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Application of Project-Based Learning in Classrooms: An Innovative Pedagogy for Sustainable Education

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ABSTRACT

In this modern age, the learners want practicable knowledge to adapt to the fast pace of technological modernization. This research has dealt the very concept of application of project based learning (PBL) approach in teaching learning activities. It develops their inherent ability enhancing sustainable education exploring their ability, and strengthening confidence for their all-round development. The qualitative research has been designed with the questionnaire accessing 50 respondents. The core area of the research is Janaprakash Secondary School of Pokhara-29, Gandaki Province, Nepal. The primary data have been collected and literature reviews have been supportive for the research. Similarly, 15 different questions have been developed for the research. For the validity 10 secondary level experienced teachers have been asked to respond to the questionnaire. Professionally teachers and students, and demographically males and females of 15 to 55 years old respondents have been selected for responses. The results show that the PBL approach is applicable to enhance the sustainable development of the new era through education. The study concludes that an application of PBL in teaching learning activities enhances the competence of the learners.

KEYWORDS: Sustainable education, student-centered learning, project-based learning, technology in education

INTRODUCTION

Education is to build the personality. The learners need to be engaged into the real life activities through learning by doing technique, which focuses on the technique

according to learners' interest and their abilities. The learners can only get through all-round development when the students get the opportunity of working by themselves. Educational project works seek to manage students to understand their problems themselves. A person who moves with time gets the wish fulfilled. Teaching learning activities go with time simultaneously. Project-based learning (PBL) takes more time and application of more time in the practicable learning motivates the learners to get more experiences eagerly. It is a pivotal course of disciples to way out the path of viable getting oneself busy in learning by doing. Time is a resource that affects all aspects of human endeavors (Kayode & Ayodelo, 2015). Thus, time is the most precious thing. Kayode and Ayodelo (2015) further opine that it affects all stakeholders in educational sectors, students, teachers, administrations supervisors, etc. As a leader of the classroom, the teachers must manage the time properly for better achievement. Teachers' time management is an important input to students' academic performance (Kayode & Ayodelo, 2015). Gerald (2002) asserted that time management can improve efficiency, effectiveness and eliminate stress. Therefore, teachers need to be very careful for the proper time management. Time planning enables a teacher to plan ahead (Gerald, 2002). Overall, time plays a key role for the all-round development of the teacher.

The quality of teaching learning activities depends upon allocation of time and practices. When the facilitators pass more time with the learners, it promotes for better results. Likewise, the learners need to be involved in project work. For example, different project works help the learners to develop their creativity. Project work is the work, which focuses on completing a task being involved themselves. It normally involves a lot of resources such as time, people, effort, devotion, and materials. It helps to develop the creativity of students and make the learners do their task themselves.

It is usually blamed that the teachers do not consume the allocated time properly. More classroom activities help create proper instruction and interaction between teachers and students. The monitoring system is not being effective in most of the schools. Monitoring by the students' representatives will be fruitful with constructive discussion among guardians, students and facilitators. Increment in time consumption for instruction and activities in school improve students' learning. In most of the schools in the country, the time consumption in teaching learning activities is less.

PBL provides many creative alternatives for both teachers and students. Teachers create an attractive atmosphere for teaching, share ideas with other peers to improve their projects, and allow them to improve their teaching strategies (Garcia, 2022). Both teachers and students become innovative when teachers use the PBL approach in their classrooms.

Project work is the task to be completed within the timeframe though time can be extended according to necessity. Students, involving themselves in the project work, can learn better. The students learn words and grammar in class and do exercises after class to consolidate (Gav, 2019). Such exercises make their learning permanent. Gav (2019) further opines that students have gained a lot of knowledge; however, they are disappointed in the practice process. If they are not involved in project work engaging themselves in their task, they are unable to develop the self-confidence. Therefore, information technology and auxiliary teaching aids (Gav, 2019) should be merged in teaching learning activities.

