

**PENGEMBANGAN KURIKULUM PELATIHAN PENDIDIKAN  
UNTUK PEMBANGUNAN BERKELANJUTAN BERBASIS  
TEKNOLOGI INFORMASI DAN KOMUNIKASI UNTUK GURU  
SEKOLAH MENENGAH PERTAMA**

**DISERTASI**

*Diajukan untuk memenuhi sebagian syarat memperoleh gelar Doktor pada  
Program Studi Pengembangan Kurikulum di Universitas Pendidikan Indonesia*



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**PENGEMBANGAN KURIKULUM PELATIHAN PENDIDIKAN  
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BERBASIS TEKNOLOGI INFORMASI DAN KOMUNIKASI  
UNTUK GURU SEKOLAH MENENGAH**

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## **SURAT PERNYATAAN**

Dengan ini saya menyatakan bahwa disertasi dengan judul “**Pengembangan Kurikulum Pelatihan Pendidikan Untuk Pembangunan Berkelanjutan Berbasis Teknologi Informasi Dan Komunikasi Untuk Guru Sekolah Menengah Pertama**” ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, Saya siap menanggung risiko/sanksi apabila dikemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

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## ABSTRAK

Mulyadi, Dadi. 2024. *Pengembangan Kurikulum Pelatihan Pendidikan Untuk Pembangunan Berkelanjutan Berbasis Teknologi Informasi Dan Komunikasi Untuk Guru Sekolah Menengah Pertama*. Doktor Pengembangan Kurikulum Fakultas Ilmu Pendidikan, Universitas Pendidikan Indonesia. Promotor: Prof. Dr. Mohammad Ali, M.A.; Co-Promotor: Dr. Laksmi Dewi, M.Pd.; Anggota: Prof. Eero Ropo. 259.

Tantangan global seperti kemiskinan, perubahan iklim, dan kekerasan masih menjadi ancaman serius terhadap keberlanjutan planet ini. Pendidikan memegang peranan penting dalam menciptakan pembangunan berkelanjutan. UNESCO meluncurkan program Pendidikan untuk Pembangunan Berkelanjutan atau Education for Sustainable Development (ESD) yang bertujuan untuk membekali individu untuk memahami dan mengatasi tantangan tersebut. Peran guru sangat penting dalam implementasi ESD di sekolah, namun banyak guru saat ini belum memiliki kompetensi yang memadai. Oleh karena itu diperlukan pelatihan untuk meningkatkan kompetensi ESD. Kurikulum menjadi langkah awal yang penting untuk memastikan bahwa tujuan pelatihan tercapai dengan efektif. Penelitian sebelumnya masih minim yang mengeksplorasi integrasi TIK sebagai alat pembelajaran interaktif dalam pelatihan ESD. Penelitian ini bertujuan mengembangkan kurikulum pelatihan ESD berbasis TIK bagi guru SMP guna meningkatkan kompetensi ESD. Metode penelitian yang digunakan adalah Design and Development Research (DDR). Sampel penelitian melibatkan 384 guru SMP di Jawa Barat dan ujicoba artefak dilakukan di SMP 22 Kota Bandung. Hasil penelitian menunjukkan bahwa implementasi ESD di sekolah belum optimal, guru SMP membutuhkan peningkatan kompetensi ESD, diperlukan pengembangan kurikulum pelatihan layak yang mengintegrasikan TIK, dan implementasi kurikulum pelatihan melalui ujicoba telah dapat meningkatkan kompetensi ESD, serta proses diseminasi kurikulum pelatihan untuk memastikan keberlanjutan penerapan kurikulum pelatihan telah dilakukan. Penelitian ini menyimpulkan bahwa kurikulum pelatihan ESD berbasis TIK untuk guru SMP telah berhasil dikembangkan dan layak untuk diimplementasikan sebagaimana ditunjukkan oleh hasil validasi ahli. Respon dari para pihak yang berkepentingan, termasuk guru, kepala sekolah, dan pejabat Dinas Pendidikan, menunjukkan antusiasme yang positif. Para guru menyatakan bahwa kurikulum ini relevan dengan kebutuhan mereka dalam memahami dan menerapkan ESD, sementara pejabat Dinas Pendidikan menilai bahwa kurikulum ini dapat menjadi model yang potensial untuk diadopsi di wilayah lain sebagai bagian dari upaya mencapai tujuan pembangunan berkelanjutan melalui pendidikan.

**Kata Kunci:** Kurikulum Pelatihan, Pendidikan untuk Pembangunan Berkelanjutan, *web-based training*.

## ABSTRACT

Mulyadi, Dadi. 2024. *Development of an Information and Communication Technology-Based Education for Sustainable Development Training Curriculum for Junior High School Teachers*. Doctor of Curriculum Development Fakultas Ilmu Pendidikan, Universitas Pendidikan Indonesia. Supervisor: Prof. Dr. Mohammad Ali, M.A.; Co- Supervisor: Dr. Laksmi Dewi, M.Pd.; Committee Member: Prof. Eero Ropo. 259.

Global challenges such as poverty, climate change, and violence remain serious threats to the sustainability of the planet. Education plays an important role in creating sustainable development. UNESCO launched the Education for Sustainable Development (ESD) program which aims to equip individuals to understand and overcome these challenges. The role of teachers is very important in the implementation of ESD in schools, but many teachers currently do not have adequate competencies. Therefore, training is needed to improve ESD competencies. The curriculum is an important first step to ensure that training objectives are achieved effectively. Previous research has been minimal that explores the integration of ICT as an interactive learning tool in ESD training. This study aims to develop an ICT-based ESD training curriculum for junior high school teachers to improve ESD competencies. The research method used is Design and Development Research (DDR). The research sample involved 384 junior high school teachers in West Java and the artifact trial was conducted at SMP 22, Bandung City. The results of the study indicate that the implementation of ESD in schools is not optimal, junior high school teachers need to improve their ESD competencies, the development of a proper training curriculum that integrates ICT is needed, and the implementation of the training curriculum through trials has been able to improve ESD competencies, and the dissemination process of the training curriculum to ensure the sustainability of the implementation of the training curriculum has been carried out. This study concludes that the ICT-based ESD training curriculum for junior high school teachers has been successfully developed and is feasible to be implemented as indicated by the results of expert validation. Responses from stakeholders, including teachers, principals, and Education Office officials, showed positive enthusiasm. Teachers stated that this curriculum was relevant to their needs in understanding and implementing ESD, while Education Office officials assessed that this curriculum could be a potential model to be adopted in other regions as part of efforts to achieve sustainable development goals through education.

**Keywords:** Curriculum Training, Education for Sustainable Development, Web-based Training.

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## DAFTAR PUSTAKA

- Abidin, M. Z., Mokhtar, M., & Arsat, M. (2023). Education for Sustainable Development from the Lenses of Malaysian School Leaders: A Preliminary Study. *Asian Education and Development Studies*, 150-165.
- Abidin, Z., Santi, N. E., & Hanum, L. (2020). Adopting Michael Fullan's Framework to Illuminate Islamic Education Teachers' Struggles for the Enactment of Government-Prescribed Curriculum. *Edukasia Islamika: Jurnal Pendidikan Islam*, 189-205.
- Abrahams, G. (2017). Constructing Definitions of Sustainable Development. *Smart and Sustainable Built Environment*, 34-47.
- Adriyanto, Y. N., Martono, D. N., Nadiroh, & Soesilo, T. B. (2019). The Implementation of Education for Sustainable Development in Adiwiyata School. *Proceedings of the 7th Mathematics, Science, and Computer Science Education International Seminar, MSCEIS*. Bandung.
- Ahmad, N., Toro-Troconis, M., Ibahrine, M., Armour, R., Tait, V., Reedy, K., . . . Inzolia, Y. (2023). Codesigns education for sustainable development: a framework for embedding education for sustainable development in curriculum design. *Sustainability*, 1-24.
- Akkus, Z. (2015). Activitybased teaching in social studies education: an action research. *Educational Research and Reviews*, 1911-1921.
- Akyol, T., Kahriman-Pamuk , D., & Elmas, R. (2018). Drama in Education for Sustainable Development: Preservice Preschool Teachers on Stage. *Journal of Education and Learning*, 102-115.
- Albareda-Tiana, S., García-González, E., Jiménez-Fontana, R., & Solís-Espallargas, C. (2019). Implementing Pedagogical Approaches for ESD in Initial Teacher Training at Spanish Universities. *Sustainability*, 1-19.
- Al-Eyd, G., Achike, F., Agarwal, M., Atamna, H., Atapattu, D. N., Castro, L., . . . Tenore, A. (2018). Curriculum mapping as a tool to facilitate curriculum development: a new school of medicine experience. *BMC Medical Education*, 1-8.
- Ali, M. (2014). *Memahami Riset Perilaku dan Sosial*. Jakarta: Bumi Aksara.
- Ali, M. (2021). *Education for National Development: A Case Study of Indonesia (Revised Edition)*. New York: Amazon.
- Ali, M., & Susilana, R. (2021). *Perancangan Kurikulum Mikro: Profesionalisme Guru untuk Pendidikan Berkualitas*. Bandung: Rajagrafindo Persada.
- Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Babson Survey Research Group and Quahog Research Group, LLC.
- Alnasib, B. (2023). Saudi Kindergarten Teachers and Education for Sustainable Development (ESD): Concept and Practice. *Preprints*.
- Amado, A., Dalelo, A., Adomßent, M., & Fischer, D. (2017). Engaging teacher educators with the sustainability agenda: A case study of a pilot professional development program from Ethiopia. *International Journal of Sustainability in Higher Education*, 715-737.

- Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Angelaki, M. E., Bersimis, F., Karvounidis, T., & Douligeris, C. (2024). Towards more sustainable higher education institutions: Implementing the sustainable development goals and embedding sustainability into the information and computer technology curricula. *Education and Information Technologies*, 5079-5113.
- Ansell, C., & Gash, A. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 543-571.
- Anyolo, E., Kärkkäinen, S., & Keinonen, T. (2018). Implementing Education for Sustainable Development in Namibia: School Teachers' Perceptions and Teaching Practices. *Journal of Teacher Education for Sustainability*, 64-81.
- Arabi, E., & Garza, T. (2023). Training design enhancement through training evaluation: effects on training transfer. *International Journal of Training and Development*, 191-219.
- Arghode, V., & Wang, J. (2016). Exploring trainers' engaging instructional practices: a collective case study. *European Journal of Training and Development*, 111-127.
- Aryani, S., Zarkasih, Z., Radeswandri, R., & Vebrianto, R. (2022). The effect of using integrated learning model on science learning in junior high school: systematic literature review. *Jurnal Pijar Mipa*, 319-324.
- Ayvaz-Tuncel, Z., & Çobanoğlu, F. (2018). In-Service Teacher Training: Problems of the Teachers as Learners. *International Journal of Instruction*, 159-174.
- Azid, R. M., & Ekowati, V. M. (2023). Positive Emotion in Muslim Fashion Mediating the Impact of Islamic Promotion and Hedonic Motivation on Impulse Buying. *4th Annual International Conference on Language, Literature and Media (AICOLLIM 2022)* (hal. 574-584). Malang: Atlantis Press.
- Bagaskara, R. R. (2024). Legal protection of consumer personal data in online loan transactions. *Asian Journal of Social and Humanities*, 1579-1586.
- Bakah, M., Voogt, J., & Pieters, J. (2011). Curriculum reform and teachers' training needs: the case of higher education in ghana. *International Journal of Training and Development*, 67-76.
- Bandura, A. (2018). Toward a Psychology of Human Agency: Pathways and Reflections. *Perspectives on psychological science*, 130-136.
- Barbier, E., & Burgess, J. (2017). The Sustainable Development Goals and the Systems Approach to Sustainability. *Economics*, 1-22.
- Barth, M., Godemann, J., Rieckmann, M., & Stoltenberg, U. (2007). Developing Key Competencies for Sustainable Development in Higher Education. *International Journal of Sustainability in Higher Education*, 416-430.
- Bates, A. W. (2015). *Teaching in a digital age: Guidelines for designing teaching and learning*. BCcampus.
- Bertschy, F., Künzli, C., & Lehmann, M. (2013). Teachers' competencies for the implementation of educational offers in the field of education for sustainable development. *Sustainability*, 5067-5080.

- Biasutti, M., & Frate, S. (2017). A validity and reliability study of the attitudes toward sustainable development scale. *Environmental Education Research*, 214-230.
- Biech, E. (2014). *ASTD Handbook: The Definitive Reference for Training & Development 2nd Edition*. Alexandria: ASTD Press.
- Biggs, E. E., Gilson, C. B., & Carter, E. W. (2019). "developing that balance": preparing and supporting special education teachers to work with paraprofessionals. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, 117-131.
- Blewitt, J. (2018). *Understanding Sustainable Development*. Abingdon, UK: Routledge.
- Borg, C., Gericke, N., Höglund, H.-O., & Bergman, E. (2012). The Barriers Encountered by Teachers Implementing Education for Sustainable Development: Discipline Bound Differences and Teaching Traditions. *Research in Science & Technological Education*, 185-207.
- Brandt, J.-O., Bürgener, L., Barth, M., & Redman, A. (2019). Becoming A Competent Teacher in Education for Sustainable Development. *International Journal of Sustainability in Higher Education*, 630-653.
- Buckley, R., & Caple, J. (2009). *The theory and practice of training*. London: Kogan Page.
- Büssing, A. G., Schleper, M., & Menzel, S. (2019). Do Pre-service Teachers Dance with Wolves? Subject-Specific Teacher Professional Development in A Recent Biodiversity Conservation Issue. *Sustainability*, 1-24.
- Bustami, Y., Syafruddin, D., & Afriani, R. (2018). The Implementation of Contextual Learning to Enhance Biology Students' Critical Thinking Skills. *Jurnal Pendidikan IPA Indonesia*, 451-457.
- Cebrián, G., & Junyent, M. (2015). Competencies in Education for Sustainable Development: Exploring the Student Teachers' Views. *Sustainability*, 2768-2786.
- Cebrián, G., & Junyent, M. (2015). Competencies in Education for Sustainable Development: Exploring the Student Teachers' Views. *Sustainability*, 2768-2786.
- Cebrián, G., Junyent, M., & Mulà, I. (2020). Competencies in Education for Sustainable Development: Emerging Teaching and Research Developments. *Sustainability*, 1-9.
- Cebrián, G., Palau, R., & Mogas, J. (2020). The Smart Classroom as a Means to the Development of ESD Methodologies. *Sustainability*, 1-18.
- Chaabani, Y., Du, X., Lundberg, A., & Abu-Tineh, A. (2023). Education Stakeholders' Viewpoints About an ESD Competency Framework: Q Methodology Research. *Sustainability*, 1-18.
- Chen, J.-L. (2022). The learning outcomes of industry expert collaborative teaching and enterprise visits on students in business schools of universities of technology in Taiwan. *Advances in Management and Applied Economics*, 85-97.
- Chou, C.-Y., Tseng, S.-F., Wang, C.-J., Chao, P.-Y., Chen, Z.-H., Lai, K., & Chan, C.-L. (2018). Learning analytics on graduates' academic records to reflect

- on a competency-based curriculum. *Computer Applications in Engineering Education*, 2168-2182.
- Choudhari, S., Rawekar, A., Mishra, V., Srivastava, T., & Vagha, S. (2020). Curriculum Evaluation of Physiology Subject of Medical Undergraduate Using 'fipo model'. *Journal of Family Medicine and Primary Care*, 3487-3491.
- Chung, H., & Park, W. (2022, October 27). Training Older Adults to Use Public Information System: Effects of Medium and Instruction Type on Training Efficacy. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, hal. 2278-2279.
- Çimşir, B. T., & Uzunboylu, H. (2019). Awareness Training for Sustainable Development: Development, Implementation and Evaluation of a Mobile Application. *Sustainability*, 1-17.
- Clark, R. C., & Mayer, R. E. (2023). *E-learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*. John Wiley & Sons.
- Cohen, R. J., Swerdlik, M. E., & Phillips, S. M. (1996). *Psychological Testing and Assessment: An Introduction to Tests and Measurement*. Mayfield Publishing Co.
- Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & education*, 661-686.
- Corres, A., Rieckmann, M., Espasa, A., & Ruiz-Mallén, I. (2020). Educator Competences in Sustainability Education: A Systematic Review of Frameworks. *Sustainability*, 1-24.
- Creswell, J. W. (2014). *Research Design : Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE.
- Dahri, N. A., Vighio, M. S., & Dahri, M. H. (2018). An Acceptance of Web Based Training System for Continuous Professional Development. A Case Study of Provincial Institute of Teacher Education Sindh, Nawabshah. *3rd International Conference on Emerging Trends in Engineering, Sciences and Technology (ICEEST)* (hal. 1-8). Karachi: IEEE.
- Department of Economic and Social Affairs. (2013). *World Economic and Social Survey 2013 Sustainable Development Challenges*. Paris: UN.
- Dessler, G. (2020). *Human Resource Management*. Pearson Education.
- Dipboye, R. L. (2018). Employee training and development. Dalam L. R. Dipboye, *The Emerald Review of Industrial and Organizational Psychology* (hal. 581-624). Leeds: Emerald Publishing Limited.
- Dokumen Tujuan Pembangunan Berkelanjutan*. (2021, Februari 10). Diambil kembali dari Tujuan Pembangunan Berkelanjutan Kementerian PPN/Bappenas: [https://sdgs.bappenas.go.id/website/wp-content/uploads/2021/02/Roadmap\\_Bahasa-Indonesia\\_File-Upload.pdf](https://sdgs.bappenas.go.id/website/wp-content/uploads/2021/02/Roadmap_Bahasa-Indonesia_File-Upload.pdf)
- Eilks, I. (2015). Science Education and Education for Sustainable Development – Justifications, Models, Practices and Perspectives. *EURASIA Journal of Mathematics, Science and Technology Education*, 149-158.
- Elliott , J. (2017). The Evolution from Traditional to Online Professional Development: A Review. *Journal of Digital Learning in Teacher Education*, 114-125.

