

A New Paradigm for Blended Learning: Leveraging Inverted Pedagogy and Digital Communication to Foster Effective Learning

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ABSTRACT

The world has witnessed changes in teaching and learning attitudes ever since the dawn of the technological revolution. Additionally, the overwhelming propensity for technology among Indian teachers and pupils has had a great effect on the country's educational system. On this basis, a study was done to determine how much teachers and students could gain from sharing precursory e-lessons through a messaging app. The main objective of this study was to investigate how to bring each student to one level, and how to focus parallelly while teaching. First, a pre-test was administered to the experimental group and the control group. After pre-testing, the experimental group underwent the intervention procedure. The benefits of precursory e-lesson sharing combined with face-to-face training were then evaluated using a post-test. It was concluded that this study not only made information transfer easier, more interesting, and more permanent, but also created a balance in the learning levels of the majority of students.

KEYWORDS

Advance Electronic Lesson Sharing, Active Listening, Critical Reading, Critical Thinking, E-Lessons

INTRODUCTION

The advancement of technology has revolutionized the way people interact and communicate globally, turning them into global netizens. This transformation has had a significant impact on their lifestyle, thinking patterns, interests, and preferences. The widespread use of digital communication has made it accessible to people from all walks of life, transcending boundaries and barriers. The corporate sector and diverse industries have greatly benefited from the comfort and efficiency provided by technological advancements, making digitalization an indispensable tool for enhancing productivity at work. It is worth noting that educational institutions are responsible for educating and training individuals on the operation of technology-oriented machines and computers in these sectors. All of these observations highlight the optimistic aspect of digital communication as a powerful and transformative mode of communication.

DOI: 10.4018/IJAET.321654

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Amidst the surge of digital addiction fueled by social media and instant messaging applications, the excessive dependence on digital communication among students in their daily lives poses a significant threat to the ethos and value of in-person classrooms, reveal its detrimental impact at the same time. While the indispensability of digital communication in modern classrooms cannot be overstated, the importance of physical classrooms should not be discounted. Digital communication has emerged as an immersive tool for contemporary learners, albeit contributing to a decline in their interest, motivation, and performance in face-to-face classrooms.

Despite the aforementioned, it is undeniable that the continuous dissemination of information by teachers via instantaneous digital communication channels serve as a potent tool to augment the efficacy of blended learning. This approach is further supported by the implementation of the inverted pedagogy, which focuses on introducing course materials outside of class, thereby maximizing in-class time for inquiry, application, and assessment to better cater to the needs of individual learners (University of Washington, Seattle, n.d.).

On one hand, Blended Learning integrates technology in the classroom to enhance the quality of education students receive (Ntuli, Kyei-Blankson, & Nur-Awaleh, 2019). On the other hand, the inverted pedagogy employs digitization to provide students with comprehensive and comprehension-based learning activities through digital platforms, effectively creating an interactive and engaging educational experience (Oermann et al., 2020).

By and large, both blended learning and the inverted pedagogy complement each other to provide students with a more comprehensive and dynamic educational experience. Through the integration of different modes of digital communication, teachers can optimize their teaching methods and foster a more collaborative and interactive learning environment for students.

The concept of blended learning has permeated every discipline, leading to significant growth in research on blended teaching and learning models. Numerous studies have shown that blended learning is a highly productive method of teaching and learning. It allows learners to progress at their own pace and schedule (Desai, 2019). In the postmodern era, information and communication technologies have played an increasingly significant role. Research has found that the more learners practice tasks using blended techniques, the better their learning outcomes (Mir & Sultana, 2016). As the impact of blended learning on learning retention and attitude has been examined, it has become apparent that learners who have more opportunities to practice through blended mediation have a better grasp of study components. Furthermore, studies have found that blended learning is more effective than traditional classrooms in ensuring retention (Kumar, 2010).

