



---

## Encouraging ICT Heightened Constructivist Instruction Methodology in The Midst of Graduate Teachers: Case Study

Ms.Amarathunga PABH<sup>1\*</sup>, Dr. Shamitha Pathiratne<sup>2</sup>,

Lecturer, Faculty of Business Studies and Finance, Wayamba University of Sri Lanka<sup>1</sup>

Dean, Faculty of Computing, ESOF Metro Campus<sup>2</sup>

---

### ABSTRACT

*With the extensive infusion of technology in our personal and professional lives, teacher educators in teacher preparation programs are challenged to provide learning environments where graduate teachers learn how to learn and learn how to teach, through information communication technology (ICT). Within the framework of teacher education programs, how are teacher educators to design intentional learning environments, where graduate teachers develop new understandings of learning and teaching with rapidly evolving ICT?*

*This study was predicated on two objectives. First the implementation of the ICT- enhanced constructivist learning today in classroom. The second refers to the emerging desideratum for the opportune teacher edification and professional development as a presupposition for the implementation of constructivist innovation in classrooms. Qualitative method was utilized for this study. 12 graduate language teachers were the participants. The group consists of one male and 11 females and aged from 24 to 31 years.*

*The findings from the data designate that the inclusion of ICT mediation in the field experiences of graduate edifier edification programmed in a constructivist way availed Graduate Teachers to identify the pedagogical potential of ICT for students' constructivist learning. Albeit there was some mystification in the students' mind and few cases of misunderstanding were descried, overall the whole study seems to have had a paramount impact on the majority of graduate teachers This impact included acquaintance of the Graduate Teachers with the constructivist learning strategy through their own concrete personal experience of an exploratory and constructivist edifying that can inspire their future edifying methodology and convinced them to utilize ICT as a constructivist learning implement.*

**KEY WORDS:** *Constructivist Classroom, Graduate Teachers, ICT Integration, ICT Mediation*

---

<sup>1\*</sup>Ms. Amarathunga PABH : [buddhini@wyb.ac.lk](mailto:buddhini@wyb.ac.lk)

## **1. Introduction**

With the extensive infusion of technology in our personal and professional lives, edifier educators in edifier preparation programs are challenged to provide learning environments where Graduate Teachers learn how to learn and learn how to edify, with and through information communication technology (ICT). Within the framework of their edifier edification programs, how are edifier educators to design intentional learning environments, where Graduate Teachers develop incipient understandings of learning and edifying with rapidly evolving ICT? How are edifiers Educators to avail preserve edifiers in developing a construal of the critical relationship between pedagogy and technology, in fostering the integration of pedagogy and technology? These were some of the questions made us reflect and incentivized to take some proactive action in this direction.

This Case study was conducted during graduate teacher training project, During the project, Graduate teachers explored how children cope and respond to ICT mediated learning situations. ICT was integrated throughout sundry stages in the inquiry to accumulate information, to make decisions, to communicate, to collaborate, and to represent school children's understandings. This paper describes the project experiences of Graduate edifiers in terms of their perceptions about utility of ICT in engendering constructivist learning environment in the classroom.

This study was predicated on two premises. The first concerns the implementation of the ICT-enhanced constructivist learning today in classroom. The second refers to the emerging desideratum for the congruous teacher inculcation and professional progress as a conjecture for the application of constructivist innovation in classrooms.

## **2. Theoretical Framework**

### **2.1 ICT and the constructivism paradigm**

There is wide consensus in edification that learning is no longer optically discerned simply as the result of a transmission of erudition. Nowadays pedagogical strategies employed in the current ICT predicated learning are linked to constructivism paradigm.

