas they do not have as impressive and modern sporting grounds as Ireland does'.*

*Do you think that we take advantage of our sporting facilities here in Ireland?*

*(Female, 12 years 2 months). )*

This demonstrated the participants ability to recognise social and cultural differences between inhabitants and the relationship that their local environment has on their lifestyles. The participants also displayed knowledge of human and physical geography. The participants began to display examples of taking the mindset of others. A word frequency query was run on assignment two and its corresponding discussion board topic and presented the following.



## 5.6 Assignment three:

Assignment three		
Name	Sources	References
What is the name of the country you have been researching	9	9
Name some of the major cities in that country	9	9
Name some small areas or underdeveloped regions	8	9
Discuss the different employment sectors in the country	7	7
What are the qualities of the transport systems and road networks in that country	8	8
In your opinion how could the country share resources more evenly across the large cities and small villages	5	5

**Figure 32;** Assignment three questions.

The themes that began to emerge during assignment three where the participants were asked to interpret information and offer solutions to any problems in Tanzania included suggestions that luxury and necessary resources should be preserved and shared more evenly across the population. The participants recognised social imbalance for people living close by in the larger cities.

### Quote:

*“Tanzania has a very unbalanced society. For example, in the city of Mwanza, one of Tanzania's largest cities, there are modern buildings with air conditioning and modern appliances just kilometres away from slums, where the people are living a difficult, challenging lifestyle. In my opinion, a good way to share resources evenly among the major cities and small villages is to compromise. for example, instead of furnishing the modern buildings in Mwanza with air conditioning and other such luxuries, while leaving people living in houses made of wood in slums, you could cut back on un-necessary luxuries in major cities to provide the people living in slums with a better quality of life”*

(Female aged 12 years 6 Months).

**Discussion board activity assignment three** interpret evidence collected so far and offer explanations for the current situation.

In assignment three on the discussion board the participants were asked to interpret evidence and offer explanations for the situation in Tanzania. The participants recognised population

and economic growth and improvement in the conditions for the people in Tanzania and the positive input of foreign aid. The participants also recognised imbalance in Tanzanian society suggesting that resources were shared unevenly. The participants considered comparisons with their own lifestyle and environment and began to show interest in problem solving. The answers also display development when compared with assignment one and assignment two showing that children practicing analysing skills can improve their critical thinking ability.

**Quote 1:**

*‘The situation in Tanzania is gradually getting better. I know this because there are lots of companies like trocaire who send supplies to Africa and build lots of buildings like schools, wells and hospitals, for example’.*

(Male, aged 12 years 4 months).

**Quote 2:**

*“There are some parts of Tanzania that have resources such as schools and hospitals, but people living in slums on the outskirts of the city sometimes don't even have running water.*

*What do you think the schools in Tanzania are like?”*

(Female, aged 12 years 3 months).

A word frequency query was run on assignment three and its corresponding discussion board topic and presented the following results:





**Figure 33: Word frequency cloud:** Assignment three and discussion board topic three

The cloud was categorised using the domain and taxonomic codes listed in figure 26 and the vocabulary was analysed for correct context use. When compared with the word frequency cloud from activity one (figure 23) and activity two (figure 25) words such as ‘opinion’ ‘example’ ‘sorting’ and ‘problems’ suggest a change in the participants thinking. The participants are not only re-using vocabulary in context they are beginning to develop their analytical skills having broken down the information and now beginning to put it back together again.



## 5.7 Assignment four:

Assignment four			
Name		Sources	References
What is the name of the country you are studying		15	15
List some of the problems that the population in that country are faced with		15	15
Suggest how conditions for members of the country's population can be improved		14	14
Make some conclusions from the evidence you have collected over the past four activities		11	11

**Figure 34:** Assignment four questions.

The major themes that emerged during assignment four where the participants were asked to draw conclusions from suitable aspects of the evidence they had collected included an awareness of poverty, child labour and perceived a lack of education as having negative effects on the people. Population increase became a common theme amongst participants while nature and wildlife were recognised as positive aspects of Tanzanian society. The participants also began to show empathy towards the people of Tanzania and an increased awareness in social injustice in Tanzania.

### Quote:

*‘The conclusions that I have collected over the past four activities, are: Tanzania may be poor, with most of their population in poverty, and also the quality of transport. Rural tribes like the Masaai, build huts and still live like old tribes, but that's their tradition and we can't really change that. Finally Tanzania's education system isn't the best. In countries like Tanzania, education should be free, and the children should be eligible to the education they deserve. Families over Tanzania already have enough hassle, with crops, taxes, school fees etc’.*

(Female aged 12 years 1 month).