- Elliott, J. (2013). *An Introduction to Sustainable Development*. Abingdon: Routledge.
- Ellis, T., & Levy, Y. (2010). A guide for novice researchers: Design and development research methods. *Proceedings of Informing Science & IT Education Conference (InSITE)*, (hal. 107-118). Cassino.
- Emilzoli, M., Ali, M., & Rusman. (2021). Perceptions, attitudes and lifestyles of students of Madrasah Ibtidaiyah Teacher Education Study Program about education for sustainable development. *IOP Conference Series: Earth and Environmental Science*, 1-6.
- Eraut, M. (2002). *Developing professional knowledge and competence*. Routledge.
- Erdoğan, P., & Gürol, M. (2021). The needs analysis of english preparatory school instructors towards professional skills in higher education. *Journal of Curriculum and Teaching*, 56-67.
- Ernawati, D. P. (2021). The Effect of Economic Growth and Poverty on Development Disparities in West Java Province. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 3193-3203.
- Ershad, Q., Kamran, U., & Umar, L. (2022). An Analysis of the Perception of Teachers on the Inclusion of Education for Fustainable Development (ESD) in the Curriculum of Teacher Education. *International Journal of Linguistics and Culture*, 111-127.
- Evans, J. C., Yip, H., Chan, K., Armatas, C., & Tse, A. (2020). Blended learning in higher education: professional development in a hong kong university. *Higher Education Research & Development*, 643-656.
- Expósito, L. C., & Sánchez, J. G. (2020). Implementation of sdgs in university teaching: a course for professional development of teachers in education for sustainability for a transformative action. *Sustainability*, 1-19.
- Fadlillah, A. F., Ali, M., Hernawan, A. H., & Riyana, C. (2023). Designing a media literacy training curriculum framework for junior high school teachers. *JTP - Jurnal Teknologi Pendidikan*, 414-429.
- Fauzi, R., & Hamdu, G. (2021). Kompetensi Guru: Pelaksanaan Pembelajaran Berkelanjutan dan Kreativitas Berbasis ESD Di Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 3(4), 1784-1797.
- Ferguson, T., Roofe, C., & Cook, L. (2021). Teachers' perspectives on sustainable development: the implications for education for sustainable development. *Environmental Education Research*, 1343-1359.
- Firman, H. (2006). *Sains-Lingkungan-Teknologi-Masyarakat dalam Konteks Implementasi Pendidikan untuk Pembangunan Berkelanjutan*. Jakarta: Pusat Kurikulum Balitbang Depdiknas.
- Fortus, D., Sutherland Adams, L. M., Krajcik, J., & Reiser, B. (2015). Assessing the role of curriculum coherence in student learning about energy. *Journal of Research in Science Teaching*, 1408-1425.
- Fredriksson, U., Kusanagi, K., Gougoulakis, P., Matsuda, Y., & Kitamura, Y. (2020). A Comparative Study of Curriculums for Education for Sustainable Development (ESD) in Sweden and Japan. *Sustainability*, 1-16.
- Gaite, S. S., Asiimwe, S., Emurugat, I., & Mugenyi, E. (2023). Influence of In-Service Training of Teachers on Teachers' Motivation in Public Secondary

- Schools in Chato District, Geita Region, Tanzania. *Journal of Education and Practice*, 89-95.
- General Assembly United Nations. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. New York: United Nations.
- Ghorbani, S., Jafari, S. M., & Sharifian, F. (2018). Learning to Be: Teachers' Competences and Practical Solutions: A Step towards Sustainable Development. *Journal of Teacher Education for Sustainability*, 20-45.
- Gil, A., Ruiz-Lopez, M. D., Fernandez-Gonzalez, M., & Victoria, E. M. (2014). The Finut Healthy Lifestyles Guide: Beyond the Food Pyramid. *Advances in Nutrition*, 358S-367S.
- Global Education Monitoring Report Team. (2016). *Education for people and planet: creating sustainable futures for all, Global education monitoring report, 2016*. Paris: UNESCO.
- Gong, X., Kannan, S., & Ramakrishnan, K. (2023). Impact of mobile technology on collaborative learning in engineering studies. *European Journal of Educational Research*, 397-406.
- González-Andrés, F., & Urbano, B. (2018, March 5). The use of rubrics to assess competences. *12th International Technology, Education and Development Conference*, hal. 4255-4261.
- Gopalan, M., Rosinger, K., & Ahn, J. B. (2020). Use of quasi-experimental research designs in education research: growth, promise, and challenges. *Review of Research in Education*, 218-243.
- Gündüzalp, S. (2021). 21st century skills for sustainable education: prediction level of teachers' information literacy skills on their digital literacy skills. *Discourse and Communication for Sustainable Education*, 85-101.
- Gunter, G., & Reeves, J. (2017). Online professional development embedded with mobile learning: An examination of teachers' attitudes, engagement and dispositions. *British Journal of Educational Technology*, 1305-1317.
- Häkkinen, P., Järvelä, S., Mäkitalo-Siegl, K., Ahonen, A., Nääkki, P., & Valtonen, T. (2016). Preparing teacher-students for twenty-first-century learning practices (prep 21): a framework for enhancing collaborative problem-solving and strategic learning skills. *Teachers and Teaching*, 25-41.
- Harvard Business Review. (2023). *AI and Robotics in the Future of Work*.
- Hasibuan, N. P., Parisiowati, M., & Erdawati, E. (2021). Sustainability Development-Based Agroindustry in Chemistry Learning to Improve the Preservice Chemistry Teachers' Competence. *Tadris: Jurnal Keguruan Dan Ilmu Tarbiyah*, 125-138.
- Helleve, I. (2017). Formally educated mentors in norway. possibilities and challenges in mentors' support of colleagues' professional development. *Nordisk tidsskrift i veileddningspedagogikk*, 30-44.
- Hermawati, S. (2023). Unveiling pedagogical competence: insights from outstanding teachers. *Advances in Social Science, Education and Humanities Research*, 60-69.
- Herranen, J., Vesterinen, V.-M., & Aksela, M. (2018). From Learner-Centered to Learner-Driven Sustainability Education. *Sustainability*, 1-14.
- Hobusch, U., & Froehlich, D. E. (2021). Education for Sustainable Development: Impact and Blind Spots within Different Routes in Austrian Teacher Education. *Sustainability*, 1-14.

