

Integrating ICT in Teaching and Learning Geography in a Secondary School: The Lived Experience of Learners

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ABSTRACT

The purpose of the study was to find out learners' experiences in using ICT to learn geography. Literature has reported that ICT was a tool for learning and teaching. Its effectiveness depended on what the teacher did with it. It was also reported that the use of ICT motivated learners and enhanced their attainment and achievement. There were however, obstacles in the use of ICT for teaching and learning. The study used the qualitative approach to find out learners' experiences in using ICT to learn geography. Self-reports and observations were used to collect data for the study. Results showed that learners used ICT as a reservoir of geographical information in word, diagrams and maps. They could get most recent information especially weather as it happened. The study concluded that ICT was indeed an important learning tool which if well planned, can enhance learning and achievement. Further studies to establish which aspects of ICT motivated learners and how it enhanced attainment and achievement can be carried out in future.

Keywords: *ICT, geography, learning, teaching, achievement, self-reports attainment, classroom, technology, computer, motivation.*

1. INTRODUCTION AND THEORETICAL FRAMEWORK

Information communication technology (ICT) has been embraced by many schools that have resources to procure the equipment or infrastructure. Computer technology is influencing every area of our lives. Interest by governments in integrating ICT in learning and investment in software and hardware puts pressure on teachers to find out valid and effective ways of using computers in the classroom. This is because of the fascination that brought out by the technology to the individuals and groups. Manufacturers and experts in ICT have been innovative. They have come up with different applications software to enhance teaching and learning. The Board of Studies of New South Wales (2003) commenting on the application of technology in teaching and learning says: 'computer technology will only be as effective as the teacher using it.' The point of emphasis is that it is what the teacher plans and does with the technology which matters and not the mere availability. Classroom technology has been delivered particularly in remote regions of any country and schools that have not had access to any form of computing technology. For example, in Lesotho, some schools are deeply aware of the role technology that plays in educating and empowering young people. Despite the fact that the greater part of the country does not have ICT, an enlightened teacher with interest in ICT has been able to make the technology accessible to the learners, thereby raising their academic achievement and enhancing their potential (Angwin, 2013). Not only has the technology been procured for the school, but also coming up with ways of how to engage learners in a dynamic way. Anderson and Dexter (2003) demonstrated the effectiveness of using wireless laptops in the USA school for teaching mathematics, science and technology thereby, making learning meaningful through project-based learning. Low maintenance costs and affordable solutions were sought to enable students to access the technology to support research and collaboration for learning. A shared computing solution with "Dell 'Zero

Clients' and Microsoft Windows Multi-built Serve, for example, it was sought to deliver a low cost, centrally managed computing environment for learners. There has been dynamic use of technology in teaching. The interest generated by the technology has reduced truancy and absenteeism by learners significantly. (Angwin, 2013; Norwich et al., 2014).

However, embracing ICT can be a challenge for slow learners who may need more time to do any task. The introduction of shared computing overcomes the challenge by enabling the teacher to remotely monitor and interact with learners from the computer station as the enterprising teacher in Lesotho remarked: "Children who are slow learners often feel embarrassed about asking questions in class and may stop coming to school. Truancy has stopped since we deployed the solution because I do not have to disrupt the rest of the class or call attention to the slowest learners." (Angwin, 2013). These observations have been underscored by Lim et al. (2003) who pointed out the need to create a conducive learning environment for the effective integration of ICT in teaching and learning by linking the computers to the learning and socio-cultural environment (Lim et al., 2002). This was however, a classroom management issue which needed attention. Pelgrum (2001) however, noted that there were obstacles to the integration of ICT in education judging by results from a worldwide educational assessment. Sandholtz et al. (1997) argued that while it was important to create a conducive classroom environment for the utilization of ICT, it was also an opportunity for teachers to create student-centered classrooms.