**Discussion board Activity four objective:** Write some examples of your conclusions and support them with the evidence you have collected

On discussion board activity four the themes moved between issues in Tanzania and the

participants experiences of learning online compared to learning through textbooks. The participants interpreted the question to consider text book and online learning. The participants answers are more opinionated and arguments are more factually backed up than the preceding discussion board questions and answers.

The presence of three factors in the following answer ‘poverty, child labour and lack of education’ is a persuasive tactic as is the example of ‘don’t need to carry a book home from school, do it in your own time and catches children’s attention’. This suggests that the participants are emotionally and cognitively involved with the learning and becoming persuasive for it’s use in primary school settings.

**Quote:**

*‘I have learned loads about tanzania by using this website for example that some of the population of the country of Tanzania are still facing provity, child labour and lake of eduaction. In my opinion it is easier to learn from the internet then textbooks, becuae you can do it in your own time and you dont need to carry a book home from school and it catches childrens attenion’*

(Female aged 12 years 2 months).

*“The layout was much better then a textbook and you could do all the work in your own time. I never knew that Tanzania and citys like Dar es Salaam . It was more interesting then a second hand book too”*

(Male, aged 12 years, 4 months)

A word frequency query was run on assignment four and its corresponding discussion board topic and presented the following



## 5.8 Questionnaires:

Questionnaire	Response
	30

**Table 4** Responses to questionnaire.

Name	Sources	References
Questionnaire	9	9
What did you have to do in this activity	30	30
Was it easy to navigate around the site please give examples to support your answers	29	31
Did you find learning using this site any different from learning using a textbook	27	27

**Figure 36.** Questionnaire questions.

The questionnaires could be taken after each assignment and focused on validating the participants understanding of the activities and their ability to navigate through the site. The questionnaire also explored the participants opinions on geography online learning compared to traditional text book learning.

Name	Sources	References
Accuracy	24	36
Accurate answer	69	293
Inaccurate answer	16	23
Inaccurate spelling	17	24
Inaccurate sentence structure	14	23

**Figure 37.** Accuracy and verification codes.

Accuracy was validated across the above criteria and answers that could be determined as accurate were coded appropriately. Similarly answers that had an innaccurate answer were coded.



the question displayed in figure 38. 'around', 'site', 'yes' 'easy' and 'navigate' are the most frequent words used by the participants. It is important to note the use of the words 'click' and 'clicking' by the participants. This suggests a psychomotor association with the content experienced by the participants during navigation. Finally, the word 'experience' suggests a deeper learning experience with the content. 'Experience' is not a listed word in the navigation questions.

### 5.8.2 Geography online learning and textbook learning:

The participants also responded to questions about the differences between online learning and textbook learning. The participants responded mostly positively to the experience of online learning reporting that they enjoyed a deeper learning experience, more responsibility for their learning and they found it more interesting. The participants also reported enjoying having the opportunity to learn in their own time.

#### **Quote:**

*'I learned so much more about Tanzania than I had previously known. I found it completely different than to using a textbook, and honestly, I found it better as it's a much better layout, and you almost have more responsibility than to using a textbook(and I like typing!)*

(Female, aged 11 years 9 months).

A word frequency query was run and it returned the following results.





*“While typing you can think more about your answer, and in class normally someone would just say something out loud without thinking”... (I like using instant messaging)... “Because you aren’t put on the spot some people might embarrassed to speak in class in front of everybody”.*

(Female, aged 12 years 4 months).

This chapter has presented the findings from the data sets collected during the study. The chapter has displayed the vocabulary and geography terms that the participants acquired during the four assignments and the discussion board activities. Examples of participants quotes representing themes that emerged from the analysis of the data are shown as evidence. The data has presented examples of validity provided by the questionnaires and displayed the volume of evidence the study can collect. The next chapter will present the discussions and conclusions.



## **6 Discussions and conclusions:**

This chapter presents a discussion and conclusions on the findings from the study. First the research question is restated along with the sub-questions that formed the evaluation of geography learning. Then, a presentation of the findings linked to relevant literature is presented under the heading of each of the four sub-questions used to evaluate geography learning. Next a summary of the conclusions are presented. Finally, the limitations of the study and suggestions for future research are discussed.

### **Question and sub-questions:**

The research objective posed at the beginning of this study was evaluating geography learning in 11 – 12 year olds in Irish primary schools analysing messaging loops.

