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Abstract: Technology integration and self-paced learning has been increasingly used in classroom setting in recent years. This study describes the use of e-SIM as an alternative to traditional remedial class and its impact to the retention rate of selected grade 6 poorly performing students. An analysis among pre-test, posttest and delayed posttest showed that, on average, scores gathered from the control group were higher than the experimental group. Further analysis indicates that students' posttest and delayed posttest scores were weakly and positively correlated while using e-SIM. Findings suggest that using e-SIM single-handedly may not guarantee its full potential. Teachers may need to proactively model, scaffold and support students if it is to be of benefit.

Keywords: self-paced learning, e-SIM, retention rate

Introduction

For several years, students were accustomed to conventional classroom teaching. Martin and Eugenio (1992) as cited in (Benjamin, 1992) states that conventional classroom teaching is conceived as the transmission of “knowledge” or “information” from the teacher to the student. The teacher in this instance prepares for the lesson to be taken, therefore takes the most active role in the classroom (provide and guide) and students are required to listen, take notes, memorize, and be able to demonstrate their knowledge by filling in the proper blanks or choosing the appropriate alternative on the test. Meanwhile, if students were not able to learn the concepts taught by teachers, they undergo remedial classes using varied intervention materials employed by the teacher. One of these intervention materials in Science is identified as Strategic Intervention Material (SIM).

The use of SIM has been exclusively used in Science subjects across grade levels in some public schools in Metro Manila. In fact, there is an annual competition of SIM Making open to all Science teachers in the Division, Regional and National levels. SIM is an instructional material meant to re-teach the concepts and skills of a particular subject even without the aid of a teacher. It is given to learners to help them master a competency-based skill which they were not able to develop during regular classroom teaching. SIM covers one specific topic intended for remedial class. It has no pre-test and post-test but includes fun and engaging activities for the learners. It is contextualized and localized so that learners can relate with the content and relate it to their experience. In classroom, teachers use SIM as a remedial or intervention material for students to hone their least mastered skills.

In the Schools Division Office of Quezon City, teachers were gathered to form a team to make the SIM a digitized intervention material. This is to answer the call of 21st century skills particularly the integration of technology in the teaching and learning process. The team was composed of four public school teachers from elementary and secondary schools. Given the role of content writer, language editor, illustrator and animator, the teams were tasked to create an Electronic Strategic Intervention Material (e-SIM) on the least mastered competencies in various subjects in elementary level. A member of this research study was able to take part as the language editor of one of the teams and

made an ESIM on Adjectives. After a year of collaboration, and validation of the material with the help of the Education Program Supervisors (EPS) and Master Teachers (MT) of the Division, the material was published on the Department of Education (DepEd) Portal which can now be utilized by the teachers and learners across the country using the teacher's official DepEd email account.

The e-SIM contains the same components as what the SIM has. The only difference is its format which can be categorized as digital, non-print material and is more interactive without the aid of a teacher. The learners can directly see the feedback to their answers, their scores and can manipulate the material in non-linear manner. According to Anderson (2005), Self-paced e-learning maximizes individual freedom. Rather than making the obviously incorrect assumption that all students learn at the same speed, have access and control over their lives to march along with a cohort group of learners or are able, despite divergent life circumstances, to begin and end their study on the same day, self-paced study correctly puts the learner squarely in control. Self-paced learning greatly improves memory performance when compared to a control group that was given the same total amount of time but it was allocated equally among tasks. Although the e-SIM is readily available online, there is no empirical research that can justify its effectiveness in relation to the learners' mastery of the competency and to the learners' retention rate in learning adjectives. Thus, the researchers conducted an action research about it.

Literature Review

Through modernization, Information and Communication Technology (ICT) has been used in educational settings since its inception, but recent empirical research has affirmed that it plays a vital role in high-quality learning and teaching. Such research insights have shown that advances in technology have opened up new possibilities for the way in which teachers educate their classes, giving potential for innovative ways to encourage students to become more engaged in their schooling. To enable the best possible outcomes for their students it is vital that schools are able to keep up with this progress. (Condie and Munro, 2007).