Agreeing to constructivism, erudition is considered to be convivially as well as individually constructed; learning is the acquisition of paramount competences in an authentic context; learning is advanced through interactive and authentic experiences that match with the intrigues of the student. So the focus of edifying should be on the development of an opportune environment for constructing erudition rather than for its transfer. In such an environment the utilization of ICT can avail to promote constructivist innovation in the edification cognition process, contributing to the entelechy of consequential authentic, active-reflective and quandary-predicated learning. It will avail the students to "learn how to learn". Students here will be able to seek solutions to authentic world quandaries. The ICT predicated technological and pedagogical framework will avail to engage students' curiosity and initiate learning, leading to critical and analytical mentally conceiving. Thus the constructivist edification philosophy aims at engendering a cognition context in a school where students study how to study, in a student-centered environment with accentuation on learning through revelation and exploration and experiences and teacher as a facilitator is expected to play a major role in this process.

The emerging desideratum for preparing edifiers for ICT-enhanced constructivist edifying: ICT-enhanced constructivist classroom practices demand that edifiers play an incipient role. This betokens that opportunities, like exposure to a number of critical examples and experience in designing ICT-predicated activities and integrating them in their classroom practice in constructivist ways are of great priority. The aim is to convince edifiers for the potentiality of ICT as constructivist learning implement. This has to be done through their experiences of their professional preparation framework. For this reason, the development and implementation of congruous learning opportunities is very paramount for the edifiers' professional development and crucial for the prosperity of innovative approaches utilizing ICT. Edifiers need to transcend traditional approaches and become acquainted with incipient methods in order to get a clear understanding of the inculcated functionality of technological implements in their instructional practices. The approaches to ICT integration in Graduate Edifier Inculcation Program should include the desideratum for vigilance of the advantages and possible difficulties of the proposed instructional practices for classroom edifying and learning and utilization of sociological and psychological settings and technological implements for fostering active learning among the learners in constructivist way.

### **3. Research Elaborations**

#### **3.1 Designing ICT mediated Constructivist Teaching Experiences for the Graduate Language Teachers:**

Using theoretical framework, a ICT mediated collaborative language teaching project for grade seven students were designed in which 12 Graduate language teachers were involved as the project participants. Their participation in the project was voluntary. The assembly of Graduate teachers consisted of 1 male and 11 females with the age ranging from 24 to 31 years. Out of these members 4 were master's degree holders while 8 were bachelor's degree holders. All the members are highly ICT literate and utilized digital technology meritoriously.

#### **4. Context of the Project:**

The project commenced with the conception of assembling the culled Schools' students and Graduate English language edifiers in an ICT mediated learning environment and engender learning situations, which optically discerns the technology as an expedient of enhancing oral and invited communication between students and edifiers as well as among themselves. The study has gone beyond the traditional classroom activities because of intending to provide an ICT-fortified collaborative learning environment. Thus, the project aimed at: providing the Graduate edifiers with the opportunity to utilize ICT for Engendering constructivist learning environment for language learning among the 7th grade students and studying their perceptions about usefulness of ICT mediation in engendering constructivist learning environment for learning English language.

#### **5. The Research Questions:**

The study is centered on the following research quandary: What according to Graduate edifiers perceived potential scholastic value of ICT in engendering constructivist learning environment?

The following research questions have been developed to address the research quandary:

1. What are the perceptions of the Graduate edifiers about the scholastic usefulness of ICT in the edification - cognition process?
2. What are the experiences of Graduate edifiers about ICT mediated language ordained dictation provided through the project?
3. What are the positive pedagogical issues identified by the Graduate edifiers in the ICT mediated language learning strategy designed by them?