On their part, learners were excited and motivated about school because they were discovering possibilities than previously possible or encouraged to study and train in careers following online research and collaboration. The use of ICT promoted learner motivation to learn geography, engagement and achievement as learners used it to store, display, analyze

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and manipulate data related to space. (Singh et.al. 2013; Yazici & Dermikaya, 2010; Vos et al., 2011). As one teacher said, “it is amazing to see how much learners can learn when they have access to things that can help and inspire them.” Teachers on their part change approaches in the classroom in response to the learners’ feedback. This is underscored by Norwich et al. (2014) who in a study using lesson study to assess learners’ learning difficulties, reported that when learners were not engaged in a lesson, a change in approach or goal would be implemented in the hope of achieving greater engagement. Such an action by the teacher confirms the relevance of the French theory of joint action in didactics which was characterized by learners’ engagement, teaching methods, environmental conditions and goals. Lim et. al. (2003) underscored the need to create a conducive learning environment for effective integration of ICT in the classroom. In all this, teacher-learner relationships were vital for success.

Teachers can also set up numerous research projects that require learners to collaborate and share their work with peers as well as online with learners in other places or countries. For example, sharing information about life with somebody in another country, local and country information helps broaden knowledge and understanding of their own country and the world, and in a specific subject. Consequently, there is so much that students now know than before.

Thus, by providing the ICT technology, teachers maximise learners’ potential as human beings and skills to search for more information and present it. (Anderson & Dexter, 2003). Cox et al. (1999) also pointed out that success of teacher’s use of the technology depended on making lessons:

more interesting; easier; more funny for the learners ; more motivating and enjoyable.

The above show that ICT on its own will not achieve much without the teacher’s input and planning, as already stated by the New South Wales Board of Studies (2003). This is stressed further by Hattie (2009) on the need for teachers to be actively engaged and passionate about teaching and learning. Thus, the success of using ICT for teaching and learning would depend on the teacher planning its use or integration.

A review of literature has shown that the use of ICT and Geographical Information Systems (GIS) enhanced learners’ engagement and motivation to learn geography. (Milson & Earle, 2008; West, 2003). It was further reported that motivation enhanced achievement in geography. (Yazici & Dermirkaya, 2010; Meijden & Denessen, 2011). (See Figure 1).

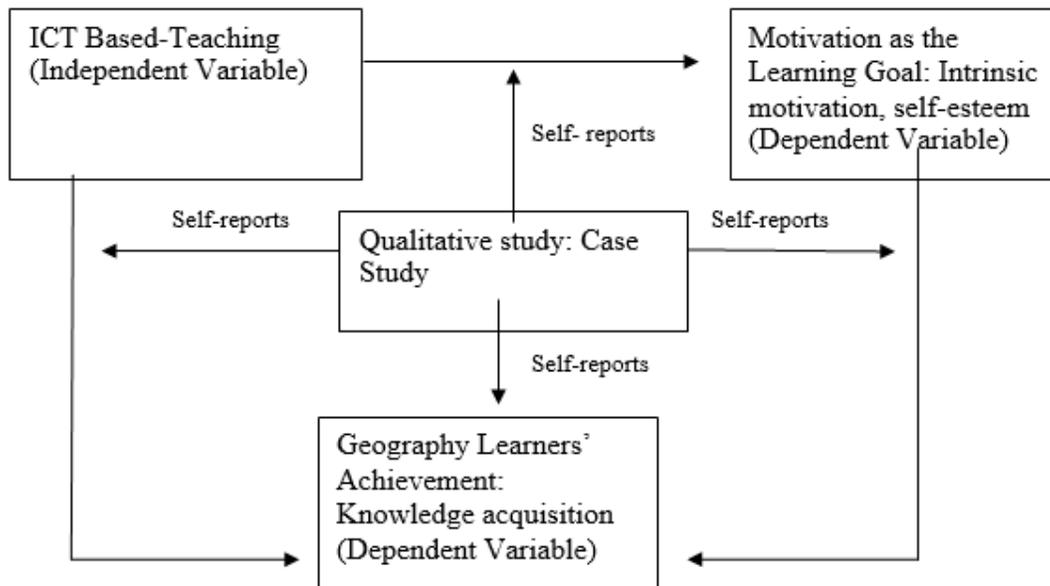


Fig 1: Conceptual Framework for Assessing the Impact of ICT on Motivation and Achievement (Adapted from Singh & Penny Van Bergen (2013))