The related sub-questions are listed below.

- What vocabulary and geography terms did the participants acquire in domain and taxonomic areas?
- What emotional themes and patterns emerge during the participants learning about other international communities?
- Is there any evidence of cognitive change during geography analytical skills learning?
- Evaluation of the learning experience for the potential of more demanding skills learning in geography.

The main conclusion of this study is that practice of the sub sets of analysing skills in geography helps learners to improve their geography knowledge. The literature (Cotterell 2012, Halpern 1999, piaget1979, Vygotsky 1985, kolb1984) suggested that when participants engage in activities that require practice of these skills evidence of critical thinking is present. The findings of this study show the positive capabilities of 11– 12 year olds practicing analytical skills in geography. Analysis of that evidence provides unique data of participants practicing analytical skills.

## **6.1 What vocabulary and geography terms did the participants acquire in domain and taxonomic areas?**

The participants acquired new vocabulary and geography terms that they re-used contextually . The participants learned physical and human geography terms and used them logically during arguments and when offering opinions. The participants also re used the new vocabulary when asking questions. This shows that the group created common consensus and a shared understanding of the content. According to Gagné (1985) verbal information is attained when the learner “learns to state or tell a fact or set of events” (p. 48 cited in Reigeluth). For Penno, Wilkinson, & Moore, (2002) vocabulary is acquired when it is reused in the correct context and can be picked up contextually. The quotes in the findings chapter show that the participants re used geography vocabulary and analytical terms during the assignments and discussion board activities. The quotes show that the participants retold events in Tanzania in their own words. This evidence is presented in quotes taken from the assignments and discussion boards where the participants re used domain and taxonomic vocabulary in context. The word frequency clouds presented under each section display the vocabulary used by the participants.

According to Gagné (2005) intellectual skills are learned when the learner can interact with the environment by using symbols. The participants search and retrieval skills are demonstrated by the participants abilities to navigate the online environment and interpret images, videos and text. Further evidence is demonstrated in the word frequency cloud obtained after analysis of the questionnaire where the participants list videos, text, images, and clicking as strategies to retrieve information. The participants ability to answer the assignment questions provided further evidence of the development of intellectual skills.

## **6.2 What emotional themes and patterns emerge during the participants learning about other international communities?**

The emotional themes and patterns that emerged were feelings of empathy and injustice. The participants became more opinionated and began to use strategies in supporting their answers with evidence as the project developed. Under empathetic coding the participants showed an increased awareness of the imbalance between their own lives and the lives of children in

Tanzania. The participants expressed emotional feelings towards the children and the situations in Tanzania. Piaget (1979) argued that these feelings are more prevalent in higher order thinkers. (CL Cox 2012) argues that differences between affective empathy (AE) and cognitive empathy (CE) can be explained as AE being the ability to share the emotional states of others while CE can be displayed by the ability to take the mental perspective of others. The participants answered open ended unbiased questions that produced responses that demonstrated shared feelings of empathy and injustice. The participants also adopted the mental perspective of others by suggesting solutions to problems that they had constructed themselves from their own interpretation of the content.

### **6.3 Is there any evidence of cognitive change during geography analytical skills learning?**

Participants learned new vocabulary and developed empathy while practicing geography analysing skills researching another international community. According to (Shamay-Tsoory, 2011a, 2011b) affective empathy and cognitive empathy are dissociated and the interactions between both areas unclear, whether they are both part of a single empathy system or independent from one another. Examples from the project demonstrate participants using empathetic words such as ‘feel’, ‘sorry’, ‘unfair’. In some cases, following these thoughts the participants suggest solutions to problems that exist in Tanzania. The examples of the empathetic words are later followed with cognitive target words such as ‘understand’ ‘think’ and phrases ‘we could solve’. This evidence suggests the presence of affective and cognitive empathy engagement with the content by the participants.

According to Gagné (1985) learners demonstrate cognitive learning when they demonstrate that they can “*manage their own learnings remembering, and thinking*” (p. 48, cited in Reigeluth 1999). Participants reported editing their answers during the assignments and the discussion board topics. During the Instant Messaging conference participants responded positively to having the opportunity to revise their comments before externalising them. The findings show that sometimes during primary school classroom activities that participants feel shy or embarrassed and experience tension while speaking out loud in front of peers. The participants suggested that this cognitive tension can be alleviated by providing

technological scaffolds such as Instant messaging and discussion boards “*While typing you can think more about your answer, ... you aren't put on the spot some people might (be).. embarrassed to speak in front of everybody*”. . Introducing these scaffolds in mainstream geography education can provide participants with tools that assist cognitive structuring and encourage participant initiated interactions.

