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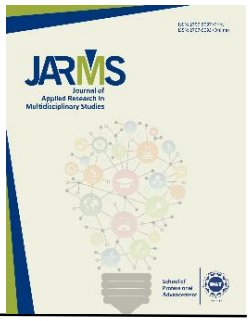

Title: **Effectiveness of Online Cooperative Learning: Evidence of Students' Achievement and their Attitude towards Intervention**

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Effectiveness of Online Cooperative Learning: Evidence of Students' Achievement and their Attitude towards Intervention

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Abstract

School Education Department is usually criticized for utilizing quite a smaller number of academic days due to many reasons such as summer and winter vacations, pandemics, terrorism, fog, extreme weather conditions and sudden holidays, etc. There is hardly any concrete mechanism or step taken to address the issue. The researchers hypothesized that if face to face mode is supplemented with some online learning, it will minimize students' academic lose. The study is an effort in this regard. The purpose of the experimental study was to determine the efficacy of online cooperative learning (OCL) integrated in the rotation model of blended learning with specifically focusing on measuring the effect of intervention on students' achievement and attitude towards OCL. By using a posttest only control group design, sixty-two first-year students were randomly assigned to either the experimental (30) or control (32) group. The experimental group received three OCL and three formal sessions per week whereas the control group had 6 face to face sessions per week. At the end of two months intervention, achievement test and questionnaire were administered to students to collect the data regarding both dependent variables. Data were analyzed by independent samples t-test and one sample t-test. The findings revealed that the students of experimental group significantly outperformed their counterparts in the control group regarding achievement and demonstrated positive effect towards OCL. It is concluded that OCL is feasible to be used with face to face mode. School education authorities are recommended to test and use this model on large scale to maximize students' academic days.

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Keywords: online cooperative learning, blended learning, rotation model, academic achievement

Introduction

Education is an essential component for the advancement of a country. A nation builds its human capital via education, which is essential for both social and economic development. Investment in education is therefore essential for a nation's welfare. Formal education is the type of education a person may only receive in an organized setting, such as a school or university. Formal education in Pakistan is struggling with a number of issues. Access to high-quality education with appropriate utilization of the academic days is one of the main issues formal education in Pakistan is experiencing by Ali et al. (2019). According to statistics, Pakistan has one of the lowest rates of literacy in the world, which is caused by issues including poverty, a lack of funding for education, a lack of teacher preparation programs, and political unrest according to Haq and Mehmood (2020).

Focusing on providing high-quality formal education in Pakistan, less use of the academic calendar year is one factor that makes it difficult. Schools Due to a variety of factors, including severe weather, unexpected holidays, summer vacations, pandemics and terrorism are frequently criticized for using relatively quiet a smaller number of academic days from academic calendar which leads to lack of quality education. This situation leads to lowering the quality of education and decreasing the enrolment of students as well as increasing the drop out of students. The side effect of this scenario is the mushroom growth of private educational institution that have these shortcoming quite less as compared to public institution. As a result of that there is an increased trust of the parents on private institutions. The middle class and poor people cannot manage to afford educating their children in these institutions. The situation culminates into low literacy rate and not achieving enrolment targets. The closing of institutions or lower utilization of academic days in schools stressed the need for developing certain backup and alternative solutions to reduce the shortcomings and boost academic day usage. Previously, many scholars and educators proposed lengthening the academic year as a solution to the problem, but their recommendations were not considered feasible and implementable. While considering the quality education, the second issue is that traditional

teaching methods fall short of meeting contemporary demands and needs of students.

Information and communication technology (ICT) have permeated numerous facets of society during the past 20 years (Bosch, 2019). Online education is developing quickly thanks to ICT innovations and ideas. ICT has the power to supplement, enhance, or in some cases completely replace traditional education. This transformation is challenging to introduce in government institutions because both instructors and students struggle to adjust to new teaching and learning approaches. This called for the research and testing of teaching and learning strategies aided by ICT that are suitable and acceptable to Pakistani instructors and students. Exponential increase in the use of ICT and in online teaching in education opened many new avenues to address teaching and learning issues systematically. One of them was to use online learning as a support to strengthen face to face formal education.