#### **6. Methods:**

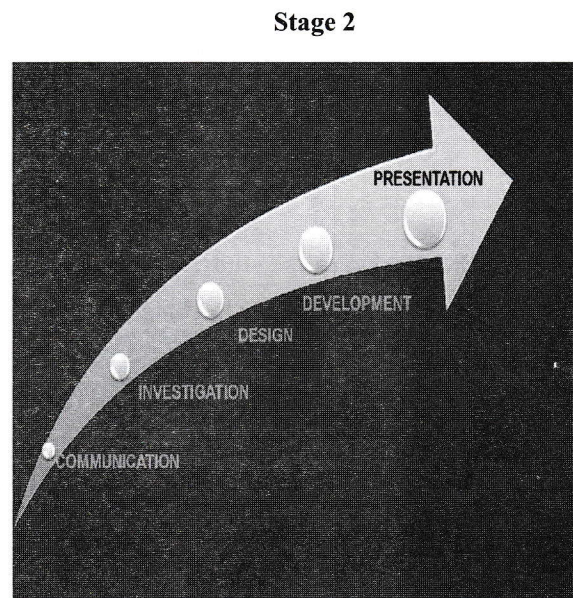
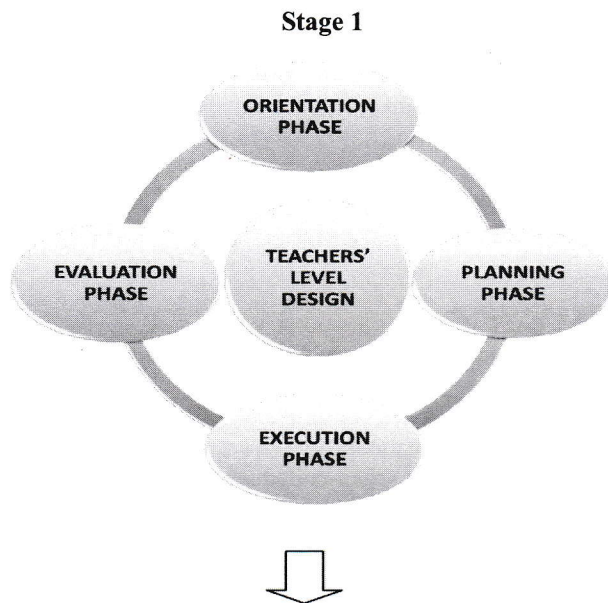
Windschitl (1998) states that qualitative approaches to classroom research are congruous because they employ a variety of methods that can avail elucidate phenomena, integrate valuable contextual information, accentuate revelation (rather than verification), and describe what is transpiring to study participants. In particular, case studies are apposite to in-depth examination of scholastic practice (Merriam, 1998; Patton, 1990; Windschitl, 1998). The study described here was qualitative in nature and employed a case study methodology. Many educationalists like Baumann, Shockley-Bisplinghoff, & Allen, 1997; CochranSmith & Lytle, 1990 value as a form of systematic, intentional inquiry about classroom dynamics. Quantitative methods were utilized in conjunction with qualitative to triangulate findings and fortify the study (Patton, 1990).

#### **7. Study Setting:**

The project duration was one week, and after getting the academic support from the pioneering schools, which adopted a policy of fortifying ICT Mediated communication for different academic and administrative purposes. For this three neighboring schools were culled according to opportuneness of its technical Infrastructures and whole hearted cooperation of the staff. The key people who involved in the project are the co-researchers, twelve Graduate teachers (facilitators), English language teachers, ICT center staff and school principals.

#### **8. Project Design:**

Two stage modules for this project were planned and Implemented by researches. The first stage dealt with the prospective teachers' level, while the second stage was cognate to the students' level. The module can be diagrammatically shown as follows-



## 8.1 Teachers' Level Design:

### 8.1.1 At this level the design had the following objectives

1. To design a training module for the Graduate teachers for:
  - a. Increasing ken and understanding about speculative background of constructivism and its application in language learning,
  - b. Constructing the required knowledge (both technical and pedagogical) for building a technological and pedagogical framework for managing the designated language content in ICT mediated learning environment.
2. To scaffold the developing of the instructional materials for Encouraging grade 7 students' engagement in language learning in ICT facilitated language education atmosphere.

