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Original Research Article

EFFECTIVENESS OF AI ENHANCED BLENDED LEARNING PROGRAMME ON THE ACHIEVEMENT OF THE LEARNER

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Abstract:

The world today is talking about Artificial Intelligence trying to replace the Human Intelligence in all the sectors. The National Education Policy 2020 also proposes the maximum use of technology in the classrooms by supporting the tagline 'AI for ALL'. But unlike any other sector, the educational sector rather than dealing with machines, deals with the human beings with emotions, intellect and unpredictive brains. Therefore, the young developing generations may get misguided if handed over in the hands of AI completely for their development. On the other hand, it has become impossible to keep pace with the faster moving world with omission of technology. The present study therefore tries to blend the traditional strategies of teaching with modern technology in such a ratio so as to gain the maximum positive outcomes. The study intends to investigate the effectiveness of AI enhanced blended learning programme on the achievement of the learner. The teaching programme was developed by the researcher by blending the AI tools with the traditional face to face teaching method. The quasi-experimental pre-post-test study was conducted on the students of grade XI of science stream, studying in Government Higher Secondary School, Pernem Goa. The study utilizes convenient sampling method for selection of the sample. The pre- test score was used to divide the sample into two groups of 15 students each, using counter balance design. One group was termed as the Experimental Group while the other group as the Controlled Group. The Gravitation topic in physics was taught to an experimental group using the developed programme, utilizing AI enhanced blended mode of teaching whereas the traditional face-to-face mode of teaching was used for the controlled group. After the treatment, both the groups were administered the post-test. The score of post- tests of experimental and controlled group was analyzed using t-test to find the effect of the treatment administered to the experimental group. The feedback was obtained from the learners to find their views and the challenges faced by them while going through the experimental phase. The study showed that there was a significant difference in the mean score of experimental and control group indicating that the programme was very effective. The feedback obtained showed that if learners are equipped and guided with proper technology and devices AI enhanced blended teaching will bring the reform by making learning more interesting, focused, engaging and playful. Hence the study provided the concrete evidence that planned integration of AI in complementation with the traditional teaching will lead to the positive enhancement of the achievement of the learning of the learner. This study will help the educators, policy makers, curriculum planners, academicians and all the stakeholders to accept the use of ai tools positively for enhancing the learning outcomes of the learners.

Keywords: *Artificial Intelligence, Blended teaching, Achievement.*

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Introduction:

Today, the wide spectrum of knowledge is easily available for the learner at the click. This has shifted the focus of the source of knowledge and information from schools and education systems to the internet browsers and social media. This leads to the reform in the teaching strategies. Along with the traditional teaching which uses only face to face mode for imparting the knowledge to the learner, the need has arised to foster the diverse learning strategies in teaching. The blended learning is as educational approach which combines the traditional teaching approach with the online and other digital modes. This also includes synchronous as well as asynchronous components. Therefore, blended teaching provides an opportunity to use various resources making the learning more engaging, flexible, personalized and structured. The blended learning provides the scope for the collaborative, self-paced, active and independent learning to the learner. Blended learning also allows the teachers to manage their time, provide the tailored content to the learners as per the individual need with individualized feedback and enhance the learning outcomes.

Artificial intelligence on the other hand has captured the world. The use of AI has been replacing the human task to mechanized task. Whereas, presently it is impossible for and AI to replace the human teacher in the classroom, the teacher can make use of AI, specially which are designed for the educational purposes, for completing the automated tasks which otherwise will unnecessarily waste the valuable time and intellect of the teacher.

Blended teaching approach using AI tools are therefore adopted by various institutions and professional training centres reflecting its potential to cater the evolving demands of the diverse learners.

