

Developing Competencies for Effective Collaboration and Teamwork

Elizabeth E. Ogar, eogar@purdue.edu
Purdue University

Dr. Neil A. Knobloch, nknobloch@purdue.edu
Purdue University

Dr. Hui-Hui Wang, huiwang@purdue.edu
Purdue University

Need for Strategy

Effective teamwork is a coordinated process in which people work toward a shared goal by aligning communication, responsibilities, and effort (Campbell et al., 2025; Klieger, 2026; Lu & Smiles, 2022). Teamwork matters because collaborative learning and work settings are now expected to build communication, critical thinking, teamwork, and adaptability for 21st-century contexts (Meszaros & Csiszarik-Kocsir, 2025). Employers across industries consistently identify teamwork as a critical skill for career success, and this expectation is especially visible in agriculture, education, extension, and STEM-related fields, where collaboration, communication, and problem-solving are central to workplace readiness (Klieger, 2026; McGunagle & Zizka, 2020; McDonald et al., 2024).

Similar concerns appeared in agriculture and STEM, where employers rank being a team player and communicator among the top employability skills and continue to report a mismatch between graduates' technical preparation and their interpersonal and transferable skill development (McDonald et al., 2024; McGunagle & Zizka, 2020). Yet students are often placed in teams without direct instruction in how to collaborate, even though many academic teams struggle with planning, monitoring progress, divide-and-conquer habits, and interpersonal conflict (Campbell et al., 2025). This creates a clear need for a strategy that defines teamwork as a teachable skill set rather than assuming it develops automatically through group work.

Connection to Literature

The literature defines teamwork through both interpersonal and intrapersonal skills. Interpersonal skills include active listening, transparent information exchange, collaborative leadership, negotiation, conflict resolution, and relationship building (Karimi & Farivarsadri, 2024; Loughry et al., 2014; Meszaros & Csiszarik-Kocsir, 2025). Intrapersonal skills include meeting role expectations, monitoring one's own contributions, and adapting to change or ambiguity (Loughry et al., 2014; Meszaros & Csiszarik-Kocsir, 2025). Openness to learning is especially relevant in interdisciplinary teams because it tends to improve decision-making, knowledge sharing, and alignment across diverse perspectives. However, evidence also suggests that unstructured openness or weak peer feedback can dilute innovation (Xiong et al., 2025). Collaboration dispositions also matter; negotiation, advocate-guide behavior, and cooperation are identifiable dimensions, and social collaborative problem-solving skills are associated with these dispositions (Li et al., 2023).

How It Works

The E.O.G.A.R. model (see Appendix) organizes teamwork into five teachable competencies that emerged from semi-structured interviews with faculty who were co-project directors in an interdisciplinary food systems project. The model provides educators with an explicit framework for teaching teamwork rather than assuming collaboration develops naturally.

This strategy makes teamwork skills explicit, observable, group engagement, active listening, and relationship building over time. Practical implementation is strongest when teams use clear goals, role allocation, guided interaction protocols, team charters, and repeated cycles of planning, action, reflection, and adjustment. Peer evaluation, self-assessment, meeting records, progress reports, and formative feedback help teams monitor behavior and identify when additional coaching is needed. Repeated authentic practice also appears necessary for higher-order skills such as shared leadership, team monitoring, role adaptability, and equitable contribution, because group projects alone are usually insufficient.

Results to Date

STEM faculty with 20 to 30 years of experience working across disciplines shared the results of their experiences when collaborators demonstrated explicit, observable teamwork skills, group engagement, active listening, and relationship-building. Results to date suggest that structured teamwork training improves open communication, planning, coordination, goal setting, collaborative problem-solving, performance monitoring, trust, and cohesion. For some participants, cooperative and collaborative learning also appears effective for developing the social skills needed for teamwork, with continued use over time producing the largest gains. Others reported gains in conceptual understanding, interpersonal skills, motivation, discussion participation, and adaptability within groups as being valuable.

