

**TEACHERS' PERCEPTIONS ON THE IMPACT OF CONTINUOUS PROFESSIONAL DEVELOPMENT TO PROMOTE QUALITY TEACHING AND LEARNING OF CHEMISTRY: A CASE OF RWAMAGANA SECONDARY SCHOOLS, RWANDA**

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**ABSTRACT**

The study was designed for the purpose of investigating the chemistry teachers' perceptions on the impact of Continuous Professional Development (CPD) in promoting quality teaching and learning of chemistry. The qualitative approach and multi-methods sequential research designs were used in this study. Closed-ended questionnaires, semi-structured interviews and focus group discussions were used to collect data. The collected data were thematically analyzed. Twenty-four participants including 5 head teachers, 4 deputy head teachers in charge of studies and 15 chemistry teachers were involved in this study. Data from both questionnaires and interviews were transcribed verbatim and analyzed thematically. The findings showed that chemistry teachers recognize the impact of CPD programs as it enhances their pedagogical and content knowledge development, to improve the quality of teaching and learning of chemistry. However, the results revealed that CPD activities do not promote students' learning directly. Additionally, the study proved that chemistry teachers have positive perceptions towards the impact of CPD programs. The study recommended that a well-structured systematic policy related to teacher's continuous professional development must be developed at national level. Further research to explore the impact of CPD activities on promoting the student learning in Rwanda should be undertaken. [*African Journal of Chemical Education—AJCE 12(2), July 2022*]

**INTRODUCTION**

For any nation to attain the quality education , it requires many factors such as qualified teachers that are well equipped with the necessary pedagogical content knowledge (PCK) and skilled school leaders with a need school leadership [7]. However being qualified does not mean that you are well equipped with knowledge, skills , attitudes and values to provide the quality education [11]. This is explained by fact that education is dynamic, and teachers have to be regularly updated with the new approaches that are trending in recent era [9].

Over the past years, a new consensus has emerged that the teacher quality is one of the most significant factors for students' achievement and educational improvement [16]. Teachers need to be empowered to further develop expertise in subject matter content, technologies, and other essential elements that lead to high standards or quality teaching [1]. In Rwandan education, teachers were underpinned to be updated by the introduction of the competence-based curriculum (CBC) in 2015 through which learners need to acquire necessary competences to be successful in the 21<sup>st</sup> century. Teachers were encouraged to implement the CBC despite some constraints for improving the quality of Education [10]. To support the effective implementation of CBC, teachers were equipped with skills and knowledge as a solution to implement efficiently the CBC. The implementation of CBC demanded that teachers had to pass through different models of continuous professional development (CPD) [2].

Teachers are the first to undertake an important task to bring the change to any education system [5]. According to [11], the quality of education cannot go beyond the quality of the in-service teachers and school leaders since students' learning is the harvest of what goes on in the classroom. According to [15], teachers and their continuous professional development (CPD) are crucial in determining the success of any educational reform directly and the future of the society indirectly. Professional development in general involves the career-long processes and related system and policies designed to enable educators (teachers, administrators, and supervisors) to acquire, broaden, and deepen their knowledge, skill, and commitment in order to effectively perform their work roles [13]. The stages of professional development for teachers in general consist of pre-service training, induction program and in-service training known as continuous professional development [4].

Teacher training is fitted with career to develop understanding and basic skill in learning process. Teachers have to be professional in teaching and grow in their career continuously [1]. The recent research done here in Rwanda related to CPD of teachers were focused on the importance of CPD program for teachers but there is no empirical evidence which show the effect of CPD on students' learning [14].

The following research questions guided this study for a better understanding the impact of continuous professional development on the quality of teaching and learning chemistry.

1. What are the perceptions of chemistry teachers on the role of CPD in teaching and learning chemistry?
2. How can the CPD impact on the improvement of student's performance in chemistry?

## **METHODOLOGY**

In this study, multi-methods sequential design and qualitative data were used to collect data from completing questionnaires, focus group discussions and semi structured interviews.

The target population of the study was composed of 15 chemistry teachers, 4 deputy head teachers in charge of studied and 5 head teachers from secondary schools found in Rwamagana District. However, the sample population of the study was purposively selected from the five selected secondary schools and a total of 24 participants were involved within which 15 are chemistry teachers, 4 deputy head teachers and 5 head teachers. The participants were chosen in such way that chemistry teachers had completed continuous professional development course in coaching and mentoring while the head teachers and deputy head teachers in charge of studies completed Continuous Professional Development Diploma course in Effective School Leadership (CPD-DESL) in 2019 delivered by University of Rwanda-College of Education (UR-CE) in partnership with Rwanda Education Board and VVOB Education for development [17].

