Computer Network-Enhanced Blended Reading Strategies

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Abstract. This study examines the effects of computer network-enhanced blended reading strategies on transforming 86 Information Technology (IT) students’ dependent reading learning attitudes into self-directed habits getting them to reach Bloom’s Cognitive Taxonomy and Competency’s C2 for academic reading comprehension at B grade level. The approach used was Action Research positioning the lecturers as the change agent and the students as the clients integrating qualitative and quantitative methods. Qualitative methods were initiated by WebQuest for Inquiry to provide the fittest reading strategies and materials for the method application and to describe how the method has changed students’ academic reading learning habit and improved their comprehension using the lecturers’ running records, classroom checklists, and post observation evaluations (POS). The qualitative results were quantitatively measured for triangulation by analyzing students’ composite scores on tasks, quizzes and exams and by students’ perspective analysis using Likert survey interpretation. The main finding is the computer network-learning environment has largely assisted lecturers to provide the most suitable cognitive skills for reading comprehension: skimming, scanning, inferring, identifying coherence, paraphrasing, QAR, summarizing, reviewing and vocabulary by context; to supply materials for syllabus design; and to create mesogogy environment for the students’ best practice. The significance of the study is the computer network learning environment has shifted pure teacher-centered (instructive-pedagogy) learning into autonomous student-centered (constructive-andragogy) getting students to develop their self-efficacy and critical thinking.

1. Introduction
Hu (2016), confirmed by Maurer (2017) notes the popularity of computers and global network technology proves to have improved students’ autonomous learning ability. For example, the network environment has greatly provided English texts for reading practice, helping learners to opt their materials independently (Myrberg and Wiberg, 2015, Bi et.al, 2016). Diploma 3 IT students at an IT institute are among those taking advantage of the computer network in boosting their English academic reading skills, critical for reaching comprehension (C2) level of Bloom’s Taxonomy and TOEFL ITP’s score at least of 450.

What has lacked of previous studies on the mix between computer network and academic reading strategies is how the technology-enhanced learning has shifted low-motivated students from being teacher-dependent (instructions-directed) into self-directed /autonomous (constructivist-oriented).

This study examines the effects of the computer network on the academic reading learning process, from the learning plan to its post implementation. It is based on lecturers’ class observations evidenced with the students’ final test results and perspective analysis after they had practised academic reading skills with much use of computer network. The research contributes to demonstrate much use of
computer network has been effective in empowering students to change their teacher-dependent learning habits into andragogy (self-directed learning).

2. **Action Research Method**

The study was Action Research conducted for 16 weeks. Students were the clients, while the change agents were two English lecturers also participant class observers. The reason for undertaking the approach is its relevance to the study process and goal in which it enables the researcher to explore complete teaching-learning process for a set of skills from the learning plan preparation through reviews on the outcomes of the learning plan.

The procedure was conducted according to Lewin’s spiral of steps as a part of Action Research approach. Each of which was composed of a circle of planning, action and fact-finding on the action result (Smith, 2001). Action Research spans from syllabus design through the clients’ attitude change review. On stage 1, using the computer network, the researcher-lecturer had conducted a webquest-inquiry to yield blended academic reading skills expanded into the brief description, target outcomes and procedure of implementation for action stage, further reviewed by her three colleagues and approved by the language coordinator. On stage 2, students were directed to practice strategies on the learning plan.

The participants were 60 Informatics Engineering (IE) and 26 Computer Engineering (CE). Both were taught with similar syllabus, materials and methods. The researcher was also one of the lecturers and participant observers for 60 IE students, while her colleague taught the other 26. Despite the participants’ different majors, they all relatively homogenous in their fundamental English skills as they had passed prerequisite English 1 with minimum grade C before learning the methods. Both classes were also fully trained with more applied IT and math discrete courses than English, so high self-motivation for practicing reading skills determined their success. Both classes were taught how to employ blended academic reading skills in the computer network environment for 15 weeks to achieve C2 level of Bloom’s comprehension, given quizzes and big tests each twice.