- Hoesny, M. U., & Darmayanti, R. (2021). Permasalahan dan Solusi Untuk Meningkatkan Kompetensi dan Kualitas Guru: Sebuah Kajian Pustaka. *Scholaria: Jurnal Pendidikan dan Kebudayaan*, 123-132.
- Hoffmann, T., & Siege, H. (2018). What is Education for Sustainable Development (ESD)? *Human Development*, 1-6.
- Hofman-Bergholm, M. (2018). Could Education for Sustainable Development Benefit from a Systems Thinking Approach? *Systems*, 1-12.
- Holfelder, A.-K. (2019). Towards A Sustainable Future With Education? *Sustainability Science*, 943–952.
- Holst, J., Brock, A., Singer-Brodowski, M., & Haan, G. d. (2020). Monitoring Progress of Change: Implementation of Education for Sustainable Development (ESD) within Documents of the German Education System. *Sustainability*, 1-19.
- Hyttinen, H., Laakso, S., Pietikäinen, J., Ratvio, R., Ruippo, L., Tuononen, T., & Vainio, A. (2023). Perceived Interest in Learning Sustainability Competencies Among Higher Education Students. *International Journal of Sustainability in Higher Education*, 118-137.
- Imara, K., & Altinay, F. (2021). Integrating Education for Sustainable Development Competencies in Teacher Education. *Sustainability*, 1-17.
- Indrawati, C. S., & Octoria, D. (2016). Continuous Professional Development to Improve the Teachers' Competencies. *Proceeding of the International Conference on Teacher Training and Education* (hal. 656-663). Surakarta: Universitas Negeri Surakarta.
- Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers. *Review of Educational Research*, 201-233.
- Inker, J., Jensen, C., Barsness, S., & Stewart, M. M. (2021). Implementing microlearning in nursing homes: implications for policy and practice in person-centered dementia care. *Journal of Applied Gerontology*, 1062-1070.
- Irvine, V., Code, J., & Richards, L. (2013). Realigning higher education for the 21st-century learner through multi-access learning. *MERLOT Journal of Online Learning and Teaching*, 172-186.
- Ismail, Rochintaniawati, D., Permanasari, A., & Riandi, R. (2022). Content Study of 7th-Grade Science Textbooks Using An ESD Viewpoint on Living Things and Their Surroundings. *Ta'dib*, 117-128.
- ITU (International Telecommunication Union). (2022). Laporan TIK global.
- Jaakkola, N., Karvinen, M., Hakio, K., Wolff, L.-A., Mattelmäki, T., & Friman, M. (2022). Becoming Self-Aware-How Do Self-Awareness and Transformative Learning Fit in the Sustainability Competency Discourse? *Frontiers in Education*, 1-13.
- Jarvie, M. E. (2016, May 20). *Encyclopedia Britannica*. Diambil kembali dari Brundtland Report: <https://www.britannica.com/topic/Brundtland-Report>
- Jegstad, K. M., Sinnes, A. T., & Gjøtterud, S. M. (2018). Science Teacher Education for Sustainable Development: from Intentions to Realisation. *Nordic Studies in Science Education*, 350-367.
- Jelsøe, E., Thualagant, N., Holm, J., Kjærgård, B., Andersen, H. M., From, D.-M., . . . Pedersen, K. B. (2018). A Future Task for Health-Promotion Research:

- Integration of Health Promotion and Sustainable Development. *Scandinavian Journal of Public Health*, 99-106.
- Jeng, C.-S., Ho, S.-J., Lin, W.-L., & Chen, F.-H. (2022). On Lao Tzu's Ethics As the Inspiration and Practice of Education for Sustainable Development. *Sustainability*, 1-14.
- Jerneck, A., Olsson, L., Ness, B., Anderberg, S., Baier, M., Clark, E., . . . Persson, J. (2010). Structuring Sustainability Science. *Sustainability Science*, 69-82.
- Jodoin, J. J. (2020). Promoting Language Education for Sustainable Development: A Program Effects Case Study in Japanese Higher Education. *International Journal of Sustainability in Higher Education*, 779-798.
- Jordan, K. (2014). Initial Trends in Enrolment and Completion of Massive Open Online Courses. *International Review of Research in Open and Distributed Learning*, 133–160.
- Ju, B., & Li, J. (2019). Exploring the impact of training, job tenure, and education-job and skills-job matches on employee turnover intention. *European Journal of Training and Development*, 214-231.
- Juntunen, M., & Aksela, M. (2014). Education for Sustainable Development in Chemistry – Challenges, Possibilities and Pedagogical Models in Finland and Elsewhere. *Chem. Educ. Res. Pract*, 488-500.
- Kabadayi, A. (2016). A suggested in-service training model based on turkish preschool teachersí conceptions for sustainable development. *Journal of Teacher Education for Sustainability*, 5-15.
- Kabombwe, Y. M., & Mulenga, I. M. (2019). Implementation of the Competency-Based Curriculum by Teachers of History in Selected Secondary Schools in Lusaka District, Zambia. *Yesterday and today*, 19-41.
- Kahriman-Pamuk, D., & Olgan, R. (2018). Teacher Practices and Preschool Physical Environment for Education for Sustainable Development: Eco Vs Ordinary Preschools. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 669-683.
- Kang, W. (2019). Perceived barriers to implementing education for sustainable development among korean teachers. *Sustainability*, 1-15.
- Kanie, N., & Biermann, F. (2017). *Governing through goals: Sustainable development goals as governance innovation*. London: MIT Press.
- Kao, C.-P., Wu, Y.-T., & Tsai, C.-C. (2011). Elementary school teachers' motivation toward web-based professional development, and the relationship with Internet self-efficacy and belief about web-based learning. *Teaching and Teacher Education*, 406-415.
- Kayembe, C., & Nel, D. (2019). Challenges and Opportunities for Education in the Fourth Industrial Revolution. *African Journal of Public Affairs*, 79-94.
- Kennedy, M. M. (2016). How does professional development improve teaching? *Review of educational research*, 945-980.
- Khorasgani, A. T. (2021). Teacher Role and Involvement in Curriculum Development and Mapping. *Journal of Education and Practice*, 1-3.
- Kieu, T. K., Singer, J., & Gannon, T. J. (2016). Education for Sustainable Development in Vietnam: Lessons Learned from Teacher Education. *International Journal of Sustainability in Higher Education*, 853-874.

- Kioupi, V., & Voulvoulis, N. (2019). Education for sustainable development: A systemic framework for connecting the SDGs to educational outcomes. *Sustainability*, 1-18.
- Kirkpatrick, J. D., & Kirkpatrick, W. K. (2016). *Kirkpatrick's four levels of training evaluation*. Alexandria: ATD Press.
- Klarin, T. (2018). The Concept of Sustainable Development: From its Beginning to the Contemporary Issues. *Zagreb International Review of Economics and Business*, 67-94.
- Kneebone, R. (2003). Simulation in surgical training: educational issues and practical implications. *Medical Education*, 267-277.
- Kolb, A. Y., & Kolb, D. A. (2017). Experiential learning theory as a guide for experiential educators in higher education. *ELTHE: A Journal for Engaged Educators*, 7-44.
- Komuhangi, A., Mpirirwe, H., Robert, L., Githinji, F. W., & Nanyonga, R. C. (2022). Predictors for adoption of e-learning among health professional students during the COVID-19 lockdown in a private university in Uganda. *BMC Medical Education*, 1-6.
- Konrad, T., Wiek, A., & Barth, M. (2021). Learning to Collaborate from Diverse Interactions in Project-Based Sustainability Courses. *Sustainability*, 1-15.
- Krylova, M., Novikova, Y., Totskaya, I., & Ostapenko, I. (2021). Traditional and innovative educational technologies at the university through the e-learning prism. *SHS Web of Conferences*, 1-7.
- Kurbanov, S., Meshchangina, E., & Stefanova, N. (2023). Environmental economics and sustainable development. *E3S Web of Conferences*.
- Kurniasih, D., Kalalangi, R., & Prihandini, A. (2023). Writing Structure of Disaster Management Planning Document in West Java. *Proceeding of International Conference on Business, Economics, Social Sciences, and Humanities*, 393-401.
- Lamb, A., McKinney, B., Frousiakis, P., Diaz, G., & Sweet, S. (2023). A comparative study of traditional technique guide versus virtual reality in orthopedic trauma training. *Advances in Medical Education and Practice*, 947-955.
- Lampert, A. (2019). Over-Exploitation of Natural Resources is Followed by Inevitable Declines in Economic Growth and Discount Rate. *Nature Communications*, 1-10.
- Laurie, R., Nonoyama-Tarumi, Y., McKeown, R., & Hopkins, C. (2016). Contributions of Education for Sustainable Development (ESD) to Quality Education: A Synthesis of Research. *Journal of Education for Sustainable Development*, 226-242.
- Le, L.-A. T., & Tran, T. Q. (2023). Effectiveness of experiential learning in teaching Vietnamese language in primary schools: perspectives of teachers and administrators. *International Journal of Education and Practice*, 85-93.
- Leach, M., Rockström, J., Raskin, P., Scoones, I., Stirling, C. A., Smith, A., . . . Olsson, P. (2012). Transforming Innovation for Sustainability. *Ecology and Society*.
- Leicht, A., Combes, B., Byun, W. J., & Agbedahin, A. V. (2018). From Agenda 21 to Target 4.7: the development of Education for Sustainable Development.