When we talk about online education, it also having some drawbacks. The seclusion and lack of interaction among pupils is a significant drawback. Numerous studies have demonstrated the detrimental impacts of isolation on students' learning experiences, and this disadvantage has received a lot of attention in recent literature. Online students who feel alone may find it difficult to connect with others and communicate with their teachers, which can make them feel lonely and disconnected. Students' feelings of isolation were their main obstacle when switching to online learning. Students claimed to lack enthusiasm and involvement in their studies as a result of feeling cut off from their professors and peers. According to a study by Drouin et al. (2019), lack of support is one of the main reasons for students dropping out of online courses. The study found that students who did not feel supported by their online instructors were less likely to complete their courses. A study by Rada and Thorne (2020) found that students who participate in online learning without social contacts may feel depressed and lonely. In order to minimize its drawbacks and increase the effectiveness and productivity of online and remote learning, new approaches must be investigated.

Cooperative learning is a teaching method which provides highly structured an academic and social learning environment. cooperative learning is a broad concept that encompasses many aspects of student development, including enhanced cognition, social skills, achievement,

confidence, critical thinking, motivation, and interdependence. Students participate in it and work in groups to finish a goal. The task of selecting the group is left to the teacher. The team is responsible for learning. Moreover, to impart what has been learnt to his or her comrades. The usefulness of online cooperative learning in higher education settings has been examined in a number of research. According to Kirschner et al. (2018), online cooperative learning can increase students' academic accomplishment by fostering their capacity for critical thought and problem-solving. who discovered that online collaborative learning may greatly improve students' academic performance and close the achievement gap. Additionally, online collaborative learning has been shown to lessen cognitive overload and boost students' enthusiasm for learning. These results imply that using online cooperative learning as a teaching strategy can improve student engagement and academic achievement. It was felt appropriate to employ OCL for online classes along face to face school classes in current study.

OCL for the sake of supplement to formal education were connected with face to face traditional school classes. To implement the blend of online and face to face classes, one of the blended learning models is used. When two different teaching approaches are combined in this way, which helps pupils learn more efficiently is Blended learning, which blends the finest aspects of online and in-person training, is projected to be used in teaching approaches in the future. According to several researchers (Bonk & Graham, 2006; Garrison & Kanuka 2004), a blended learning approach is the best method to provide students with a quality education Literature revealed four fundamental programs for blended learning. Any blended learning paradigm that is developed will fit inside these four paradigms . The four different types of blended learning models are the Rotation model, the Flex model of mixed learning, the LA Carte model, and the Enriched virtual model. Current study opted rotation model of blended learning and is based on the rotation model of blended learning, which is a researcher-designed model of blended learning for schools with planned activities and in a scheduled way. It is characterized as a weekly fixed time rotation between in-person and internet-based online.

According to the predetermined timetable and course structure, one class alternates between online and conventional classroom environments. The majority of the work is also done in person, according to a set schedule

that alternates between online and in-person study. The main rotation in this framework is made up of three learning stations: online learning, face-to-face learning, and group projects.

When we talk about formal education, it is important to establish efficient methods and practices for high-quality education in institutions in order to address past issues and combat the epidemics if any. Rarely do parents allow their kids to attend additional classes. Similar to breaks, vacations' main objective is to shield pupils from inclement weather. The only way to modify and supplement our formal educational system in each of these situations is through blended learning (Ibrahim et al., 2020). As a result of that it was felt appropriate to test the effectiveness of rotation model of blended learning and in online learning part of intervention. Online cooperative learning was used as an instructional strategy. To enhance student performance and lessen the drawbacks of online learning, such as the loss of social connection, there are eight cooperative learning practices that may be easily adopted. Examples of the student achievement division include role playing, group processing, role playing, group investigation, and poll group re-poll (Peshkam, 2018). Specifically, these strategies were utilized in current studies, online teaching with the help of zoom application and WhatsApp groups. Variety of applications are available that enable students to increase peer interaction. Cooperative learning group sizes also rely on the peer-interaction technologies used, such as WhatsApp, Zoom, and Skype.

There are not many studies done in Pakistan on the use of blended learning techniques in formal institutions. Anjum et al. (2021) conducted a research on higher secondary classrooms to evaluate the benefits of blended learning vs. traditional methods (face-to-face instruction, videos, Google searches, voice messaging, etc.). The results showed that blended learning, as opposed to simply in-person instruction, had a favorable effect on students' academic achievement. This was a mixed learning setting where students might study information shared via WhatsApp along with lectures from the institute. But it was not so systematic and scheduled on the pattern of formal school setting. In order to raise students' intrinsic motivation, Bosch et al. (2019) investigated the value of integrating online cooperative learning into a blended learning design. Using online cooperative learning enhanced students' intrinsic motivation, according to his findings

The researcher's decision to work on blended learning using more organized procedures than were previously utilized for formal education was due to increase its effectiveness and address its problems was driven by a review of pertinent literature. As a result, the study's objectives were to determine the effect of using rotation model comprising online cooperative learning with face to face sessions on students' academic performance and attitude towards OCL. Online Cooperative learning (OCL) was an independent variable whereas academic achievement and students' attitudes towards OCL were dependent variables.