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Through regular communication with others, English proficiency improves and so is the pass-rate or achievement rate in examinations and other assessment exercises. One teacher remarked that “There is no doubt ... that technology enhances learning and life.” Rue (2014) in a study on how pupils use ICT to support and enhance their learning concluded that successful utilization depended on complementary work to help learners achieve greater autonomy and self-reflection. In addition, teachers needed a sound understanding of the tools available, and their utilization for pedagogy. Without such an understanding, Rue argues that the learning and teaching tools such as computers may become part of the problem rather than part of the solution to improve learning. An earlier study by Sutherland et al. (2004) had reported on the need for transforming teaching and learning by embedding ICT into everyday classroom practices. These observations underscore the need for thorough preparation by the teacher who wishes to incorporate ICT in the teaching of learners. There have to be clear goals for each lesson, what the teacher seeks to achieve, what content is to be taught or learned using ICT. This implies paying attention to pedagogy. This further supports the view by the Board of Studies (2003) when they said, ‘although technology is not a substitute for quality teaching, it can enhance quality teaching. Considerations such as these would enable a more focused use of the technology for effective teaching and learning. Ling and Marton (2012) in a study on using variation theory as a guiding principle of pedagogical design for the improvement of learning and teaching concluded that classroom activities needed careful planning by the teacher to be more effective. Similarly, using ICT as a tool for teaching and learning needed careful planning if it is to be successful and achieve the intended goals. For example, using ICT can be a very important variation in a lesson which can bring about greater motivation to the learners from the usual methods. It is against this background that research sought to observe and record learners’ experiences using ICT to learn geography in a secondary school. The question was: What has been the learners’ experience in learning geography through ICT?

2. AIM

To share experiences on how ICT can be integrated in learning and teaching at secondary school level.

3. OBJECTIVES

- To identify the utility of ICT in teaching and learning geography.
- To identify what information can be obtained through ICT.
- To discuss advantages of using ICT in teaching and learning geography.
- To outline the challenges encountered in teaching and learning using ICT.
- To make recommendations for the future to enhance ICT utilisation for teaching and learning in secondary schools.

4. SIGNIFICANCE OF THE STUDY

It is hoped that the study will inform teachers on how they can embrace ICT in teaching not just geography but other subjects too. It is hoped that teachers in different schools will be motivated to use the hard-earned computers in their schools more purposefully and introduce variety in their teaching and learning. It is hoped that results of the study would popularise ICT application in teaching and learning thereby making classroom management more innovative.

5. METHODOLOGY

This was a qualitative study in which observation, open ended questionnaire, participation or practical involvement were key data collection activities. The teacher taught geography. He/she would introduce the lesson. After 10 – 15 minutes of the 40-minute lesson, he/she would give an activity related to the lesson to go and work on the computer in the laboratory. Activities ranged from research to find out certain information in word, diagram, picture or video work individually but they were allowed to work in pairs if they focused on the task assigned. The teacher would move around to see learners work on the task as well as give guidance where appropriate or necessary. Learners would be assisted where they encountered challenges and their questions would be attended to during the course of the activity. The teacher would also monitor from his/her work station to ensure learners remained on task. Those digressing to games would be identified and advised by name to focus on task. Learners would be asked to print their final piece of work for submission to the teacher for assessment. Those who finished early would be allowed to play games during the last five minutes as a reward for completing the work early and well.