- Dalam A. Leicht, J. Heiss, & W. J. Byun, *Issues and trends in Education for Sustainable Development* (hal. 25-38). Paris: UNESCO.
- Lestari, H., Ali, M., Sopandi, W., & Ana, R. W. (2021). Infusion of Environment Dimension of ESD into Science Learning Through the RADEC Learning Model in Elementary Schools. *Jurnal Penelitian Pendidikan IPA*, 205-212.
- Letouzey-Pasquier, J., Gremaud, B., Blondin, S., & Roy, P. (2022). Development of teachers' practices in the field of education for sustainable development (ESD): a discursive community of interdisciplinary practices focusing on the theme of chocolate. *Environmental Education Research*, 1-15.
- Li, B. (2009). The Use of E-learning in Pre-Service Teacher Education. *Campus-Wide Information Systems*, 132-136.
- Listiawati, N. (2011). Relevansi nilai-nilai ESD dan Kesiapan guru dalam mengimplementasikannya di Sekolah. *Jurnal Pendidikan Dan Kebudayaan*, 17(2), 135-152.
- Listiawati, N. (2013). Pelaksanaan Pendidikan untuk Pembangunan Berkelanjutan oleh Beberapa Lembaga. *Jurnal Pendidikan Dan Kebudayaan*, 430-450.
- Liu , X., Bonk, C. J., Magjuka, R. J., Lee, S.-h., & Su, B. (2005). Exploring four dimensions of online instructor roles: a program level case study. *Online Learning*, 29-48.
- Liu, Y., & Qi, W. (2021). Construction of language teachers' professional competence in education for sustainable development in higher education for post-pandemic era. *Journal of Language Teaching and Research*, 304-311.
- Liu, Y., & Qi, W. (2021). Construction of Language Teachers' Professional Competence in Education for Sustainable Development in Higher Education for Post-Pandemic Era. *Journal of Language Teaching and Research*, 304-311.
- Lohmann, J., & Goller, A. (2022). Physical Education Teacher Educators' Subjective Theories about Sustainability and Education for Sustainable Development. *International Journal of Sustainability in Higher Education*, 877-894.
- Lohmann, J., & Goller, A. (2022). Physical Education Teacher Educators' Subjective Theories About Sustainability and Education for Sustainable Development. *International Journal of Sustainability in Higher Education*, 877-894.
- Lohmann, J., Breithecker, J., Ohl, U., Gieß-Stüber, P., & Brandl-Bredenbeck, H. P. (2021). Teachers' Professional Action Competence in Education for Sustainable Development: A Systematic Review from the Perspective of Physical Education. *Sustainability*, 1-26.
- Lohr, L., & Kowch, E. (2004). Designing effective instruction. *Educational Technology Research and Development*, 85-90.
- Lozano, R., Bautista-Puig, N., & Barreiro-Gen, M. (2022). Developing a sustainability competences paradigm in Higher Education or a White Elephant? *Sustainable Development*, 870-883.
- Luo, J., & Muyunda, G. (2021). Teachers' Voice in Zambia: How to Make Them Involved in Curriculum Development. *International Journal of Asian Education*, 388-397.

- Maba, W., & Mantra, I. N. (2018). The primary school teachers' competence in implementing the 2013 curriculum. *SHS Web of Conferences*.
- Mahdavi, M., Falah, V., & Salimi, L. (2023). The structural model of teachers' empowerment indicators with an emphasis on the theory of cognitive flexibility in the first secondary school of mazandaran province schools. *Journal of Adolescent and Youth Psychological Studies*, 224-232.
- Maidiana. (2021). Penelitian Survey. *ALACRITY : Journal Of Education*, 20-19.
- Malik, M. K., Qi, Z., Iqbal, M., Zamir, S., & Malik, B. F. (2022). Education for sustainable development: secondary school teacher's awareness and perception of integration. *Sustainable Development*, 1515-1525.
- Mardapi, D., & Herawan, T. (2019). Community-based teacher training: Transformation of sustainable teacher empowerment strategy in Indonesia. *Journal of Teacher Education for Sustainability*, 48-66.
- Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-Winning Faculty Online Teaching Practices: Roles and Competencies. *Online Learning*, 184-205.
- Maryati, S., Humaira, A., & Pratiwi, F. (2018). Spatial Pattern of Agricultural Land Conversion in West Java Province. *IOP Conference Series: Earth and Environmental Science*, 1-8.
- Marvin, R. (2020). *The Future of 5G Technology*
- McKeown, R., Hopkins, C., Rizzi, R., & Chrystalbridge, M. (2002). *Education for sustainable development toolkit*. Knoxville: University of Tennessee.
- McKinsey & Company. (2021). *The State of Digital Transformation*.
- McNaughton, M. J. (2012). Implementing Education for Sustainable Development in Schools: Learning from Teachers' Reflections. *Environmental Education Research*, 765-782.
- Mensah, J. (2019). Sustainable Development: Meaning, History, Principles, Pillars, and Implications for Human Action: Literature Review. *Cogent social sciences*, 1-21.
- Miao, F., Zhang, Q., & Yang, K. (2023). Application of diversified teaching strategies in the intelligent physical education platform: enhancing course interactivity and engagement. *International Journal of Education and Humanities*, 229-233.
- Miller, N., Wick, J., Luther, V. P., & Newman, J. R. (2023). Online Infectious Diseases Subspecialty Supplementary Curriculum for Medical Students and Residents: Moving Beyond "You Get What You Get". *J Med Educ Curric Dev*, 1-6.
- Miloslavsky, E. M., Sargsyan, Z., Heath, J. K., Kohn, R., Alba, G. A., Gordon, J. A., & Currier, P. F. (2015). A simulation-based resident-as-teacher program: the impact on teachers and learners. *Journal of Hospital Medicine*, 767-772.
- Miskiah, Suryono, Y., & Sudrajat, A. (2019). Integration of information and communication technology into islamic religious education teacher training. *Jurnal Cakrawala Pendidikan*, 38(1),, 130-140.
- Mochizuki, Y., & Bryan, A. (2015). Climate Change Education in the Context of Education for Sustainable Development: Rationale and Principles. *Journal of Education for Sustainable Development*, 4-26.

- Mogren, A., Gericke, N., & Scherp, H.-Å. (2019). Whole school approaches to education for sustainable development: a model that links to school improvement. *Environmental education research*, 508-531.
- Mokhtar, S., Alshboul, J., & Shahin, G. (2019). Towards Data-driven Education with Learning Analytics for Educator 4.0. *Journal of Physics: Conference Series*, 1-6.
- Mongar, K. (2022). Teachers' Preparedness to Teach Environmental Science in Bhutan. *EURASIA Journal of Mathematics, Science and Technology Education*, 1-9.
- Moradi, Y., Ahmadi, F., Sadeghi, A., & Oshvandi, K. (2019). Conceptualizing and determining core clinical competencies in nursing students: a qualitative study. *International Nursing Review*, 530-540.
- Mugarura, P., Ssempala, F., & Nachuha, S. (2022). Role of in-service teacher training as a tool for the student's performance in selected public secondary schools in kisoro district. *International Journal of Educational Policy Research and Review*, 1-13.
- Mula, I., & Tilbury, D. (2011). *National journeys towards education for sustainable development, 2011: reviewing national experiences from Chile, Indonesia, Kenya, the Netherlands, Oman*. Paris: UNESCO.
- Müller, U., Hancock, D., Stricker, T., & Wang, C. (2021). Implementing ESD in Schools: Perspectives of Principals in Germany, Macau, and the USA. *Sustainability*, 1-16.
- Müller, U., Lude, A., & Hancock, D. (2020). Leading Schools Towards Sustainability. Fields of Action and Management Strategies for Principals. *Sustainability*, 1-19.
- Munandar, H., & Junita, S. (2022). The effectiveness of psychomotor evaluation using peer assessment in the practicum activities. *Jurnal Pendidikan Sains Indonesia*, 569-578.
- Napal, M., Mendióroz-Lacambra, A. M., & Peñalva, A. (2020). Sustainability Teaching Tools in the Digital Age. *Sustainability*, 1-14.
- Natalia, C. (2018). Modernization of Physical Education of Students by Means of Choreography on the Basis of an Integrated Approach. *Physical Education, Sport and Health Culture in Modern Society*, 41-45.
- Niens, J., & Bögeholz, S. (2021). Health and Land-Use Courses of Action for Education for Sustainable Development in Madagascar: Teacher Perspectives on Possibilities for Implementation. *Sustainability*, 1-32.
- Nikmah, I. L., Juandi, D., & Prabawanto, S. (2019). Students' difficulties on solving mathematical problem based on ESD objectives. *Journal of Physics: Conference Series*, 1-6.
- Nikou, S. A., & Economides, A. A. (2018). Mobile-based micro-learning and assessment: impact on learning performance and motivation of high school students. *Journal of Computer Assisted Learning*, 269-278.
- Nketsia, W., Opoku, M. P., Saloviita, T., & Tracey, D. (2020). Teacher educators' and teacher trainees' perspective on teacher training for sustainable development. *Journal of Teacher Education for Sustainability*, 49-65.
- Nkonde, E., Oloyede, O., & Peter, G. (2020). Exploring Eswatini Senior Secondary School Geography Teachers' Understanding of and Attitudes to Education

