

Strategic Transformation in Engineering Education

Preparing Future-Ready Engineers for the Day After Tomorrow



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Strategic Transformation in Engineering Education: Preparing Future-Ready Engineers for the Day After Tomorrow

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- methods and digital integration. *Frontiers in Education*, 9, .
<https://doi.org/10.3389/feduc.2024.1473766>
- Abildinova, G., Zh, K., Abykenova, D. B., Assainova, A., & Sembayev, T. (2024). Білім берудегі оқытудың белсенді және цифрлық әдістері. *Habarşy - Abaj atyndağy Almaty universiteti. Fizika-matematika seriâsy*, 85 (1), .
<https://doi.org/10.51889/2959-5894.2024.85.1.015>
- Adams, S., Watson, K., & Malave, C. O. (1996). Foundation coalition at texas a&m university: Utilizing tqm and od to manage curricula change.
<https://doi.org/10.1109/FIE.1996.567799>
- Ahmed, S., Naudhani, T., & Wazir, S. (2025). The role of faculty development in enhancing teaching quality in higher education in pakistan. *Social science research archives.*, 3 (3), 1895-1908. <https://doi.org/10.70670/sra.v3i3.1024>
- Ahuja, V. (2023). Faculty development for dynamic curriculum design in online higher education. *Advances in educational technologies and instructional design book series* , 155-175. <https://doi.org/10.4018/978-1-6684-8646-7.ch009>
- Ai, S. (2024). Empowering online teaching: A system Research of online instructors' professional development in higher education. *Interactions: UCLA Journal of Education and Information Research*, 19 (1), . <https://doi.org/10.5070/d41.6661>
- Akçayır, G., Xiong, W., Jin, Q., Rose, K., Basaraba, K., Buchanan, D., Jamieson, M., Kim, M., & McFeetors, P. J. (2024). Enhancing undergraduate engineering education: Collaborative and reflective practices in professional learning programs for instructors and gtas. *Proceedings of the CEEA Conference* , .
<https://doi.org/10.24908/pceea.2024.18526>
- Akçayır, G., Xiong, W., Jin, Q., Rose, K., Basaraba, K., Buchanan, D., Jamieson, M., Kim, M., & McFeetors, P. J. (2024). Enhancing undergraduate engineering education: Collaborative and reflective practices in professional learning programs for instructors and gtas. *Proceedings of the CEEA Conference* , .
<https://doi.org/10.24908/pceea.2024.18526>
- Alkhatib, O. J. (2025). Steam integration and engineering. *Advances in educational technologies and instructional design book series* , 345-374.
<https://doi.org/10.4018/979-8-3693-7408-5.ch015>
- Alves, A. C., Kumpaty, S., Shimek, G., Alves, D., & Leão, C. P. (2024). Shaping the future of engineering education: Exploring trends and insights in asme-imece engineering education conference papers, 2012-2023.
<https://doi.org/10.1115/imece2024-140882>
- Amer, A., Sidhu, G. K., Alvarez, M. I. R., Ramos, J. A. L., & Srinivasan, S. (2024). Equity, diversity, and inclusion strategies in engineering and computer science. *Neveléstudomány* , . <https://doi.org/10.3390/educsci14010110>
- Anakok, I., Hess, J. L., Panuganti, S., Jesiek, B., & Katz, A. (2024). Board 277: Exploring the intersection of diversity, equity, inclusion, and ethics in engineering: Project overview and preliminary results. <https://doi.org/10.18260/1-2--46851>

- Anderson, M., Todd, B., Burkett, S., Warren, G., Brown, M., & Cordes, D. (n.d.). Engineering collaborations with liberal arts. <https://doi.org/10.18260/1-2--5552>
- Arias, G. J. H. (2025). Implementación de canva y genially como herramientas digitales educativas en el proceso de enseñanza-aprendizaje en la educación superior. *Dominio de las Ciencias*, 11 (1), 2049-2070. <https://doi.org/10.23857/dc.v11i1.4284>
- Ariff, M. A., Haikal, J., Nazwa, N. F., Aziz, N. A. A., & Zamri, W. F. H. B. W. (2024). A comparative Research of approaches in the engineering education system in malaysia, singapore, and finland. *Asean journal of engineering education*, 8 (1), 41-48. <https://doi.org/10.11113/ajee2024.8n1.157>
- Arms, V. M., Duerden, S., Green, M., Killingsworth, M. J., & Taylor, P. (1998). English teachers and engineers: A new learning community. *International Journal of Engineering Education*, 14 (1), 30-40.
- Arslan, O., Arslantas, T. K., & Baran, E. (n.d.). Integrating technology into an engineering faculty teaching context: Examining faculty experiences and student perceptions. <https://doi.org/10.1080/03043797.2021.2011148>
- A framework for integrating AI into engineering education, empowering human-centered approach for industry 5.0. <https://doi.org/10.1109/educon60312.2024.10578796>
- Azevêdo, A. L. C. D., Oliveira, R. M. S., Souza, M. B. D., Borges, J. F., & Valente, K. S. G. (2024). Entre a técnica e a reflexão: A integração de tecnologias digitais e metodologias ativas na formação de professores. <https://doi.org/10.46550/me9zpk39>
- Azizan, M. T., Liau, B., & Tuah, N. N. A. A. M. (2024). Empowering educators through technology-enhanced cooperative problem-based learning (te-cpbl). *Asean journal of engineering education*, 8 (2), 136-146. <https://doi.org/10.11113/ajee2024.8n2.178>
- Backer, P. R., & Sullivan-Green, L. E. (2016). Integration of general education into the senior capstone class in engineering. <https://doi.org/10.18260/P.25423>
- Bakilapadavu, G., & Shekhavat, S. (2013). Integrating humanities and liberal arts in engineering curriculum: Need, experiences and new directions.
- Bansal, S. K., Gaffar, A., & Dalrymple, O. (2015). Building faculty expertise in outcome-based education curriculum design. <https://doi.org/10.1109/FIE.2015.7344100>
- Bansal, S., Kyle, A. M., Brightman, A. O., & Amos, J. R. (2023). Approaches to address new abet diversity, equity, and inclusion criteria in biomedical engineering curricula. *Biomedical engineering education*. <https://doi.org/10.1007/s43683-023-00116-4>
- Baran, E. (2016). Investigating faculty technology mentoring as a university-wide professional development model. *Journal of Computing in Higher Education*, 28 (1), 45-71. <https://doi.org/10.1007/S12528-015-9104-7>
- Bari, L. (2025). Connecting academia and industry: Change management in curriculum co-design. Industry and higher education. <https://doi.org/10.1177/09504222251354894>