Compared to traditional classrooms, digital medium has the potential to connect learners who can study from home without having to travel long distances. Thus, digitization has opened the doors of learning to everyone, allowing students to expand their networks globally. Communication through technology across borders instills confidence in users and raises awareness of different societies, cultures, and languages. Familiarity with the technological world can help students accelerate their learning. Digitalization enables meaningful, multi-literate tasks and provides unprecedented ways to support students while facilitating collaboration and interaction among them (Lievens, 2015). Blended learning aligns with the values of traditional higher education institutions and has the potential to enhance both the effectiveness and efficiency of meaningful learning experiences (Garrison & Heather, 2004). The teaching and learning processes have seen significant changes due to blended learning, and experts like Barr and Tagg (1995) believe that blended learning, which is more prevalent in the corporate sector, is likely to take place in higher education as well. Newey (2018) states that when done correctly, blended learning can benefit an organization's training program in many ways, including expanding reach, increasing engagement, providing references, facilitating collaboration, and simplifying assessment processes.

When exploring language department options, computer-assisted language learning (CALL), a facet of blended intervention, has revealed significant potential for effectively teaching the most challenging aspects of linguistics and phonetics. English teachers have taken a notable

lead in adapting CALL for remarkable results, particularly in controlled experimental and non-experimental settings, as well as establishing technology-mediated environments (Ferreira et al., 2014). CALL has elicited responses from students who struggle with speaking phobia, contributing to an improved learning process.

Aligning second language acquisition theory principles with blended teaching-learning strategies provides a more profound foundation. For example, the input processing theory principle suggests that learners are driven to extract the message from input before they consider how it is linguistically encoded (Mayo et al., 2013). Similarly, activity learning design theory principles such as lead-in, planning, acting, and reviewing are utilized to give students a clear idea of what they are expected to accomplish upon task completion, provide them with necessary resources for completing tasks, and maintain a consistent approach throughout the semester.

One the whole, we can sum up that the proliferation of digital communication among students presents a significant threat to the traditional value and spirit of face-to-face classrooms. The pervasive influence of digital addiction, particularly fueled by social media and instant messaging apps, impairs students' ability to concentrate during lectures, rendering their attention span inadequate or simulated. This troubling phenomenon personally observed by numerous educators, including myself, whereby students display blank expressions when questioned, indicating pretended listening by them while they attend classes. Educators are frequently faced with the task of reiterating to students the need to refrain from using their smartphones during class sessions. Alas, this habit has become so deeply ingrained in their conduct that they resort to surreptitiously engaging with their screens before, during, and immediately after classes. Such an apparent compulsion to remain glued to their devices within the academic milieu may be seen as an overaddiction of screens, which can impair their academic outcomes and also disrupt the physical classroom ambiance. To address this challenge, inverted pedagogy with blended learning can serve as a solution to effective teaching, bridging the gap between teachers and learners and helping them achieve their learning objectives with mental satisfaction. The utilization of identical digital communication channels as a means of diversion from their less fruitful screen habits, towards more fruitful engagement via immediate instructional guidance and learning materials for upcoming lessons, reflects a deliberate intention to ameliorate their attitude, instill a requisite sense of seriousness, and foster motivation. Taking into account all of the aforementioned points, the epistemological and educational significance of this study is unequivocally affirmed.

RESEARCH GAP

Upon thorough analysis, it is discerned that the possibilities for experimentation with blended learning are limitless. Thus far, the reviewed research underscores the following benefits of blended learning:

- Personalized and flexible learning that accommodates students' preferred pace and schedule.
- Enhanced retention of knowledge.
- Increased opportunities for learners to engage in collaborative and interactive activities.
- Meaningful and transformative learning experiences.
- Improved opportunities for students to overcome their fear of speaking in public.

Based on the identified gaps, the following research questions were formulated:

- What is the effect of pre-lesson stimulus on face-to-face teaching?
- How does the rate of learning efficiency differ between blended learning and face-to-face teaching without pre-lesson stimulus?

