



Perception of the Continuous Professional Development Programs among Secondary School Heads and Teachers of Biology in Gicumbi, Rwanda

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Abstract: The purpose of this study was to find out how teachers felt about Continuing Professional Development in biology. This study used the descriptive research design. The population used in this study was 133 individuals including 73 O'Level biology teachers and 60 school head teachers. The sample size for the study was 100 persons selected randomly. Data gathered through questionnaire and an interview. Descriptive statistics was used to analyze the quantitative data while the thematic technique was used to analyze the qualitative data. The results showed that teachers had positive attitude toward CPD since it had aided in their professional development and it improved the academic performance of their students. It is suggested that more training opportunities be provided to support teachers' professional development. By removing barriers to participation and providing financial support, CPD programs will have a greater impact on the professional development of biology educators.

Keywords: AIMS; Biology; CPD; Students' performance.

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Introduction

Various countries have implemented activities for Continuing Professional Development (CPD) in teaching and learning. CPD in education has been implemented in Japan using audio-visual movies, with a focus on teaching such science subjects as biology for a set period of time. The attended CPD was planned to compare the learning outcomes of students' interactions with the biology test score. It demonstrated improved students' performance at 80% as a result of a high level of interest and motivation in learning and as a result, more girls began to perform exceptionally well in science subjects (Darling-Hammond et al. 2010). Rwanda has not lagged behind in terms of the CPD Implementation. A variety of CPD strategies have been devised to support teaching and learning. This is done to supply teachers with new teaching skills and competencies.

The Ministry of Education created and implemented a CPD framework in all secondary and elementary schools in collaboration with the Rwanda Basic Education Board (REB) and other education partners (REB, 2017). Today, the main issue identified in some schools is lack of adequate CPD training. Some teachers are behind in teaching effectiveness which makes it difficult in helping students to cover the intended curriculum (Srinivasacharlu, 2019). This was due to scarcity of CPD content and expertise, particularly in rural areas of the country.

According to a 2018 report published by the African Institute for Mathematical Sciences (AIMS) in Rwanda, the aggregate of the results from national examinations in S3 Biology from 2013 to 2017

revealed that while 44% of candidates obtained grade 9 at the national level, 47% obtained grade 9 at the Gicumbi District (AIMS Rwanda, 2018). This suggested that the Biology Subject had received better performance in the district. AIMS Rwanda initiated a Teacher Training Program (TTP) in 2019 with the aim of strengthening teachers' capacities in order to improve students' performance. This was done because the biology Senior Three National Examination results at secondary day schools in the Gicumbi region have been consistent for two years without an increase. While AIMS Teacher Training Programme is a type of Continuous Professional Development aimed at improving teaching quality and students' performance in Mathematics and Science (AIMS Rwanda, 2018), there has been a gap in the literature regarding the effect of AIMS CPD offered to biology teachers on students' performance in biology. As a result, this study was conducted in an attempt to fill the gap in the literature. The study was guided by the following research question: What are the perceptions of biology teachers and head teachers about the CPD offered to biology teachers?

Literature Review

Continuous Professional Development

The term Continuous Professional Development refers to the additional education that professionals pursue. CPD typically assists employees in improving their skills at work (Day & Leitch, 2007; Guskey, 2002). To improve personal abilities for use in the business, CPD transforms learning into something deliberate and proactive.



Figure 1: Continuous professional development cycle (Martín, 2015)

CPD is the professionals' all-encompassing dedication to improving abilities and competence (Clifton et al., 2008). This training is mediated by the

inclusion of occupational and practical skills. This enables teachers to become aware of their development trends. CPD plays a crucial role in the

maintenance, enhancement, and expansion of teachers' knowledge, skill and competence (Save the Children, 2014). CPD is the process of creating, maintaining and preserving professional abilities. These abilities may be acquired formally, through training or informally through experience and observing others (Darling-Hammond et al., 2010). It can come in a variety of ways, from team shadowing to peer coaching. It is a tool that is gradually rising in popularity (Martin, 2015). The CPD cycle is depicted in the figure 1.

According to Redman (2018), as CPD involves gathering and determining the progress that a teaching staff has made in improving the professional expertise in comparison to their previous training, digital technology has significantly impacted the teaching profession in the 21st century (Nsabayezu et al., 2020; Nsabayezu et al., 2022a; Nsabayezu et al., 2022b; Nsabayezu et al., 2023a; Nsabayezu et al., 2022b). It is therefore crucial for teachers to incorporate this technology into the teaching of biology (Nsabayezu et al., 2022b). Teachers are hence expected to upgrade their professional skills so that they can keep updated in their respective fields of specialization (Clifton et al., 2008).