At the end of the term, learners were asked to write brief reports on their experiences of learning geography through ICT. Self-reports of seven students were selected. Interest was more on learners’ experiences in using ICT in learning geography and not how widespread was the utilisation. Responses from the seven learners are listed below. This is what learners said. Their responses have been recorded as Learner 1 to Learner 7.

Learner 1

Key Features from Learners’ Experiencing in using ICT in Geography Lessons

1. Research
2. Information reservoir
3. Appropriate illustration source (pictures, diagrams and videos)
4. Word processing
5. If attached to a printer, documents can be printed instantly
6. Development of brochure through Publisher
7. Access to world information as it happens e.g. weather
8. Effective tuition and teaching
9. Teaching and learning aid
10. Motivational

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11. Neat work presentation
12. Speed
13. Makes learning funny, interesting

Learner 3

How I.C.T. has helped us to Study Geography in Year 8

Use of ICT in Teaching and Learning Has Challenges

1. Filtered sites
2. Irrelevant information
3. Illustrations that are too small
4. Programmes not working as required
5. Temptation to go on to games sites
6. Losing work easily
7. If computers are shared, then some learners may achieve very little.

I.C.T. has helped us to learn in Geography in numerous ways.

- We have been able to study things in more detail and in-depth ways.
- We have been able to see things from all over the world using the internet.
- We have been able to look at the weather in London in a matter of a few minutes.
- We have been able to get information from real meteorologists from different countries.
- It has helped us to understand aspects of the weather and the world we live in, in a more complex way which will help us in the years to come.

Learner 2

Learning Geography through ICT

- (a) Study Rainfall Types and Information
- (b) Weather and Climate Information
- (c) Coastal Erosion
- (d) Drawings, Reviewing Maps and Diagrams
- (e) Word Processing
- (f) The Use of Publisher for Brochures
- (g) Research to find more geographical information
- (h) Search for Appropriate Illustrations

Learner 4

How I.C.T. has helped us to study Geography in Year 8

Advantages and disadvantages of using I.C.T. to help with Geography learning

Learning through ICT is good because we can access more information and pictures. It is however, bad because some information is filtered and hard to get.

Advantages	Disadvantages
<ul style="list-style-type: none"> • We have been able to look at things in a more complex way, which will help us in year nine. • We have been able to extract information from some sites easily. • We have been able to look at things that help us understand it better than in textbooks. 	<ul style="list-style-type: none"> • Sites have been filtered. • Things have been on the search engines that have absolutely nothing to do with Geography. • Diagrams were too small. If you expand them they were blurred.
<p>We could improve the way we use I.C.T.</p> <ul style="list-style-type: none"> • We could unblock the sites. • We could have at least one lesson a week using ICT. • We could get more computer programmes situated around Geography. 	

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Learner 5

How I.C.T. has helped us to Study Geography in Year 8

It has helped us understand about things like weather fronts and anticyclones using diagrams and research from meteorologists from around the globe.

For example: Figure2: (a) Summary of what an anticyclone is from the computer.