### 8.1.2 This level design had the following phases:

- a) **Orientation phase** - At this phase the prospective edifiers were oriented to constructivism as a cognition theory and constructivist instructional strategies, desideratum for ICT mediation for enhancing students learning and desideratum for utilizing ICT for engendering constructivist learning environment for language learning.
- b) **Planning phase**- The research team has selected 3 areas of language learning namely- writing composition, poetry comprehension and creative writing. School group 1 of Graduate teachers selected "My favorite place" as a topic for written countenance. But the arrangements of written expressions were beyond the customary writing of compositions. The sub- groups of the students in the class selected to inscribe issue centered newspaper articles, compose poetry depicting the glory of the place and TV narratives. All these items were developed using ICT applications. The second school group decided to work on in depth poetry comprehension. The sub- groups were anticipated to develop concept webs, literary analysis and efficacious recitations of the given poems. The third school group worked on ingenious story inditing, converting the plots into scripts and make ICT fortified animated presentations of the scripts in the form of E-comics. Here the English method masters along with the prospective edifiers orchestrated the circadian sessions, instructional materials, rubrics and concept webs.
- c) **Execution phase**- A detail schedule of 4-5 days comprising of 5 stages was chalked. These stages included- communication, investigation, design, development and presentation. The detailed explanation of these stages is given in the second phase.
- d) **Evaluation phase** – The evaluation of the project was predicated on

- A 5-point Likert scale quantifying the degree to which Graduate edifiers acceded or dissented with four verbal expressions regarding the scholastic usefulness of ICT predicated on the project experiences.
- Answers and explications on open ended questions given in indited form asking them to identify and mention any positive edifying issues they had found in ICT mediated learning.
- Three collaborative project reports about the results and experiences of the Graduate edifiers and school students about the project.

## 8.2 Design at the students' level:

### 8.2.1 At this caliber the design had the following objectives-

1. To develop an instructional design for Emboldening 7<sup>th</sup> grade student's engagement in learning language in ICT mediated environment,
2. To facilitate the student's language learning in ICT mediated learning environment by:
  - a. Fostering inter group and whole class communication.
  - b. Encouraging them to investigate with deference to their culled language tasks.
  - c. Facilitating students' designing, developing and presenting stages of language learning tasks by providing felicitous technological and pedagogical support.

There were 5 stages students move in through the project; communication, investigation, design, development, and presentation. Each phase lasted around for one day.

## 9. Results

To study perceptions of the Graduate edifiers about inculcated value of the ICT mediation in engendering the constructivist learning environment the data was amassed with the avail of:

- A 5-point Likert scale quantifying the degree to which Graduate edifiers acceded or dissented with 5 statements regarding the scholastic usefulness of ICT
- Answers and explications on open ended questions given in indicted form asking them to identify and mention any positive inculcated issues they had found in the ICT mediated language injunctive authorization project,

Three collective reports about the outcomes and experiences of the Graduate edifiers and school students about the project:

- Focus group interviews of the Graduate edifiers
- Reflection logs of the Graduate edifiers. The accumulated data was analyzed quantitatively as well as qualitatively. Predicated on this analysis the endeavor is made to answer the following research questions:

### 9.1 Research Question 1. - *What is the perception of the Graduate edifiers about the scholastic usefulness of ICT use in edifying –learning process?*

To answer this question A 5-point Likert scale quantifying the degree to which Graduate edifiers acceded or disaccorded with 5 verbalizations betokened in table 1 regarding the perceived inculcated usefulness of ICT.

**Table 1: Graduate teachers' perceptions about the usefulness of ICT**

	Statement	Strongly Agree	Agree	No Comment	Disagree	Strongly Disagree	Total
1.	I feel ICT mediated language teaching is better than traditional method of teaching languages:	8	2	1	1	-	12
2.	ICT helps to make learning interesting	9	2	1	-	-	12
3.	ICT facilitates students learning	7	3	1	1	-	12
4.	ICT helps to create active learning environment for the students inside or outside the classroom	6	5	-	1	-	12
5.	ICT is useful for teaching all the aspects of language instruction	5	4	1	2	-	12

Table 1. Shows that majority of the Graduate edifiers had positive perceptions about ICT use in