Various programs can assist teachers to advance their CPD (Guskey, 2002). These include school-based learning where experienced teachers can mentor fresh teachers by conducting model lessons. There can also be induction for recently recruited teachers in order to support them with the challenges they may face at the beginning of their professional journey. Moreover, CPD can be organized in form of conferences, seminars and symposiums where teachers can present and discuss their innovative ideas (Pedder et al., 2008).

Theoretical Framework

In this study, the constructivism theory by Jean Piaget (1896–1980) was favored since any improvements were based on teachers' prior training or professional experience. Constructivism is a learning theory that promotes active knowledge production by participants. It implies that people build their understanding of the world based on their prior knowledge, experiences and interactions with their surroundings. Learning, according to the constructivist viewpoint, is a process of meaning-making and knowledge production rather than passive information intake (Apple, 2001). During the biology teaching and learning process, the instructor

must provide a cooperative classroom atmosphere where participants have the means and chance to build new understanding by combining experiences from many sources (Nsabayezu et al., 2022c; (Nsabayezu et al., 2022d) Training is required to advance teachers' subject knowledge to provide effective facilitation throughout instruction delivery. The constructivism theory is dealt with CPD training given to Biology secondary teachers since it enhances teachers' subject matter in Biology based on their prior training or experience.

Methodology

Research Design

This study employed the descriptive research design which focuses on describing and grasping the qualities, behaviors or phenomena of a certain group or setting. It attempts to present an accurate and full portrayal of the subject of inquiry without influencing factors or assuming cause-and-effect relationships (Murekatete et al., 2022; Nsabayezu, et al., 2022e). Here, both qualitative and quantitative data were collected and analysed (Sukamolson, 2007). During interviews with head teachers, qualitative data were gathered. Following that, the results were compared and discussed in conjunction with quantitative data from questionnaires completed by biology teachers.

Population and Sampling

The target population for this study was biology teachers and head teachers trained by AIMS Rwanda, mainly in the Gicumbi area. The population included 133 persons from the Gicumbi District's 60 secondary schools, including 73 O'Level biology teachers and 60 head teachers. Among the 133 participants, 100 were randomly chosen to participate in the study.

Instruments

Primary data were gathered with the aid of the questionnaire. The five-point Likert scale was used to develop the structured questionnaire, with 1 denoting "strongly disagree," 2 "disagree," 3 "neutral," 4 "agree," and 5 "strongly agree." Through interview, the heads of schools presented their views.

Statistical Treatment of Data

Quantitative data collected via questionnaire was analysed through descriptive statistics. Qualitative data gathered through interview was analysed using the interpretive and discourse analysis techniques.

Validity and Reliability

To ensure the validity of the instruments, research supervisors' scrutinized the instruments before data was collected from the field. They provided opinions on how the instruments would be improved before venturing into the data collection exercise (Nassaji, 2015). To ensure the required reliability, triangulation, the use of more than one source of data was employed. A pilot study was carried out with some teachers who were not part of the sample and their questionnaire data was run in the SPSS to test the reliability coefficient. The analysis yielded the Cronbach's Alpha of 0.753 which is above the minimal of 0.6. Therefore, the instruments were considered valid and reliable before they were used for data collection.

Ethical Considerations

This study received ethical approval from ACEITLMS and Gicumbi District authorities. Before data collection, all participants were given an equal chance to participate in the study. No questions about the participants' personal lives were asked. Every participant signed a consent form to commit themselves to participate in the study. Anonymity and confidentiality were ensured to avoid exposing respondents' names.

Results and Discussion

This section presents the findings of the study. The results are guided by research questions as appears bellow. Before presentation of research findings, this section begins with the presentation of demographic characteristics of respondents.

Demographic Characteristics of the Participants

Respondents were males and females. They had a minimum of three years of professional experience. They included 100 respondents: 60 head teachers and 40 biology teachers, 54 males and 36 females.

Research Question 1: What is the perception of biology teachers and head teachers about teachers participating in the CPD sessions?