A selection of the project work, according to the competency development projected by the curriculum, is very important. Innovation is the basic quality that college students must possess (Gav, 2019). In this case, guidance is usually provided by the teacher, either in the form of a list of questions or a peer response from outlining the

aspects on which feedback should be provided (Liu & Hansen, 2002). In PBL, students pace according to their own ability and develop by themselves day by day gradually. They become constructive setting their goals with the collaboration of their colleagues contextually. Some studies in schools that follow PBL approaches have pointed out to positive effects on students' engagement, motivation, and beliefs in their own efficacy, although the specific PBL model and the intensity of its use have varied across these schools (Condliffe et al., 2017). Thus, PBL helps students to be engaged in learning with more motivation.

The personality builds up when the practitioners pass through the application of knowledge, developing the competence in real life. PBL offers a broad range of alternatives for both teachers and students (Pacheco, 2022). According to Newell (2003), "PBL changes the role of the teacher from lecturer and director of instruction to that of resource provider and participant in the learning activities and from expert to advisor or facilitator" (p. 5). Transferring the knowledge into the real life situation qualifies the learners to deal with the facts of problems. In recent years, student-centered learning has undergone significant changes influenced by the introduction of the competency-based approach to the digital learning environment (Abdigapbarova & Zhiyenbayeva, 2023). Educational activity is a lifelong process; however, receiving institutional education may structure with age and time pattern. Education is the transmission of civilizations (Naziev, 2017). Here, the foundation of institutional education is based on school education.

In Nepal, teachers, students, and guardians are not satisfied with the present system of education, but the proper heed is under the shadow of traditional concept and ongoing pedagogical teaching. The modern teachers need to deal with students carefully, developing their ability with interests. Abdigapbarova and Zhlyenbayava (2023) state that the interests and needs determine the methodological, organizational, and technological changes aimed to promote personalized learning. The teachers have to understand learners' interests and ability to apply technology to enhance their development. Interactive learning can help students access information at any time and place to improve their learning, increase academic achievements, and influence motivation (Diacopoulos & Crompton, 2020). It is necessary to have an interactive class to make permanent transfer onto students involving them different works. They further explain that the communicative intelligence, culture, and value orientations of the sample depend on the degree of student-oriented learning, supported by the qualification of future professionals and interactive changes in education. Thus, teaching learning activities need to make classes interactive.

Education projects are developed because participants should gain specific knowledge and skills (National Oceanic and Atmospheric Administration US Department of Commerce, 2009); therefore, project work is a key to enhance the quality education, rather than loading the bulky theoretical matters on their growing heads. This process of creating new knowledge allows students to test and achieve their ideas in the way they want, which promotes their innovation competence. Thus, it is necessary to encourage teachers in higher education to adopt PBL (Guo, et al., 2020). Therefore, the PBL approach promotes the students and teachers to promote their competence.

Engaging students in the project work is not found in the school level teaching and learning environment. The textbooks are being recited, some bullet points are being rotted and education has been exam-orientated rather than being competency-based learning. Technology enhanced learning (TEL) as an approach is interdisciplinary in nature because it brings together two research fields: technology and education

(Laurillard, 2007). Therefore, it is necessary that should alter the pedagogy of teaching learning process. In order to engage students in project works, the thickness of contents needs to be shortened.

It is the responsibility of schools to develop the confidence of learners by teaching textbooks, but they need to have the plan of awarding project works to students and engage them in learning by doing. The teachers need to be very eager to apply the project works in their classes. This study suggests schools to incorporate project works in school education to enhance the quality of education.

RESEARCH METHODS

The PBL approach enhances education for sustainable development in the country, creating an awareness to learning by doing. The study deals with a new approach of teaching learning activities based on learning by doing that creates permanence in the concept development. PBL develops insights positively to make the life productive in any field. Therefore, it makes the learners self-dependent.

Thus, the objective of this study is to explore how PBL helps the learners for their all-round development. Applying close ending questions, the study attempts to find out the views of teaching facilitators and learners on PBL. As there is a problem in the traditional teaching learning process such as the lecture method in which students go on listening and try to recall the lectures, PBL innovative pedagogy is helpful for students to become innovative.