Implementation of this strategy has also demonstrated potential to increase participants' awareness of the specific competencies that contribute to successful collaboration. Structured teamwork protocols have been associated with gains in open communication, planning and coordinating, goal setting, collaborative problem-solving, performance monitoring, trust, and team cohesion. They have also been associated with fewer common teamwork problems, including social loafing and interpersonal conflict. However, an important barrier remains, including miscommunication, uneven participation, low trust, remote communication difficulties, and a lower perceived value of teamwork despite skill gains.

Advice to Others

Future work should treat teamwork as a developmental competency embedded across courses and projects rather than as a one-time assignment. A practical first step is to compile a clear inventory of the skills being targeted, then teach them directly through workshops, team-based experiences, role rotation, guided reflection, and actionable assessment. Programs should also strengthen faculty facilitation and institutional culture, because collaboration develops more effectively when teamwork is reinforced in curriculum goals, assessment systems, and everyday teaching practice. Overall, success in collaborative teams is most likely when teamwork is defined through specific, learnable skills, especially listening, openness to learning, adaptability, communication, and shared accountability, and then supported through structured practice and feedback over time.

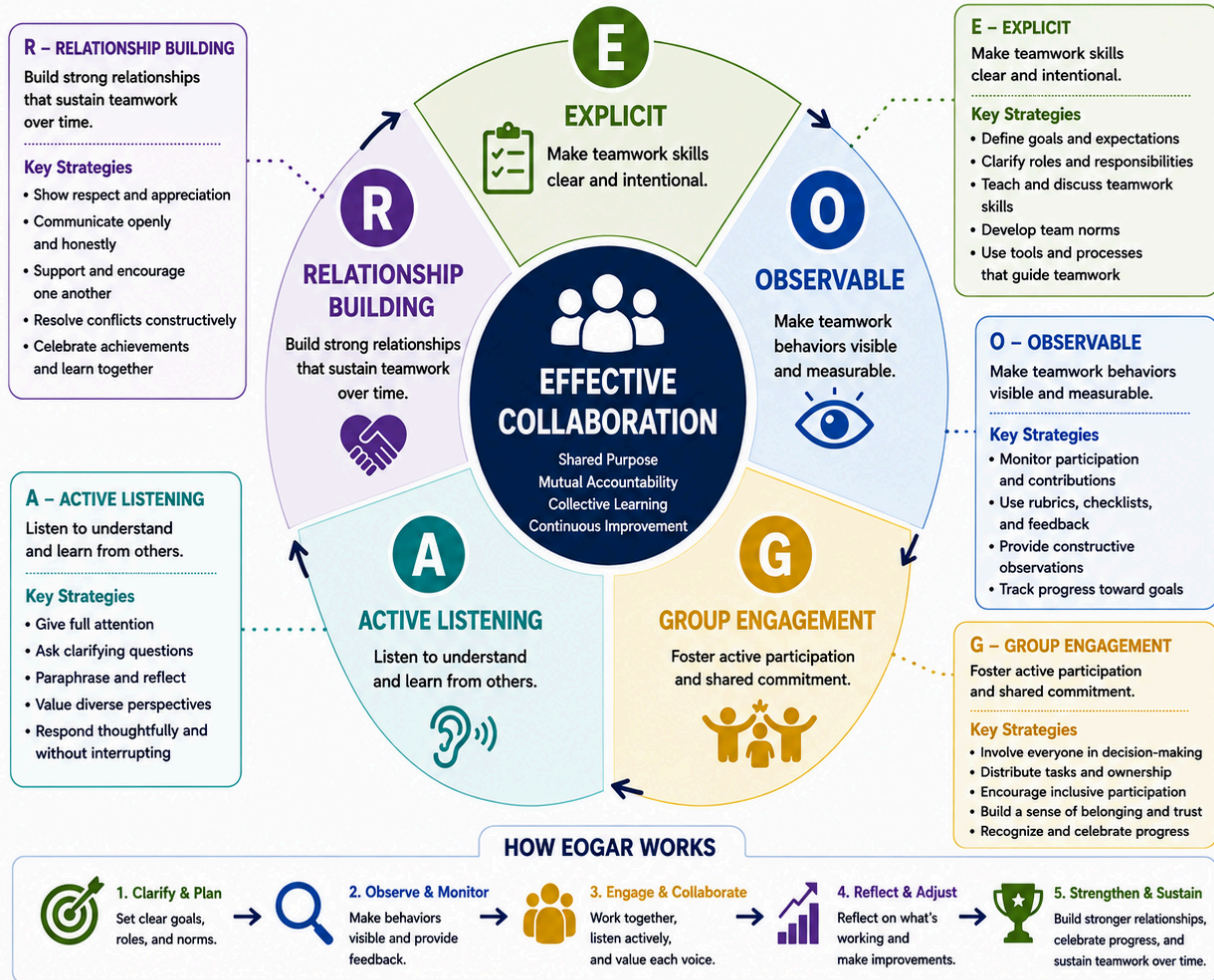
References

- Campbell, C. G., Babik, I., & Crowley, S. J. (2025). Teaching of transferable teamwork competencies in higher education: development of the TWC Training Protocol. *Frontiers in Education (Lausanne)*, 10. <https://doi.org/10.3389/feduc.2025.1637203>
- Karimi, H., & Farivarsadri, G. (2024). Exploring the collaboration skills among architecture students: a quantitative study in north cyprus. *buildings (basel)*, 14(7), 1984. <https://doi.org/10.3390/buildings14071984>