- for Sustainable Development. *International Journal of Research - GRANTHAALAYAH*, 407-417.
- Noe, R. (2020). *Employee Training & Development, Eighth Edition*. New York: McGraw Hill.
- Noe, R. (2023). *Employee Training & Development, Ninth Edition*. New York: McGraw Hill.
- Noh, J.-W., Park, B. S., Kim, E. J., & Kim, M. H. (2018). The investigation of the educational needs on the job competence for physical therapist assistant in the students of Quang Tri medical college in Vietnam. *Journal of Physical Therapy Science*, 1428-1433.
- Ödalen, J., Brommesson, D., Erlingsson, G. Ó., Schaffer, J. K., & Fogelgren, M. (2019). Teaching university teachers to become better teachers: the effects of pedagogical training courses at six Swedish universities. *Higher Education Research & Development*, 339-353.
- O'Flaherty, J., & Liddy, M. (2018). The Impact of Development Education and Education for Sustainable Development Interventions: A Synthesis of the Research. *Environmental Education Research*, 1031–1049.
- O'Grady, A. C., Reeve, S. A., Reeve, K. F., Vladescu, J. C., & Deshais, M. (2021). Comparing computer-based training and lecture formats to teach visual analysis of baseline-treatment graphs. *Behavioral Interventions*, 67-92.
- Oh, S., & Park, J. (2023). A literature review of simulation-based nursing education in korea. *Nursing Reports*, 506-517.
- Oliver, B. (2019). *Making micro-credentials work for learners, employers, and providers*. Deakin University.
- Olmos-Gómez, M. C., Estrada-Vidal, L. I., Ruiz-Garzón, F., López-Cordero, R., & Mohamed-Mohand, L. (2019). Making Future Teachers More Aware of Issues Related to Sustainability: An Assessment of Best Practices. *Sustainability*, 1-21.
- Olsson, P., Folke, C., & Berkes, F. (2004). Adaptive Comanagement for Building Resilience in Social-Ecological Systems. *Environmental Management*, 75–90.
- Ornstein, A. C., & Hunkins, F. P. (2017). *Curriculum: Foundations, Principles, and Issues, Global Edition*. Pearson Higher Education & Professional Group.
- Ozdemir, N. K., Akçabozan Kayabol, N. B., Aydin, G., & Tatlı, C. E. (2022). Fostering teachers' career education competencies: test of a training programme. *British Journal of Guidance & Counselling*, 462-473.
- Palmberg, I., Hofman-Bergholm, M., Jeronen, E., & Yli-Panula, E. (2017). Systems Thinking for Understanding Sustainability? Nordic Student Teachers' Views on the Relationship between Species Identification, Biodiversity and Sustainable Development. *Education Sciences*, 1-18.
- Pálsdóttir, A., & Jóhannsdóttir, L. (2021). Key Competencies for Sustainability in University of Iceland Curriculum. *Sustainability* , 1-17.
- Pariscal, D. R., & Ivy, G.-A. (2022). Practices in the contextualization of the english curriculum in the public secondary schools. *Technium Social Sciences Journal*, 60-75.

- Park, J. H. (2023). Analysis of educational discourse through historical changes of music curriculum in korea. *Asia-Pacific Journal of Convergent Research Interchange*, 497-506.
- Paudel, P. (2021). Online education: benefits, challenges and strategies during and after covid-19 in higher education. *International Journal on Studies in Education (IJonSE)*.
- Peedikayil, J. V., Vijayan, V., & Kaliappan, T. (2023). Teachers' Attitude Towards Education for Sustainable Development: A Descriptive Research. *International Journal of Evaluation and Research in Education*, 86-95.
- Pegalajar-Palomino, M. C. (2021). What Does Education for Sustainable Development Offer in Initial Teacher Training? A Systematic Review. *Journal of Teacher Education for Sustainability*, 99-114.
- Perkasa, M., Irwansyah, M., & Annafi, N. (2020). Teacher's perception on the implementation of education for sustainable development-based learning in senior high school. *Journal of Physics: Conference Series*, 1-5.
- Pesha, A. (2021). Key competencies of university graduates to achieve sustainable development. *E3S Web of Conferences*.
- Pfund, C., House, S., Asquith, P., Fleming, M., Buhr, K., Burnham, E., . . . Sorkness, C. (2014). Training mentors of clinical and translational research scholars. *Academic Medicine*, 774-782.
- Pfund, C., House, S., Spencer, K., Asquith, P., Carney, P., Masters, K., . . . Fleming, M. (2012). A research mentor training curriculum for clinical and translational researchers. *Clinical and Translational Science*, 26-33.
- Popham, W. J. (1999). *Classroom Assessment: What Teachers Need to Know*.
- Potter-Nelson, E., & O'Neil, J. K. (2019). Role of Teachers on Education for Sustainable Development. Dalam W. L. Filho, *Encyclopedia of Sustainability in Higher Education* (hal. 1-10). Cham: Springer.
- Print, M. (1993). *Curriculum Development and Design*. Routledge.
- Psek, W., Davis, F. D., Gerrity, G., & Stametz, R. (2016). Leadership Perspectives on Operationalizing the Learning Health Care System in an Integrated Delivery System. *EGEMS (Wash DC)*, 1-11.
- Puertas-Aguilar, M.-Á., Álvarez-Otero, J., & de Lázaro-Torres, M.-L. (2021). The Challenge of Teacher Training in the 2030 Agenda Framework Using Geotechnologies. *Education Sciences*, 1-14.
- Purvis, B., Mao, Y., & Robinson, D. (2019). Three Pillars of Sustainability: In Search of Conceptual Origins. *Sustainability Science*, 681–695.
- Purwianingsih, W., Novidsa, I., & Riandi, R. (2022). Program for Integrating Education for Sustainable Development (ESD) Into Prospective Biology Teachers' Technological Pedagogical Content Knowledge (TPACK). *Jurnal Pendidikan IPA Indonesia*, 219-228.
- Puspitasari, N., Suroso, D. S., & Sagala, S. H. (2017). Identifying Mainstreaming Climate Change Adaptation Efforts for Children into the West Java Development Planning. *The Indonesian Journal of Planning and Development*, 62-73.
- Putra, N. S., Permanasari, A., & Desmiawati, D. (2021). Student Sustainability Disposition: Where Are Students' Levels? *Thabiea : Journal of Natural Science Teaching*, 148-158.

