

Teacher STEAM Education Supported by Professional Learning Communities: A Meaningful Practice of Teacher Professional Development

Alan C.K. Cheung

The Chinese University of Hong Kong, Hong Kong 999077, China

“All sorts of things can happen when you’re open to new ideas and playing around with things.”

–Stephanie Kwolek

STEAM education is a synergetic, interdisciplinary approach that conflate science, technology, engineering, arts and mathematics to foster creative, critical, and imaginative thinking and skills in students (Lamichhane, 2021). The core of STEAM is innovation and problem-solving. It places premiums on interdisciplinary skills, including inquiry, communication, collaboration, and self-management (Holbrook, 2020). In a world facing emerging challenges and complexities, STEAM education is instrumental in cultivating talents with abilities to integrate multiple-disciplinary knowledge, think critically and innovatively, solve problems voluntarily, and carry out effective collaboration.

Improving teachers’ STEAM literacy is crucial for a successful STEAM education in formal schooling. There are a variety of teacher STEAM literacy training practices including but not limited to curricular reconstruction, project-based training, maker education, and the professional learning community (PLC). Among them, the concept of PLC stands out in recent teacher development research as the infrastructure for supporting teacher-teacher and teacher-researcher collaboration to advance student learning. The PLC is an umbrella term, used to describe several forms of teacher collaboration, such as the “community of practice”, “teacher collaborative community”, “learning team”, “learning community”, “professional learning network”, “problem-solving team”, “collaborative teacher team”, and “inquiry community” (Olsson, 2019). There are commonalities among these practices. Generally, members of a PLC share one or several common goals that relate to educational outcomes and teacher professional development. PLCs encourage communication, collaboration, and mutual assistance from teachers to resolve practical is-

© 2024 Insights Publisher. All rights reserved.



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License

(<http://www.creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed by the Insights Publisher.

sues. PLCs provide opportunities for teachers to access new educational notions, approaches, and strategies. Additionally, PLCs establish mechanisms for regular feedback and evaluation to inform teachers of the improvement they need to make as well as the progress they have made (Yao, 2023).

Melding PLCs with STEAM education is of vital significance for developing teachers' STEAM literacy. PLCs have the potential to increase teachers' theoretical and practical capacities for STEAM education by providing diverse educational resources and creating professional learning environments (Qiao, 2023). Under PLC programs, teachers collaboratively explore interdisciplinary learning projects that require students to apply concepts from science, technology, engineering, arts, and mathematics to solve problems. Such practice-based activities can constantly improve teachers' understanding and application of STEAM education ideas (Ma, 2021).

STEAM training in the form of PLC helps promote teachers' professional development and, in the meantime, contributes to the building of sufficiently competent teaching force for successful implementation of STEAM education (Chen, 2023). *Professional Learning Community (PLC) in STEAM Education: A Hands-on Workshops Sample* in this issue of the journal is an examination of the effects of the Istanbul DSW (Design Skill Workshops) Academy training program on participating teachers' perceptions of key 21st century skills teaching effectiveness, design self-efficacy, and perceptions of interdisciplinary teaching (Gülhan, 2024). Its research findings confirm that the use of professional learning communities like the hands-on workshop is an effective practice in STEAM education.

References

- Chen, Z. (2023). Design and Implementation of the Course "Operation and Adjustment of Robot Workstations" in Vocational Colleges as a STEAM Education Program (Master's thesis). Guangdong Polytechnic Normal University. DOI: <https://doi.org/10.27729/dcnki.ggdjs.2023.000331>
- Gülhan, F. (2024). Professional learning community (PLC) in STEAM education: A hands-on workshops sample. *Science Insights Education Frontiers*, 20(1):3149-3172. DOI: <https://doi.org/10.15354/sief.24.or496>
- Holbrook, J., Rannikmäe, M., & Soobard, R. (2020). STEAM Education-A transdisciplinary teaching and learning approach. In *Science education in theory and practice: An introductory guide to learning theory* (pp. 465-477). DOI: http://dx.doi.org/10.1007/978-3-030-43620-9_31
- Lamichhane, B. R. (2021). STEAM Education for Transformative Mathematics Learning. *Saptagandaki Journal*, 12(1):36-53. DOI: <https://doi.org/10.3126/sj.v12i12.46152>
- Ma, Y. (2021). A Case Study of Collaboration among Members of the Interdisciplinary Teaching Community (Master's thesis). Northeastern Normal University. DOI: <https://doi.org/10.27011/d.cnki.gdbsu.2021-000978>
- Olsson, D. (2019). Improving teaching and learning together: A literature review of professional learning communities. Available at: <https://www.researchgate.net/publication/358221175>
- Qiao, M. (2023). Application of Blended Teaching in Vocational Education Curricula (Master's thesis). Guangdong Polytechnic Normal University. DOI: <https://doi.org/10.27729/dcnki.ggdjs.2023000430>
- Yao, L. (2023). The Role of Anchor Teacher Studios in Teacher Professional Development from the Perspective of PLCs (Doctoral dissertation). Northeastern Normal University. DOI: <https://doi.org/10.27011/dcnki.gdbsu.2023.000145>

Correspondence to:

Alan C.K. Cheung
PhD

Department of Educational Administration and Policy
The Chinese University of Hong Kong
Hong Kong 999077
China

E-mail: alancheung@cuhk.edu.hk

Conflict of Interests: None

Doi: 10.15354/sief.24.co249