The school education department frequently receives criticism for making use of a relatively small number of instructional days in the academic calendar. We spend a lot of time on holidays and unplanned getaways. Due to a lack of supervision and an educational gap, students' performance suffers as a result (McCarney, 2015). It was necessary to make an effort to close the educational gap. Off-campus courses and summer camps were regarded as great supplements to formal education when used in tandem. In contrast, just 43% of students in the ninth grade passed the board test in RBISE, while the percentage of pupils passing the 12th grade in 2022 is 49%. Both the teaching-learning process and the exams for all subjects were carried out improperly in the previous two years. In order to reduce such types of educational losses, it was urgently necessary to create extra and alternative mechanisms as a backup to the face-to-face education system.

Determining the effect of adding online cooperative learning to a rotation model for formal education on students' academic performance and attitude towards the type of learning was the study's main objective as a result. Students' views towards OCL and their academic achievement were dependent variables, whereas OCL was an independent variable.

The main objectives of this study were, to find out the effects of designed blended learning (OCL along face-to-face classes) on students' academic achievement, to investigate the effect of intervention on students' attitude towards online cooperative learning and to test the applicability of online cooperative learning with face-to-face learning. Research questions were developed, to what extent OCL with face to face classes affect academic achievement of students and to what extent intervention affect attitude of the students towards online cooperative learning?

Many diverse nations and cultures have conducted online and in-person research on cooperative learning and blended learning. But this is the first investigation of its kind into Pakistani society. Additionally, no other researchers examined the use of OCL in the rotation model of blended learning in formal education. This study will undoubtedly promote OCL in the setting of our educational system.Policymakers may find the findings useful in understanding how to apply OCL tactics in an online environment. It might provide decision-makers with insight into how formal institutions and professors might increase the number of class hours.

The results might make it easier for educational management to come up with an emergency backup or replacement for formal education so that they can keep on teaching and learning. Additionally, the study might inspire educational scholars to take the risk of starting similar innovations in their field. The spread of OCL may assist teachers in using it to adapt their current methods of instruction to meet the diverse demands of their students. This approach might help underachievers raise their performance by forming relationships with classmates.

Many different nations and universities throughout the world have conducted studies on blended and cooperative learning.

Method

Research Design

The research design for this study was a Qusai experiment with a posttest-only control group design. Purposive sampling was used to select GGHSS Rawalpindi as the intervention for carrying out the study. Utilizing a posttest only controls group design, sixty two (62) first-year students were randomly assigned to either experimental (30) or control (32) group. The experimental group was exposed to OCL rotation model encompasses three OCL sessions and three face to face classes per week, whereas the control group received traditional instruction in the form of regular six classes per week. A Zoom presentation by the teacher and student presentations by cooperative learning groups were part of the intervention. In order to meet the CL goal, a Whatsapp group was developed for students to communicate. The intervention was carried out in the subject/ domain of education. Both groups were taught the same content. The study lasted two months. After the intervention, both groups were administered achievement test and

attitude scales to the students of both the groups. The researcher developed the following tools to gather data.

1. A fifty (50) mark achievement exam comprising 20 multiple-choice questions and six responses requiring a limited response was created as a posttest.
2. A five-point scale questionnaire was created for students in order to assess the students' attitudes towards OCL for the experimental group. Which were having 5-point rating scale from strongly disagree to strongly agree as 5 = *Strongly agree,* 4 = *Agree,* 3 = *neither agreed nor disagree,* 2 = *Disagree,* 1= *Strongly disagree*.

Both tests were shared with seven experts for content and face validity of the instrument. It was improved with the addition of feedback. Cronbach's Alpha was used to gauge reliability. Results indicated that the instruments are reliable and valid.