- Bayles, T., Morrell, C., Staklis, S., & Jordan, K. D. (2024). Work in progress: Broadening participation in engineering with the stem excellence in engineering equity (seee) project. <https://doi.org/10.18260/1-2--44121>
- Bennet, R., Beston, W., Dickson, M., Gerty, J., & Ruggier, P. (1998). Integrated learning: Engineering science, english, and orientation. <https://doi.org/10.1109/FIE.1998.736905>
- Bernhardt, K. L. S., & Rossmann, J. S. (2019). An integrative education in engineering and the liberal arts: An institutional case Research.
- Bernhardt, K. S., & Roth, M. J. S. (2002). Active ethics: Philosophy, cases, and writing. <https://doi.org/10.1109/FIE.2002.1158736>
- Booker, N. K., Gates, J. D., & Knights, P. (2021). Cognitive biases and the cultural disconnect between engineers and decision-makers. <https://doi.org/10.47577/TSSJ.V17I1.2752>
- Buckeridge, J. S. (1994). Introducing philosophy and ethics to the engineering curriculum.
- Bustos, P. M., Avendaño, J. F., & A, M. I. V. (2023). Implementation of curricular innovations in undergraduate engineering programs: Scope and challenges. <https://doi.org/10.1109/weef-gedc59520.2023.10343787>
- Campbell, R. C., Reible, D. D., Taraban, R., & Kim, J. (2018). Fostering reflective engineers: Outcomes of an arts- and humanities-infused graduate course. <https://doi.org/10.1109/WEEF-GEDC.2018.8629714>
- Campbell, R. C., Reible, D. D., Taraban, R., Kim, J., & Na, C. (2020). Fostering reflective habits and skills in graduate engineering education via the arts and humanities. <https://doi.org/10.18260/1-2--34685>
- Cárdenas, C., Martínez, C., & Muñoz, M. (2013). Bringing active learning into engineering curricula: Creating a teaching community.
- Carlson, W. B. (2018). Knowledge, skill, and wisdom: Reflections on integrating the social sciences and engineering. https://doi.org/10.1007/978-3-319-91134-2_15
- Carrell, J., Cruz, J., Herbert, A., Laver, M., Lazarus, E., Rivero, I., Nuñez, E., & Tabassum, N. (n.d.). Board 346: Nsf due 2142666 and nsf due 2142685. Collaborative research-engineering empathetic engineers (e³): Effects of the humanities on engineers' critical thinking and empathy skills. <https://doi.org/10.18260/1-2--42972>
- Chaturvedi, S. K., & Akan, O. (2006). Simulation and visualization enhanced engineering education.
- Chen, D. A., & Hoople, G. D. (2017). Contextualizing a new general engineering curriculum in the liberal arts.
- Choi-Lundberg, D. L., Butler-Henderson, K., Harman, K., & Crawford, J. (2023). A systematic Research of digital innovations in technology-enhanced learning designs in higher education. *Australasian Journal of Educational Technology*. <https://doi.org/10.14742/ajet.7615>

- Chong, A., Wilkinson, L., & Tihanyi, D. (n.d.). Intersections of humanities and engineering: Experiments in engineering specific humanities electives and pedagogies. <https://doi.org/10.18260/1-2--20694>
- Chong, R. N. R., Belayutham, S., Ibrahim, C. K. I. C., & Adhikari, S. K. (2022). A theoretical exploration on the standing of liberal arts in the civil engineering curriculum. *Environment-behaviour proceedings journal*, 7 (19), 77-83. <https://doi.org/10.21834/ebpj.v7i19.3261>
- Christensen, S. H. (2015). Engineering as a liberal art – vehicle for critical thinking or material rewards?. *Engineering Research*, 7 , 187-190. <https://doi.org/10.1080/19378629.2015.1062490>
- Ciolacu, M., Marghescu, C., Mihailescu, B., Șorecău, M., Șorecău, E., & Bechet, P. (2024). Education 5.0: Transforming engineering education in the age of generative AI. <https://doi.org/10.1109/siitme63973.2024.10814745>
- Conceição, S. C. O., & Samuel, A. (2025). Strategic integration of artificial intelligence in faculty development grounded in adult learning principles. *New Directions for Adult and Continuing Education* , . <https://doi.org/10.1002/ace.70003>
- Di, Z., Jia, C., Wang, J., Zhang, C., Li, H., & Liu, X. (2025). Construction and practice of an innovative practical talent cultivation model based on industry-education integration and university-enterprise collaboration. *Journal of education and educational research*, 14 (3), 36-38. <https://doi.org/10.54097/fjxqxh10>
- DiBiasio, D., Boudreau, K., Dodson, L., Quinn, P., Bergendahl, J., Sullivan, J. M., Gaudette, G. R., Abel, C., Robinson, L. A., & Wodin-Schwartz, S. (2018). Many hands on the elephant: How a transdisciplinary team assesses an integrative course.
- Donald, J., Lachapelle, S., McIsaac, J., Abraham, T., Clemmer, R., Gordon, K. D., McCook, S., & Zytner, R. G. (2015). Training versatile engineers: A historical and present perspective on the place of the humanities and social sciences in the canadian engineering context. <https://doi.org/10.24908/PCEEA.V0I0.5797>
- Doscher, S. (2023). Curriculum internationalization in the digital era. <https://doi.org/10.4324/9781003444237-9>
- Edamana, P., Kolar, A. K., Mehta, P. S., Srinivasan, S., & Froyd, J. E. (2012). Development of a teaching learning centre and ongoing faculty development programs - a case Research.
- Egarievwe, S. U. (2015). Faculty development and international collaborations using vertical education enhancement model.
- Elkadi, H., Mahgoub, Y., & Kenawy, I. (2024). Building collaborative innovation platforms for engineering education. *Journal of Mediterranean Cities*, 4 (1), 156-166. https://doi.org/10.38027/mediterranean-cities_vol4no1_9
- Eppes, T. A., Milanovic, I., & Sweitzer, F. (n.d.). Outcome assessment of liberal education skills. <https://doi.org/10.18260/1-2--18799>
- E-transformation in higher education and what it coerces for the faculty. <https://doi.org/10.4018/978-1-6684-7540-9.ch054>