The findings on the perception of biology teachers and head teachers on biology teachers' participating in the CPD session are shown in table 1. Findings in the table show that 88 (88%) respondents agreed that biology teachers attended the CPD programs while Only 12% disagreed. This finding suggests that the majority of respondents considered the CPD programs to be existing and that biology teachers actually attended the programs for professional development.

Table 1: Perception on Teachers' Participation in the CPD Programs

Perception	f	%
Agree	88	88
Undecided	0	0
Disagree	12	12
TOTAL	100	100

Table 2: Perception on the Role of CPD Programs

Perception	f	%
Agree	43	43
Undecided	24	24
Disagree	33	33
TOTAL	100	100

Among the 20 interviewed head teachers, 12 (60%) reported that it is crucial for them to participate in CPD programs for their professional development since it enhances their leadership skills and pedagogical knowledge and promotes reflective practice, enables them to adjust to changes in the educational system, and supports students' various needs. On the other hand, 8 (40%) teachers expressed that by actively seeking out opportunities for learning and growth through CPD, head teachers contribute to raising the standard of their instruction and have a positive influence on the academic outcomes of their students. This is

following the literature which report that teachers who participate in CPD increase the likelihood for students to score above the district median on science curriculum-based assessments (REB, 2017). It is further reinforced by Nunguye *et al.* (2022) who found that professional development programs for teachers based on curricular and instructional strategies have a high probability of affecting students' learning outcomes.

Research Question 2: What is the perception of biology teachers and head teachers about the role of the CPD programs toward teachers' professional development?

This research question sought to establish the perception of respondents about the role of the CPD programs as appears in table 2.

Findings in table 2 show that 43 (43%) respondents agreed that biology teachers attended the CPD programs while Only 33% disagreed and 33 (33%) were undecided. The majority of respondents considered the CPD programs to be fruitful in enhancing the professional development. CPD initiatives are essential for advancing teachers' professional growth. CPD programs further support teachers' ongoing development by fostering lifelong learning, enhancing knowledge and pedagogical abilities, encouraging reflective practice, developing cooperation, and positively influencing the achievement of students (Ukachi & Onuoha, 2014). Head teachers 14 (75%) expressed that the programs offer an essential framework for teachers' development. On the other hand, 6 (25%) said that the CPD program promotes cooperation, inspiration, flexibility in the face of change and possibilities for career progression are all aspects of CPD programs that support the ongoing growth of teachers. Results showed that there is an effect of CPD offered by AIMS to biology teachers on students' performance in biology. Science teachers acknowledge the value of CPD programs since they helped them to increase their pedagogical and content expertise, which enhances the calibre of chemistry teaching and learning as advocated by Bunane *et al.* (2022).

Conclusions and Recommendations

Although individual viewpoints may vary, biology teachers and head teachers commonly recognized the importance and value of CPD courses for teachers' professional development. They appreciated the opportunities for growth, collaboration and continuing learning that CPD provided. It is therefore recommended that more training opportunities be provided to support teachers' professional development. By removing barriers to participation and providing financial support, CPD programs will have a greater impact on the professional development of biology educators and it will increase the quality of biology education.

References

- AIMS Rwanda. (2018). Mathematics and Sciences National exams performance in all districts of Rwanda. Kigali.
- Apple, M. W. (2001). Comparing neo-liberal projects and inequality in education. *Comparative Education*, 37(4),409-423.
- Bunane, J. B., Kampire, E., & Karegeya, C. (2022). Teachers' perceptions on the impact of continuous professional development to promote quality teaching and learning of chemistry. *African Journal of Chemical Education*, 12(2), 96–100.
- Clifton, R.A., Dooner, A.M., Harrison, D. (2008). Stages of collaboration and realities of professional learning communities. *Teaching and Teacher Education*, 24, 564-574.
- Darling-Hammond, L., Chung Wei, R., & Andree, A. (2010). How high-achieving countries develop great teachers. Stanford Center for Opportunity Policy in Education ~ Research Brief, 1-8.
- Day, C., & Leitch, R. (2007). The Continuing Professional Development of Teachers: Issues of Coherence, Cohesion and Effectiveness. In *International Handbook of School Effectiveness and Improvement*. https://doi.org/10.1007/978-1-4020-5747-2_38.
- Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: theory and practice*, 8(3/4), 381-389.
- Martin, E. (2015). Pathways that converge in teacher professional development: Are they present in Spain? *Psychology, Society and Education*, 7(3), 327-342.
- Murekatete, E., Ndayambaje, I., & Nsabayezu, E. (2022). Effect of chemistry teachers commitment on public secondary school student performance in chemistry subject in Nyagatare District, Rwanda. *Journal of Research Innovation and Implications in Education (JRRIE)*, 6, 379–388.
- Nassaji, H. (2015). Qualitative and descriptive research: Data type versus data analysis. *Language Teaching Research*, 19(2), 129–132. <https://doi.org/10.1177/1362168815572747>
- Nsabayezu, E., Iyamuremye, A., Kwitonda, J. D., & Mboniyirivuze, A. (2020). Teachers' perceptions towards the utilization of WhatsApp in supporting teaching and learning of chemistry during COVID-19 pandemic in Rwandan secondary schools. *African Journal of Educational Studies in*