classroom. Out of 12 Graduate edifiers 10 vigorously concurred or concurred that ICT mediated language edifying is better than the traditional method of edifying. One of them dissented and another had no comment. This shows that still few were not convinced about the preponderating of ICT over the traditional method. Out of 12 11 Graduate Edifiers were of the opinion that ICT makes learning fascinating, while one did not comment on this. 11 out of 12 Graduate edifiers positively responded about ICT facilitating students' learning but, one still was not acceding to it and another did not opiate to comment about it. Eleven out of twelve Graduate edifiers felt that ICT avails to engender active learning environment inside as well as outside the classroom and only one were not convinced about it. 9 out of 12 Graduate edifiers found ICT subsidiary for edifying all the aspects of language injunctive authorization but 2 of them did not concur to this and one did not opiate to comment. This analysis is engendering positive picture about the prospective teachers' perceptions about ICT use. This finding is fortifying the findings of earlier researchers who have shown the auspicious posture toward and positive perceptions about ICT use among Graduate edifiers as a result of intentional learning opportunities for ICT integration in Pedagogical Inculcation (Lee, Teo, Chai, Choy, Tan, 2007; Gill & Dalgarno, 2008; Yasemin Gülbahar, 2008).

## **9.2 Research Question 2. - *What are the experiences of Graduate edifiers about ICT mediated language injunctive authorization provided through the project?***

To answer this question, the data was gathered from three collaborative project reports, the reflection logs of the Graduate teachers and focus group interviews of the Graduate teachers.

### ***Case study of group 1:***

Group 1 consisted of 4 Graduate language edifiers and 45 Class 7 students. Out of 4 edifiers 2 had precedent edifying involvement in schools while the other two had only involvement of field edifying practice of 10 language edifications. All of them were exuberant. The only distinction between the experienced and callow edifiers was that initially the former were hurrying to do direct edifying rather than playing the role of the facilitators. The school where the group conducted the project was one of the good schools in the vicinity having a computer lab. But the administrative ascendancy was very rigid. The principal initially opposed the conception of the project as according to her it was a sheer waste of time. The first of the 4 days of the project was plenary of disappointments for the Graduate edifiers. They themselves were finding it arduous to play the role of the facilitators. They were rather irresolute about the students' active involvement in the project. The school students too were withal dormant and waited for the ordinate dictations from the teachers' mouths. The edifier pupils' interaction pattern transmuted gradually with more and more engaging the students in the process of learning through ICT mediation. As described earlier the group worked on inditing activity. The topic culled was "My favorite place". The presentations of issue predicated newspaper article, TV narrative and a group composed poem was done with the avail of ICT application. The principal who was initially so skeptic about the project transpired to be there when the students' presentations were going on. She appreciated the students and the Graduate edifiers saying that she could never imagine that her students could do so much.

### ***Case study of group 2:***

The second group of Graduate edifiers worked with the 50 grade seven students. This school too had good infrastructure. The school ascendancy was flexible and facile to approach. They were very receptive to innovative practices. But the students wanted to ken whether this activity will give them mark, if they will be eluded from periodical test, if the entire group members will be graded same etc. This shows that students are still bothered about the grades or marks rather than getting involved in the ingenious task. The Graduate edifiers could establish good rapport with the language edifier and the students from the school. Here too the first day ended with lot of discombobulating on the component of students. But the task gained momentum from the next day. By the terminus of the project the cooperative and collaborative spirit among the participants was significantly incremented. The group of Graduate edifiers was callow in terms of school edifying. All of them were very adolescent and amicable in nature. The Graduate edifiers as well as students had sound erudition and skills of ICT. This group decided to work on in depth poetry comprehension. The sub- groups were expected to develop concept webs, literary analysis and efficacious recitations of the given poems. The ICT availed presentations of the students were very much appreciated by the scholastic edifiers and principal.

### ***Case study of group 3:***

The 3rd group of the Graduate edifiers was allotted a school with congruous technical facilities. Unlike other 2 groups this group of Graduate edifiers themselves was apprehensive about the utilization of ICT mediation in fostering ingenious inditing among 47 class 7 students. They were withal unsure about the students' readiness for working collaboratively in constructivist learning environment. But the replication they received on the first day of the project proved to be the ocular perceiver opener for them. This group worked on ingenious story inditing, converting the plots into story maps and further into scripts and make ICT fortified animated presentations of the scripts in the form of E-comics. They shared these comics with students from other divisions of the school.