- Exter, M., Ashby, I., Gray, C. M., Wilder, D. M., & Krause, T. S. (2017). Systematically integrating liberal education in a transdisciplinary design studio environment.
- Farooq, R., & Jan, K. (2024). Teacher preparation and professional development programs with educational technologies. <https://doi.org/10.58532/nbennurtach11>
- Fisher, E., & Mahajan, R. L. (2003). Humanistic enhancement of engineering: Liberalizing the technical curriculum.
- Fisher, P., & Fairweather, J. S. (1999). Transforming engineering service courses. <https://doi.org/10.1109/FIE.1999.839172>
- Flath, D., & Michelfelder, D. P. (2017). Thinking like an engineer: Responding to the engineering blind spot at liberal arts colleges.
- Forin, T. R., Sukumaran, B., Farrell, S., Hartman, H., Jahan, K., Dusseau, R. A., Bhavsar, P., Hand, J., & Bruckerhoff, T. F. (2017). Board # 139: Rethinking engineering diversity, transforming engineering diversity (redted).
- Frair, K., Cordes, D., Cronan, M., Evans, D., & Froyd, J. E. (1997). The nsf foundation coalition-looking toward the future [engineering education]. <https://doi.org/10.1109/FIE.1997.644804>
- Fuentes, A. B. C., & García, M. R. (2024). Digital competence analysis to inform current pedagogy and curricula. *Research in education and learning innovation archives*(33), . <https://doi.org/10.7203/realia.33.29257>
- Ghaemi, R. V., Potvin, G., & Trajano, H. (2024). A self-directed module to empower engineering students to engage with equity, diversity, inclusion, and indigeniety. *Proceedings of the . CEEA Conference*. <https://doi.org/10.24908/pceea.2024.18580>
- Gil, V. A., Pérez, M. L., Narváez, M. M. J., González-Gómez, D., & Hernández, S. G. T. (2022). Valoración de la implementación de una ruta de apropiación de tic para profesores de ingeniería, salud y educación. *Uni-pluri*, 22 (1), 1-16. <https://doi.org/10.17533/udea.uniopluri.344572>
- Giuliano, H. G., Giri, L., Nicchi, F., Weyerstall, W., Aicardi, L. F. F., Parselis, M., & Vasen, F. (2022). Critical thinking and judgment on engineer's work: Its integration in engineering education. *Engineering Research*, 14 (1), 6-16. <https://doi.org/10.1080/19378629.2022.2042003>
- Gomar, R., & Chan, A. D. C. (2024). Equitable engagement methodologies in engineering education: Innovative teaching strategies and their impact. *Proceedings of the CEEA Conference* , . <https://doi.org/10.24908/pceea.2024.18626>
- Gopakumar, G., Gale, D. D., Caron, B., & Drew, R. A. L. (2012). Models for leadership in curricular innovation: Concordia's centre for engineering in society. <https://doi.org/10.24908/PCEEA.V0I0.4660>
- Grady, H. (2004). Centers for excellence in engineering education: A case Research. *Frontiers in Education* , 944-948. <https://doi.org/10.1109/FIE.2004.1408680>
- Graeff, E., & Wood, A. (n.d.). Undergraduate engineering as civic professionalism. <https://doi.org/10.5325/goodsociety.30.1-2.0076>

- Grimson, W., Murphy, M., Christensen, S. H., & Ernø-Kjølhede, E. (2008). Philosophy matters in engineering research. <https://doi.org/10.1109/FIE.2008.4720424>
- Guilbeau, E. J., & Pizziconi, V. B. (1998). Increasing student awareness of ethical, social, legal, and economic implications of technology. *Journal of Engineering Education*, 87 (1), 35-45. <https://doi.org/10.1002/J.2168-9830.1998.TB00320.X>
- Gunnink, B., & Bernhardt, K. (2002). Writing, critical thinking, and engineering curricula. <https://doi.org/10.1109/FIE.2002.1158211>
- Hadi, W., & Hasan, M. A. (2025). Ai-driven curriculum transformation and faculty development in developing universities. <https://doi.org/10.4018/979-8-3373-1375-7.ch010>
- Hadi, W., & Hasan, M. A. (2025). Ai-driven curriculum transformation and faculty development in developing universities. <https://doi.org/10.4018/979-8-3373-1375-7.ch010>
- Hadi, W., & Hasan, M. A. (2025). Ai-driven curriculum transformation and faculty development in developing universities. <https://doi.org/10.4018/979-8-3373-1375-7.ch010>
- Hallinan, K. P., Daniels, M., & Safferman, S. I. (2001). Balancing technical and social issues: A new first-year design course. *IEEE Technology and Society Magazine*, 20 (1), 4-14. <https://doi.org/10.1109/44.913197>
- Hammond, T., Watson, K. L., Ray, S., Lightfoot, R., Casey, D., & Thomas, S. L. (n.d.). The development of a texas a&m university faculty of engineering education. <https://doi.org/10.18260/1-2--36409>
- Harper, B. J., Lattuca, L. R., Yin, A., & Terenzini, P. T. (2010). Liberal education for the engineer of 2020: Are administrators on board?.
- Harris, J., Molicard-Chartier, P., & Jadidi, M. (2024). Redesigning the common engineering first-year (part 1): Designing for 21st century students. *Proceedings of the CEEA Conference*, . <https://doi.org/10.24908/pceea.2024.18610>
- Hergert, D., Earley, R., & Bommaraju, S. (2003). Incorporating liberal education concepts into engineering technology senior design course at miami university.
- Herrera, O. A., Mejías, P., & Cid, A. (2024). Innovating the design of university learning modules through ict integration. <https://doi.org/10.1109/sccc63879.2024.10767641>
- Hoque, S., Yang, H., & Yousefi, P. (2025). Digital technologies in engineering education: A scoping Research of integrated dynamic teaching. *Proceedings of the CEEA Conference*, . <https://doi.org/10.24908/pceea.2025.19640>
- Hoyt, B., Hanyak, M., Vigeant, M. A., Snyder, W., Aburdene, M. F., Hyde, D., Mastascusa, E., & Prince, M. J. (2001). Project catalyst: Promoting systemic change in engineering education. <https://doi.org/10.1109/FIE.2001.963666>
- Huang, A., Bozorgmehri, N., Broome, A., Carter, P., Cho, H., Farrell, J., Ginley, J., Gotanda, W., Hynes, M., Neill, C., Pett, O., Purnell, W., Razzino, E., Remcho, O., Rigoglioso, V., Rosen, C., Ryan, E., Serpe, M., Sweeney, W., Bachiochi, G. (n.d.).