Through the designed programme, this study therefore intends to have the proper blend of human intelligence and artificial intelligence in such a ratio so as to enhance the traditional teaching strategy using AI tools. In the present research, the researcher has designed the selected topics from gravitation chapter from Physics of Grade 11 using curipod.ai. The programme to be presented in classroom which gave the enough scope for the learner and the teacher to interact in online, offline, synchronous, asynchronous along with traditional mode. The live quizzes, drawing sketches/graphs and numerical questions were also introduced in the programme to make the lessons more interesting and interactive as counterpart to the purely traditional teaching using only chalk and talk method. Also, on completion of the programme, the feedback was collected from the learner to find the impact, attitude and challenges faced by them. The study intends to implement and find the effectiveness of AI enhanced blended learning programme on the achievement of the learner.

Objectives:

1. To develop a programme for AI enhanced blended teaching for gravitation selected topics in Physics.
2. To implement the developed programme on the students of Grade 11.

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3. To conduct the post -test and analyze the data to find the effectiveness of AI enhanced blended teaching programme.
4. To find the challenges faced by the learners while implementing AI enhanced blended learning programme.

Literature Review:

Adem Daskan, & Yildiz, Y. (2020), in the research paper explored the blended learning to achieve the maximum learning outcomes. The researcher touched upon the aspect of blended learning having the potential to create the effective learning environment by facilitating the easy accessibility of the resources, providing autonomy & flexibility to the learner. The study also mentioned that the use of technology will boost stress free learning environment and engagement. Using technology along with the traditional teaching method will empower the teacher to provide immediate and individualized feedback for self-evaluation giving maximum space for the teacher to interact with the learner.

Chandra, S., & Rao. (2019), in the study mentioned that blended learning leads to the high levels of student's achievements than purely using traditional method alone. Blended learning provides autonomy to the learner, foster collaborative learning, develop positive attitude, improves communication, is cost effective, allows personalized education, time management and allows learner to learn at his own pace.

Lalima, & Lata Dangwal, K. (2017), in the research discussed the concept, features and the prerequisite of implementing blended learning. The study also discussed the scope of blended learning in the Indian educational system and the approach that needs to be adopted for successfully implementing the blended learning in the educational system.

Park,Y., & Min Young Doo. (2024), reviewed the publications exploring the use of AI applications in blended learning. In the review, the researcher studied the selected 30 publications from January 2027 to October 2023. The review upholds that maximum use of AI apps are for online asynchronized individual learning. Whereas, the use of AI app to connect online activities with offline activities conducted in the classroom are not much explored. The researcher mentioned the role of AI as the mediator to help to control the flexibility and autonomy the learner and the supplementary tool to promote the effective interactions and facilitate the learning process.

Stefanic, D. (2024), in the study upholds that, ai enhances blended learning outcomes by tailoring the content as per the need of the learner, creating personalized learning experience, improving student engagement and performance. Integration of AI in the blended learning approach can foster the innovative teaching practices and can address the common challenges in education.

Research Questions:

1. How artificial intelligence can be used in blended learning?
2. How blended learning can be integrated in regular classroom teaching using AI tools?
3. What is the effect of using AI enhanced blended teaching mode on the achievement of the learner?
4. What are the challenges faced by the learners towards using AI enhanced blended teaching programme?

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Hypothesis:

a. Null Hypothesis

There is no significant difference in the mean score of the experimental and control group.

b. Research Hypothesis

There is significant difference in the mean score of the experimental and control group.

Research Methodology:

Type of Research:

The researcher used Mixed Method for the present study.

Methodology of Research:

The present study implements quasi experimental pre-post test research method to find the effectiveness of the developed programme. The survey method was also used for collecting the feedbacks of the learners.

Sample and sampling process:

30 students from Government Higher Secondary School studying in Grade 11 were selected for the present study.

Tools and Methods of Data Analysis:

Tools for data collection – The achievement test in the form of questionnaire was used to collect the data in the form of pre and post test whereas, the questionnaire in the form of g-form was used for survey to find the feedbacks of the learners.

Tools for data analysis – t-test was used to analyzed the data collected through the achievement tests.