Questionnaires and focus group discussions are separated but ‘connected’ [18]. The focus group discussion was done with all the chemistry teachers at focus school. Semi-structured interviews were done by chemistry teachers, head teachers and deputy head teachers in charge of studies guided by the researcher. The interview guide was made up of open-ended questions to permit the researcher to gather accurate information. The questionnaires used were different for chemistry teachers and schools’ leaders and were made off two parts, one part for correction of participant educational background and part two for correction of views up on continuous professional development programs. However, some questions were cross-cutting for ahead teachers, deputy head teachers in charge of studies and chemistry teachers.

To confirm the validity of the study, the research instruments were checked by three experts (3 evaluators) from University of Rwanda-College of education prior to the starting of the study in view of the study’s objective. Reliability was proved by incorporating the audit trail. Before drawing conclusions from the findings, the recordings, filled questionnaires and transcripts from interviews audios were sent to 3 experts to ensure that only decisions were taken from participants ‘responses and not affected by investigator intentions.

The participant identification was anonymous and confidential kept before to proceed data collection. Permission from district office was got, consent form has been given to each participant to agree to participate voluntary. To optimize the trustworthiness of the study transcriptions from interviews, the transcripts were sent back to the interviewees to make sure that there is no added

information to their views. Data were analyzed through qualitative methods whereby thematic approach were employed to finds results related to the research question. This method was used in this research because the researcher wanted to investigate the peoples 'perception on the impact of Continuous Professional Development in promoting quality teaching and learning of chemistry.

## **RESULTS AND DISCUSSION**

### **Perceptions of chemistry teachers on the role of CPD activities in teaching and learning**

When analyzing the findings from all sources either from transcripts of interviews or from the ticked or selected answers in questionnaires. Findings from chemistry teachers in all the selected schools were analyzed to discover their perceptions towards the impact of participating in different planned CPD activities at their schools. Peer tutoring (peer teaching), lesson study and Community of practice were identified by all chemistry teachers as the most CPD activities frequently performed and beneficial at school. The findings from focus group discussions and semi-structured interviews again showed that when teachers share experiences and views about any concept and giving feedback through collaborative learning, results to improvement of teacher's practices and knowledge retention. This is in agreement with the findings of the study of [6] where they found that college of teachers' education graduate and saying that are finished products, rather they need professional development through collaboration with senior teachers for exchange of experiences.

All of the 5 head teachers and 4 deputy head teachers in charge of studies confirmed from the questionnaires that Community of Practice, lesson study and peer teaching are the most CPD strategies that are effective and teachers benefit more from them to improve their teaching practice. On other hand, the attendance in workshop, trainings, involvement in action research, case study discussion and field visit were highlighted from questionnaires as the least beneficial strategies of CPD and are identified as passive CPD activities.

The figure 1 below indicates chemistry teachers' perceptions on the benefits (role) of CPD activities during their teaching practices.

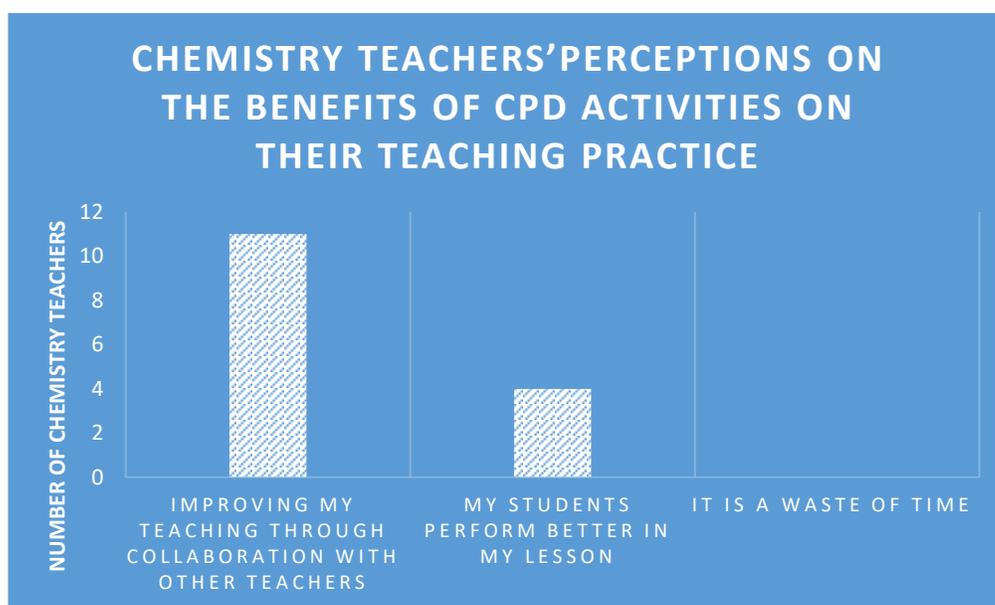


Figure 1. Chemistry teachers' perceptions on the benefits of CPD activities.