- Experiences from the first cohort of engineering students at a liberal arts university. <https://doi.org/10.18260/1-2--43549>
- Hudspith, R. (2000). Improving the bridge: Making engineering education broader and longer. <https://doi.org/10.1109/ISTAS.2000.915569>
- Huerta, M., & Requena-García-Cruz, M. (2025). Integrating theory and practice in engineering education: A cross-curricular and problem-based methodology. *Education Sciences*, 15 (9), 1253-1253. <https://doi.org/10.3390/educsci15091253>
- Hug, S., Thiry, H., & Gates, A. Q. (2015). Strategies for sustaining change in engineering education. <https://doi.org/10.1109/FIE.2015.7344219>
- Hunter, K. (2005). From henry v to starman: Linking the humanities and social sciences to engineering.
- Innovations in pedagogical practice and curriculum development in higher education. <https://doi.org/10.1108/978-1-83549-506-3>
- Interdisciplinary curriculum for engineering graduates. *Advances in higher education and professional development book series* , 53-85. <https://doi.org/10.4018/978-1-7998-7999-2.ch004>
- Jablokow, K. W. (2007). Engineers as problem-solving leaders: Embracing the humanities. *IEEE Technology and Society Magazine*, 26 (4), 29-35. <https://doi.org/10.1109/MTS.2007.911075>
- Jadidi, M., Jeffrey, J., & Salvatore, S. (2025). Redesigning the common engineering first-year (part 2): Pilots and stakeholder engagement. *Proceedings of the CEEA Conference* , . <https://doi.org/10.24908/pceea.2025.19597>
- Jaipal-Jamani, K., Figg, C., Gallagher, T. L., Scott, R. M., & Ciampa, K. (2015). Collaborative professional development in higher education: Developing knowledge of technology enhanced teaching. *The Journal of Effective Teaching*, 15 (2), 30-44.
- Julius, A., & Ibrahim, M. S. N. (2024). Reshaping engineering education: Addressing complex human challenges: A book research. *Asean journal of engineering education*, 8 (2), 114-117. <https://doi.org/10.11113/ajee2024.8n2.169>
- Júnior, H. G. M., Moura, C. C. D., Paula, E. A. D. O., Silva, K. C. A. B. D., Júnior, M. D. F. S., SANTOS, P. H. B. D., & Sousa, R. M. S. (2024). A formação docente e o currículo multidisciplinar no contexto da cultura digital. *Revista Ibero-Americana de Humanidades, Ciências e Educação*, 10 (10), 3558-3575. <https://doi.org/10.51891/rease.v10i10.16351>
- Kalonji, G., Regan, T., & Walker, M. (1996). The evolution of a coalition: Ecsel's programs for years 6-10. <https://doi.org/10.1109/FIE.1996.568517>
- Kedrowicz, A. A., & Watanabe, S. (2006). Infusing technical communication and teamwork within the ece curriculum. *Turkish Journal of Electrical Engineering and Computer Sciences*, 14 (1), 41-53.
- Kırkıç, K. A., KORKMAZ, Z. S., Doğan, S., Nalbantoğlu, Ü. Y., & Cengiz, S. G. (2024). Faculty development to design effective online courses: Responding to requirements.

- Tuning journal for higher education, 11 (2), 163-189.
<https://doi.org/10.18543/tjhe.2597>
- Kitto, K. L., & Sylvester, B. (2002). A multidisciplinary approach to teaching ethical considerations in engineering technology. <https://doi.org/10.1109/FIE.2002.1158705>
- Koné, E. H. Y. (2024). Human and technology mediation for effective blended learning in digital higher education. *International journal of learning and teaching*, 10 (3), .
<https://doi.org/10.18178/ijlt.10.3.341-347>
- Koretsky, M., & Magana, A. J. (2019). Using technology to enhance learning and engagement in engineering.. *Advances in engineering education* , .
- Krause, S., Middleton, J. A., Hjelmstad, K. D., Judson, E., Culbertson, R., Ankeny, C. J., Chen, Y., Ross, L., Mayled, L. H., Lopez, E., Park, Y. S., & Smith, B. B. (2017). Scaling a faculty professional development program to multiple disciplines through disciplinary communities of practice evolving from evidence-based workshops.
- Kretschmann, J. (2024). Innovative engineering education for a better future. *Engineering education Research*, 2 , . <https://doi.org/10.54844/eer.2024.0564>
- Kumar, S. S., Bharathi, S. H., R, V. S. R., & Castro, M. (2024). Bridging theory and practice: Innovative approaches in contemporary engineering education. <https://doi.org/10.1109/tale62452.2024.10834315>
- Küpper, J. (2023). The role of the humanities in the formation of reflective engineering practitioners. *Philosophy of engineering and technology* , 297-307.
https://doi.org/10.1007/978-3-031-25233-4_22
- Kuznetsova, H., Danylchenko, I., Zenchenko, T., Rostykus, N., & Lushchynska, O. (2024). Incorporating innovative technologies into higher education teaching: Mastery and implementation perspectives for educators. *Multidisciplinary Researchs*, 7,2024spe027-2024spe027.
<https://doi.org/10.31893/multirev.2024spe027>
- Lata, K. (2024). Innovation in pedagogical practices: Technology-enhanced learning in higher education. *ShodhKosh Journal of Visual and Performing Arts*, 5 (7), .
<https://doi.org/10.29121/shodhkosh.v5.i7.2024.2362>
- Lavi, R., Bertel, L. B., & Du, X. (2023). Guest editorial special issue on transforming engineering education. *IEEE Transactions on Education*, 66 , 404-409.
<https://doi.org/10.1109/te.2023.3308668>
- Lavi, R., Bertel, L. B., & Du, X. (2023). Guest editorial special issue on transforming engineering education. *IEEE Transactions on Education*, 66 , 404-409.
<https://doi.org/10.1109/te.2023.3308668>
- Lazarinis, F., Panagiotakopoulos, T., Armakolas, S., Vonitsanos, G., Iatrellis, O., & Kameas, A. (2024). A blended learning course to support innovative online teaching in higher education. *European Journal of Education* , .
<https://doi.org/10.1111/ejed.12820>
- Li, B., Ryan, R. G., Warter-Perez, N., Gan, Y., Mustafa, H., Cox, H., & Ding, L. (2016). Vertical integration of the liberal arts in engineering education.