Research in multimedia learning has also found that learners with varying levels of expertise benefit from different instructional formats (Kalyuga, Ayers, Chandler, Sweller 2003). Self-paced or individualized learning is one which is defined as learning directed by the individual in order to meet personal learning objectives. Extensive research on human memory and learning has illuminated a number of effective instructional strategies for improving the learning outcomes of all students. For example, instruction that incorporates opportunities for students to engage in retrieval practice, through frequent formative or low-stakes testing, and quizzing, improves learning significantly over instructional methods relying primarily on information transformation. (Black & William 1998; McDaniel, Agarwal, Huelser, McDermott & Roedigger 2011). According to Anderson (2005), Self-paced e-learning maximizes individual freedom. Rather than making the obviously incorrect assumption that all students learn at the same speed, have access and control over their lives to march along with a cohort group of learners or are able, despite divergent life circumstances, to begin and end their study on the same day, self-paced study correctly puts the learner squarely in control. Self-paced learning greatly improves memory performance when compared to a control group that was given the same total amount of time but it was allocated equally among tasks. However, the students who retained the most also utilized better meta-cognitive strategies to learn. The ability to self-study is not perfect on its own; one needs to be able distinguish between more complex

(difficult) tasks and easier tasks. The students who could distinguish the easier from the harder (in other words used more meta- cognitive strategies) did the best. When the students were given control over their study behavior they had increased memory performance even when they did not increase their total study time (Tullis et al., 2011). “Overall, trusting learners with control over their own learning has the potential to improve their learning” (Tullis et al., 2011, p.117). However, in a study *A comparison of the effectiveness of traditional classroom style teaching to a self-paced internet-based food safety education program for secondary school-aged students*, Thompson et al. (2007) found no statistically significant difference in self-paced or traditional learning methodologies for middle school aged children. When examining adjusted posttest scores, childcare providers who participated in the traditional delivery method scored significantly higher than those who were involved in the self-paced delivery method. There are several possible explanations for this finding. One potential explanation is that the participants in the self-paced group were not able to successfully remain cognitively engaged and focused on the content of the interactive CD-ROM. As indicated by Ormrod (1995), many students are unable to successfully monitor and manage their own learning and to remain engaged and focused on learning tasks.

According to Ambrose & Lovett, (2014), students entering an instructional situation with misconceptions about the material are likely to retain their faulty beliefs in the absence of instruction explicitly confronting and challenging these ideas. When properly implemented through an enforced vigilance from the academic mentor, this instruction ensures quality learning. This pursuit supplements and complements the traditional educational system and satisfies the demand of life-long learners (Anderson, Upton, Dron & Malone, 2015). Apropos of, self-paced learning strategies direct a better academic achievement among student-learners. It is further concluded that it develops a better internal drive among the student-learners as it harnesses overt perceptual processes as they interact with their colleagues and teachers in their learning tasks. Butler (2002) elucidated that the motivation component used in this learning prototype includes both self-efficacy (degree to which one is confident that one can perform a task or accomplish a goal) and epistemological beliefs (beliefs about the origin and nature of knowledge). As Maria Montessori stated, “My vision of the future is no longer of people taking exams and proceeding on that certification from the secondary school to the university, but of individuals passing from one stage of independence to a higher, by means of their own activity, through their own effort of will, which constitutes the inner evolution of the individual”.

Instructional materials are school resource inputs, they include print and non – print items that are designed to impart information to students in the educational process. Instructional materials also include items such as kits, textbooks, magazines, newspapers, pictures, recordings, slides, transparencies, videos, video discs, workbooks and electronic media including music, movie, radio, software, CD – ROMs, and online services (Dahar, 2011). Instructional material plays a very important role in the teaching learning process. It enhances the memory level of the students and makes the teaching – learning process interesting (Nicholls, 2000; Raw, 2003). SIM or Strategic Intervention Material refers to a teaching aid introduced into the teaching methods to stimulate the activity of the students and thereby increased their level of understanding (Dy, 2011). It is strategically prepared and designed for teaching remediation for low achievers in the subject. It is given after the regular classroom instruction to students who were not able to grasp the concepts of the subject matter. In order to facilitate the learning process, instructional media are used as aids. Instructional media are classified as speaking – listening media, reading – writing media and computer – based instruction (Aranes, 1998).