 The study was held through quantitative approach, applying the questionnaires for 50 teachers and students. The exploratory research design was adopted to investigate such a problem to provide scientific conclusive results. The study attempted to find out whether traditional pedagogy in the teaching learning process is not leading the learners on their proper way and use of project works might be an innovating pedagogy for sustainable development in education.

The study was conducted on quantitative research method as it attempted to collect the data from primary sources like field survey, using questionnaires as data collection technique. The questionnaire form was developed for survey and distributed to collect the required data. The area of the study was Janaprakash Secondary School in Pokhara Metropolitan City. The data were accumulated from both teachers and students. The secondary sources were also applied to support the claim. The uploaded version of curriculum development was supportive for the study. The effect of project work and increment in quality education was compared in a correlational way.

Data were analyzed, using descriptive analysis method, which was done statistically. The students were given the project works of different functions of English communication and were asked them to perform their activities individually and collectively according to the project. They were instructed to perform the real conversation with the teachers having interviews and conducting the quiz contest by themselves and made the video records.

RESULTS AND DISCUSSION
Results

To collect data for the study, the survey forms used during the study consist three demographic related variables and 15 Likert scale constructs. The survey construct is given in the following tables and figures:

Table 1

Responses to 15 Questions

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Sum	Aver.
R 1	1	2	2	2	1	2	2	2	2	3	2	2	3	2	3	31	2.07
R 2	2	1	2	2	2	2	3	2	2	2	1	2	3	2	3	31	2.07
R 3	2	1	2	2	2	2	3	3	2	1	2	1	3	3	2	31	2.07
R 4	2	2	1	2	1	1	3	2	2	1	1	2	3	1	3	27	1.80
R 5	2	2	2	1	3	2	4	4	2	1	2	1	2	1	5	34	2.27
R 6	2	1	1	1	2	2	2	2	1	3	2	1	2	2	3	27	1.80
R 7	1	2	2	2	1	1	2	2	1	2	1	2	2	2	3	26	1.73
R 8	1	2	2	2	2	2	2	2	1	2	1	2	2	1	2	26	1.73
R 9	1	2	2	2	1	1	1	2	1	2	2	1	2	1	2	23	1.53
R 10	2	2	2	2	2	1	2	1	1	2	3	2	3	2	3	30	2.00
R 11	2	1	2	2	1	2	2	2	1	2	1	2	2	1	2	25	1.67
R 12	1	2	2	2	2	2	3	2	2	4	2	1	3	1	2	31	2.07
R 13	1	2	2	2	2	2	3	2	2	4	2	1	3	1	2	31	2.07
R 14	1	2	2	2	2	2	3	2	2	4	2	1	3	1	2	31	2.07
R 15	1	2	2	2	2	1	1	2	1	2	2	2	2	1	1	24	1.60
R 16	2	1	2	2	2	2	2	2	2	3	2	2	3	2	1	30	2.00
R 17	2	1	2	2	4	3	2	1	1	2	1	2	2	1	2	28	1.87
R 18	2	2	3	2	4	2	2	2	3	2	2	3	2	1	3	35	2.33