This approach is unique among the various blended learning strategies that have been tested and presented, and it is expected that employing inverted pedagogy with digital communication and blended learning can yield significant improvements in learning efficiency compared to the issues previously addressed.

OBJECTIVES

The objectives of this study are:

- To compare and contrast direct instruction with preparatory e-lessons followed by face-to-face lectures.
- To evaluate the extent to which each student can actively engage in his/her learning.
- To assess the impact of dual instruction, combining e-lesson sharing and face-to-face instruction.

RESEARCH DESIGN

The present study utilizes a pre-test and post-test design with a control group. In this design, a cohort of research participants is randomly assigned to the Experimental and Control Group, and both groups are tested based on the dependent variable. Both are pre-tested on O, representing pre-test observations of the dependent variable. Then the experimental group is exposed to X representing post-test observations of the independent variable (treatment). In contrast, the control group undergoes pre-test and post-test observations without receiving the treatment. The outcome of this design is determined by comparing the difference between the pre-test and post-test results of the experimental group to that of the control group's pre-test or post-test observations. (Peter & Dugan, 2002).

METHODOLOGY

This study was conducted at the K.L. University, Hyderabad with B.Tech students. Systematically, the participants (randomly assigned Control and Experimental Group) who had been attending classes through direct instruction with contemporary methods and style were given a pre-test so that the difference between the abilities of both the groups could be verified. With the intervention process, the selected e-lessons in the form of word files and audio files were shared with the participants grouped through the Telegram messenger app so that they could know the crux of the upcoming lesson at least 24 hours before it. The aforesaid shared e-lessons were sequentially taught in a face-to-face classroom as a stimulus. As a successful move, a post-test was given to the experimental group to examine the effects of the precursory lessons with face-to-face instruction. This was further compared with the pre-test scores and post-test scores accordingly.

DATA COLLECTION AND DATA ANALYSIS

A total of 120 students took part in the study. The participants were associated with the Bachelors of Computer Science and Engineering (CSE) Programme. Two first-year sections of the Computer Science and Engineering Programme, consisting of 120 students each, were the control group and experimental group participants. The data was analysed using the descriptive statistics method.

PRE-TEST

The pre-test was meant to test Active Listening and Critical Reading and Thinking (Audio File Content on Electronic Commerce followed by five MCQs and Passage Reading on Critical Thinking

Skills followed by five MCQs). The option-wise responses of respondents for the pre-test are framed in Table 1.

Each test was conducted for 25 Marks. Table 1 exhibits the overall scores of number 60 participants each from control and experimental group in the two tests in the form of Mean and standard deviation. While calculating the overall Mean of the Experimental and Control group participants in Active listening, it was 7 and 8 respectively. Identically, the critical reading and thinking test Mean for the said groups was 6 and 7 respectively. The similarity can be gauged graphically from Figure 1.

With the comparison of scores, it is deduced that there was no significant difference between the control and experimental groups in talent, activeness, knowledge, and learning ability. The statistical analysis evinced that the participants possessed the same levels of learning output as testing input.