With the results presented in figure 1 above, it shows how chemistry teachers perceive the benefit of CPD activities for both improving teaching practices and affecting students ‘performance. 11 out of 15 teachers emphasized that CPD programs help them to improve their teaching practice while only 4 out 15 agreed that CPD programs affect students ‘performance.

The following figure 2 indicates the views of Head teachers and Deputy head teachers in charge of studies on how CPD activities improve teacher’s teaching practice.

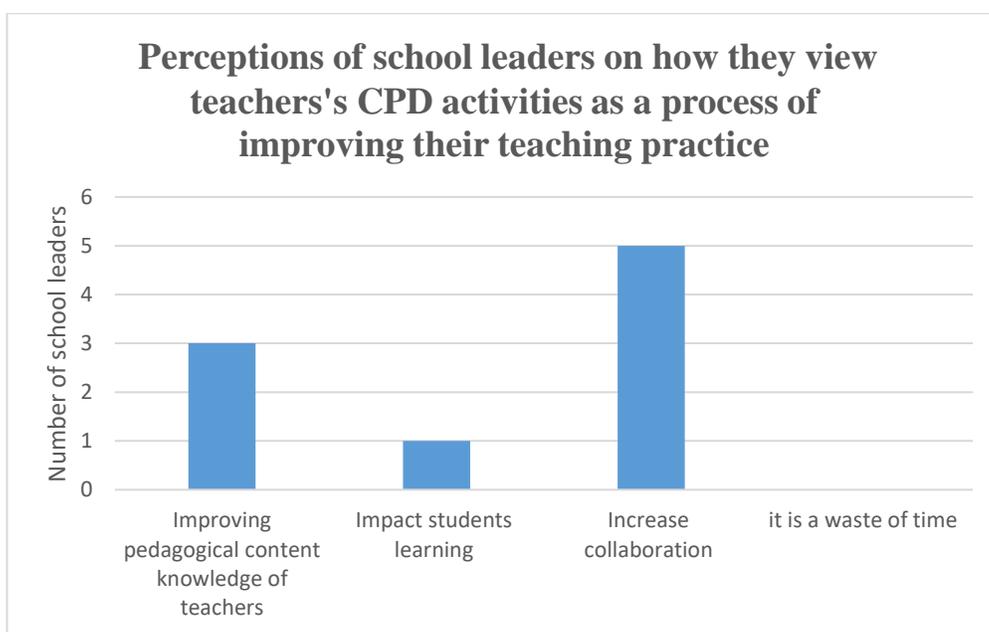


Figure 2. The perceptions of school leaders on teachers’ CPD activities

From the figure 2 above, the results showed that 5 school leaders perceive that CPD activities increase collaboration of teachers, 3 school leaders agreed that CPD activities improve pedagogical

and content knowledge while only 1 school leader agrees that CPD activities can impact students' performance. This is in agreement with the study conducted by [13]. He said that to improve teaching in the classroom, professional development activities must be collaborative, long term, and content driven.

The following figure 3 shows the findings from questionnaires completed by chemistry teachers, head teachers and deputy head teachers in charge of studies on types of CPD activities that carried out by teachers at school and their frequencies.