#### **6.4 Evaluation of the learning experience for the potential of more demanding skills learning in geography.**

According to the participants in this study the artefact is a good strategy for learning geography and is more favourable than traditional textbook learning. The participants enjoyed the challenge of learning through initiating the interactions with the content. Every participant has to sign in and click on a symbol in order to begin an interaction whether it was with the content, questionnaire, assignment, discussion board or during the instant messaging conference. The participant initiated interactions start messaging loops that begin with and end with the participants. The artefact facilitates participant initiated interactions informed by geography content practicing higher order skills development. The evidence points towards a more active learning setting than is traditionally experienced by the participants while learning geography. The skill set practiced differs from Piaget's original focus. The participants initiate the interactions with the content and construct answers with very little input from the instructor. The self-directed participation with the activities and the open ended nature of the questions are more demanding than the strategies that Piaget initially used when assessing higher order thinking. The analysis of the participants talk during this study and the evidence of their answers to assignments practicing higher order thinking skills suggest that more demanding activities in geography education can influence participants attitudes and produce evidence of critical thinking skills at a younger age than initially conceived by theorists such as Piaget (Inhelder et al, 1958, Gredler 2005, Lourenco 2012). The participants enjoyment and success levels during the task suggest that online learning courses can be adapted to primary school settings and that a reappraisal of the governments strategy for implementing e-learning into Irish education is necessary (National digital strategy 2013). A targeted approach at primary rather than third level education for the implementation of e learning strategies may yield better outcomes for education in the

immediate term. The development of an online Irish primary curriculum can provide unique insights into Irish primary school education.

## **6.5 Summary of conclusions.**

Within the boundaries of the study the findings show that the combination of technologies record unique information during primary school geography analysing skills learning. Geography analysing skills learning has the potential to transfer to new skills across domains. During geography analysing skills learning participants aged 11 – 12 years learn new vocabulary and cognitive strategies. 11 – 12 year olds display cognitive empathy towards other international communities and affective empathy towards people their own age who they have never met. The evidence displays the presence of tension experienced by children aged 11 – 12 years that technology, particularly discussion boards and Instant messaging can alleviate. The evidence displays the children's positive experience of a new strategy for geography learning that includes individual and group online activities.

## **6.6 Limitations and future research**

The findings from the research point towards the positive affordances of technology to capture unique data during geography learning. The questionnaires need to be refined to capture more data and the option to save midway through assignments and questionnaires need to be added. Geography skills learning for 11 – 12 year olds has a wider significance for learners. This study was limited by its focus on analysing skills and the remaining seven skills suggested by the geography curriculum require further research. Subjects such as History, Science and maths could be practiced using this strategy, working towards an online Irish Primary curriculum. The positive use of a wide variety of technology in a primary school classroom setting should be explored further. The participants responded positively to the use of the technologies and other subjects could benefit from their presence. The impact of technology in assisting children to overcome cognitive tension experienced during answering questions in class would provide real insight into what barriers the participants experience during externalising internalisations and could lead to an increase in student initiated interactions with learning content. The study is limited by only having 24 participants. Reappraising the vocabulary that is used on the site to provide information for the participants may increase the volume of tasks and assignments the participants complete. Adopting this approach with a wider sample of students would give a more accurate picture of geography skills learning at primary school level. Replacing some of the images with embedded GIT's such as google earth could further enhance the learning potential behind this design. Similarly adding game based layers to the design

such as experience points for signing in, building from the bottom up, progression dynamics and communal discovery may provide new findings in learning geography. Finally, the development of an online Irish Primary curriculum can provide real insight into how Irish primary school children learn.