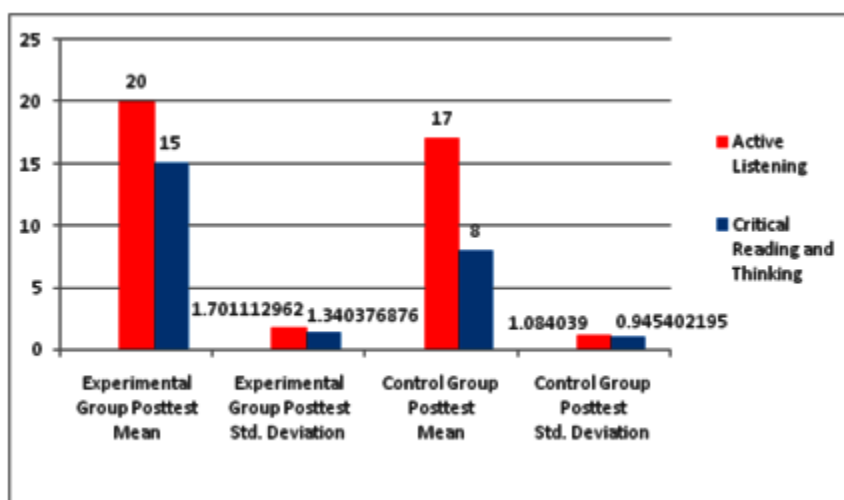
INTERVENTION

Subsequent to the pre-test, the participants underwent the treatment process, which involved the dissemination of e-lessons in the form of word file content and audio files accompanied by learning instructions. The experimental group was provided with these e-lessons one day prior to each face-to-face instruction, allowing them to familiarize themselves with the knowledge content and expected outcomes of the upcoming lesson. By doing so, the in-class time has been utilized for inquiry, application, and assessment, enabling effective pedagogy and catering to the diverse learning needs of individual students.

Table 1. Pre-test scores of experimental and control group

Pre-Test	Experimental Group		Control Group	
	Mean	Std. Deviation	Mean	Std. Deviation
Active Listening	7	1	8	1.276803034
Critical Reading and Thinking	6	1	7	1.560367188

Figure 1. Pre-test scores of experimental and control group



The lectures administered to the experimental group comprised of various components, including active listening, critical reading, and critical thinking. The lectures were conducted in a sequenced manner, commencing with the sharing of audio file content on the greatest pleasures of reading in life, obtained from listenaminute.com. This was followed by lectures on critical reading and critical thinking, facilitated through PowerPoint presentations. Post these lectures, the experimental group underwent the mock tests to gauge their assimilation of the lecture content.

POST-TEST

Following the completion of the intervention process, a post-test was conducted to measure the impact of the precursory strategy in comparison to face-to-face instructions. The post-test comprised of an audio file on the possibility of head transplants by 2030, followed by ten multiple-choice questions, including five questions on logical sentence ordering for the construction of a coherent paragraph (verbal reasoning). The overall performance of the experimental group is presented in Table 2.

Upon analysing the pre and post-test scores of the experimental group, a remarkable improvement in performance was observed, indicating the electrifying effect of precursory mediation alongside face-to-face teaching input. The treatment group outperformed significantly in comparison to their earlier scores.

The most intriguing aspect of the study was to measure the impact of the independent variable X on the performance of the dependent variable O, which yielded exceptional results. Employing the selected research design, a comparative analysis of both the control group and experimental group was conducted. While the scores of the control group showed some progress, they were not comparable to the performance exhibited by the experimental group. The ensuing data illustrates the post-test abilities of the control group and the competency of the experimental group after learning.

The amalgamation of framed data comparisons serves as a powerful means to convey anticipated outcomes in all blended learning classrooms. Augmented lucidity and precision achieved through the quantification of detailed analyses of the Control and Experimental groups' abilities at the onset of the study, followed by an examination of the impact of mediation processes on the post-performance of the Experimental group speaks itself. Initially, neither the Control nor the Experimental group evinced any noteworthy aptitude. However, a significant improvement by the end of the study substantiates that the Experimental group profited from the mediation exposure, entailing an array of inputs.

