

Features of HyFlex Technologies as a Key Element of Hybridization in Education

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ABSTRACT

With the rapid development of digital technologies and the need to adapt educational processes to the requirements of modernity, the study of the features of hybrid education has become increasingly important. The purpose of this article was to evaluate the role of HyFlex technologies in facilitating hybrid learning. In order to test the effectiveness of HyFlex technologies, an experiment was conducted to assess students' performance and motivation, as well as to compare results across groups studying in traditional face-to-face, distance, and hybrid formats. The results of the study indicated that the most effective models of educational programmes combine elements of traditional and distance learning, thereby providing enhanced flexibility and adaptability. Based on the findings, a teaching methodology incorporating HyFlex technologies was developed, combining both face-to-face and distance components to create a hybrid learning experience. After the implementation of this methodology, concrete results were obtained: students who were taught using the new methodology achieved benchmark test scores that were 15% higher than those taught exclusively in traditional or distance learning formats. The results demonstrate that integrating HyFlex technology into education significantly enhances student achievement and motivation, while promoting more effective and adaptive learning.

KEY WORDS

Blended learning, digital tools, performance, blended courses, student satisfaction

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References

- Abdybekova, N., & Eliseeva, K. (2023). Pedagogical conditions for the introduction of online learning in the university. *Bulletin of the Jusup Balasagyn Kyrgyz National University*, 15(2), 4-11.
- Aviv, I., Svetinovic, D., & Lee, S.-W. (2024). Requirements engineering for web3 systems: Preface. In: G. Liebel, I. Hadar, & P. Spoletini (Eds.), *Proceedings - 32nd IEEE International Requirements Engineering Conference Workshops, REW 2024* (pp. 326-327). Reykjavik: Institute of Electrical and Electronics Engineers.
- Ayala-Carabajo, R., & Llerena-Izquierdo, J. (2024). Bibliometric review on a hybrid learning model with VLEs from a higher education context. In: J. P. Salgado-Guerrero, H. R. Vega-Carrillo, G. García-Fernández, & V. Robles-Bykbaev (Eds.),

- Systems, smart technologies and innovation for society (pp. 148-157). Cham: Springer.
- Bazaluk, O., Svyrydenko, D., & Terepyshchyi, S. (2017). Structural-functional models of integration and reintegration of Ukrainian educational landscape. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 5, 163-168.
- Beatty, B. J. (2019). *Hybrid-flexible course design: Implementing student-directed hybrid classes*. Provo: EdTech Books.
- Beissembayeva, S., Oshakbayeva, Z., Yerkibayeva, G., Babayeva, K., & Chakanova, S. (2025). Formation of key skills of the XXI century in the educational practice of a teacher. *International Journal of Evaluation and Research in Education*, 14(4), 3125-3134.
- Bower, M., Dalgarno, B., Kennedy, G., Lee, M. J. W., & Kenney, J. (2014). *Blended synchronous learning: A handbook for educators*. Sydney: Office for Learning and Teaching. Available at: http://blendsync.pbworks.com/f/ID11_1931_Bower_Report_handbook_2014.pdf (accessed 23 February 2026).
- Brown, M. (2024). Enhancing “HyFlex” instruction: Best practices, criticisms, and results from a case study in graduate education. *International Journal of Studies in Education and Science*, 5(1), 43-54.
- Caldas Jayo, R., Neri Ayala, A. C., Muñoz Vilela, A. J., Susanibar Ramirez, E. T., & la Cruz Orbe, S. (2023). Analysis of the implementation of the HyFlex model. *Salud, Ciencia Y Tecnología*, 3, 367.
- Danyaro, A., Attah, J. O., & Sallah, B. H. (2024). Effect of Hyflex learning on student’s academic performance in education technology in Kwara state. *International Journal of Universal Education*, 2(1), 24-28.
- Dirckinck-Holmfeld, L., Bygholm, A., Camacho, H., Canwat, V., Jensen, I., Kansime, C., Komakech, W., Namubiru, M., Okot, D. P., Olanya, D. R., Olok, G. T., & Perry, V. D. (2024). PBL hybrid: An exploration of the concept of hybrid learning in a resource-constrained university context. *Networked Learning Conference*, 14(1), 1-5.
- Griban, G. P., Yavorska, T. Y., Tkachenko, P. P., Kuvaldina, O. V., Dikhtiarenko, Z. M., Yeromenko, E. A., Lytvynenko, A. M., Hresa, N. V., Okhrimenko, I. M., Ovcharuk, I. S., & Prontenko, K. V. (2020). Motor activity as the basis of a healthy lifestyle of student youth. *Wiadomosci Lekarskie* (Warsaw, Poland: 1960), 73(6), 1199-1206.
- Grover, V., Nandal, M., Balusamy, B., Sahu, D., & Dogra, M. (2024). Proposed hybrid model in online education. *EAI Endorsed Transactions on Internet of Things*, 10, 1-7.
- Guerrero-Quiñonez, A. J., Bedoya-Flores, M. C., Mosquera-Quiñonez, E. F., Ango-Ramos, E. D., & Lara-Tambaco, R. M. (2023). Hybrid education: Current challenges. *Ibero-American Journal of Education & Society Research*, 3(1), 276-279.
- Howell, E., Hubbard, K., Linder, S., Madison, S., Ryan, J., & Bridges, W. C. (2024). HyFlex pedagogy: Six strategies supported by design-based research. *Journal of Applied Research in Higher Education*, 16(4), 1042-1054.
- Hu, Z. (2024). Sustaining hybrid teaching as effective pedagogy at higher education institutions: Students’ voices. *Journal of Education and Health Promotion*, 13(1), 168.
- Joseph, O., & Aviv, I. (2025). Quantum-Secure Coherent Optical Networking for Advanced Infrastructures in Industry 4.0. *Information (Switzerland)*, 16(7), 609.
- Kwilinski, A., Merritt, P., & Wróblewski, Ł. (2024). Advancing sustainable development goals through digital culture: A global research overview. *Cultural Management: Science and Education*, 8 (1), 61-80.
- Luzan, P., Titova, O., Mosia, I., Pashchenko, T., & Navruzova, G. (2024). The Model for Professional Competence Development of Engineering Teachers at Colleges. *Lecture Notes in Mechanical Engineering*, 1, 509-520.
- Ma, L., Yang, H., & Yang, J. (2023). A multimodal teaching quality evaluation for hybrid education based on stepwise regression analysis. *Mobile Networks and Application*, 28(3), 960-970.
- Mahande, R. D., Abdal, N. M., & Nasir, N. (2024). Investigating the effect of learning styles on HyFlex learning towards equity of learning in higher education. *Interactive Technology and Smart Education*, 21(3), 442-460.
- Manciaracina, A. G. (2021). Educational technologies for hybrid learning contexts: A grid of 12 technological communication tools. *Journal of Systems, Cybernetics and Informatics*, 19(8), 64-81.
- Mayer, S., Abou Refaie, R., & Uebernickel, F. (2024). The challenges and opportunities of hybrid edu-