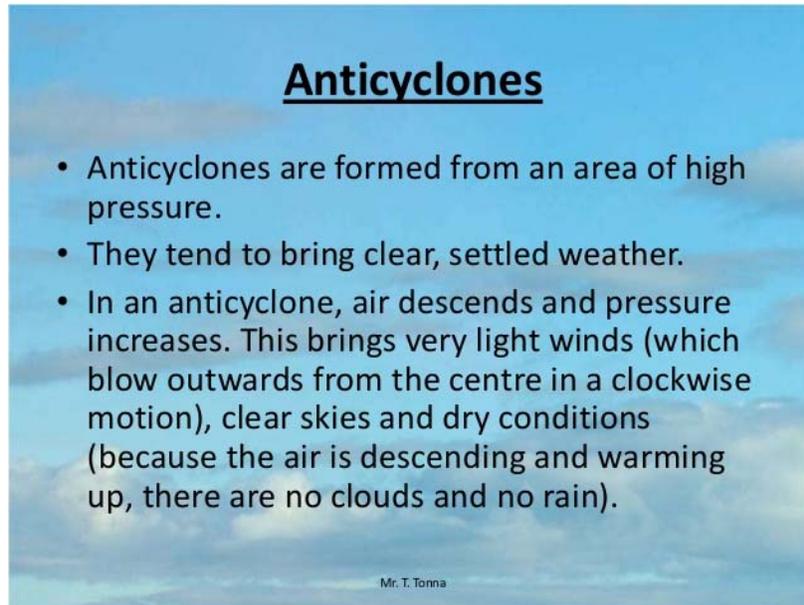


Fig 2a: Cyclone and Anticyclone



Fig 2b: Diagrams, learners can get from the computer.

There are several key surface features to consider when making a forecast. We will begin this discussion with the anticyclone, which is a high pressure centre where the pressure has been measured to be the highest relative to its surroundings. That means moving any direction away from the “High” will result in a decrease in pressure. High pressure centres often represent the centres of anticyclones.

Learner 6

Learning Geography Using I.C.T

MY Geography on the computer has improved tremendously, I enjoy this subject, it is one of my most favourite subjects. I need to improve on my map skills when I have done that I will understand Geography more.

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My teacher has improved my work by far. Next year I will have learnt a lot this year. I like learning about Earthquakes and volcanoes. It is an advantage on the computer because when you do not understand it, you can just look it up on the internet and that is a big advantage. The disadvantages were sometimes some of the Websites on Geography are filtered. It makes me frustrated and then you have to find another website. I would improve

the layout on the computer because you sometimes cannot find anything.

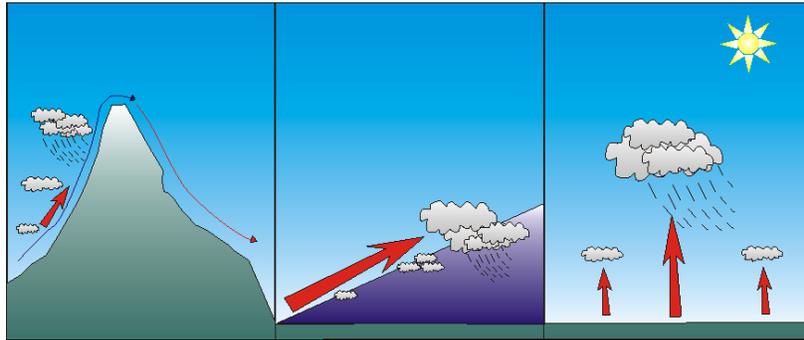


Fig 3: Rainfall Types

Learner 7

How I.C.T. Helped Us In Year 8

We have studied Rainfall, the Weather, Earthquake, Climate and Coastal Erosion using I.C.T.

I.C.T. has helped us in Year 8 because it was easy to find what we needed. The disadvantages of using the internet were:

- Many sites were filtered.
- Things had been put on which had nothing to do with Geography.
- The site sometimes gave the wrong information.

Obviously, there were advantages as well.

- The sites were easy to get on to.
- The sites had the right information.
- We could extract word documents easily.

Learner 8

How I.C.T. Has Helped Me In Year 8

Using computers in Geography has helped me by:

- Getting information faster.
- Getting better and helpful information.
- Making work nice and neat.
- Easier to insert the pictures.
- Making work easier.
- Making it more interesting.

Using computers in Geography has not helped me by:

- Programmes not working the way you want it to.
- Some good informative sites are filtered.
- Temptation of going onto game sites.
- Losing work easily.

I.C.T. will help me in Year 9 by:

- Making working funnier, easier, getting information faster, better information and work that is much neater!

6. DISCUSSION

Responses from learners suggest a number of benefits of using ICT in geography lessons. These include: (1) Access to rich and a wide variety of geographical resources and information. Thus, ICT on its own is a massive library. The sources were described as much better than what a textbook offered. Some of the respondents reported on the usefulness of ICT: 'Getting better and helpful information, there is more information.' Not only was there more information but diagrams, maps and drawings, vital geographical language.