All these case studies avail us to observe that the school ascendant entities are not sure about the potential of the students to construct erudition; the prospective edifiers still have apprehensions about their role that of facilitators. Optically discern the following remarks from their reflection logs: "I was wondering how the diminutive children can analyze the poem" ..., "I feel the edifier should give them the points for the newspaper indite up" ..., "I do not cerebrate the students will be able to engender a story plot "It was intriguing to visually perceive the vicissitudes in their notes after the projects. Optically discern some of the following remarks:

#### **Group 1:**

"The schoolchildren were so dedicated on their tasks; they consummated their responsibility of the group project very well", "The students after an initial hindrance exhibited prodigious interest in the project work and great commitment to their tasks, All of them reached sufficiently good results". "They were engaged in an exploratory way of learning very different from what they were habituated to so far".

#### **Group 2:**

Evaluating their students' work, the group notes that "students participated actively in the whole learning process", "it was very productive for students to visually perceive their work being exhibited on the screen ". They observed that "what students relished more in this project was the opportunity they had to work with autonomy, to make decisions and act on them without having to heedfully auricular discern passively to edifiers." They concluded that "it was a self-regulating progression for students expediting learning through exploration and discovery".

#### **Group 3:**

As mentioned earlier the members of the group were very skeptic about the potential of students in working independently in cooperative and collaborative manner and do ingenious story inditing with ICT application. The same group mentions in the report the following:

"The students were exhibiting great interest and exuberance in preparing the story plot." "It was a great pleasure to optically discern the ingenious story conceptions pouring in from the students. "Overall activity acted very positively for student learning and that "the traditional edifying approaches cannot avail students in the development of ingenious way of thinking... "It is very consequential for students to be engaged in quandary solving in an ingenious, not mechanistic way working collaboratively in the class..."

These last points implicatively insinuate a remarkable shift from their initial skepticism to a more positive posture to ICT mediated constructivist learning, denoting a positive effect that the project work had on them.

All the three case studies betoken that our Graduate edifier prospered in implementing in their groups ICT mediated language learning activities in a constructivist way. They seem through his report to apperceive in their students' reactions and demeanor in the classroom some of the expected outcomes of the constructivist learning approach. They withal seem to appreciate this kind of learning as exploratory, self-regulating and different from the edification methods they and their students used to have experienced till then.

### ***9.3 Research Question 3. - What are the positive pedagogical issues identified by the Graduate teachers in the ICT mediated language learning strategy designed by them?***

To answer this question, the Graduate teachers were asked to answer one open ended question.

Question: What positive educational issues did you find, if any, in ICT mediated language learning project? Explain your opinion in brief. Answers and Explanations to open ended question: The Graduate teachers' responses were analyzed and categorized as follows:

**Table 2: Positive Educational Issues Identified by the Graduate Teachers**

	Response	Frequency
1.	Evokes enthusiasm	8
2.	Leads to creative learning	6
3.	Is captivating and interesting for students	8
4.	Fosters learning through exploration and discovery	9
5.	Facilitates the effective understanding of concepts	10
6.	Facilitates active learning of the students	9
7.	Gives opportunity to rectify students' mistakes and improve them	4
8.	Develops students' imagination and creativity	11
9.	Nurtures inquiry skills	4
10.	Enhances motivation for learning	3
11.	Crystallizes abstract notions into concrete things	1
12.	Is useful as an assignment after teacher's presentation only	1
13.	No specific response	2

Positive inculcated issues identified by Graduate edifiers: (open question) (N=12) All the 12 students answered the open question. The answers to question were analyzed and categorized qualitatively according to the scholastic issue mentioned by Graduate edifiers. The emerged categories are presented on the table 2 (most of the Graduate edifiers stated topographies fitting to more than one grouping). The majority of them (9/11) could identify and mention numerous constructivist questions fitting to or approaching constructivist conceptions ("leads to ingenious learning", "active learning by the students", "opportunity to learn from mistakes" etc.). They seemed to have been influenced and understood the scholastic meaning of the activities. This was more conspicuous in the following representative answers and explications:

"...the students are involved in an ingenious process that requires deep cerebrating and utilization of their Imagination to emerge the final product". "...The students are able to observe their mistakes and are able to rectify them". "...In this way students are constructing their erudition through exploratory work in lieu of simply passively receiving information from an educator" "...Students can use literary concepts and tasks in a more ingenious, blissful way" "...Students are active, they utilize their imagination and cultivate their creativity"

"... It avails students to put themselves in the position of a journalist" Two Graduate edifiers could not mention any concrete edifying characteristics and answered in very general and obscure terms. For example: "This method is good", "This method is interesting" etc. Three others re-corroborated that the method was subsidiary and fascinating but they would prefer the traditional method of classroom edifying afore this kind of activity. As one of Graduate edifiers mentioned "...we should first present the poem and then apply this activity for better comprehension".

Another Graduate edifier mentioned "First I would have expounded the students how to invite a story then discuss with them the plot and then suggest them the correct way to invite the story". Though such replies were very few (2) still they denote that, a lack of pellucidity and misunderstanding of the pedagogic rationale of constructivist approach of our project and shows their conviction about the traditional way of the teacher-led instructional practices for edifying the incipient concepts in lieu of the proposed cognizance construction by students themselves.

## 10. Conclusion

The conclusions drawn from the data presented in this paper betoken that the inclusion of ICT mediation in the field experiences of Graduate teacher inculcation programme in a constructivist way



availed Graduate edifiers to identify the academic prospective of ICT for students' constructivist learning. Albeit there was some mystification in the students' mind and few cases of misunderstanding were described, overall the whole project seems to have had a paramount impact on the majority of Graduate edifiers. This impact included acquaintance of the Graduate edifiers with the constructivist learning approach through their discrete concrete personal experience of an exploratory and constructivist edifying that can inspire their future edifying methodology and convinced them to utilize ICT as a constructivist learning implement. Albeit the findings from this study may not be generalized beyond this study's population because of the minuscule sample size and the fact that the Graduate edifiers were volunteers to participate in the study, the study does provide suggestions on how Graduate edifiers can be yare for utilizing ICT as an edification and learning implement for constructivist learning environment.

## References

- Allington, E., & Cunningham, P. (2002). *Schools That Work: Where All Children Read and Write*, Boston: Allyn and Bacon.
- Burris, N.; Nathan, R.; Temple, C.; Temple, F. (1987). *The Beginnings of Writing*. Published by Allyn and Bacon, Inc.
- Cresswell, J. (2007). *Qualitative Inquiry & Research Design*. (2nd Ed.). Thousand Oaks, CA: Sage.
- Gay, L.R. (1990). *Educational Research: Competencies for Analysis and Application*. Merrill Publishing Company, New York.
- Kenner, R., & Richards, G. (1980). A Home Made Package for Use in the Language Lab. *NALLD Journal*, 15 (1), 31-34.
- Tunnicliffe, S. (1984). *Poetry Experience: Teaching and writing poetry in secondary schools*. Published by Methuen Co. Ltd. Creswell: Sage
- Voss, F.R. (1985). *Elements of Practical Writing*. CBS college Publishing, New York.
- [www.idrc.ca/cp/ev-155557-201-1](http://www.idrc.ca/cp/ev-155557-201-1) - retrieved on 27th January, 2015
- [www.idrc.ca/cp/ev-155557-201-1](http://www.idrc.ca/cp/ev-155557-201-1) retrieved on 30th January, 2015
- [rtmindia.com/ict.in.education%2520RTM](http://rtmindia.com/ict.in.education%2520RTM) retrieved on 5th February, 2015
- [ijedict.dec.uwi.edu/include/get.doc.ph](http://ijedict.dec.uwi.edu/include/get.doc.ph) retrieved on 6th February, 2015
- [www.ict4lt.org/en/en\\_mod1-4.htm](http://www.ict4lt.org/en/en_mod1-4.htm) retrieved on 8th February, 2015
- [www.pixelonline.net/ICT4LL2011/programme](http://www.pixelonline.net/ICT4LL2011/programme) retrieved on 9th July, 2015
- [www.ict4lt.org/en/en\\_mod2-1.htm](http://www.ict4lt.org/en/en_mod2-1.htm) retrieved on 25th August, 2015