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## Appendix A: Design table

<b>Finding from the literature</b>	<b>Implication of the finding for the design</b>	<b>Implementation in practice</b>
Need for research into Geography learning 11 – 12 year olds (Caitlan, 2013, Edelson et al, 2012).	Create a geography based unit of work for 11 – 12 year olds.	Geography primary curriculum, Strand: Human environments Strand unit: people and other lands
Need to focus on skills development in geography (Caitlan, 2013, Edelson et al, 2013)	Design a geography based unit of work that focuses on skills development.	Project skills focus on Analysing skills and subdomains of <ul style="list-style-type: none"> <li>• Sort, group and/or classify data on people, events and natural phenomena using a range of appropriate criteria.</li> <li>• Look for and recognise patterns and relationships in the environment.</li> <li>• Interpret information and offer explanations.</li> <li>• Draw conclusions from suitable aspects of the evidence collected.</li> </ul>
If the skills in the subdomains of analysing skills are practiced it can lead to children developing hypothetico deductive thinking skills (Inhelder et al, 1958 , Piaget 1979)	Create an environment where hypothetico deductive thinking skills are practiced.	Project skills focus on practicing analysing skills as they contain the elements for hypothetico deductive reasoning and the presence of Instant messaging and discussion boards facilitates practice.

<p>Practicing skills with peers, more able others, scaffolds and resources enhances potential learning (Vygotsky 1979)</p>	<p>Groups within easy access of each other virtually and physically while also having access to a teacher and resources to stimulate learning while practicing hypothetico deductive reasoning skills.</p>	<p>A website containing images, text, multimedia, discussion boards, and participants linked using IM system.</p>
<p>Information processing is a combination of Accommodation &amp; Assimilation (Piaget 1979) Externalization &amp; Internalization (Vygotsky 1979) Concrete experience, reflective observation, abstract conceptualization, active experimentation (Kolb 1984).</p>	<p>Design elements of the artefact that can facilitate information processing with the potential for cyclical interactions.</p>	<p>Discussion boards. Instant messaging. Note boards.</p>
<p>Vygotsky, Kolb and Piaget can be considered constructivist theorists. (Beetham &amp; Sharpe 2013)</p>	<p>Design an artefact using a constructivist model.</p>	<p>Use Jonassons constructivist learning model.</p>
<p>Jonassons constructivist model (Jonasson )</p>	<ul style="list-style-type: none"> <li>• Problem/project (Modelling)</li> <li>• Problem/project representation. (Scaffolding)</li> <li>• Problem/project manipulation space. (Scaffolding)</li> <li>• Related cases.</li> <li>• Information resources.</li> <li>• Cognitive tools.</li> <li>• Conversation/collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse another international community.</li> <li>• Website design.</li> <li>• Classroom groups and community website.</li> <li>• Examples of previous international communities learned.</li> <li>• Images, video, text.</li> </ul>

	<p>tools.</p> <ul style="list-style-type: none"> <li>• Social/Contextual Support</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion boards, Instant messaging.</li> <li>• Teacher as guide on the side, peers, messaging loops, Instant messaging and/or face to face interactions.</li> </ul>
<p>Information processing occurs through Gagné's instructional design model so if participants can explore individually they need extra scaffolding (Riegeluth 1999).</p>	<ul style="list-style-type: none"> <li>• Gain attention.</li> <li>• Inform the learner of the objective.</li> <li>• Stimulate recall of prior knowledge.</li> <li>• Present information.</li> <li>• Provide guidance.</li> <li>• Elicit performance.</li> <li>• Provide feedback.</li> <li>• Assess performance.</li> <li>• Enhance retention and transfer.</li> </ul>	<ul style="list-style-type: none"> <li>• Image.</li> <li>• Geography curriculum objective.</li> <li>• Sentence/question/paragraph trigger.</li> <li>• Image followed by text.</li> <li>• Reason for learning about information.</li> <li>• Questions to recap text.</li> <li>• Reasons for answering the questions.</li> <li>• Student performs a self-assessment task.</li> <li>• Take part in a discussion on the discussion board.</li> </ul>
<p>The more interactions that take place the more likelihood of learning taking place.</p>	<ul style="list-style-type: none"> <li>• Create opportunities for interactions</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion boards, Questionnaire's, Instant messaging.</li> </ul>
<p>Dialogic teaching supports interactions and can be structured (Alexander 2013).</p>	<ul style="list-style-type: none"> <li>• Open ended questions continue dialogical loops.</li> </ul>	<ul style="list-style-type: none"> <li>• Open ended questions in assignments and on the discussion boards.</li> </ul>
<p>Some participants can be too shy to really get involved but during messaging activities they can adopt a 'texting</p>	<ul style="list-style-type: none"> <li>• Provide technologies and means of interaction that can remove barriers to dialogue.</li> </ul>	<ul style="list-style-type: none"> <li>• Capture any evidence of this change if it occurs. Captured through IM, Discussion board and teacher observations during activities.</li> </ul>

personality'		
<p>The messaging loop aids cognitive structuring allowing the learner to put concepts into context and stimulates interest and motivation while providing ongoing feedback for the teacher. (Markett, Sánchez, Weber &amp; Tangney, 2006)</p>	<ul style="list-style-type: none"> <li>• Design activities that encourage dialogical loops.</li> </ul>	<ul style="list-style-type: none"> <li>• Messaging loops on the discussion board.</li> <li>• Messaging loops during Instant messaging.</li> <li>• Messaging loops during assignments and questionnaires.</li> </ul>

Appendix A Design table.