Population and Sample Size

The purpose of this study was to examine the effects of incorporating online cooperative learning (OCL) into a rotation model of blended learning (OCL-Face-to-Face Traditional Classes) for formal education. As a result, the population of this study was made up of students enrolled in higher secondary institutions run by the government. Higher secondary education in a school setting refers to intermediate courses.All 11th grade education students attending Tehsil Rawalpindi government higher secondary schools made up the study's population.

A sample from the population was chosen through the use of multistage sampling. Purposive sampling was used to initially choose the sample school from the entire population. Similar to purposive sampling, the researcher employs his or her own sound judgement to choose the appropriate sample from the population in order to achieve her research objectives. A school that shares characteristics with all other comparable institutions in the city is the Government Girls Higher Secondary School in Rawalpindi. Because it was easier to conduct the experiment without running afoul of ethical standards, the researcher purposefully chose the sample by getting permission first.

Second, the school's class was specifically chosen. First-year students were chosen because they were familiar with internet-connected devices

and could quickly adapt to a new learning environment at this age. 62 first-year students in all were involved in the study. They were between the ages of sixteen and eighteen.

At the third stage, subjects were assigned by simple random sampling to both groups (Control and experiment). 62 students were present. In a sizable class at a public institution, the socioeconomic and academic backgrounds of the students are diverse. Randomization was used to balance out the two groups. Since practically everyone in the class had access to the internet and electronic devices for the online class.

Research Instrument and Pilot Study

The goal of the study was to determine how OCL in combination with in-person regular school classes affected students' academic development. As a result, the researcher created a test to administer to research participants as a post-test. All of the subjects that were planned for and taught to both groups during the intervention formed the basis for the test. Twenty multiple-choice questions (MCQs) worth 30 points each and six brief questions with a restricted response each worth 5 points made up the posttest. There were 50 possible points on the exam. The test includes questions about knowledge and understanding levels, as can be seen in the specifications table. Similarly to see the attitude of students towards OCL was evaluated by constructiong five point likert scale questionnaire. Twentyfive items questionnaire were made and presented to experts to ensure validity of tool.

The test was distributed to seven experts for content and construct validity of the instrument. Then it was improved by adding feedback to make useful tools. Pilot test was done with 15 students from GGHSS Rawalpindi and 15 from the same city's GGHSS who were not included in the sample to determine the reliability of the instruments. On two separate occasions, the pilot test was carried out twice.

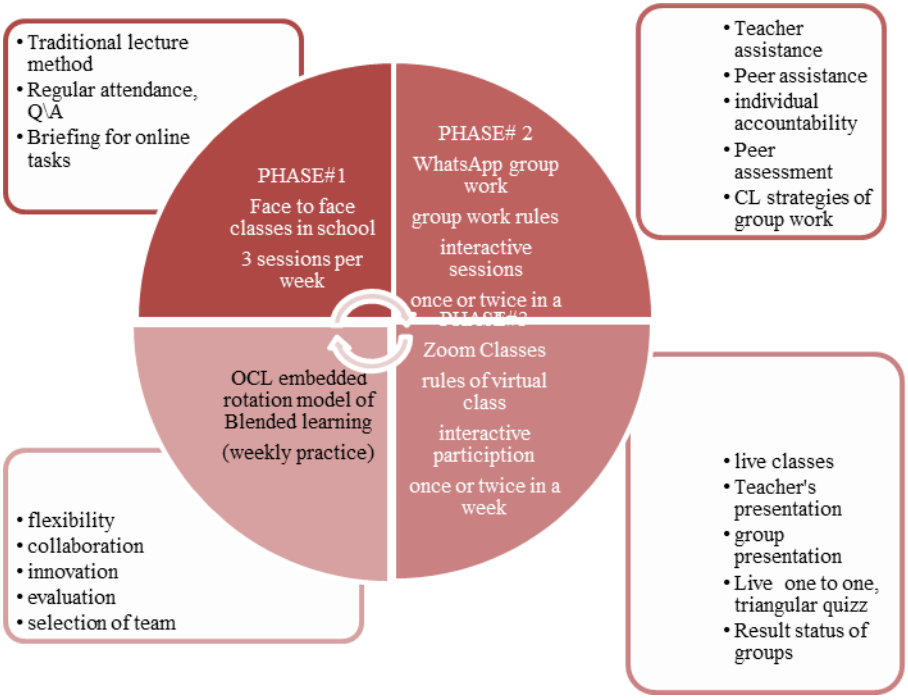
Cronbach alpha was used to test the results. Reliability Analysis 'r' for the questionnaire was 0.78 and for the accomplishment exam it was 0.71. The sum of the scores for each sentence was used to get the final score. High scores indicated an engaged and happy learning experience, whereas low scores indicated a bad and unfavourable learning experience.