- Li, M., & Liu, X. (2025). Enhancing humanities and social sciences curriculum in engineering institutions by using interdisciplinary approaches. *Cogent Education*, 12 (1), . <https://doi.org/10.1080/2331186x.2024.2433831>
- Li, Y. (2025). Exploration into the cultivation of innovative cross disciplinary talents in new engineering at applied undergraduate universities. *Journal of higher education teaching.*, 2 (1), 210-218. <https://doi.org/10.62517/jhet.202515131>
- Liang, Y. (2024). Exploring the path of “project team style” faculty development for applied undergraduate programs. *Journal of education and educational research*, 7 (3), 191-195. <https://doi.org/10.54097/5m8brj37>
- Lighty, J. S., Battin, M. P., Harris, A. R., & Mower, G. B. (2004). Engineering ethics a collaboration between engineering and philosophy.
- Lisbôa, E. S. (2024). Conectando saberes na formação docente: A curricularização das tecnologias digitais no ensino de computação. *Extensão em Foco*, 1 (35), 54-70. <https://doi.org/10.5380/ef.v1i35.95523>
- Litzinger, T. A., Christman, J., Lau, A. S., Tuana, N., & Wise, J. H. (2003). Learning and teaching ethics in engineering: Preparing engineering faculty to teach ethics.
- Lord, S. M., Ohland, M. W., Froyd, J. E., & Lindsay, E. (2015). An international exploration of electrical and computer engineering education practices.
- Lord, S. M., Ohland, M. W., Froyd, J. E., & Lindsay, E. (2015). An international exploration of electrical and computer engineering education practices.
- Lucietto, A., & Peters, D. (2024). Editorial: Engineering technology and engineering: Incorporating the humanities into the classroom. *Frontiers in Education*, 9 , . <https://doi.org/10.3389/feduc.2024.1534407>
- MacDougall, J., Ham, A., & Pop-Iliev, R. (2012). Enhancing the engineering curriculum through holistic engineering. <https://doi.org/10.24908/PCEEA.V0I0.4685>
- Maciejewski, A. A., Chen, T. M., Byrne, Z. S., Miranda, M. A. D., McMeeking, L. B. S., Notaros, B. M., Pezeshki, A., Roy, S., Leland, A. M., Reese, M. D., Rosales, A. H., Siller, T. J., Toftness, R. F., & Notaros, O. (2017). A holistic approach to transforming undergraduate electrical engineering education. *IEEE Access*, 5 , 8148-8161. <https://doi.org/10.1109/ACCESS.2017.2690221>
- Mahardhani, A. J., Nadeak, B., Hanika, I. M., SENTRYO, I., & KEMALA, R. (2023). A new approach to curriculum development: The relevance of the higher education curriculum to industry needs. *International Journal of Educational Research Excellence*, 2 (2), 501-509. <https://doi.org/10.55299/ijere.v2i2.620>
- Mai, Y. (2024). Curriculum development for innovation and entrepreneurship education: A business school - chamber of commerce resource synergy model. *Region - educational research and researchs*, 6 (9), 65-65. <https://doi.org/10.32629/rerr.v6i9.2754>
- Manriquez, M. L., & Traverro, A. S. (2025). Design and development of a technology-integrated module for educators using triple e model. <https://doi.org/10.70838/pemj.390106>

- Martello, R., & Stolk, J. (2007). Paul revere in the science lab: Integrating humanities and engineering pedagogies to develop skills in contextual understanding and self-directed learning.
- Martínez, D., Douglas, K., Beattie, A., & Gonzalez, E. (2024). Faculty development symposium: Building a community for early-career engineering hispanic faculty's success and advancement. <https://doi.org/10.18260/1-2--47457>
- McCormick, J. R., Radloff, B., Lamm, N., & Talbert-Hatch, T. L. (2011). Preparing engineering graduates for the real world.
- McKay, A. (2007). Introducing humanities aspects through english language teaching in engineering.
- Mendieta, R. E. J. (2025). Educational innovation in virtual environments: A systematic Research of methodological strategies post-covid-19 (2020–2025). *Ciencia latina*, 9 (4), 7857-7866. https://doi.org/10.37811/cl_rcm.v9i4.19372
- Mentore, L., & Refrigeri, L. (2024). Strengthening university teaching through faculty development: Strategies to reduce the gap between research and teaching in italian universities in line with european policies. *Agora International Journal of Juridical Sciences*, 18 (2), 217-225. <https://doi.org/10.15837/aijjs.v18i2.6991>
- Miriam, M., Lotus, A., Pekinasova, A., Chorlton, B., Dawson, L., Farago, E., Poornima, P., Lamb, J., & Marasco, E. (2025). Community of practice for early-career teaching-stream faculty members: Structure and reflections. *Proceedings of the CEEA Conference* , . <https://doi.org/10.24908/pceea.2025.19587>
- Mollica, M. Y., Olszewski, E., Kiyohara, C., Matusalem, D., Ochs, A., Imoukhuede, P., Regnier, M., Yasuhara, K., Thomas, W., & Taylor, A. C. (2023). Incorporating diversity, equity, and inclusion content into bioengineering curricula: A program-level approach.. *Journal of Biomechanical Engineering-transactions of The Asme* , 1-38. <https://doi.org/10.1115/1.4063819>
- Morin, M., Ducoste, J. J., & Brown, E. (2024). Wip: Piloting a comprehensive needs assessment to enhance engineering faculty development. <https://doi.org/10.18260/1-2--48314>
- Mosia, N. (2024). Developing a curriculum for practical skills-based pedagogy in engineering education: A skills-driven teaching and learning approach for job transition pathways applicable in engineering training and development for a university of technology. <https://doi.org/10.34190/icer.1.1.3178>
- Mosly, I. (2024). Artificial intelligence's opportunities and challenges in engineering curricular design: A combined Research and focus group Research. *Societies*, 14 (6), 89-89. <https://doi.org/10.3390/soc14060089>
- Mpofu, F. Y., & Chasokela, D. (2024). Curriculum design and innovation. *Advances in higher education and professional development book series* , 273-292. <https://doi.org/10.4018/979-8-3693-6915-9.ch011>