## Appendix B: Ethics application form.

### Title of project

Evaluating, geography learning, in 11 - 12 year olds, in Irish primary schools, analysing messaging loops.

### Purpose:

This project has the purpose of

1. Evaluating geography learning in 11 - 12 year olds in Irish primary schools.
2. Analysing students' expressions during messaging loops.

To achieve this it is necessary to carefully design and construct the learning environment to capture data. This will be achieved using an Instant Messaging app, Microsoft Lync and a discussion board hosted on Microsoft Sharepoint 2013.

### Rationale:

### Methods and Measurements.

The study will be presented through a descriptive case study.

<b>Focus:</b>	Developing an in-depth description and analysis of children 11-12 year olds geography learning.
<b>Type of problem:</b>	Providing an in-depth understanding of children's explanations for choices during analysing skills activities.
<b>Unit of analysis:</b>	Studying 11 – 12 year olds analysing skills development during geography learning.
<b>Data collection forms:</b>	Multiple sources: <ul style="list-style-type: none"><li>• Observations.</li><li>• Documentation of Instant Messaging conferences.</li><li>• Documentation from discussion boards.</li><li>• Documentation of online survey.</li><li>• Artefacts created during the study.</li></ul>
<b>Data analysis strategies:</b>	Descriptive analysis of the case study. Description of the themes that emerge during the study. Description of the interactions recorded during conferencing and discussion boards. Description of the participants answers to survey questions. Quantifying participants involvement, in duration, amount of interactions.
<b>Written report</b>	A detailed analysis of each activity during the study and the overall case study.



- The study will take place over four thirty minute activities. Half of the activities will take place during normal school time and half of the activities will take place outside of school where the participants will be encouraged to leave messages on a discussion board.
- During a geography learning activity the participants will be presented with images of geography features. The participants will have to identify patterns, categorise information and suggest relationships between the images they are presented with. The participants will also suggest explanations for their reasoning and comment on the explanations of others. The participants will send their comments through an Instant messaging app, Microsoft Lync.
- After the activity, participants will visit a discussion board hosted on Microsoft Sharepoint 2013, where examples of their earlier comments will be discussed. Participants will be encouraged to share their explanations about their earlier comments and discuss any changes that have taken place in their reasoning.
- At the end of the study the participants will complete an online survey sharing their reflections on the experience.

Questions asked during the study will focus on students' explanations for their reasoning about their choices in analysis, identifying patterns, and categorising the information they are presented with during the study.

### **Participants.**

The study will be open to thirty self-selected students aged 11 – 12 years, in Scoil Naomh Anna, Shankill. Children will be selected and a letter of invitation and a consent form to take part in the study will be sent home to these parents and their children. On receipt of signed consent forms, students will be invited to take part in the project. If more than the prescribed number apply to take place in the project they will be accommodated but the data will not be used for the purpose of the project. The justification for the sample is in order to sample a statistically relevant size.

### **Debriefing arrangements**

Debriefing will take place after each classroom activity and there will be a final presentation of the results of the study to the participants. Any questions arising during the study will be discussed with the participants.

### **Ethical considerations raised by the project.**

As the children are under the age of 18, the children will require parental consent and informed consent to be eligible to take part in the project. The children and parents will be contacted through the school with details of the project and its possible consequences. It will also be necessary to obtain permission from the school principal and the school board of

management. Consent forms will be accompanied by information sheets (please see attached documents).

## Appendix C Information sheet for parents/guardians.

### INFORMATION SHEET FOR PARENTS/GUARDIANS

**Name:** Dermot Walsh TCD School of Computer Science and Statistics.

**Supervisor:** Richard Millwood, School of Computer Science and Statistics.

**Title of Research:**

Evaluating, geography learning, in 11 - 12 year olds, in Irish primary schools analysing messaging loops.