When shifting from teacher-centered to student-centered designs, the students' levels of proficiency play an increasing pivotal role that also need to be taken into account. The learners need to have a minimal functional proficiency that allows them to explore an open-ended environment as the Internet without the intervention of an instructor. An important principle of communicative language teaching is the use of authentic materials. A great deal of research has been conducted on how to integrate such materials along with pedagogically well-designed reading tasks into the language curriculum (Grellet, 1981; Lee & VanPatten, 1995; Omaggio-Hadley, 2001). As Omaggio-Hadley points out, the design of appropriate comprehension tasks for written discourse becomes a function of text type, the purpose for which the learner is reading, and the background information and language proficiency skills the reader brings to the text. In general, instructional strategies that have been suggested constitute a combination of bottom-up, top-down, and interactive approaches that guide the learner to approach the processing and decoding of a text from different perspectives (Grellet, 1981). Such instructional practices by-and-large can be applied most successfully in a text-specific approach, in which the instructor guides the learners through a text, matching text and reading tasks with the proficiency level and needs of the students. Through a particular task design, the instructor facilitates the students' reading process and guides the learners to explore a variety of preselected resources, thus providing a clear goal to be accomplished by the students. Furthermore, the tasks are designed so "they are not so broad that students wander aimlessly through the material yet open enough to provide multiple paths, outcomes, and interpretations, which can form the basis for subsequent classroom interaction" (Furstenberg, 1997, p. 24). An effective way to engage students in an active interactive reading process is also to have them write about what they read. Writing about one's reading experience seems to facilitate reading comprehension and leads to the discovery of the different factors that intervene in the reading process (Martínez-Lage, 1995; Zamel, 1992). Warshawer (1997) recommends that computer-mediated communication activities be experiential and goal-oriented, and that tasks be consistent with principles of situated learning (i.e., that learners engage in meaningful tasks and solve meaningful problems that are of interest to the learners and can also be applied in multiple contexts). Such principles in activity design also need to apply to the use and exploration of multimedia-based resources.

Contextualization is developing new skills, knowledge, abilities and attitudes in students in presenting new subject matter in a meaningful and relevant context. Localization on the other hand by Taylor (2004) is "...Freedom for schools or local education authorities to adopt this curriculum to local conditions," and "relating the content of the curriculum and the processes of teaching and learning to the local environment". It is based on local needs and relevance for the learners where there are flexibility and creativity of the lessons. According to Tomlinson and Masahura (2004), the advantages of localizing and contextualizing the curriculum are: cultural sensitivity, potential for personalization, easy availability of resources, direct relevance of materials to learners, and ownership of the development process. A holistic learning process aims to help students understand the meaning of teaching materials with it in the context of day to day (the context of personal, social and cultural), so that students have the knowledge/skills which are dynamic and flexible to actively construct their own understanding (Bandonio, 2008). One of the weaknesses of contextualized instruction is the unavailability of resources in which most of the school in the Philippines lacks resources to support authentic learning and the realization of competent and result-based mechanism of science literacy and quality education. With this weakness of contextual teaching and learning, localization of resources will serve as an avenue in generating authentic learning to the 21st century learners. Localization is about making content usable and adaptable to meet local needs, address a particular teaching style or learning style, to adapt to a different grade level, to adapt for a different discipline,

to adjust to a different learning environment, to address diversity needs, to address a cultural preference, to support a specific pedagogical need, and to address either a school or a district's standardized curriculum. Localization refers to the transfer, adaptation, and development of related values, knowledge, technology, and behavioral norms from/to the local contexts. Some characteristics and examples of localization are as follows: local networking; adaptation of external technological, economic, social, political, cultural, and learning initiatives to local communities; decentralization to the community or site level; development of indigenous culture; meeting community needs and expectations; local involvement, inter-institutional collaboration, and community support; local relevance and legitimacy; and concern for community-based needs and characteristics and social norms and ethos (Kim, 1999).