R 19	2	2	2	2	2	2	2	3	1	1	2	2	2	3	3	31	2.07
R 20	2	2	2	1	3	1	2	1	3	2	2	2	2	1	2	28	1.87
R 21	2	1	2	1	2	1	2	2	2	2	2	2	2	2	2	27	1.80
R 22	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	29	1.93
R 23	2	2	1	2	2	3	2	1	2	1	2	3	1	1	2	27	1.80
R 24	2	2	3	2	3	2	3	2	3	2	2	2	2	2	3	35	2.33
R 25	2	2	2	2	2	2	3	2	2	2	2	2	2	2	3	32	2.13
R 26	2	2	2	1	3	2	2	3	2	1	1	2	1	1	1	26	1.73
R 27	2	2	3	2	3	2	2	2	3	2	2	2	3	2	3	35	2.33
R 28	2	2	1	2	1	1	2	2	2	1	2	1	2	3	3	27	1.80
R 29	2	2	2	1	3	2	3	2	2	1	2	2	2	2	3	31	2.07
R 30	2	2	2	3	2	2	3	2	2	1	2	2	2	2	3	32	2.13
R 31	2	2	3	3	2	1	1	3	2	2	2	3	3	2	3	34	2.27
R 32	1	1	2	2	2	1	1	2	2	1	1	2	2	1	3	24	1.60
R 33	2	2	2	3	2	1	2	2	1	1	2	2	2	2	3	29	1.93
R 34	2	2	3	2	2	2	2	2	2	2	1	2	3	3	3	32	2.13
R 35	2	2	3	2	2	2	2	2	2	2	1	2	3	3	3	32	2.13
R 36	2	2	3	2	2	2	2	2	2	2	1	2	3	3	3	32	2.13
R 37	2	2	2	3	2	2	3	2	2	2	3	3	1	1	2	32	2.13
R 38	2	2	3	1	2	2	3	2	1	3	3	2	3	4	4	37	2.47
R 39	3	2	2	2	3	2	2	3	2	2	2	1	2	2	4	34	2.27
R 40	2	2	2	2	2	1	3	2	2	2	2	2	2	3	4	33	2.20
R 41	2	2	2	3	2	2	2	3	2	2	3	2	3	2	2	34	2.27
R 42	2	2	2	3	2	2	2	3	2	2	3	2	3	2	2	34	2.27
R 43	2	2	3	2	1	1	2	2	2	1	2	2	2	3	3	30	2.00
R 44	2	3	2	2	2	2	2	2	2	1	2	2	2	2	2	30	2.00
R 45	1	2	1	3	2	1	3	1	2	2	2	2	1	2	2	27	1.80
R 46	2	2	2	1	2	2	3	2	1	2	2	1	2	3	2	29	1.93
R 47	1	1	2	2	2	2	2	1	2	1	2	1	2	3	2	26	1.73
R 48	3	2	2	1	2	2	1	2	2	2	1	2	2	2	3	29	1.93
R 49	1	2	1	2	2	2	2	1	2	2	1	2	2	2	2	26	1.73
R 50	2	2	3	1	2	2	3	2	1	2	2	2	1	2	3	30	2
Sum	90	92	104	97	104	88	113	102	91	96	95	90	108	96	129		
Ave.	2	2	2.1	2	2.1	2	2.3	2	2	1.9	1.9	1.8	2.2	1.9	2.6		

Note: Questionnaire survey, 2024.

In this, study, data are filled in the tables and pie charts. The tables have been used for listing the questions included in the questionnaire, respondents' responses according to Likert scale given above. Likewise, pie charts have been applied to show the demographic pictures of data collection.

Figure 1

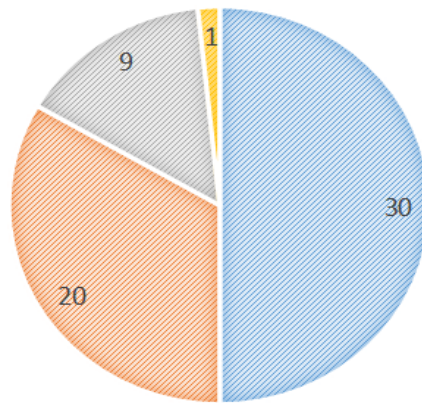*Respondents' Demographic Status*

Figure 1 displays the status of respondents. As given in the figure, the number of grade 10 and 12 students with male and female teachers are shown. Since the study area has adopted the PBL approach to enhance the quality of education, it is necessary to collect the views of learners and facilitators. Figure 1 shows the types of different respondents. As given in in the figure, the number grade 12 students as respondents is the highest, as more project works were given to them to accomplish, and the number of grade 10 students is lesser than grade 12 students. For validity of data, teacher experts were selected. Among them, 9 were male teachers as there were more male teachers in higher level classes and 1 was the female teacher selected as a respondent.