Dear Parents/Guardians,

I am a primary school teacher and a post-graduate student at Trinity College, Dublin. As part of my MSc studies I am doing research with the School of Computer Science and Statistics in TCD this year. The aim of the study is to evaluate geography learning in 11 – 12 year olds using instant messaging and discussion boards. This study hopes to identify ways in which technology usage can enhance collaborative learning. As part of this study your child will be invited to participate in a pre-questionnaire, a collaborative group activity where children will map out our school environment on four consecutive afternoons and an online questionnaire.

**What is involved if your child participates in the study?**

This study will involve thirty students aged 11 – 12 participating in five activities using Instant messaging and a discussion boards for learning geography. The activities will take place on five consecutive afternoons during school and will last for approximately thirty minutes each. The participants will also be asked to make contributions to an online discussion board following the activities.

Following the four geography learning activities the students will be asked to complete an online questionnaire asking them about their views on geography learning, instant messaging and discussion boards for learning. The questionnaire answers will be used to examine the children's views on geography learning through technology. Anonymity will be maintained at all times. The children's names will not be disclosed, furthermore, there will be no audio or visual recordings. In the unlikely event that information about illegal activities should

emerge during the study, the researcher, Dermot Walsh, will follow the school's child protection policy and inform the relevant authorities.

**Can you and your child withdraw from the study?**

Your decision to allow your child to participate in the study is **voluntary**. You may withdraw your child from the study up to the point of conducting the data analysis without consequences. Every effort will be made to maintain a high level of confidentiality throughout the research by assigning each child with a number rather than their name when analysing the data. Any raw data will be destroyed once it has been analysed. If there is a child with epilepsy and/or a family history of epilepsy the child may take part but only with parental permission.

If you have any questions about this research please do not hesitate to contact me at [walshd13@tcd.ie](mailto:walshd13@tcd.ie) or. If you agree to take part in the study, please sign the consent form attached and have your child sign his/her assent form.

Thank you very much for considering your child for this research study.

## Appendix D: Child consent form

### Child Consent Form

#### Declaration

- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.
- I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.
- I understand that if I make illicit activities known, these will be reported to appropriate authorities.
- I understand that I may stop electronic recordings at any time, and that I may at any time, even subsequent to my participation have such recordings destroyed (except in situations such as above).
- I understand that, subject to the constraints above, no recordings will be replayed in any public forum or made available to any audience other than the current researchers/research team.
- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.
- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.
- I understand that my participation is fully anonymous and that no personal details about me will be recorded.
- *<If the research involves viewing materials via a computer monitor>* I understand that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.
- I have received a copy of this agreement.

I .....agree to take part in this research project.

I have read, or had read to me, information about the project and know how information will be collected and stored. I understand that I can choose not to take part in the research at any time. Also, I know that my parents will be also given a consent form in order for me to take part in this study.

**Data Protection:** I agree to Trinity College, University of Dublin storing and using my information from this project.

Date:.....

Signature of Researcher:.....

Date:.....

**Please note:** For any further questions please contact [walshd13@tcd.ie](mailto:walshd13@tcd.ie).

## **Appendix E:** Information sheet for Board of Management.

**Name:** Dermot Walsh TCD School of Computer Science and Statistics.

**Supervisor:** Richard Millwood, School of Computer Science and Statistics.

### **Title of Research:**

Evaluating, geography learning, in 11 - 12 year olds, in Irish primary schools analysing messaging loops.

Dear Board of Management,

I am a primary school teacher and a post-graduate student at Trinity College, Dublin. As part of my MSc studies I am doing research with the School of Computer Science and Statistics in TCD this year. The aim of the study is to evaluate children's expressions during geography learning activities during an instant messaging conference and posts contributed to a discussion board. This study hopes to identify ways in which technology usage can enhance higher order thinking amongst 11 – 12 year olds. As part of this study children will be invited to participate in a pre-questionnaire, four thirty minute activities and one post study questionnaire.

### **What is involved if your school participates in the study?**

I am writing to invite your school to take part in this study. This will involve thirty students aged 11 – 12 participating in five activities using Instant messaging and a discussion boards for learning geography. The activities will take place on five consecutive afternoons during school and will last for approximately thirty minutes each. The participants will also be asked to make contributions to an online discussion board following the activities.

Following the four geography learning activities the children will be asked to complete an online questionnaire asking them about their views on geography learning, instant messaging and discussion boards for learning. The questionnaire answers will be used to examine the children's views on geography learning through technology. Anonymity will be maintained at all times. The children's names will not be disclosed, furthermore, there will be no audio or visual recordings. In the unlikely event that information about illegal activities should

emerge during the study, the researcher, Dermot Walsh, will follow the school's child protection policy and inform the relevant authorities.