Scope Limitations and Delimitations:

Scope:

The present study is applicable to the students opted for Physics as one of the main subjects and studying in Grade XI in Government Higher Secondary School, Pernem Goa.

Limitation:

The aspects like the economic status, demographic location, social background of the learners are not taken into consideration. The age, gender, previous knowledge of the learners, interest, attitude, aptitude are beyond the control of the researcher and is not taken into consideration for the present study.

Delimitations:

1. The study is delimited to the Government Higher Secondary School, Pernem Goa.
2. The study is delimited to the students studying in Grade XI
3. The study is delimited to the selected topics in Gravitation chapter.
4. The study is delimited to the use of Curipod.ai as the AI tool.
5. The study is delimited to the use of google form for the survey.

Results and Discussion:

The present study, using the quasi-experimental pre – pos test, analyzed the effect of the blended learning programme on the achievement of the learner. The 30 students of grade 11 studying in science stream were selected from Government Higher Secondary School Pernem Goa by convenience sampling method. For the

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purpose of forming two equivalent groups, pre test in the form of questionnaire was administered to the sample. Based on the score obtained by the students in the pre -test, the students were divided into two groups using counter balance technique. The group 1 was named as the Experimental group, whereas the group 2 was named as the Control group.

The AI enhanced blended learning programme was designed using the AI tool Curipod.ai to teach the selected content of topic gravitation of Grade 11 Physics from the text book recommended by Goa Board of Secondary and Higher Secondary Education.

The developed programme was administered on the experimental group, whereas the same topic was taught to the control group using the traditional face to face method. After completion of the selected topic, post- test was administered on both the groups.

The score of post -test out of 20 marks was as follows

Gr. 1	16	13	11	12	14	15	13	13	15	13	13	17	15	17	15
Gr. 2	9	11	12	12	15	8	7	14	13	12	12	11	13	15	12

The score of the post - test was analyzed using t-test to find the difference in the mean. The result obtained is as shown

The two tailed P-value = 0.0035 < 0.05. Therefore, as per the criteria, this difference is considered as statistically significant => Reject null hypotheses.

Confidence Interval:

The difference in the mean of control and experimental group = 2.40

95% confidence of this difference is from 0.86 to 3.94

Particulars	Group 1(Experimental group)	Group 2(Control group)
Mean	14.1333	11.7333
Variance	2.9156	4.9956
Standard Deviation	1.7075	2.2351
n	15	15

t- value = 3.3047 Degrees of freedom = 28 Critical Value = 2.048

t-value > critical value => there is a significant difference in the means of post- test score of the experimental and control group.

From the analysis of data, it can be seen that, for degrees of freedom 28, the critical value is 2.048 which is less than the calculated t- value 3.3047 this clearly indicates that the mean of the two group varies significantly. Also, since the p-value is less than 0.05 this proves that the difference in the means is not by chance and the null hypothesis can be clearly rejected and the experimental hypotheses is to be accepted. And hence the study concludes that the AI enhanced blended learning programme proves to be effective in enhancing the achievement of the learner.

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Form the feedback obtained from the learners, it was seen that, the learners found the programme very effective, interesting, engaging, interactive and focused. The instant and individualized feedback provided the guidance to the individual learner to work on the weaker section. The incentives provided to the learners motivates them to do still better, creating the atmosphere of healthy competition. While there are many positives of the programme, the learners also faced some of the challenges while participating in the study. The challenges where network issues, system or mobile phones not supporting the selected AI tool and unavailability of sophisticated systems making it difficult to answer the online questions which required drawing of graphs and figures. The learners are of the opinion that, if these challenges are mitigated the blended learning programme using ai tools will prove to be robust in enhancing the achievement of the learner.

This study will form the base for the makeover of the education system. This will provide the concrete proof that if the challenges are mitigated, the ai tools can be confidently integrated in complement with the traditional teaching to yield the maximum learning outcomes.

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