Using ICT had motivational effects on learners which increased their level of engagement. This observation supports Wankel and Blessinger (2013) and Hattie (2009) who, writing on key issues on the use classroom technologies reported that ICT increased learner engagement and retention. One learner reported that learning geography through ICT made the subject more interesting and now enjoyed the subject more than ever before. Not only did ICT make learning geography more interesting but improved attainment and achievement as one learner remarked:

'We have been able to look at things that help us understand concepts better than in textbooks.' '...been able to look at things in more detail which will help us I the next grade or year; ...my geography on the computer has improved tremendously, I enjoy the subject, it is one of my favourite subjects. I need to improve on my map skills and when I have done that I will understand geography more and ...will learn more in the coming year

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because when you do not understand something you just look it up on the internet and that is a big advantage.

Such sentiments as expressed by the learners underscore how much and in what way ICT can enhance learning, attainment and achievement. Results agree with Angwin (2013) on enhanced achievement. However, this does not just happen. The teacher has to plan the incorporation of ICT in the teaching and learning programme as one learner remarked; 'my geography teacher has improved my work by far.' The teacher must plan when to use ICT in a lesson, what for and how to go about to get the required information. This includes the duration the teacher wants learners to use the computer in any one lesson. It would be better to integrate teacher learner activities such as introduction and exposition of concepts to the class before assigning learners to do a specific activity using ICT. For example, after an introduction to weather elements, the teacher can ask learners to look for weather information where they are and at some other place in the country to underscore the idea that weather varies from place to place and from time to time, rainfall types, weather fronts and anticyclones around the globe. One learner remarked that 'We have been able to look at the weather in a city away from us in a matter of minutes and can get information from real meteorologists in different countries...., I like learning about earthquakes and volcanoes...' Thus planning by the teacher, monitoring and guidance during the lesson are vital. It is not time for the teacher to relax and disengage from the learners. It also gives the teacher the opportunity to attend to learners experiencing difficulties individually. Not only is ICT used for researching information but for illustrations as well. The findings are in agreement with earlier studies (Board of Studies, 2003; Lim et al., 2003; Norwich, 2014).

Learners can draw diagrams and other illustrations as part of geographical activities during lessons. They can use various applications such as 'Draw' or 'Publisher' to come up with illustrations of various geographical features such Figure 2. Alternatively learners can search for appropriate illustrations on the internet. Learners can also use word processor to prepare their own notes, write answers to questions prepared by the teacher. They can insert diagrams and pictures. In some cases they can access videos which enable learners to see live pictures of geographical process thereby enhance understanding of geographical concepts. This enables learners to present neater work than hand written. Where learners work in pairs on a task, there is collaboration, and research has demonstrated that collaborative learning is more effective through knowledge sharing as learners interact as reported in an earlier study by Anderson and Dexter (2003). This is yet another advantage of using ICT for teaching and learning. Learners can also extract word documents on a particular topic. This makes work much easier and interesting. While the use of ICT enjoys the advantages as documented above, there are disadvantages too which learners and teachers should be aware of. Though these are low level skills and uses of ICT, ability

to apply should be appreciated that learners can integrate ICT in the learning of geography. This also helped create a learner-centered classroom environment in which learner activity was greatly enhanced. (Sandholtz, 1997; Lim et al, 2003). In addition it provided variation in lesson presentation as well as learning in line with variation theory and French theory on joint action and engagement and creation of a conducive classroom environment. (Lim et al., 2003; Norwich et al, 2014; Ling et al, 2012).