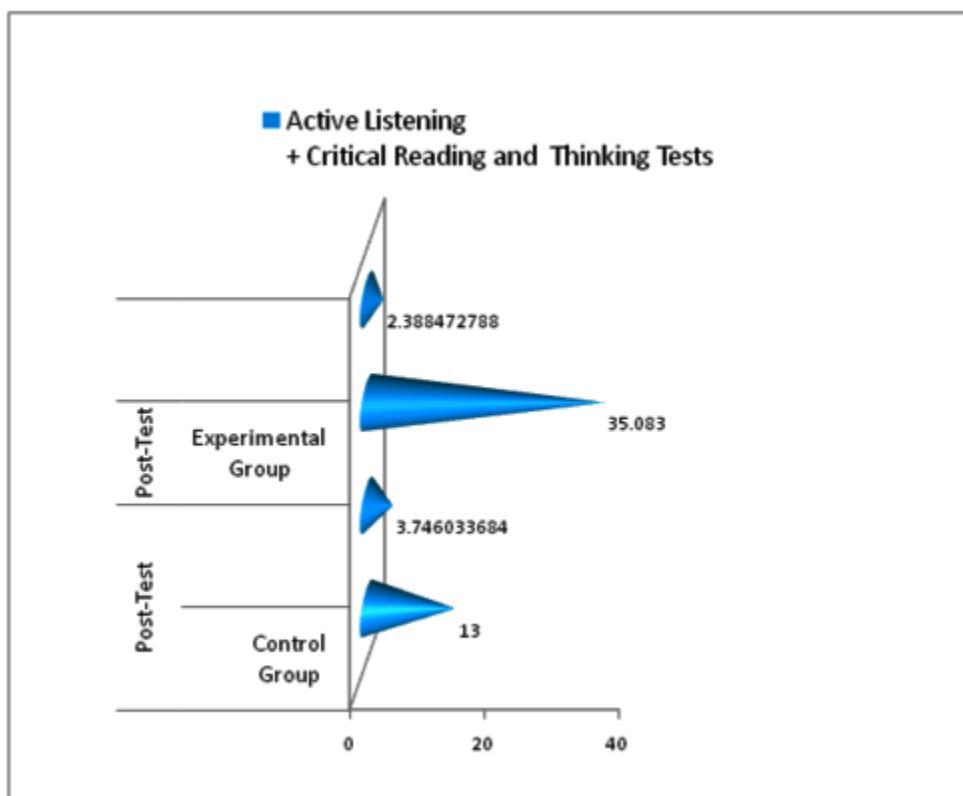
Table 2. Pre-test and post-test of performance comparison of experimental group

Pre and Post Test	Pre-Test Experimental Group		Post-Test Experimental Group	
	Mean	Std. Deviation	Mean	Std. Deviation
Active Listening	7	1	20	1.701112962
Critical Reading and Thinking	6	1	15	1.340376876

Table 3. Post-test comparisons of control and experimental group

Post Test	Post-Test Control Group		Post-Test Experimental Group	
	Mean	Std. Deviation	Mean	Std. Deviation
Active Listening + Critical Reading and Thinking tests	13	3.746033684	35.083	2.388472788