- N.N., S. (2025). A multi-dimensional approach to faculty development for capacity building in higher education: Towards vision viksit bharaat 2047. *European Economics Letters*, 15 (3), 1418-1426. <https://doi.org/10.52783/eel.v15i3.3536>
- Namasivayam, S., Al-Obaidi, A. S. M., & Fouladi, M. H. (2023). A conceptual curriculum design approach for educating engineers of and for the future. *Indonesian journal of science and technology*, 8 (3), 381-396. <https://doi.org/10.17509/ijost.v8i3.59580>
- Napitupulu, M. H., Muddin, A., Bagiya, B., Diana, S., & Rosyidah, N. S. (2024). Teacher professional development in the digital age: Strategies for integrating technology and pedagogy. *Global international journal of innovative research*, 2 (10), 2382-2396. <https://doi.org/10.59613/global.v2i10.334>
- Napitupulu, M. H., Muddin, A., Bagiya, B., Diana, S., & Rosyidah, N. S. (2025). Teacher professional development in the digital age: Strategies for integrating technology and pedagogy. <https://doi.org/10.71364/ijfsr.v2i4.33>
- Nelson, J., & Napper, S. (1999). Ramping up an integrated engineering curriculum to full implementation. <https://doi.org/10.1109/FIE.1999.840421>
- Nelson, R., Garcia, S. A., Bonner, E. P., Marone, V., Yuen, T. T., & Browning, J. (2018). Engaging engineering faculty in transformative practices. <https://doi.org/10.1109/LATICE.2018.000-4>
- Niebuhr, V. N., Niebuhr, B. R., Trumble, J. M., & Urbani, M. J. (2014). Online faculty development for creating e-learning materials. *Education for Health: Change in Learning & Practice*, 27 (3), 255-261. <https://doi.org/10.4103/1357-6283.152186>
- Nilsen, E., Matthew, V., Besterfield-Sacre, M., & Monroe-White, T. (2015). Taking stock: Using a landscape inventory to drive curriculum and program change. <https://doi.org/10.1109/FIE.2015.7344125>
- Offodum, C. D., & Oyelami, S. (2022). Strategies for teaching-focused industry-academia collaboration in engineering. *Journal of the Nigerian society of chemical Engineers*, 37 (3), 56-59. <https://doi.org/10.51975/22370308.som>
- Olds, B., & Miller, R. L. (1997). The call of stories: Reading and writing in the humanities with engineering and science faculty. <https://doi.org/10.1109/FIE.1997.632663>
- O'Neill-Carrillo, E., Frey, W., Jimenez, L. O., Rodriguez, M., & Negron, D. (2008). Social, ethical and global issues in engineering. <https://doi.org/10.1109/FIE.2008.4720352>
- Ortiz, J. C., Hernández, S., Navarro-Illana, P., Martín-Palomino, A. P., Navarro-Illana, E., & Aroca, G. (2025). Design of a b-learning workshop for teacher digital skills training. *RGSA: Revista de Gestão Social e Ambiental*, 19 (1), e010668-e010668. <https://doi.org/10.24857/rgsa.v19n1-005>
- Ozaktas, H. M. (2013). Teaching science, technology, and society to engineering students: A sixteen year journey. *Science and Engineering Ethics*, 19 (4), 1439-1450. <https://doi.org/10.1007/S11948-011-9329-4>

- Passamani, A. P., Pin, A. C., Callegario, E. S., Careta, I. P., Fia, V. B. D., Crivelari, V. M. B., & Barcelo, K. B. (2024). O papel das tecnologias digitais na construção de currículos inovadores para a formação de professores. <https://doi.org/10.51891/rease.978-65-6054-106-10>
- Patrick, C., & McShane, M. (2023). Development of a π shaped undergraduate curriculum using a curriculum continuity checkup process coupled with an iterative application of kotter's change model. <https://doi.org/10.1109/fie58773.2023.10342995>
- Peculiarities of training future specialists in higher education institutions using innovative teaching technologies. *Scientia et societus*, 86-95. <https://doi.org/10.69587/ss/1.2025.86>
- Penprase, B. E. (2020). Engineering education reconsidered. https://doi.org/10.1007/978-3-030-41633-1_4
- Pereira, C. A., Oliveira, P. M., & Reis, M. J. C. S. (2020). Drivers da adoção de metodologias não tradicionais: Estudo de caso no mestrado-integrado de engenharia eletrotécnica e de computadores na universidade de trás-os-montes e alto douro, portugal. *Texto Livre: Linguagem e Tecnologia*, 14 (1), . <https://doi.org/10.35699/1983-3652.2021.26709>
- Pfotenhauer, S. M., Jacobs, J., & Pertuze, J. A. (n.d.). Orienting engineering education towards innovation, entrepreneurship, and industry partnerships the case of the mit-portugal program. <https://doi.org/10.18260/1-2--18757>
- Pierrakos, O., & Stottlemeyer, E. (2019). Liberal arts engineering education: Reflecting on the past and envisioning the future. <https://doi.org/10.1109/FIE43999.2019.9028604>
- Porter, R., & Herkert, J. R. (1996). Engineering and humanities: Bridging the gap. <https://doi.org/10.1109/FIE.1996.567791>
- Prince, B., SIDDHARTH, S., & Keshav, R. (2024). Evaluating the efficacy of project-based approach for teaching humanities courses to engineering students. <https://doi.org/10.18260/1-2--47350>
- Putri, D. F., & Abdullah, A. (2024). Innovative approach in curriculum development; improving education and training programs through multidimensional strategies. *Pedagogik : Jurnal Pendidikan*, 11 (2), 160-179. <https://doi.org/10.33650/pjp.v11i2.9290>
- Putri, D. F., & Abdullah, A. (2024). Innovative approach in curriculum development; improving education and training programs through multidimensional strategies. *Pedagogik : Jurnal Pendidikan*, 11 (2), 160-179. <https://doi.org/10.33650/pjp.v11i2.9290>
- Quinn, R. G. (1993). Drexel's e4 program: A different professional experience for engineering students and faculty. *Journal of Engineering Education*, 82 (4), 196-202. <https://doi.org/10.1002/J.2168-9830.1993.TB01074.X>