Data instruments were as follows:

| INSTRUMENT                      | INSTRUCTIONS                                                                 | TYPES OF DATA                                                                 |
|---------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Physical Environment Form (PEF) | Completed by lecturers at the end of each theory and practice class         | Lecturers’ attendance lists and Berita acara with students’ and class chief’s signature |
| Running record and classroom checklists | Completed and submitted to lecturers-to-lecturers intranet named PORSEA by the lecturers after each class finished weekly | Lecturers’ weekly notes on the implementation of each theory and practice class: type of interactions, classroom activities, classroom and independent, study tasks |
| Post-observation summary (POS) and post course lecturers’ evaluations | Completed by the lecturers after the course ended evaluated by other lecturers and submitted to PORSEA network as the post evaluation, | Summary information about classroom structure, organization of the lesson, instructional strategies, classroom climate and lecturers’ comments |

2. Raw scores of students’ assignments (8 times; 4 before midtest and 4 before final test), 2 quizzes each before mid and final test, a midtest and a final test whose percentage of each to students’ final marks was: 20% averaged total assignment score, 15% averaged total quizzes’ score, 30% midtest and 35% final test score. The students’ results were submitted to intra-lecturers’ PORSEA network.
3. A close-ended questionnaire asking students’ responses on the strategies and materials quality disseminated, filled and submitted by the internal information academic website, SIKAD.

The third stage of Action Research is to analyze learning outcomes of the action stage by quantitative and qualitative analyses. The data were first measured qualitatively by analyzing the lecturers’ class observations on the effects of computerized blended academic reading skills based on running records, classroom checklists and POS. The lecturers’ observations were supported with the students’ final grades on the skills. Students were graded on the basis of their work quality alone, uncontaminated by reference to how other students in the course perform on the same or equivalent tasks, and without regard to each student’s previous level of performance. Students’ overall achievement was measured based on their score totals.

The lecturers’ findings on how computerized blended academic reading skills has helped active teaching for understanding were also cross checked from the students’ perspectives as the clients by Likert’s Composite Score Analysis (Boone and Boone, 2012).

3. The Role of Computer Network on Learning Plan

The lecturers’ preliminary diagnoses found students’ poor comprehension was due to low reading interests at will, desperately in need for an action plan to change their reading behavior. The plan was the skills-based syllabus. Thus, what analyzed to be the best practices and learning format for academic reading comprehension were inquired by web-quest method, mining existing electronics documents from the Internet/computer network. The selected strategies were Blended Reading Strategies; Genres For Predicting Texts, Summarizing for Increasing Text Comprehension, Retelling and Reporting, Paraphrases, Review For More Comprehension, Reading for a Gist, Vocabulary Building Strategies, Reading Aloud, Coherence, Inference, Skimming and Scanning, Graphic Organizers Use For Information Tracking, QAR Strategy, and Collaborative Reading Strategies. The blended strategies were consistent with usual practices in Active Teaching for Understanding (Estacion, et.al, 2004) enabling learners to achieve Bloom’s Taxonomy C2 level.

4. How Computer Network-Enhanced Blended Reading Changed Students’ Attitudes on Learning Reading

It was targeted the learning process for the strategies in the computer network would have been mesogogy learning, inevitably has switched from teacher’s instructions-centered (pedagogic) into student-centered learning (andragogy). For the first 7 weeks students learned as passive listeners under the lecturer’s control. The next 7 weeks after midtest students were pressed to be active learners. They had to exploit the computer network independently, either individually or collaboratively with their much less lecturers’ interventions especially for browsing new materials, doing tasks in class and independent study, and distance discussing between them and their lecturers.

The computer networks consisted of free Internet access, the internal website functioning as an academic webpage between faculty members and academic staffs-to-students named SIKAD, and electronic mailing lists between students and lecturers. In class SIKAD facilitates lecturers’ sharing materials with their students anywhere and anytime. Modules, reading articles and instructions for practice sessions were made available in the internal website in advance in similar formats: a] presentation slides; b] blended reading strategies’ worksheets and instructions, reading texts, electronic text links. Only the students and the lecturers of the related course could access materials from the site.