Conceptual Framework

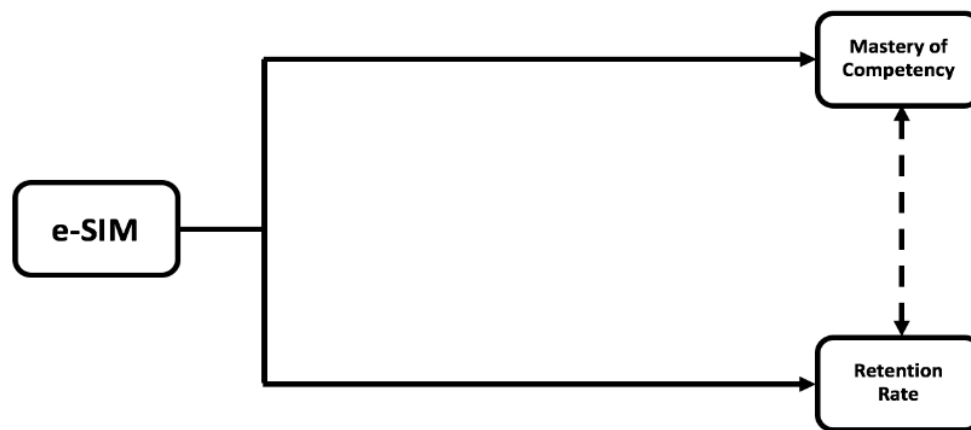


Figure 1. The relationship of variables. Three aspects or variables are present: e-SIM, mastery of competency, and retention rate. The diagram, as how it was constructed, shows that e-sim has a direct effect on the mastery of competency and retention rate. As such, it can be seen that there is a two-headed arrow that connects the latter variables. This tells that if mastery of competency is positively affected by the use of e-sim, then the rate of retention is positively affected as well. In other words, if the poorly-performing students have attained a high retention rate, then that means that they have achieved a mastery of the competency and vice versa.

Statement of the Problem and Hypothesis

This study focused on the use of e-sim as an alternative to traditional remedial class and its impact to the poorly performing students' retention rate in learning adjectives. Specifically, this study sought to answer two questions:

1. Is there a significant difference on using e-SIM from undergoing traditional remedial class for aiding on the learning of poorly-performing students or are the effects just the same?
2. Is e-SIM an effective tool for the learners to master the competency in adjectives?

H1: Electronic-Strategic Intervention Material (e-SIM) is an effective tool in the remediation process of poorly-performing students.

Research Design

The researchers utilized a quantitative approach on an experimental design. As explained by Farhady (2006), experimental method has a powerful nature that makes it more appropriate to examine the effectiveness of a new teaching method (as cited in Shafaei & Rahim, 2015). According to Earl Babbie (2011), in experimentation, the experimental group is a group of subjects to whom an experimental stimulus is administered whereas the control group is a group of subjects to whom no experimental stimulus is administered and who resemble the experimental group in all other aspects.