- Ramos, F., Costa, N., Tavares, J., & Huet, I. (2006). A staff development program for promoting change in higher education teaching and learning practices. https://doi.org/10.1007/978-0-387-34731-8_52
- Research on the talent cultivation model for emerging engineering disciplines in local universities under the context of industry-education integration. *International journal of new developments in education*, 6 (10). <https://doi.org/10.25236/ijnde.2024.061024>
- Riley, K., Davis, M., Jackson, A. C., & Maciukenas, J. (2009). "ethics in the details": Communicating engineering ethics via micro-insertion. *IEEE Transactions on Professional Communication*, 52 (1), 95-108. <https://doi.org/10.1109/TPC.2008.2012286>
- Rodier, C., Galaleldin, M., Boudreau, J., & Anis, H. (2019). From stem to steam in engineering design. <https://doi.org/10.24908/PCEEA.VI0.13752>
- Ross, L., Mayled, L. H., Krause, S., Judson, E., Hjelmstad, K. D., Middleton, J. A., Culbertson, R., Ankeny, C. J., Chen, Y., Hjelmstad, K. L., Glassmeyer, K., & Hoyt, S. (2019). Scaling and assessment of an evidence-based faculty development program for promoting active learning pedagogical strategies.
- Rossmann, J. S., Sanford, K. L., Nicodemus, J., & Cohen, B. (2020). The sociotechnical core curriculum: An interdisciplinary engineering research degree program.
- Ruiz-Cantisani, M. I., Lara-Prieto, V., Mendoza, A. G. R., Rodriguez-Rosales, A., Garcia-Garcia, R., & Membrillo-Hernandez, J. (n.d.). Engineering of the future: The influence of educational innovation. <https://doi.org/10.1109/weef-gedc63419.2024.10854957>
- Russo, M. T. (2007). The newcomers: Humanities in engineering education.
- Rust, J. (2019). Toward hybridity: The interplay of technology, pedagogy, and content across disciplines at a small liberal arts college.. *Journal of the Scholarship of Teaching and Learning*, 19 (2), 102-129. <https://doi.org/10.14434/JOSOTL.V19I1.23585>
- Saadi, J. I., Das, M., Roeder, G. J., Ostrowski, A. K., Lee, S., Santos, M., Breazeal, C., D'Ignazio, C., Yang, M. C., & Verma, A. (2023). Incorporating social, policy, and ethical considerations in engineering and design education: An examination of barriers and resources. <https://doi.org/10.1115/detc2023-116605>
- Saeed, M. M., Saeed, R. A., Ahmed, Z. E., Gaid, A. S. A., & Mokhtar, R. A. (2024). AI technologies in engineering education. *Advances in educational technologies and instructional design book series* , 61-87. <https://doi.org/10.4018/979-8-3693-2728-9.ch003>
- Samaka, M., & Ally, M. (2016). Model for transforming engineering education using technology-enhanced learning. https://doi.org/10.1007/978-3-319-15323-0_5
- Schaefer, D. (n.d.). Invited paper - fostering a culture of professional faculty development and recognition of engineering & engineering technology educators. <https://doi.org/10.18260/1-2--17247>

- Schleiss, J., Johri, A., & Stober, S. (2024). Integrating AI education in disciplinary engineering fields: Towards a system and change perspective. <https://doi.org/10.48550/arxiv.2410.12795>
- Seabrook, D. B. E., Neeley, D. K. A., Zacharias, D. K., & Caron, B. R. (n.d.). Teaching sts to engineers: A comparative Research of embedded sts programs. <https://doi.org/10.18260/1-2--35281>
- Sen, S., Hagle, J. L., Goldberg, J., & Ferrell, W. (1996). Engineering with liberal and technical education (elite). <https://doi.org/10.1109/FIE.1996.572926>
- Shankar, R., & Suppiah, S. (2014). A case Research on the enhancement of faculty teaching competencies in an engineering diploma.
- Shartrand, A. M., Gomez, R. L., & Weilerstein, P. (n.d.). Answering the call for innovation: Three faculty development models to enhance innovation and entrepreneurship education in engineering. <https://doi.org/10.18260/1-2--20950>
- Shaznay, N. (2024). Bridging the industry-higher education gap with critical design futures thinking and genai for innovation. <https://doi.org/10.1201/9781003469551-11>
- Shetty, D., Leone, D., Alnajjar, H., Keshawaraz, M. S., Nagurney, L. S., & Smith, L. (2001). Integrating engineering design with humanities, sciences and social sciences using integrative learning blocks.
- Siller, T. J., Miranda, M. D., & Whaley, D. (2007). Engineering education partnership. *International Journal of Engineering Education*, 23 (1), 58-64.
- Simeonova-Ingilizova, M. D. (2025). Practice-oriented approaches in engineering education for the 21st century. <https://doi.org/10.1109/icest66328.2025.11098232>
- Singh, K. (2014). Blended professional learning. *ASCILITE conference proceedings* , 404-409. <https://doi.org/10.14742/apubs.2014.1243>
- Singha, R., & Singha, S. (2024). Educational innovation transforming higher education for workforce readiness. *Advances in higher education and professional development book series* , 37-55. <https://doi.org/10.4018/979-8-3693-0517-1.ch003>
- Slade, M. L., Westerman, P., & Harrington, A. J. (2024). The use of digital technologies to enhance student-engagement pedagogies in higher education distance learning. *Advances in educational technologies and instructional design book series* , 233-258. <https://doi.org/10.4018/979-8-3693-5633-3.ch009>
- Spinelli, J. (2004). Teaching civilization, communication skills, and ethics through a course in electrical engineering history.
- Staley, T. N., & Bairaktarova, D. (2022). Why change engineering education?: Pragmatic perspectives from the humanities and social sciences. <https://doi.org/10.5821/conference-9788412322262.1344>
- Stavermann, K. (2025). Research in online teacher professional development: A systematic mapping Research. *International Journal of Emerging Technologies in Learning (ijet)*, 20 (01), 47-67. <https://doi.org/10.3991/ijet.v20i01.53643>

