

## **Professional Development Framework for Biology Educators**

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### **Abstract**

This descriptive study aimed to create a professional development framework for 21st-century biology educators through an analysis of their profile characteristics along the following domains: personal and professional, internationalization, research, and extension environment. It also described the effects of professional development on their teaching effectiveness, 21st-century skills, proficiency levels, contribution and effects of professional development, strengths, and weaknesses. It further identified the motivations, hindrances, and enabling factors that contributed to or hindered their participation in different professional developments. In achieving these, the researcher used questionnaires, interviews, and documents of purposively selected educators in Benguet. The study revealed that most biology educators are female, obtained professorial positions, with diverse teaching experiences, involved in trainings, seminars, workshops, conferences, benchmarking, and study programs. The research highlighted their outstanding performance in Individual Performance and Commitment Review, teaching, and self-reported subject proficiency levels. The study also found that educators frequently encouraged their students to develop 21st-century skills but were not actively involved in internationalization activities. Professional development contributed greatly to content, teaching methods, learning resources, and the well-being of teachers and students, positively affected the level of teaching effectiveness evaluation by students, twenty-first-century skills of biology educators, and their proficiency levels. Their strengths are subject knowledge, professionalism, teaching approach, and approachability while weaknesses all point to the management of learning. Motivations included personal and career development, enhancing university profile, and opportunities, while the hindering factors were time, financial constraints, ethical concerns, and lack of motivation towards professional development. The formulated framework encompasses seven areas: (a) individual professional development plan, (b) mentoring and coaching, (c) collaborative learning communities, (d) multi-modal professional development, (e) integration of 21st-century skills, (f) recognition and incentives, and (g) evaluation and feedback.

*Keywords: Biology education, 21st century skills, internationalization, research and extension, teaching effectiveness, Descriptive Research, Philippines*