Figure 2
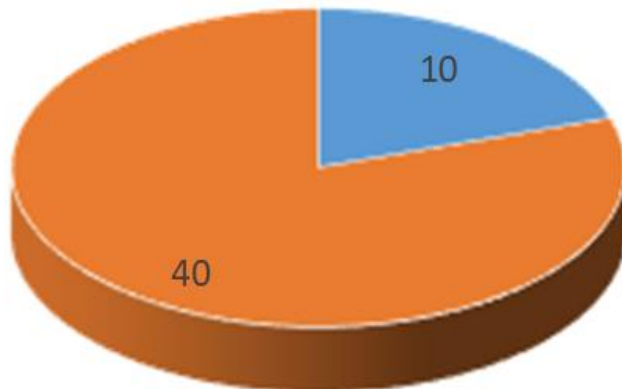
The Proportion of Number of Teachers and Students

Figure 2 discloses the proportion of number of teachers and students. As given in the figure above, there were 10 teachers and 40 students as respondents. The percentage of student-respondents is 80 and the teacher-respondent is 20.
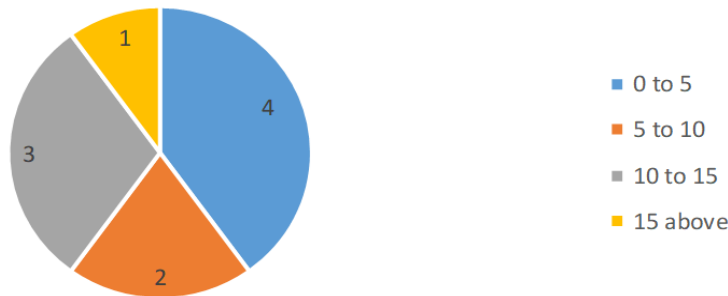
Figure 3
Experience of Teachers

Figure 3 displays the experience of teachers. According to the figure, there are 4 teacher-respondents having 0 to 5 years' experience, 2 teachers having 5 to 10 years' experience, 3 teachers having 10 to 15 years' experience and 1 teacher having more than 15 years' experience.

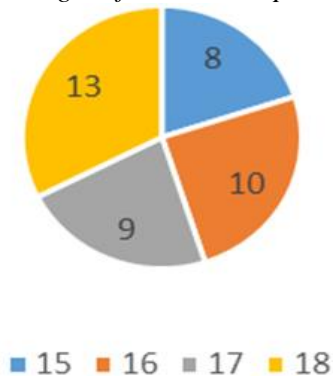Figure 4
The Ages of Student-Respondents

Figure 4 shows the ages of the student-respondents where there are 8 students of 15 years old and 10 are 16 years old. There are also 9 students of 17 years old and 13 are of 18 years old.

As shown in Table 1, the respondents have agreed with applying project works in teaching learning activities to enhance competence. The data show that the average value of 50 respondents remained 2, and Likert scale defines for the average value 2 is for agreement. Among 50 respondents, 12 respondents strongly agreed, 2 respondents neutrally and 36 responded for the second scale in the given Likert scale. Hence, teachers and students have provided a positive response for the inquiry of application of project works in the learning process. Concerning to The second question whether the project works makes students able to solve their problems by themselves, in which the average value of response is 2. It shows that using the PBL approach in teaching learning activities creates the ability to solve the problems.

Furthermore, the third inquiry was to find out the result of the agreement or disagreement of on creating a conducive learning environment from the collaborative activity and the average value is 2.1. It is near to the 'agreed' response, which means that issuing the PBL approach in the learning process creates helpfulness and teamwork among the learners. The project works may develop individually or in a group. Working in a group provides more ideas to accomplish the project works. Hence, it creates a favorable environment for the group work. Likewise, the fourth question is concerned to

essentiality of the project works on the issue of mastery on the targeted works and the average score is 2, meaning that the respondents agreed to the inquiry. The learners and teachers get the mastery over the time when they get through the project works. A continuous work creates better competence on the learners and teachers.