Any details uncovered in discussions were submitted to the academic website one day later, accessible anytime and anywhere. Students could personally emailed questions or responses to the lecturer and would get the lecturer’s response back soon. Likewise, practice classes were held in computer network environment. Students downloaded and read the assigned texts from the same website independently/collaboratively. Then, they completed worksheets attached on the website in practical classes.
The lecturers’ running records, classroom checklists POS, and post course evaluations showed the computer network learning environment has greatly contributed to growing students’ self-efficacy, critical thinking and motivation finally motivating them to continuously improve their reading skills at will. The averaged total scores for their assignments increased from 71.60 (B grade) to 75.29 (AB grade), while marks of their quizzes drastically rose from 56.78 (C grade) to 76.33 (AB grade) according to the institute’s formally applied standard after students were more actively engaged in computerized self-directed learning.

Table 2. IE and CE students’ reading performance after applying computer network-enhanced blended reading skills

| GRADE | ∑IE | %IE | ∑CE | %CE |
|-------|-----|-----|-----|-----|
| A     | 0   | 0   | 1   | 3.85|
| AB    | 10  | 16.67 | 5  | 19.23|
| B     | 23  | 38.3 | 8   | 30.77|
| BC    | 20  | 33.33 | 10 | 38.50|
| C     | 7   | 11.67 | 2  | 7.7 |
| D     | 0   | 0   | 0   | 0   |
| E     | 0   | 0   | 0   | 0   |

Table 2 shows 33 or 55% of 60 total IE students got B to AB grades, while 14 or 53.85% of 26 total CE students achieved grades B to A grades, indicating more than 50% of the students from each class achieved C2 level well after practicing computer network-enhanced blended reading strategies. None of IE and CE students got E and/or D. Twenty IE students got BC and only 9 got C, while two students in CE class got C and 10 students got BC. Thus, in comparison, IE and CE students achieved similarly satisfactory academic reading comprehension represented by the percentage of those getting grades at interval of A to B after applying the strategies in the computer network environment.

5. Measuring The Effects of Computerized Blended Reading Skills Strategies to Non-Computer Network Learning Environment from Students’ Perspectives

Based on perspective analysis as is displayed on Table 3 next, the index percentage calculation demonstrates students agree that reading materials drawn by the computer network were challenging, inspirational, motivating, well-organized and practical for their completing tests related academic reading skills. This portrays students’ positive responses on the quality of materials needed for practicing the strategies, indirectly representing their positive views on the capacity of the computer network to supply appropriate sources for academic reading learning.

Table 3. Students’ perspectives on the web-inquired materials selection.

| STATEMENT                              | %INDEX | PERSP. |
|----------------------------------------|--------|-------|
| Students agree the materials are       | 67.47  | +     |
| understandable.                        |        |       |
| Students agree the materials are       | 66.93  | +     |
| challenging, inspirational, and        |        |       |
| motivating.                            |        |       |
| Students regard the materials have     | 67.73  | +     |
| been well organized.                   |        |       |
| Students agree lecture and practice    | 68.53  | +     |
| materials have helped them drilled so  |        |       |
| as to complete test questions.         |        |       |

In order to measure the effectiveness of the strategies from students’ perspectives as the client of the method, a Likert-Scale survey analysis on the strategies were conducted showing these results:
Table 4. Students’ perspectives on computer network-enhanced blended reading strategies after applying computer network-enhanced blended reading skills

| STATEMENT                                                                 | %INDEX | PERSP. |
|---------------------------------------------------------------------------|--------|--------|
| Students agree they have acquired practical skills in academic reading after using the strategies. | 65.6   | +      |
| Students found they developed critical thinking after directed to apply the strategies. | 66.4   | +      |
| Students regard the lectures and practices on the strategies will benefit them at work. | 71.2   | +      |

Overall, students as the clients viewed blended reading strategies in computer network-based learning environment positively impacted their academic reading skills’ improvement. They agreed blended reading strategies in the computer network learning environment has improved their academic reading skills, comprehension and critical thinking, convincing them mastery of those strategies would help their future continuously.