- Qablan, A. (2018). Building Capacities of Educators and Trainers. Dalam A. Leicht, J. Heiss, & W. J. Byun, *Issues and Trends in Education for Sustainable Development* (hal. 133-156). Paris: UNESCO.
- Qureshi, M. S. (2020). Learning by Sustainable Living to Improve Sustainability Literacy. *International Journal of Sustainability in Higher Education*, 161-178.
- Rahlin, M., Barnett, J., & Sarmiento, B. (2021). Functional Symmetry Observation Scale, Version 2: Development and Content Validation Using a Modified Delphi Method. *Pediatric Physical Therapy*, 37-44.
- Rahman, A. A., Kaniawati, I., Riandi, & Hendayana, S. (2023). Secondary Science Teachers Perception on STEM Learning for Sustainable Development. *Jurnal Penelitian Pendidikan IPA*, 1297-1303.
- Ratheeswari, K. (2018). Information Communication Technology in Education. *Journal of Applied and Advanced Research*, 45-47.
- Ratinen, I., & Linnanen, L. (2022). The Connection of Finns' Environmental Awareness to Their Anticipatory Competence. *Frontiers in Education*, 1-8.
- Razmara, J., Fotoohi, S., & Parvizpour, S. (2014). Flexible protein structure alignment based on topology string alignment of secondary structure. *International Journal of E-Education, E-Business, E-Management and E-Learning*, 19-22.
- Redman, A., & Wiek, A. (2021). Competencies for Advancing Transformations Towards Sustainability. *Frontiers in Education*, 1-11.
- Ribeiro, D. N., Junior, F. H., Cunha, C. L., Kaetsu, P. T., Dionizio-Leite, P. F., & Junior, C. M. (2021). Digital sustainability: how information and communication technologies (icts) support sustainable development goals (sdgs) assessment in municipalities. *Digital Policy, Regulation and Governance*, 229-247.
- Richey, R. C., & Klein, J. D. (2007). *Design and Development Research*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Richter, S., & Kauffeld, S. (2020). Beyond supervisors' support: influencing (international) technical training transfer. *European Journal of Training and Development*, 391-403.
- Rieckmann, M. (2018). Learning to transform the world: key competencies in Education for Sustainable Development. Dalam A. Leicht, & J. Heiss, *Issues and Trends in Education for Sustainable Development* (hal. 39-59). Paris: UNESCO.
- Rieckmann, M., & Barth, M. (2022). Educators' competence frameworks in education for sustainable development. Dalam P. Vare, N. Lausselet, & M. Rieckmann, *Competences in education for sustainable development: Critical perspectives* (hal. 19-26). New York: Springer Nature.
- Rimal, K. (2018). Teacher: An Important But Less Recognized Actor of School Curriculum Development in Nepal. *Dhaulagiri Journal of Sociology and Anthropology*, 66-71.
- Rivalina, R. (2014). Kompetensi teknologi informasi dan komunikasi guru dalam peningkatan kualitas pembelajaran. *Jurnal Teknодик*, 165-176.
- Roblyer, M. D., & Doering, A. H. (2013). *Integrating Educational Technology Into Teaching*. Pearson/Allyn and Bacon Publishers.

- Rockwell, A. R., Bishopp, S. A., & Orrick, E. A. (2021). Do policy and training changes influence patterns of police use of force? An interrupted time-series analysis. *Policing: An International Journal*, 469-482.
- Roorda, N. (2020). *Fundamentals of Sustainable Development*. Abingdon, UK: Routledge.
- Rundgren, S.-N. C., & Yamada, N. (2023). Does Teacher Training of ESD Help In-service Teachers to Implement ESD in School? *Journal of Education for Sustainable Development*, 131–161.
- Sabola, B. C. (2017). Managing the Implementation of A School Curriculum in Malawi: Challenges and Policy Implications. *Texila International Journal of Management*, 106-117.
- Sachs, J., Guillaume, L., Fuller, G., & Drumm, E. (2023). *Sustainable Development Report*. Dublin: Dublin University Press.
- Sachs, J., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2021). *Sustainable Development Report 2021*. Cambridge: Cambridge University Press.
- Sachs, J., Lafortune, G., Kroll, C., Fuller, G., & Woelm, F. (2022). *Sustainable Development Report 2022*. Cambridge: Cambridge University Press.
- Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019). *Sustainable Development Report 2019*. Cambridge: Cambridge University Press.
- Sachs, J., Schmidt-Traub, G., Lafortune, G., Fuller, G., & Woelm, F. (2020). *Sustainable Development Report 2020*. Cambridge: Cambridge University Press.
- Sadler, D. R. (1989). Formative Assessment and the Design of Instructional Systems. *Instructional science*, 119-144.
- Saleem, Z., Ishaq, M., & Mahmood, Z. (2019). Meta-analysis approach towards importance of in-service training in teacher's professional and social development. *Global Social Sciences Review*, 250-256.
- Salman, M., Ganie, S. A., & Saleem, I. (2020). The Concept of Competence: A Thematic Review and Discussion. *European Journal of Training and Development*, 717-742.
- Saputri, K. D., & Puspitasari, K. A. (2023). Increasing student interest and learning outcomes through the discovery learning model on subject human respiratory system. *Co-Catalyst: Journal of Science Education Research and Theories*, 1-8.
- Schina, D., Esteve-González, V., Usart, M., Lázaro-Cantabrana, J.-L., & Gisbert, M. (2020). The integration of sustainable development goals in educational robotics: a teacher education experience. *Sustainability*, 1-15.
- Scott, W., & Gough, S. (2003). *Sustainable Development and Learning: Framing the Issues*. London: Taylor & Francis.
- Setiawati, H., & Corebima, A. D. (2017). Empowering critical thinking skills of the students having different academic ability in biology learning of senior high school through pq4r - tps strategy. *The International Journal of Social Sciences and Humanities Invention*, 3521-3526.
- Shahroom, A. A., & Hussin, N. (2018). Industrial Revolution 4.0 and Education. *International Journal of Academic Research in Business and Social Sciences*, 314–319.

- Shi, L., Han, L., Yang, F., & Gao, L. (2019). The Evolution of Sustainable Development Theory: Types, Goals, and Research Prospects. *Sustainability*, 1-16.
- Shidiq, A. P., Rozi, F., & Purnama, Y. (2022). Professional competency analysis of physical education teachers at the level of private madrasah ibtidaiyah based on government regulation number 19 of 2017. *Al-Aulad: Journal of Islamic Primary Education*, 103-112.
- Shulla, K., Filho, W. L., Lardjane, S., Sommer, J. H., & Borgemeister, C. (2020). Sustainable development education in the context of the 2030 Agenda for sustainable development. *International Journal of Sustainable Development & World Ecology*, 458-468.
- Simulation in surgical training: educational issues and practical implications. (2003). *Medical Education*, 267-277.
- Sipos, Y., Battisti, B., & Grimm, K. (2008). Achieving transformative sustainability learning: engaging head, hands and heart. *International journal of sustainability in higher education*, 68-86.
- Soleh, A. (2015). Pertumbuhan Ekonomi dan Kemiskinan di Indonesia. *EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis*, 197-209.
- Sørensen, E., & Torfing, J. (2011). Enhancing Collaborative Innovation in the Public Sector. *Administration & Society*, 842-868.
- Sterling, S. (2016). A Commentary on Education and Sustainable Development Goals. *Journal of Education for Sustainable Development*, 208-213.
- Stock, T., Obenaus, M., Kunz, S., & Kohl, H. (2018). Industry 4.0 as enabler for a sustainable development: A qualitative assessment of its ecological and social potential. *Process Safety and Environmental Protection*, 254-267.
- Stock, T., Obenaus, M., Kunz, S., & Kohl, H. (2018). Industry 4.0 as enabler for a sustainable development: A qualitative assessment of its ecological and social potential. *Process Safety and Environmental Protection*, 254-267.
- Sun, D., Wang, C., & Chi, Y. (2022). Preschool Education in China: The Research on Curriculum Design and Teaching Strategies. *Asian Education Studies*, 51-55.
- Sund, P., & Gericke, N. (2020). Teaching Contributions from Secondary School Subject Areas to Education for Sustainable Development – A Comparative Study of Science, Social Science and Language Teachers. *Environmental Education Research*, 772-794.
- Sutirna, & Samsudin, A. (2019). *Landasan Kependidikan: Teori dan Praktik*. Bandung: Refika Aditama.
- Syafruddin, Rahim, A. R., Munirah, Syahruddin, Kadir, A., Bakri, M., & Thaba, A. (2020). Curriculum Development in College: Research and Development Study of Electronic Subjects for Indonesian Subjects at Muhammadiyah University of Makassar. *Universal Journal of Educational Research*, 4835-4844.
- Taba, H. (1962). *Curriculum Development: Theory and Practice*. Harcourt, Brace & World.
- Tanenbaum, A. S., & Wetherall, D. J. *Computer Networks* (5th ed.). Pearson Education.