The response of the questionnaire shows an agreement for the statement of the fifth inquiry. The fifth question is concerned with students to make them busy in their studies, and the average value for the variable is 2.1 that is near to 'agreed' definition in Likert scale. The agreement shows that most of the respondents are agreed to the statement. The sixth statement relates to promoting a self-study environment and the response for the statement is 'agreed' scoring 2 average value in the Likert scale. Therefore, it is analyzed that the learners promote their self-study habit when they practiced the project works during their teaching learning activities. As all-round development of the learners through PBL is expected, the respondents are with 'agreed' scale having 2.3 average value in Likert scale that is near to value 2 in the statement number 7. Thus, it strengthens personality of the learners with all-round development.

The eighth statement, however, deals with strengthening hard and soft skills of the learners, and the average value is 2 that shows the respondents' agreement with the given statement. Soft skills are used to develop the presentation and hard skills are acquired through competence. Personality develops when the hard skills expose with better soft skills, and the respondents agree, which means that the projects works make the skills applicable in the entire life. Following the statement number 9, the project works are highly useful to create self-confidence. It develops when the participants pass through difficulties, but the project works provide that the capacity to bear and defend the hardship, thus making anybody self-confident. The average value is 2, which signifies that the respondents agreed the given statement. Analogously, in the statement number 10, the average value is 1.9 that is adjoining to 'agreed' as a response. The statement reads like this: 'It is applicable in school level teaching.' The questionnaire was distributed to teachers of different subjects, including science, social studies, mathematics, and languages. According to the statements presented in the questionnaire, PBL is highly applicable in different subjects in school teaching learning activities.

PBL is to involve the learners in a practicable teaching learning activities. The respondents are highly agreed in the statement number 11, having an enquiry that PBL enhances the principle of 'Learning by doing' with the average value 1.9, which is near to the 'agreed' response. As value 2 is for the agreed point, this statement has a nearer value among 15 different statements. As the statement number 12 having the query that PBL erupts the inherent ability, the respondents agreed with the average value 1.8 as the value 1 is for 'extremely agreed,' this statement has the nearest value among 15 different statements. Therefore, this statement can be taken as the highest agreement question among all. The learners may find their inherent ability in which they explore when they get opportunities, undoubtedly PBL provides the learners to expose their hidden capacity. The statement 13 relates to the development of social values because of PBL. The social values such as truth, love, non-violence, goodwill, tolerance, and empathy develop in the PBL approach. With an average value of 2.2, near to 'agreed' in Likert scale, the respondents have positive responses for the statement 'It develops the social values'. Accordingly, it can be accepted that the PBL approach develops social values.

In addition, the response of the statement 'It supports for professional life' has the average value of 1.9 that is near to 'agreed' in Likert scale. It means that the respondents have an agreement to the statement. Nevertheless, the professional life develops with applying soft skills to expose the hard skills, which can be promoted with

a constant follow up and the constant follow up is possible with the project works' skill. The last question deals with economic development, but reluctantly the Likert value scale falls to average 2.6 that is near to 'neutral' as it means that the respondents are not very interested on the statement or they are not sure about the given statement. This is only one question that is not agreeable to the respondents.

Figure 2 discloses the proportion of number of teachers and students. As shown in Figure 4, there were 10 teachers and 40 students as the respondents.