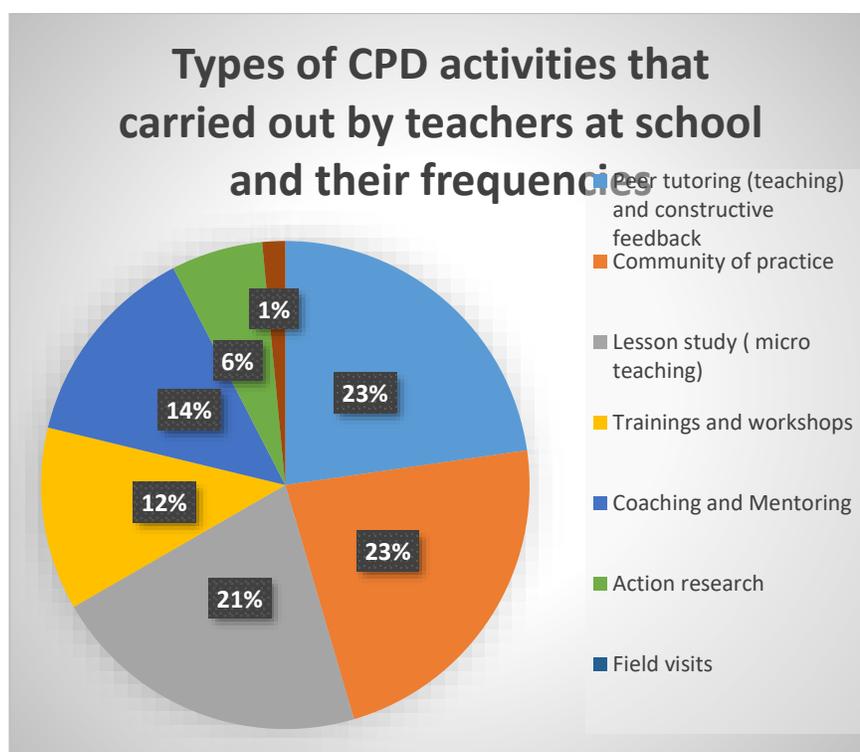


Figure 3. Different types of CPD activities that teachers carried out at school level

From the figure 3 above, the findings show that peer teaching (tutoring), constructive feedback, community of practice and lesson study were reported as the most practical activities done in all the schools. Both peer teaching and community of practice represented each 23%, microteaching represented 21% followed by coaching and mentoring (14%), training and workshops (12%). Action research and case study discussion represented less than 10% while field visits represented 0%. These findings are in agreement with those of [12] who found that peer teaching, community of practice and microteaching are the main activities that are beneficial for teachers because they make teachers to be actively involved in their teaching. Workshops, trainings, coaching and mentoring, case study are not commonly done at all Schools.

Finally, from the results, researcher confirmed that both chemistry teachers and school leaders have positive perceptions towards the impact of CPD activities in broadening pedagogical content knowledge. However, the results showed again there is no evidence to demonstrate the direct impact of CPD activities on students learning. This is supported by some authors in their literatures such as [6], [2]. All confirm that through CPD programs, teachers enhance their PCK and contribute a lot to their teaching practice but CPD effect to students' learning is not demonstrated empirically.

**Challenges that hinder teachers’ participation in CPD activities**

All the participants interviewed highlighted some of the challenges or difficulties faced in relation to their professional development experiences. The figure 4 below shows the challenges by teachers during CPD activities.