### **Can you withdraw from the study?**

Your decision to allow your school to participate in the study is **voluntary**. You may withdraw the school from the study up to the point of conducting the data analysis without consequences. Every effort will be made to maintain a high level of confidentiality throughout the research by assigning each child with a number rather than their name when analysing the data. Any raw data will be destroyed once it has been analysed. If there is a child with epilepsy and/or a family history of epilepsy the child may take part but only with parental permission.

If you have any questions about this research please do not hesitate to contact me at [walshd13@tcd.ie](mailto:walshd13@tcd.ie) or. If you agree to take part in the study, please sign the consent form attached.

Thank you very much for considering your school for this research study.



## Appendix F: Parent/guardian consent form

### Project

Evaluating, geography learning, in 11 - 12 year olds, in Irish primary schools analysing messaging loops.

### DECLARATION:

- I am 18 years or older and am competent to provide consent.
- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions and my child's questions have been answered to my satisfaction and understand the description of the research that is being provided to me and my child.
- I agree that my child's data is used for scientific purposes and I have no objection that my child's data is published in scientific publications in a way that does not reveal my child's identity.
- I understand that if my child makes illicit activities known, these will be reported to appropriate authorities.
- I understand that my child may stop electronic recordings at any time, and that my child may at any time, even subsequent to my child's participation have such recordings destroyed (except in situations such as above).
- I understand that, subject to the constraints above, no recordings will be replayed in any public forum or made available to any audience other than the current researchers/research team.
- I freely and voluntarily agree for my child to be part of this research study, though without prejudice to my legal and ethical rights.
- I understand that my child may refuse to answer any question and that my child may withdraw at any time without penalty.
- I understand that my child's participation is fully anonymous and that no personal details about my child will be recorded.

- <If the research involves viewing materials via a computer monitor> I understand that if my child or anyone in my family has a history of epilepsy then my child is proceeding at his/her own risk.
- I have received a copy of this agreement.

**Parent Consent Form**

I

.....  
 .....

(name of parent/guardian) consent to

.....

(name of child) taking part in this research project.

**Data Protection:**

I agree to Trinity College, University of Dublin storing of any personal data relating to my child which results from this project. I agree to the processing of such data for any purposes connected with the research project as outlined to me.

Signature of parent.....

Date.....

Signature of Researcher

.....Date.....

**Please note.**

As this research involves group learning, if your child has any issues requiring assistance or support from an adult supervisor please indicate this to the researcher. If you have any questions please contact [walshd13@tcd.ie](mailto:walshd13@tcd.ie).

## Appendix G Assignment and questionnaire questions

### Assignment one:

- What is the name of the country you are studying
- What continent is it in
- Name some of the people and communities that live there
- What games do the people in your country play and what pastimes do they enjoy
- What art and culture has developed in your country
- Can you name some customs and traditions that your country celebrates

### Assignment two:

- What country have you been researching
- Has the population been increasing or decreasing
- What are the major features of the natural environment in the country
- Discuss the different homes and settlements in your country
- Discuss any relationships between the natural environment and the homes and settlements
- Suggest some solutions to any problems that exist in the country you have been studying

### Assignment three

- What is the name of the country you have been researching
- Name some of the major cities in that country
- Name some small areas or underdeveloped regions
- What are the qualities of the transport systems and road networks in that country
- Discuss the different employment sectors in the country
- In your opinion how could the country share resources more evenly across the large cities and small villages

### Assignment four:

- What is the name of the country you are studying
- List some of the problems that the population in that country are faced with
- Suggest how conditions for members of the country's population can be improved
- Make some conclusions from the evidence you have collected over the past four activities

Questionnaire:

- What did you have to do in this activity
- Was it easy to navigate around the site please give examples to support your answers
- Did you find learning using this site any different from learning using a textbook

## Appendix H: Discussion board questions

Discussion boards:

- What is your interpretation of the evidence you collected and what explanations can you offer for the current situation
- What information did you sort group and classify
- What patterns and relationships did you identify in the Tanzanian environment
- Write some examples of your conclusions and support them with evidence that you have collected

## Appendix I: Script for resizing text in Microsoft survey app.

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<style>
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.ms-formlabel
```

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font-size:45px;
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}
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.ms-RadioText
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font-size:30px;
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}
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.ms-long
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font-size:30px;
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.ms-input
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font-size:30px;
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}
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</style>
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