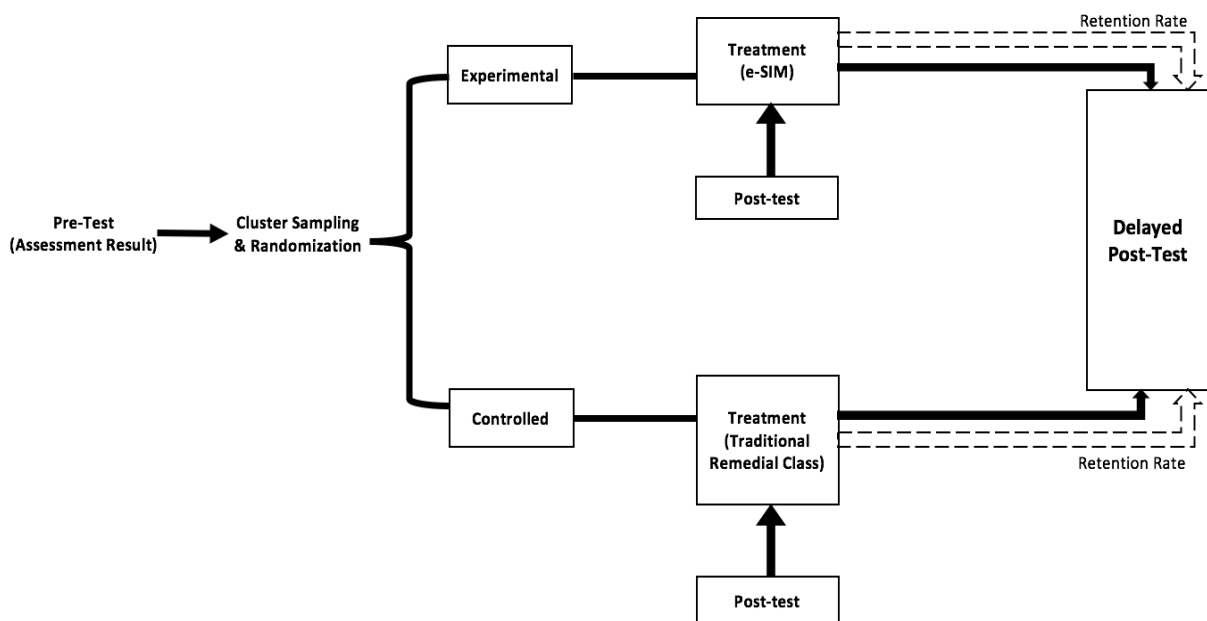


Figure 2. The diagram shows the experimental and control group in which comparisons of these two at the end of the experiment lead toward the effect of the experimental stimulus. Experimental group undergo remediation with the use of e-SIM while the control group had undergo traditional remedial class.

Sampling and Participants

The participants of this study were the Grade 6 students from a public elementary school in Schools Division Office of Quezon City. The subjects were selected through the collected assessment results on the particular lesson of adjectives from the subject teacher. These results identified the poorly-performing student in mastering the lesson. After administering a pre-test, cluster sampling wherein randomization of participants was done. Babbie (2011) described this process by numbering all of the subjects serially and selecting numbers by means of a random number table, or the experimenter might assign the odd-numbered subjects to the experimental group and the even-numbered subjects to the control group.

Instrumentation

The instrument that the researchers utilized was the e-SIM on adjectives that was created through a collaboration of team members formed during a seminar-workshop that was attended by one of the researchers of this study.

SIM is classified as non-digital printed material composed of five parts namely, Guide Card, Activity Card, Assessment Card, Enrichment Card, and Reference Card. Guide Card gives a preview of what students will learn. It stimulates interest in the topic; presents the focus skill; briefly cites the activities; and challenges the learner in performing the task. Meanwhile, the Activity Card defines the tasks that the learner should undertake in order to develop a certain skill whereas, the task is competency-oriented. It provides enough practice for the learners so that they can perform the skill automatically. On the other hand, the Assessment Card helps the learners measure their level of skill mastery upon completion of the tasks. The result of the assessment identifies the knowledge or skill that the learners may need to enhance or further develop. It is in the Enrichment Card that the learners are provided with additional exercises for further application of knowledge or skill. Lastly, Reference Card provides additional content to the coverage of their textbook. It may also contain a list of resources that the learners may refer to for further readings.

Data Gathering Procedure

The researcher sought the approval of the principal of the selected secondary school. Upon receiving the approval, the researcher requested a copy of the master list of Grade 6 students to be able to manage the distribution of students.

