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A study on impact of Co-operative Problem Based Learning (CPBL) in upgrading critical thinking and scientific practices of teachers

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The present study examines the impact of exploratory design process of an intervention (CPBL) on critical thinking and scientific practices of teachers in the teaching learning process. This study includes a purposive sample of 31 students following the Bachelor of Education (BEd) Degree and 17 students enrolled in the Postgraduate Diploma in Education (PGDE) Program using one group pretest posttest design related to quasi experimental design. Both qualitative and quantitative methods are used for data collection and analysis. After the CPBL intervention, pre-service and in-service participants' performance in critical thinking and scientific practices is very high, increasing the mean values from 34.55 to 70.03 and from 38.76 to 70.82 respectively. However, the posttest difference between the two academic groups is not significant at 0.05 alpha level ($t=-0.184$, $p>0.05$). It revealed that participants in both groups have been able to achieve higher scores for four components of critically thinking and scientific practices than the pretest. The mean difference between the pretest and the posttest is significant (BEd) =0.137, P>0.050) and t (PGDE) =0.168, p>0.05). Wilcoxon Signed Rank test results (Z(BEd)= -4.842 and (Z(PGDE)= -3.624, p>0.05) confirming that there is a positive impact of the utilized intervention on development of critical thinking and scientific practices of the participants in relation to the teaching learning process. It also reveals that the participants had critically thought of what they practice in the act of teaching and the effect of CL activity of Double Entry Journal Paired Annotations as a basic Co-operative Learning (CL) activity is prominent in uplifting critical understanding of the basic issues of T-L process. Impact of the complicated CL activities of think pair share, number heads together**,** group investigation, and jigsaw is considerably high in enhancing scientific practices related to scientific method in the act of teaching. It further reveals that a majority are in agreement with the value of the scientific method in framing one's mind scientifically. A majority of the two academic groups are also in agreement with most of the positive aspects of the co-operative learning experience. It is noteworthy that the participants in both programs of study agree with most of the benefits of CL. Yet, they consider that CL is a time wasting activity and it is difficult to achieve personal targets through CL (61.29% of BEd and 58.82% of PGDE).

Keywords: Co-operative Learning (CL), Problem Based Learning (PBL), critical thinking, scientific practices

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