Statistical Tools and Analysis

In order to analyse research questions, Each group's mean, SD, and mean difference were calculated. To assess the significance of the difference between the means of the two groups, a t-test (independent sample) was used. significance of the difference in posttest scores for the variable (academic attainment) examined at 0.05 levels between the means of the two groups. Posttest raw scores are supplied in tabular form for interpretation. One sample t test was used on the data that was gathered to analyse attitude of suudents towards OCL.

Nature of the Intervention/ Procedure

Students' academic performance and attitudes towards online cooperative learning are the study's dependent. Blended learning (BL-OCL), a mix of online cooperative learning in rotation model of blended learning in a school context, is the study's independent variable. Both groups received formal instruction during the sixth period of school, and 45-minute online sessions were offered three times each week. The control group attended class six days a week on a regular basis in the same manner that was previously used in that class. Both groups received the identical lesson materials. whereas the experimental group just got a three-day face-to-face class. Additionally, the remaining three courses are administered virtually using the Zoom app and WhatsApp groups in accordance with the cooperative learning strategies. The intervention was carried out in the following phases using a step-by-step for experimental group.



Delimitations of the Study

This study was delimited only to the 11th grade female students studying Education subject of Tehsil Rawalpindi only.

Limitation

Study is only for the duration of two months. Students might conversate with each other regarding their separate group working ,it may influence the performance of students of experimental group.

Ethical Consideration

A letter of permission was used to get the school principal's prior approval. Students were unable to give their informed permission because doing so might have changed the experiment's outcomes. If students knew they were taking part in an experiment and would be graded at the end, there was a chance they might become more engaged and work harder during this intervention period.

students received a debriefing on their involvement in an experiment after the intervention was complete; this was done on purpose to keep them from knowing beforehand.

Results

Independent sample *t* test was calculated with the help of SPSS Software. The results showed a significant difference in the mean values of both groups. The results show that the experimental group performs better than the control group in terms of academic performance as shown in table.

Table 1

Independent Sample t-test for Comparing Mean Scores of Students' Achievement Both Groups

	Condition	*N*	Mean	SD	*t*-value	*df*	Sig.	Mean difference
Post-test	Experimental Group	30	34.93	7.24	7.95	60	.000	14.83
	Control group	32	20.75	6.81				

According to Table 1, the *t*-value (7.95) is significant at *p*=0.00. The mean of experimental group (*M* = 34.93, *SD* = 7.239) is clearly higher than the control group mean score (*M* = 20.75, *SD* = 6.810). To find out the attitude of experimental group students towards OCL embedded blended learning. This reveals that one sample t test was employed.

Table 2

One Sample t-tests for Attitude of Students towards Online Cooperative Learning along Face to Face Classes, in Terms of Student's Experiences

	N	Mean	SD	Test value	*t*	*df*	Sig.	Mean difference
Total	30	33.4333	1.431	21	47.6	29	0.000	12.43

Table 2 shows that the *t* value (47.6) is considerably higher than the test value (21) at *p*=0.005. At the end of the intervention, the students attained mean score of OCL experience is clearly greater than the Test value (21). The test value was set to the instrument's neutral value. By dividing the number of items by 3 (the instrument's neutral point), the test value was computed, or 7x 3 = 21. The test value was consequently changed to 21.

The seven items of the questionnaire, which inquired about students' opinions on online cooperative learning in addition to in-person instruction, were subjected to one sample t-test. To determine if students' opinions of the researcher's blended learning model in formal education were substantially different from one another (a neutral point), the students' OCL experiences scores were compared to the chosen test value.

The purpose of study was to analyze the academic achievement of both groups to see significance difference of designed blended learning verses traditional instruction. Secondly, the purpose was to see attitude of experimental group students regarding blended learning based upon their experiences.

Students who were taught about OCL in face-to-face classes performed significantly better than the control group on the achievement test. The results showed that the students of experimental group outperformed their counterparts in the control group in academic performance. (Table 1)

The results regarding the second research question showed that the students' attitude towards OCL was quite positive when measured. After the intervention, it was clear that the students' mean rating of the OCL experience was much higher than the test value (21). The results support the study by indicating that students have positive attitude towards collaborative online learning. They found the initiations of the rotation model of the blended learning model in schools, a positive one. As a result of the analysis, the students' experiences with OCL in face-to-face classes are very encouraging and satisfying. They also enjoyed working in online groups and making group presentations with their peers.