The process was done on a three-hour session per day. As stated previously, students on the control group undergo a normal remedial class while the students on the experimental group undergo a remediation using e-sim with the teacher closely monitoring their self-paced learning. After this, the students were formally assessed. Scores were recorded. After a week, there was a delayed posttest. The idea of the delayed posttest is an adherence to the concept of retention learning. According to Haynie (1990), Nungester & Duchastel, (1982), retention learning pertains to the learning that lasts beyond the initial testing and it is assessed with tests administered two or more weeks after the information has been taught and tested (as cited in Haynie, 1997). All data were analyzed accordingly. The result of the delayed post-test led to the answers on the questions set in this study.

Data Analysis

1. Independent Samples T-Test

The Independent Samples *t* Test compares the means of two independent groups in order to determine whether there is statistical evidence that the associated population means are significantly different. This is used to compare the two groups which answered problem statement number 1.

2. Dependent T-test

The dependent *t*-test (called the paired-samples *t*-test in SPSS Statistics) compares the means between two related groups on the same continuous, dependent variable. It was used to answer problem statement number 2 as it compared the result of posttest and delayed posttest of each group-- control and experimental.

Results

This covered the presentation, analysis and interpretation of the data gathered to identify the impact of e-SIM on retention rate of poorly performing grade six students in learning adjectives.

Table 1.1 Significant Differences between Control and Experimental Group in terms of Pre-test, Posttest, and Delayed Posttest

	Mean Score		t-test value	p-value
	Control	Experimental		
Pre-test	9.8333	9.4667	.271	.757 ns
Posttest	22.2333	21.9333	-.395	.788 ns
Delayed Posttest	17.4667	18.0000	.311	.694 ns

*** - significant at 5%, ns - not significant*

At 5% level of significance, we have sufficient evidence to say that pre-test (.757), posttest (.788) and delayed posttest (.788) have no significant difference between control and experimental group since p-value computed are greater than 0.05 level of significance.

Table 1.2 Significant Difference between Posttest and Delayed Posttest in Experimental Group

	Paired Differences					Correlation	T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Posttest Delayed posttest	3.93333	2.83978	.51847	2.87294	4.99373	.868	7.586	29	.000

Table 1.2 shows that Posttest and Delayed posttest scores were weakly and positively correlated ($r=.868$, $p < 0.001$). On average, posttest scores were 3.90 points higher than delayed posttest scores (95% CI [2.87, 4.99]).

Discussion

Overall, no differences were found between the two groups in each test. On average, scores gathered from the control group were higher than the experimental group. As an alternative to traditional remedial class, this result could be generated due to the spatial context of e-sim. Students in a traditional remedial class may interact to the teacher and clarify meanings. On the other hand, e-sim provides the exercises for the students to answer on their own while the teacher monitors their self-paced learning. Students in experimental group tended to consume more time in order to fully understand some topics, for instance the order of adjectives. Students could co-construct meaning in the content while using e-sim unlike in control group where they created shared context with the teacher and achieved mutual understanding efficiently and/or beyond repair in e-sim. In terms of the effectiveness of e-sim on students' retention rate, findings showed that there is no significant difference between posttest and delayed posttest in experimental group. It does, however, still allow an instant support in remediating poorly performing students in terms of learning adjectives.

Conclusions

Using e-sim in learning adjectives enabled the students to work at their pace with the use of technology. E-sim adds a valuable tool for teachers in facilitating learning. On the other hand, there are possible reasons for e-sim to be less effective than remedial class. Given the differences in individual competence, some students may not be able to adopt e-sim as it requires certain degree of not only independence but also motivation in learning. Task implementations might not be done consistently.

To maximize its effectiveness in terms of retention rate, collaborative opportunities with the teacher while using e-sim should be employed along with students' progress in learning adjectives. During the session, teachers might scaffold students' understanding without giving straightforward responses. This should be done most especially to the students who are having difficulty answering as they might feel pressured in accomplishing various learning goals. In short, e-sim can provide potentially useful pedagogical tool for teaching adjectives and increasing retention rate among the poorly performing students but with support systems from the teacher.

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Appendix

CONTROL GROUP



EXPERIMENTAL GROUP