Figure 2. Post-test comparisons of control and experimental group

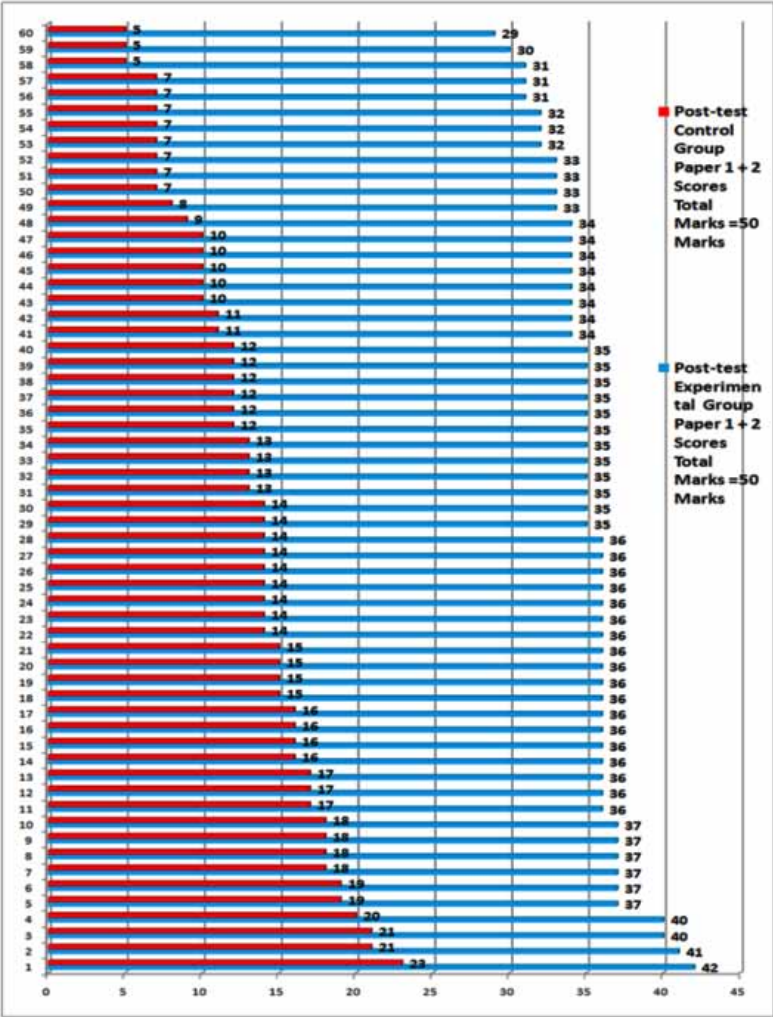


While it is possible that the simplicity of the content and level of questions may have led to some minor changes in the performance of the control group without mediation, it is important to note that such changes can be easily reckoned and extrapolated to ensure the best performance of the experimental group. The experimental group performed exceptionally well, demonstrating the exponential effect of treatment. The lowest performance score among experimental group participants was 29 out of 50 marks, equivalent to 58%, while the highest score reached 42, representing an outstanding 84% performance after mediation. In contrast, the control group's lowest post-test score was only 5 (a mere 10%), with a few individuals scoring 23 (46%), followed by a chain of below-average level scores. The figures presented below provide a clear representation of the above- and below-average individual performance of post-test performers in both groups.

DISCUSSION

Providing e-lessons in advance was feasible through various modes of digital communication like email, Learning Management Systems (LMS), Enterprise Resource Planning (ERP), etc. Nevertheless, the opted instant messaging app for instructions and material delivery before the commencement of in-person classes showered numerous advantages. For instance, students frequently asked questions in the group, were able to edit their messages to rectify incoherence, improper words, and effectively organizing their queries. While one student was writing, other participants were observing message edits and learning from communicative errors.

Figure 3. Above and below average post-test comparisons



Moreover, the experimenters' replies were open to all, enabling collaborative learning with each question and answer. Such an approach could not have been successful through aforementioned modes of digital communication. Therefore, by employing precursory e-lessons, instant messaging, and follow-ups, participants remain connected and actively engaged with frequently asked questions, answers, and cleared doubts before the detailed teaching session.

This method ensured a successful and productive diversion of students from unnecessary distractions during intervention period and it prevented them from wasting their time. Overall, it created a successful and satisfying information transfer for the majority of learners.

CONCLUSION

The research findings suggest a noteworthy improvement in performance, indicating that the transfer of information became more accessible, engaging, and enduring. A well-balanced level of learning for all students was attained after implementing preliminary e-lessons, instructions, chats, discussions,

and face-to-face teaching, thereby supporting the effectiveness of blended learning with inverted pedagogy. This approach has the potential to generate diverse strategies, methods, and approaches for improved learning outcomes.

Inverted pedagogy has played a pivotal role in enhancing the productivity of teaching and learning. One significant advantage of this approach is that it fosters equal participation among learners with varying levels of proficiency - an issue of great concern in Indian classrooms due to the high student-teacher ratio and limited instructional time. Inverted pedagogy has demonstrated the capacity to overcome obstacles such as restricted class time and unequal opportunities for skill practice.

The current pedagogy provides an outcome-oriented approach to improve productive and receptive skills. The study highlights the contribution of inverted pedagogy to productive teaching and learning and underscores its potential for further research and implementation.

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