Table 2

The Responses of Teachers to the Given Statements in the Questionnaire

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12	Q 13	Q 14	Q 15	Sum	Ave.
R 1	2	2	1	2	1	1	3	2	2	1	1	2	3	1	3	27	1.8
R 2	2	1	1	1	2	2	2	2	1	3	2	1	2	2	3	27	1.8
R 3	1	2	2	2	1	1	2	2	1	2	1	2	2	2	3	26	1.73
R 4	1	2	2	2	2	2	2	2	1	2	1	2	2	1	2	26	1.73
R 5	1	2	2	2	1	1	1	2	1	2	2	1	2	1	2	23	1.53
R 6	2	2	2	2	2	1	2	1	1	2	3	2	3	2	3	30	2
R 7	2	1	2	2	1	2	2	2	1	2	1	2	2	1	2	25	1.67
R 8	1	2	2	2	2	1	1	2	1	2	2	2	2	1	1	24	1.6
R 9	2	1	2	2	2	2	2	2	2	3	2	2	3	2	1	30	2
R 10	2	1	2	2	4	3	2	1	1	2	1	2	2	1	2	28	1.87
Ave.	2	2	2	2	2	2	2	2	1.2	2.1	1.6	1.8	2.3	1.4	2.2		

Note: Questionnaire survey, 2024.

Table 2 exhibits the responses of teachers to the given statements in the questionnaire. As given in the statement 14, the teachers agreed to the statements, which showed that the statement 14 has the average value 1.4, suggesting strongly agreed to the statement. It is observed for validity and reliability.

Discussion

The study explored that the PBL approach enhances the quality education though the current teaching learning activities is unable to meet the objectives of quality as the learners are not being engaged in such projects. The principle of teaching is to create competence in the learners so that they can be creative and can acquire life skills. To explore the issue, the study has been conducted among the learners and facilitators, using the questionnaire in exploratory research design. The quantitative data were collected and used to explore the issues raised in this study.

The area for the study was selected on the basis of the study's significance as it directly concerns with the teaching learning activities. To make the study valid, 10 teaching experts were selected who have been teaching for fifteen to thirty years. Their responses were examined and analyzed. Later the learners were engaged into the projects of taking interview, presenting it in the mass through video medium, developing quiz questions, and organizing the program by themselves, creating a composition on the current issues and presenting them. These activities were productive to develop confidence in them and to expose their abilities, which is done according to their responses for the questionnaire. The results show that PBL can be highly utilized for the concept development that would be beneficial in their professional lives.

As the past experiences in teaching learning play an important role in the classroom context, PBL has been accepted as a new and advance approach. The results have also showed that the project works according to the subject matter and interest of the learners, applying their complete effort to accomplish their tasks. They act as seriously as it is their ultimate purpose. Therefore, creating awareness and motivation is

a major task of PBL. Thus, it is a claim of this study that an application of project work can play a pivotal role in modern day teaching learning activities. Learning is a process to get oneself exploring something useful in the course of life. It is insightful that provides the knowledge to build up the foundation of creative life. Previously, the teachers used to apply grammar translation method in which creativity is almost under the crust but at this present time, the learners are being involved in the respective project works who get better opportunities to develop their qualitative lives with creativity.

The study was conducted by collecting data through questionnaire. The respondents were teachers and learners.

The findings of the study may be helpful for the policy making process. It is very useful for the curriculum developers to apply PBL in teaching learning activities. Curriculum Development Centre (CDC) may utilize the findings of this study in reconsidering the assessment system so that it can include the PBL approach in its curriculum.

CONCLUSION

The current situation of teaching learning activities does not full-fill the demand of the modern technological learners. It is significant to lead the twenty-first century students on the way of learning by doing. They can develop their professional career based on their capability, using a PBL approach. Leaving the traditional lecturing method, the new PBL approach needs to be applied. Out of 50 respondents, 40 respondents agreed for PBL including teachers and students.

The changes are possible when the thoughts change first. It is a must for the new generation to adapt to a technology-based method of teaching learning. The new generation has to be given skills when they are trained to do from their own activities in order to develop their quality and experience. The skills lead the learners to acquire permanent development, which help achieve sustainability in learning. Therefore, the PBL approach generates sustainable education.

CONFLICT OF INTEREST DECLARATION

I hereby wish to declare that I do not have any conflict of interests to disclose. However, I declare that the manuscript has not been published before and is not being considered for publication elsewhere.

AUTHOR CONTRIBUTIONS

I declare that this manuscript is originally produced by me.

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