- Tetteh, A., & Khumi-Agbasa, P. (2019). Basic school teachers' knowledge in fundamental curriculum concepts and curriculum development process in ghana. *Journal of Education and Practice*, 95-104.
- Thayer, T. (2023). Identifying Similarities and Differences in Sustainability Education and Foresight and Futures Education: A Comparative Analysis of Competence Frameworks. *The International Journal of Learning Futures*, 95-109.
- Thijs, A., & Akker, J. (2020). *Curriculum in development*. Enschede: Netherlands Institute for Curriculum Development (SLO).
- Thomas, V. (2014). Types of Training. Dalam B. Gardner, & V. Thomas, *Building an Information Security Awareness Program* (hal. 81-88). Amsterdam: Elsevier.
- Tondeur, J., Aesaert, K., Pynoo, B., Van Braak, J., Fraeyman, N., & Erstad, O. (2017). Developing a validated instrument to measure preservice teachers' ict competencies: meeting the demands of the 21st century. *British Journal of Educational Technology*, 462-472.
- Trask, S., Manuele, P., Borne, L., Galy, O., Potter, B., & Bay, J. (2024). Developing the tokelau national health and physical education curriculum: a case study. *Health Education Journal*, 78-94.
- Turban, E., Pollard, C., & Wood, G. *Information Technology for Management: Digital Strategies for Insight, Action, and Sustainable Performance*. Wiley.
- Tyler, R. W. (1949). *Basic Principles of Curriculum and Instruction*. The University of Chicago Press.
- Tyler, R. W. (2013). Basic principles of curriculum and instruction. *Curriculum studies reader E2*, 60-68.
- Uçar, M. Y. (2017). The effect of mentor training program on competence and attitude regarding mentorship. *Journal of Family Counseling and Education*, 50-71.
- Uitto, A., & Saloranta, S. (2017). Subject Teachers as Educators for Sustainability: A Survey Study. *Education Sciences*, 1-19.
- UNESCO. (2006). *Education for sustainable development toolkit*. Paris: UNESCO.
- UNESCO. (2014). *UNESCO roadmap for implementing the Global Action Programme on Education for Sustainable Development*. Paris: UNESCO.
- UNESCO. (2017). *Education for Sustainable Development Goals Learning Objectives*. Paris, France: UNESCO.
- UNESCO. (2017, 10 10). *Unesco Digital Library*. Diambil kembali dari Unesco Digital Library: <https://unesdoc.unesco.org/ark:/48223/pf0000247444/PDF/247444eng.pdf>. multi
- UNESCO. (2018). *Issues and Trends in Education for Sustainable Development*. Paris: UNESCO.
- UNESCO. (2020). *Education for Sustainable Development A roadmap*. Paris: UNESCO.
- UNESCO. (2020). *Guide for the Effective Dissemination of the Asia-Pacific ESD Teacher Competency Framework*. Bangkok: UNESCO.
- UNESCO. (2022). *Global citizenship education: advocacy, practice and awareness handbook for teachers*. Bangkok: UNESCO.
- UNESCO. (2022). *Digital Inclusion and TIK*.

- UNESCO. (2023, November 12). *UNESCO*. Diambil kembali dari UNESCO: <https://www.unesco.org/en/articles/empowering-learners-through-transformative-education-sustainable-development-asia-and-pacific?hub=355>
- UNESCO. (2024, May 30). *What is education for sustainable development?* . Diambil kembali dari UNESCO: <https://www.unesco.org/en/sustainable-development/education/need-know?hub=72522>
- United Nations. (2007, September 24). *UN News Global perspective Human stories.* Diambil kembali dari United Nations: <https://news.un.org/en/story/2007/09/232332>
- Üstün, A. B. (2023). Investigating impacts of using mobile video lectures on student satisfaction and academic achievement in blended learning. *Malaysian Online Journal of Educational Technology*, 199-210.
- Vangrieken, K., Meredith, C., Packer, T., & Kyndt, E. (2017). Teacher communities as a context for professional development: A systematic review. *Teaching and teacher education*, 47-59.
- Vare, P., Arro, G., Hamer, A., Gobbo, G., Vries, G., Farioli, F., . . . Zachariou, A. (2019). Devising a Competence-Based Training Program for Educators of Sustainable Development: Lessons Learned. *Sustainability*, 1-21.
- Velthuis, F., Dekker, H., Coppoolse, R., Helmich, E., & Jaarsma, D. (2021). Educators' experiences with governance in curriculum change processes; a qualitative study using rich pictures. *Advances in Health Sciences Education*, 1027-1043.
- Vilmala, B. K., Kaniawati, I., Suhandi, A., Permanasari, A., & Khumalo, M. (2022). A Literature Review of Education for Sustainable Development (ESD) in Science Learning: What, Why, and How. *Journal of Natural Science and Integration*, 35-44.
- Voogt, J., Pieters, J., & Handelzalts, A. (2016). Teacher collaboration in curriculum design teams: effects, mechanisms, and conditions. *Educational Research and Evaluation*, 121-140.
- Wahr, F., Underwood, J., Adams, L., & Prideaux, V. (2013). Three Academics' Narratives in Transforming Curriculum for Education for Sustainable Development. *Australian Journal of Environmental Education*, 97-116.
- Wals, A., & Corcoran, B. P. (2012). *Learning for sustainability in times of accelerating change*. Wageningen: Wageningen Academic.
- Waltner, E.-M., Rieß, W., & Brock, A. (2018). Development of an ESD Indicator for Teacher Training and the National Monitoring for ESD Implementation in Germany. *Sustainability*, 1-17.
- Waltner, E.-M., Scharenberg, K., Hörsch, C., & Rieß, W. (2020). What Teachers Think and Know about Education for Sustainable Development and How They Implement it in Class. *Sustainability*, 1-15.
- Warlina, L., & Pradana, S. B. (2021). Sustainable Agricultural Land Management in Garut Regency, West Java Province, Indonesia. *Journal of Engineering Research*, 1-15.
- Warsi, A., Dawdy, K., Bishop, M., Khader, J., Amiel, G., Heneghan, K., . . . Szumacher, E. (2022). Leadership, leading, and influencing change in cancer education: development and assessment of a pilot leadership

- workshop in cancer education for interdisciplinary healthcare staff. *Journal of Cancer Education*, 697-712.
- Warsono. (2017). Guru: Antara Pendidik, Profesi, dan Aktor Sosial. *The Journal of Society & Media*, 1-10.
- Wiek, A., Withycombe, L., & Redman, C. (2011). Key Competencies in Sustainability: A Reference Framework for Academic Program Development. *Sustainability Science*, 203–218.
- Wilhelm, S., Förster, R., & Zimmermann, A. (2019). Implementing Competence Orientation: Towards Constructively Aligned Education for Sustainable Development in University-Level Teaching-And-Learning. *Sustainability*, 1-22.
- Wiliam, D. (2011). *Embedded Formative Assessment*. Solution tree press.
- Wuryaningsih, W., Susilastuti, D. H., Darwin, M., & Pierewan, A. (2019). Effects of Web-Based Learning and F2F Learning on Teachers Achievement in Teacher Training Program in Indonesia. *International Journal of Emerging Technologies in Learning (iJET)*, 123-147.
- Yarime, M., Trencher, G., Mino, T., Scholz, R., Olsson, L., Ness, B., . . . Rotmans, J. (2012). Establishing Sustainability Science in Higher Eeducation Institutions: Towards An Integration of Academic Development, Institutionalization, and Stakeholder Collaborations. *Sustainability Science*, 101-113.
- Yilmaz, H., & Yavuz, F. (2020). A study on turkish efl teachers' motivations through in-service trainings. *Mavi Atlas*, 350-361.
- Yuan, X., Yu, L., Wu, H., She, H., Luo, J., & Li, X. (2022). Sustainable Development Goals (SDGs) Priorities of Senior High School Students and Global Public: Recommendations for Implementing Education for Sustainable Development (ESD). *Education Research International*, 1-14.
- Yuniarti, S. Y., Hasan, R., & Ali, M. (2019). Competencies of Education for Sustainable Development Related to Mathematics Education in Senior High School. *Journal of Physics: Conference Series*, 1-7.
- Zaragoza, M. C., Díaz-Gibson, J., Caparrós, A. F., & Solé, S. L. (2021). The Teacher of the 21st Century: Professional Competencies in Catalonia Today. *Educational Studies*, 217-237.
- Zhukova, O., & Iliško, D. (2020). Novice Teachers' Beliefs and Knowledge about Education for Sustainable Development. *Acta Paedagogica Vilnensis*, 34-44.
- Ziaul, I., & Shuwei, W. (2023). Environmental Sustainability: A Major Component of Sustainable Development. *International Journal of Environmental, Sustainability, and Social Science*, 900-907.
- Zoller, U. (2012). Science Education for Global Sustainability: What Is Necessary for Teaching, Learning, and Assessment Strategies? *Journal of Chemical Education*, 297-300.