Some sites are filtered making it difficult if not impossible to obtain information which you may need urgently. However, because there are many sites, one can always look for another site. Some learners may get frustrated if they cannot access information quickly as one learner reported, 'sometimes some of the websites are filtered. It makes me frustrated...and have to find another website.' In some cases, the sites give wrong information or may contain information that has nothing to do with geography. Some programmes may be working when you need them. There may be power failure in which case what was planned for ICT use cannot be done hence the teacher must always have plan B for every lesson. Some illustrations or diagrams may be too small and attempts to expand or enlarge them may get them blurred and difficult to read. The above illustrates some of the obstacles teachers should be aware of whenever they use ICT in their teaching (Pelgrum, 2001; Hokason, 2004; Butzin, 2001; Goodson, 1995).

Conclusion and Recommendations

7. CONCLUSIONS AND RECOMMENDATIONS

The study has demonstrated that ICT can be used successfully to teach geography. The use of ICT should be an integral part of the teacher's teaching plan. ICT on its own would not lead to successful learning, but with the teacher's active involvement. Teachers should take advantage of the motivational effect of ICT and use it more often than not. Awareness of the barriers or obstacles associated with the use of ICT like power failures, unsuitable sites and information distractions when learners go on game sites instead of the work assigned. Future studies could focus on the use of ICT in teaching specific topics, classroom management and the specific aspects that raise motivation, learning, attainment and achievement.

REFERENCES

- [1] Anderson, R.E. and Dexter, S. (2013) Newsome Park Elementary: making learning meaningful through project based learning using wireless laptops in a K-5 mathematics, science and technology magnet school. Case Report from the USA.
- [2] Angwin, D. (2013) Technology Enhances Learning and life, eLearning Africa, 2013 Report

<http://www.ejournalofscience.org>

- [3] Baker, E. L. Herman, J.L. and Gearhart, M. (1996). Does technology work in schools? Why evaluation cannot tell the full story. In C. Fisher, D.C. Dwyer and K. Yocam (eds.) *Education and technology Reflections on Computing in Classrooms* p.185-202, San Francisco, Jossey Bass.
- [4] Butzin, S.M.(2001). Using instructional technology in transformed learning environments: An evaluation of Project CHILD. *Journal of Research on Computing in Education*, Vol. 33(4)p.367-373.
- [5] Carter, B.W., Wankel, C. (2013) *Cutting Edge technologies in Higher Education, Digital humanities: Current Perspectives Practices and Research*, Vol. 7, Emerald Group Publishing Limited.
- [6] Goodson, I.F. and Mangan, J.M. (1995). Subject cultures and the introduction of classroom computers. *British Educational Journal*, Vol. 21(5) p.613-629.
- [7] Hokason, B. and Hooper, S. (2004). Integrating technology in classrooms: We have met the enemy and he is us. Paper presented at the Annual Meeting of the Association for Educational Communications and Technology, Chicago:IL.
- [8] Lim, C.P., Teo, Y.H., Wong, P. Khine, M.S. Chai, C.S. and Divaharan, S. (2003). Creating a conducive learning environment for the effective integration of ICT. *Classroom management issues, Journal of Interactive Learning Research*, Vol, 14 (4) p.405-423.
- [9] Ling, L. M. Marton, F. (2012) Towards a science of the art of teaching. Using variation theory as a guiding principle of pedagogical design.' *International journal of Lesson and Learning Studies*, Vol. 1(1) p.7-22.
- [10] Norwich, B. Dudley, P., Ylonen, Annaman (2014) A comment on the article, 'Using lesson study to assess pupils' learning difficulties, *International Journal of Learning and Lesson Study*, Vol. 3(2)p. 192-207.
- [11] Rue, J. (2014) A comment on James Reeves' Article, 'How do pupils use ICT devices to support and enhance their learning?' *International Journal of Lesson and Learning Studies*, Vol. 3 (3).
- [12] Pelgrum, W.J. (2001). Obstacles to the integration of ICT in Education: Results from worldwide educational assessment. *Computers and Education*, Vol.37 p.163-178.
- [13] Sandholtz, J.H., Ringstaff, C. and Dwyer, D. (1997). *Teaching with Technology: creating student-centered classrooms*, New York: Teachers College.