- Loughry, M. L., Ohland, M. W., & Woehr, D. J. (2014). Assessing teamwork skills for assurance of learning using catme team tools. *journal of marketing education*, 36(1), 5–19. <https://doi.org/10.1177/0273475313499023>
- Li, S., Pöysä-Tarhonen, J., & Häkkinen, P. (2023). Students' collaboration dispositions across diverse skills of collaborative problem solving in a computer-based assessment environment. *Computers in human behavior reports*, 11, Article 100312. <https://doi.org/10.1016/j.chbr.2023.100312>
- Lu, H. S., & Smiles, R. (2022). The role of collaborative learning in the online education. *International Journal of Economics, Business and Management Research*, 6(6), 97-106.
- McDonald, N., Luke, J., & Cosby, A. (2024). Non-technical skills needed for the current and next-generation agricultural workforce. *agriculture (Basel)*, 14(7), 1106. <https://doi.org/10.3390/agriculture14071106>
- McGunagle, D., & Zizka, L. (2020). Employability skills for 21st-century STEM students: the employers' perspective. *higher education, skills and work-based learning*, 10(3), 591–606. <https://doi.org/10.1108/HESWBL-10-2019-0148>
- Meszaros, A., & Csiszarik-Kocsir, A. (2025). The importance of soft skills in the 21st century - mapping the background of student group work based on the results of primary research. *International Symposium on Intelligent Systems & Informatics*, 000285–000290. <https://doi.org/10.1109/SISY67000.2025.11205412>
- Xiong, M., Chan, N. N., Wong, B. E., & Xie, X. (2025). Investigating cognitive flexibility and innovation in interdisciplinary project-based learning: the role of openness to learning and peer feedback quality in vocational education. *Frontiers in Psychology*, 16, 1691422. <https://doi.org/10.3389/fpsyg.2025.1691422>

Appendix

EOGAR Model for Collaboration and Teamwork

This strategy makes teamwork skills **explicit**, **observable**, **group engagement**, **active listening**, and **relationship building** over time.



PURPOSE: E.OGAR turns teamwork into an intentional, observable, and learnable set of competencies that lead to stronger collaboration, better problem-solving, and greater impact—over time.