Discussion

In this study, OCL was utilized in online classrooms, conventional teaching was used in face-to-face classes, and station rotation model was used to integrate blended learning. Two scales, achievement tests, and a questionnaire completed by the experimental group were used to collect data from both groups. Previous studies looked into the effect of blended learning on academic performance or motivation. The blended learning process is extremely unstructured since, according to many earlier studies, there was no planned pedagogy or well-organized activities utilized to educate in an online environment with in-person sessions**.** Previously, CL

was maximally employed in face-to-face context, and it was not used in blended learning or in online context sufficiently.

Prior research on CL has mostly examined face-to-face courses to assess its efficacy, and with a few exceptions, all studies, whether carried out in Pakistan or elsewhere, have demonstrated that CL is successful in a face-to-face format. It hasn't been tried out or employed in online classrooms, though, where the teaching and learning styles are very different from those in traditional classroom settings. Consequently, it was urgently necessary to study on it in order to research engaging and effective ICT-supported teaching and learning paradigms. The use of laptops, iPads, and other cutting-edge technology by students during and after school hours is known as blended learning, and it has been shown to increase academic achievement and student engagement (Chang et al., 2014; Lozano-Lozano et al., 2020; Kazu & Demirkol, 2014). Current research supports the data cited above in that blended learning, as opposed to traditional teaching in formal education, has a favorable influence on students' academic attainment. The findings are consistent with other studies because OCL is a well-organized and structured teaching method that greatly encouraged students to cooperate, investigate terminology, understand concepts, and meet group objectives. As a result, kids learn as much as possible and improve academic performance.

In their OCL experiences, students encountered a variety of CL strategies through which they investigated a subject with the assistance of peers, worked on tasks assigned by CL groups after the teacher's presentation on the scheduled team time in WhatsApp groups, gave group presentations via Zoom, defended their groups, responded to the quiz, and weekly team status informed them of their status as winners, runners-up, or losers. For their group projects, they received praise in front of the class, and also received ongoing criticism. In addition, results from prior blended learning studies in terms of improved satisfaction, suitability for use in formal education, enjoyment, and motivation among students with a course are consistent with prior studies of blended learning (Chang et al., 2014; Pierce, 2017; Vaughan, 2007). The results are consistent with earlier research since OCL provided a variety of activities and interactive sessions that made it simple for students to work in an online environment. As a consequence, they didn't feel lonely or bored and preferred this collaborative working setting.

The results are also in line with earlier research on students' positive attitudes towards using CL that was conducted in face-to-face classes (Bosch, 2019; Deen, 1991; Erdem, 2009; Goyak, 2009; Jordan & Metais, 1997; Langlois, 2001; Neber et al., 2001; Peterson & Jeffrey, 2004). Results are in accordance with other research since online classes adhere to and execute all five primary CL components, allowing for participatory learning and the consequent positive attitude among students. Although the current study's findings are consistent with those of other research on blended learning in formal education and CL in formal settings, there isn't yet enough information on OCL blended learning for formal education to compare the findings. This study lends credence to several previous studies that show blended learning can improve students' academic performance and attitudes towards CL employed in rotation models.

Conclusion

From the above mentioned findings, the following conclusion was drawn. OCL - rotation model of blended learning enhances student's achievement of 11th grade govt. schools' students enrolled in the subject of education. Moreover, Students of 11th grade govt. schools enrolled in the subject of education are having quite positive attitude towards the OCL being part of their traditional formal education.

Recommendations

1. This interventions may be tested in other subject and grades in govt. schools
2. A unit/ two session may be incorporated in the in-service / pre-service the teachers training material.
3. Apply in institutes in scenarios such as Covid 19, smog, unexpected holidays, and summer
4. OCL may be tested with other models of blended learning like Flex model .
5. The same model , to see its effectiveness for three groups, one totally traditional formal education, one group with mixed BL-OCL design, one with only OCL .
6. It can be applied at college level for intermediate students to validate outputs rather than higher secondary schools.

7. This study was done in female schools; further research is required for male students.

8. Research should be conducted over a long period of time, such as a semester, to see its impact in a more authentic way.

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