- Stouffer, W. B., & Russell, J. (2003). Too liberal or not liberal enough: Liberal arts, electives, and professional skills.
- Summers, S. (2024). Digital faculty fellows: A cross-disciplinary professional development model. *New Directions for Teaching and Learning* , . <https://doi.org/10.1002/tl.20605>
- Suyitno, M., Rahim, I., Poncowati, S. D., Rampeng, R., & Surwuy, G. S. (2024). The influence of teacher training, curriculum development, and technological integration on student academic achievement. *Global international journal of innovative research*, 2 (6), 1397-1406. <https://doi.org/10.59613/global.v2i6.207>
- Temes, G. C., & Solymar, L. (2015). In defense of engineering education [point of view]. <https://doi.org/10.1109/JPROC.2015.2448911>
- Terenzini, P. T., Lattuca, L. R., Kremer, G. E. O., Plumb, C., & Trautvetter, L. C. (2008). Panel session - preparing the engineers of 2020 - emerging evidence from six exemplary colleges and universities. <https://doi.org/10.1109/FIE.2008.4720523>
- Thang, P. D. (2025). From theory to classroom: Innovation in teaching methods and faculty development in higher education. *Tennessee community service international of empowerment.*, 2 (1), 33-43. <https://doi.org/10.53730/tcsie.v2n1.13>
- The two cultures of engineering education: Looking back and moving forward. *Philosophy of engineering and technology* , 133-150. https://doi.org/10.1007/978-3-031-11601-8_7
- Thibault, R., Hivon, R., L'Heureux, D., & Boutin, N. (2002). The development of the competencies linked to the human dimension of engineering.
- Tuffnell, C. (2023). Digital transformation of post-pandemic learning and teaching: Utilising tpack to support educator development in a flipped learning pilot. <https://doi.org/10.21428/8c225f6e.6f043b79>
- Uzorka, A., Odebiyi, O. A., & Makumbi, D. (2025). Exploring key factors in faculty professional development programs for seamless integration of modern technology. *Social education research* , 112-124. <https://doi.org/10.37256/ser.6120255893>
- Valles, M., & Avilés, M. J. G. (2025). Innovación pedagógica en la educación superior: Impacto de las tic en entornos virtuales. Una revisión sistemática. *RECIAMUC*, 9 (3), 321-335. [https://doi.org/10.26820/reciamuc/9.\(3\).julio.2025.321-335](https://doi.org/10.26820/reciamuc/9.(3).julio.2025.321-335)
- Vedhathiri, T. (2024). Facilitating outstanding engineering faculty members through training from recruitment to retirement. *Engineering education Research*, 2 , . <https://doi.org/10.54844/eer.2024.0562>
- Veza, I., Yusrizal, Y., Idris, M., Putra, N. R., & Balogun, S. A. (2023). Current status of global engineering education: Mini research. <https://doi.org/10.62024/radial.v1i2.8>
- Viberg, O., Bälter, O., Hedin, B., Riese, E., & Mavroudi, A. (2019). Faculty pedagogical developers as enablers of technology enhanced learning.. *British Journal of Educational Technology*, 50 (5), 2637-2650. <https://doi.org/10.1111/BJET.12710>
- Vuoriainen, A., Rikala, J., Heilala, V., Lehesvuori, S., Öz, Ş., Kettunen, L., & Hämäläinen, R. (2024). The six c's of successful higher education-industry

- collaboration in engineering education: A systematic Research research. *European Journal of Engineering Education*, 1-25. <https://doi.org/10.1080/03043797.2024.2432440>
- Wallwey, C., Singer, A., Hall, L., Delaine, D., & Herman, J. (2024). Considering the development and evaluation of engineers as teachers. *International Journal of Engineering Pedagogy (iJEP)*, . <https://doi.org/10.3991/ijep.v14i3.43421>
- Wentzheimer, W. W., Ermer, G. E., VanAntwerp, J. J., & VanderLeest, S. H. (2004). An optimal engineering education: The bse at a liberal arts college.
- Whelan, K. A., & Jones, S. A. (2005). An alternate paradigm for undergraduate engineering: The bachelor of arts.
- Whittier, D., & Lara, S. (2006). Preparing tomorrow's teachers to use technology (pt3) at boston university through faculty development assessment of three years of the project. *Technology, Pedagogy and Education*, 15 (3), 321-335. <https://doi.org/10.1080/14759390600923816>
- Williams, M., Litynski, D., & Apple, D. (2001). Process education and continual process improvement at western michigan university (wmu). <https://doi.org/10.1109/FIE.2001.963693>
- Wiśniewski, L. (2024). Developing digital content for the classroom: Best practices for curriculum development in the digital age. <https://doi.org/10.62422/978-81-968539-1-4-065>
- Wood, J. C. (1997). Engineering technology curriculum integration in an associate degree program.
- Wood, T., Mazzaro, G., & Skenes, K. (n.d.). The eclectic reader for introduction to engineering. <https://doi.org/10.18260/1-2--45570>
- Work-in-progress: A faculty development response to integration of diversity, equity, and inclusion into the engineering curriculum. <https://doi.org/10.1109/fie56618.2022.9962644>
- Yelamarthi, K., Dandu, R., Yanambaka, V. P., & Mahajan, S. (2024). Exploring the potential of generative AI in shaping engineering education: Opportunities and challenges. *Journal of Engineering Education Transformations* , . <https://doi.org/10.16920/jeet/2024/v37is2/24072>
- Yumna, A. M. (2025). Technology integration models and instructional design frameworks to facilitate the development of teacher training programmes. <https://doi.org/10.4038/jipe.v1i2.15>
- Zabalawi, I., & Kordahji, H. (2025). Shaping the future of universities in the age of industry 5.0. *Advances in human resources management and organizational development book series* , 1-26. <https://doi.org/10.4018/979-8-3693-8181-6.ch001>
- Zandvoort, H. (2010). Engineering education for a sustainable, just and peaceful society.

Zhang, J. (2025). Application of blended training models in faculty development at medical universities in the post-pandemic era.
<https://doi.org/10.70702/bdb//bxpj9180>

Zhao, W. (2024). Innovation and practice of talent cultivation models in higher education from the perspective of industry-education integration.
<https://doi.org/10.62381/h241515>