6. Comparing The Effects of Computer Network-Enhanced Blended Reading to Non-Network Enhanced Blended Strategies

Table 5. IE and CE students’ final reading performance after applying reading skills merely based on textbooks

| GRADE | ∑IE (55) | %IE | ∑CE (29) | %CE |
|-------|----------|-----|----------|-----|
| A     | 0        | 0   | 0        | 0   |
| AB    | 5        | 9   | 0        | 0   |
| B     | 15       | 27.3| 1        | 3.44|
| BC    | 15       | 27.3| 6        | 20.7|
| C     | 10       | 18.2| 2        | 3.64|
| D     | 10       | 18.2| 17       | 58.62|
| E     | 0        | 0   | 3        | 10.34|

Table 5 shows only 20 or 36.4% of 55 total IE students got B to AB grades, only one CE students got B while none could get AB. None of them afforded A. Ten or 18.2% of 55 total IE students could not even hit C grade, while 17 or 58.62% of CE students also got D with 3 students failed the reading skills test. Thus, IE and CE students class of 2016 failed to get satisfactory academic reading comprehension represented by the percentage of those getting grades at interval of B to A after applying strategies without computer network environment support.

The reasons why it has happened are the same as has been listed in https://www.teachervision.com/curriculum planning/textbooks-advantages-disadvantages page 2 summarized on table 6, showing the comparison between learning and practicing academic reading skills using computer network and merely by textbook approach as:

Table 6. Computerized reading strategies vs. textbook-approach learning

| TEXTBOOK BASED | COMPUTER NETWORK BASED LEARNING |
|----------------|---------------------------------|
| The textbook is designed as the sole source of | Provide students with lots of information sources |
information. such as trade books, CD-ROMS, websites, encyclopedias, etc. Use textbook sparingly or supplement with other materials. Ask higher-level questions and provide creative thinking and problem-solving activities. Discover what students know about a topic prior to teaching. Design the lesson based on that knowledge. Lots of supplemental materials such as e-books, Internet, podcasts offer various text levels. Involve students in problem-solving activities, higher-level thinking questions, and extending activities.

Textbook may be old or outdated. Textbook questions tend to be low level or fact-based. Textbook is not written by taking students' background knowledge into account. Reading level of the selected textbook could be too difficult. The textbook has all the answers to all the questions discouraging students to practice thinking and digging critically for an answer.

7. Conclusion
The study proves the computer network-based learning environment gets EFL learners and their lecturers easier to engage in teaching and learning academic reading comprehension with certain target for learners. The study shows students can improve their academic reading comprehension after applying certain reading strategies yielded by and applied in the computer network environment. As the main supporting tool, the computer network facilitated the lecturers as the change agent and students as the clients.

Through webquest-inquiry in preliminary research, the computer network aided the most suitable reading strategies’ finding predicted to support students in improving academic reading comprehension up to level C2 of Bloom’s Taxonomy. It also aided materials’ search suitable for students to practice applying the strategies. Then, the technology has provided the internal webpage shared between the lecturers and students for all materials’ update in advance to prepare before attending classes, while also using them anytime without brick-and-mortar class boundary, time, money and energy excess. Furthermore, the computer network has enabled reading link sources to be shared for students’ independent learning. Next, the computer network through emails and the Facebook has supported the lecturers and students’ online discussions about uncovered questions in lectures and practices.

Finally, the computerized learning gave a chance for students to provide online responses without space and time constraints about the quality of lecture and practice materials selected from the computer network and the academic and pragmatic advantages of blended reading strategies to them. The lecturers’ qualitative findings were triangulated with students’ grades along with their online feedback showing the essential roles of computer network to enable the students to acquire cognitive skills for improving their academic reading comprehension.

However, the limitation of this study is the results have been limited to homogenous learners as the participants of the study have relatively equivalent academic English training background and study concentration. Thus, more heterogeneous EFL learners may be targeted as the subject of the next study to see the wider impact of the method on EFL learners.

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