- Nsabayeze E, Iyamuremye A, Mukiza J, Mboniyirivuze A, Gakuba E, Niyonzima FN, Nsengimana T. (2022a). Impact of computer-based simulations on students' learning of organic chemistry in the selected secondary schools of Gicumbi District in Rwanda. *Education and Information Technologies* <https://doi.org/10.1007/s10639-022-11344-6>.
- Nsabayeze, E., Iyamuremye, A., & Urengejeho, V. (2022b). Computer-based learning to enhance chemistry instruction in the inclusive classroom: Teachers' and students' perceptions. *Education and Information Technologies*, 27(3)1–4. <https://doi.org/10.1007/s10639-022-11082-9>
- Nsabayeze, E., Iyamuremye, A., Mukiza, J., Habimana, J. C., Mboniyirivuze, A., Gakub, E., Nsengimana, T., & Niyonzima, F. N. (2022c). Teachers' and students' perceptions towards the utilization of formative assessment rubric for supporting students' learning of organic chemistry. *Journal of Educational Sciences*, 45(1), 124–134. <https://doi.org/10.35923/jes.2022.1.09>
- Nsabayeze, E., Mukiza, J., Iyamuremye, A., Mukamanzi, O. U., & Mboniyirivuze, A. (2022d). Rubric-based formative assessment to support students' learning of organic chemistry in the selected secondary schools in Rwanda: A technology-based learning. *Education and Information Technologies*, 27(4), 1–18. <https://doi.org/10.1007/s10639-022-11113-5>
- Nsabayeze, E., Iyamuremye, A., Nahimana, J. P., Mukiza, J., Kampire, E., & Nsengimana, T. (2022e). The progress in the application of rubric materials in chemistry teaching and students' learning enhancement during 21st century: a systematic review. *Discover Education*, 1(1), 1–8. <https://doi.org/10.1007/s44217-022-00005-y>
- Nsabayeze E, Iyamuremye A, Mboniyirivuze A, Niyonzima FN, Mukiza J. (2023a). Digital-based formative assessment to support students' learning of organic chemistry in selected secondary schools of Nyarugenge District in Rwanda. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-023-11599-7>.
- Nsabayeze E, Iyamuremye A, Nungu L, Mukiza J, Mukama E, Niyonzima FN. 2023b. Online periodic table of elements to support students' learning of trends in properties of chemical elements. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-023-11650-7>.
- Pedder, D., Storey, A., & Opfer, V. D. (2008). Schools and continuing professional development (CPD) in England - State of the Nation research project - Synthesis report. October, 1–77.
- REB. (2017). Teacher Training Manual - Reflections on Teaching Practice and Focus on Assessment (3rd Phase) (Kigali). Rwanda Education Board: Ministry of Education.
- Redman, E., Wiek, A., & Redman, A. (2018). Continuing professional development in sustainability education for K-12 teachers: Principles, programme, applications, outlook. *Journal of Education for Sustainable Development*, 12(1), 59-80.
- Save the Children. (2014). Continuing Professional Development for Improving Literacy Instruction in Rwanda, 8(8), 2-7.
- Srinivasacharlu, A. (2019). Continuing Professional Development (CPD) of Teacher Educators in 21st Century. *Shanlax International Journal of Education*, 7(4), 29–33. <https://doi.org/10.34293/education.v7i4.624>.
- Sukamolson, S. (2007). Fundamentals of quantitative research. Language Institute Chulalongkorn University, 1(3), 1-20.
- Ukachi, N. B., & Onuoha, U. D. (2014). Continuing professional development and innovative information service delivery in nigerian libraries: inhibitors and the way out. *Annals of library and information studies*, 60(4), 269–27.