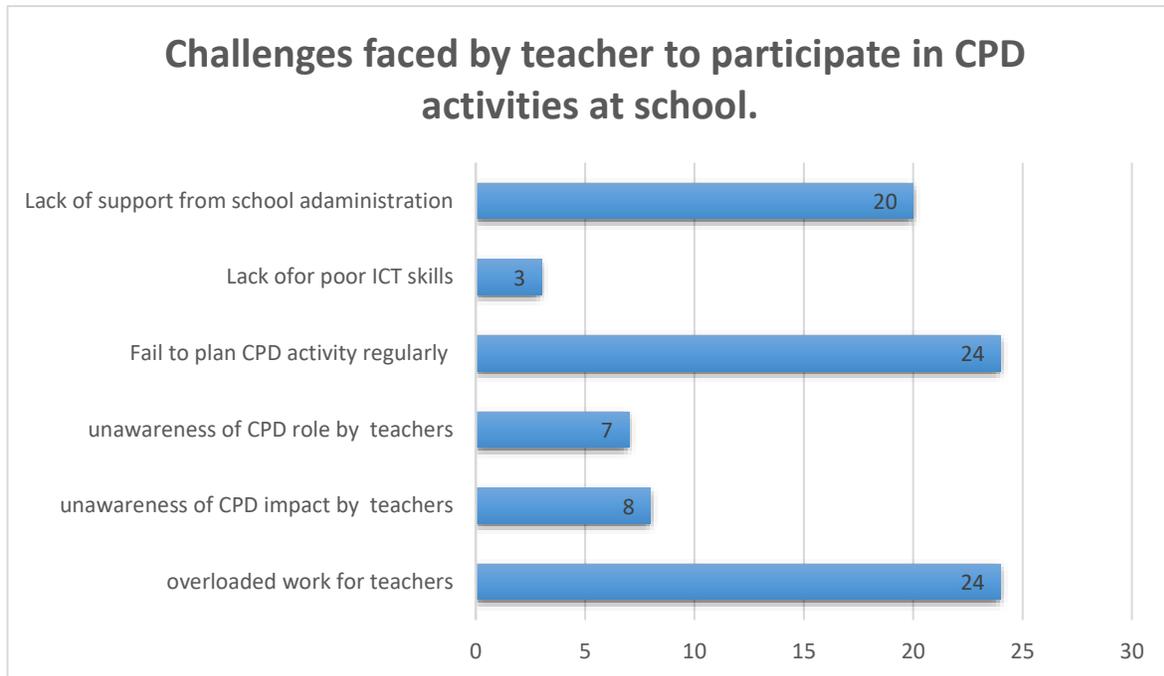


Figure 4. Challenges faced by teachers to participate in CPD activities

The figure above showed that the most challenges faced in the implementation of the CPD programs at school level include lack of sufficient time (overloaded work for teachers), fail to plan

CPD activity regularly (poor planning), lack of CPD framework, and lack of support from School Leaders (Figure 4).

The findings from the above Figure showed that all the mentioned challenges can hinder teachers to participate in different CPD activities. However, they don't affect CPD programs at the same pace. For example, all the 24 participants through completing questionnaires, mentioned that lack of CPD framework (fail to plan CPD activity regularly) and overloaded work for teachers (lack of sufficient time) as the most challenges that hinder the effectiveness of CPD programs.

The participants highlighted some of the barriers identified as limiting the opportunities available for teachers to engage in more school-based professional development. The biggest barrier identified is time. Chemistry teacher from one targeted school said:

*For us, the most concerns we encounter, I can mention overloaded timetable and lack of opportunities to be engaged in such activities; to get time for those activities is not easy". "The challenge we face here is daily workload and insufficient time. Sometimes, the CPD activity is organized after the class is ending when all the teachers are tired.*

Chemistry teachers emphasized that they had problem to find a suitable time to formally meet and discuss issues related to their practice with their colleagues. Lack of well-planned CPD activities, insufficient support from the school administration, Overloaded timetable for teachers were mentioned from both 24 interviews and 24 questionnaires like barriers for teachers to participate in CPD activities. However, they do not hinder teachers at the same rate. This was

emphasized by [3], [14], they showed in their findings that lack of teachers' motivation, lack of CPD plan, minimal support and monitoring from school should affect teachers to be involved in CPD activities.

### **The impact of CPD on the improvement of student's performance in chemistry**

When analyzing data from interviews and questionnaires about the impact of CPD activities on students' performance, both school Leaders and Chemistry teachers emphasized that CPD activities can improve teachers' pedagogical content knowledge through collaboration especially when CPD activities are well organized and performed especially when community of practice is empowered. However, the discrepancy between teachers' perceptions towards the impact of CPD activities to the students' learning and school leaders was mentioned. 13 of 15 chemistry teachers said that CPD activities can indirectly impact students' performance, on other hand, results from School Leaders showed that there is no clear evidence indicating that CPD activities impact on students' learning directly. This is due to the fact that students' performance is influenced by many other factors rather than CPD activities. This agreed with findings of [2] and [12] who found that CPD activities help teachers to improve PCK but there is no evidence showing their direct impact on students' performance.

## CONCLUSIONS AND RECOMMENDATIONS

This study aimed at investigating teachers' perceptions on the impact of continuous professional development to promote quality teaching and learning of chemistry. The findings from the study showed that both chemistry teachers and school leaders have a positive perception towards the impact of CPD activities on broadening teachers' pedagogical content knowledge. However overloaded timetable, shortage of time, lack of support for teachers from school administration and lack of CPD framework were found as the challenges to effective implementation of the CPD programs at school level. Collaborative learning, lesson study, and peer teaching (tutoring) were identified as CPD activities to improve teachers' PCK and teaching practices.

This study was limited only to small geographical scale of Rwanda. Thus, the findings should not be generalized to the country level. The data collected also was limited to only chemistry teachers and school leaders who attend CPD course. Thus, the results may not be generalized to all chemistry teachers and school leaders.

Based on results of the study and the limitation mentioned, the present study recommends that (i) School leaders have to provide the necessary support for teachers and create a good collaborative school climate whereby the teachers' needs are pinpointed. (ii) The government should assess the policy governing teachers' CPD programs. (iii) The government should adjust the financial structural resources in different educational aspects so that the emphasis should be put on teacher's CPD activities which help teachers to promote quality of teaching and learning. (iv) A well-

structured systematic CPD policy which explain clearly the CPD framework at school level has to be developed and inserted into teacher's weekly timetable. (v) Lastly, further studies to examine the impact of CPD activities on students 'performance have to be done.

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### CONFLICT OF INTEREST

Author declares no conflict of interest

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