- cation with location asynchrony: Implications for education policy. *Policy Futures in Education*.
- Mishra, J., & Dholakia, K. (2023). The future of hybrid learning models and sustainable education in the post-pandemic era. In: T. Walker, K. Tarabieh, S. Goubran, & G. Machnik-Kekesi (Eds.), *Sustainable practices in higher education* (pp. 53-70). Cham: Palgrave Macmillan.
- Musabekova, G. T., Rysbekova, A. K., Meldebekova, U. I., Beysenbayeva C. B., Orazbayev, E. D., & Usenov, A. S. (2013). Formation of readiness of the future teachers to innovative activity. *Life Science Journal*, 10(4), 3535-3543.
- Nazira, A., Sandibaeva, N., & Garnaeva, G. (2025). Formation of students' research skills in digital transformation of physics teaching. *Periodicals of Engineering and Natural Sciences*, 13(2), 473-488.
- Obinna, N. N., Thuraka, B., & Okusi, O. (2024). Impact of information technology on teaching and learning: A focus on hybrid teaching mode. *African Journal of Humanities and Contemporary Education Research*, 15(1), 119-130.
- Prontenko, K., Bloshchynskiy, I., Griban, G., Zhukovskiy, Y., Yavorska, T., Tkachenko, P., Dzeneliuk, D., Dovgan, N., Bezpaliy, S., & Andreychuk, V. (2019). Formation of readiness of future physical culture teachers for professional activity. *Universal Journal of Educational Research*, 7(9), 1860-1868.
- Rudenko, S., Sapenko, R., Bazaluk, O., & Tytarenko, V. (2018). Management features of international educational projects between universities of Poland and Ukraine. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 2, 142-147.
- Sabatayeva, B., Saduov, A., Madiyarova, E., Jempeissova, G., Selezneva, I., Shtiller, M., & Fursova, T. (2018). International students' satisfaction with university services: The case of postgraduate students from central Asia. *Espacios*, 39(9), 04.
- Singh, R. K. P. G., & Singh, G. K. S. (2023). Hybrid mode of learning for early childhood education: Teachers' perspective. *International Journal of Academic Research in Progressive Education and Development*, 12(3), 1103-1116.
- Tavares, P. R., Pereira, D. A. de S., de Brito, F. C., de Sá, G. B., Gomes, L. F., Fujiyoshi, M. R. dos S., Modesto, V. T., & da Cruz, R. C. das V. (2024). The role of digital information and communication technologies in modern education. *Contribuciones a las Ciencias Sociales*, 17(2), e4980.
- Tortola, R. L. (2024). Unveiling the voices of teachers in Hyflex learning. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 8(6), 547-560.
- Totueva, G. (2024). Integration of digital technologies in teaching Russian language. *Bulletin of the Jusup Balasagyn Kyrgyz National University*, 2024(3), 235-238.
- Ueoka, S., & Nakatou, M. (2024). The difference in learning effectiveness between HyFlex training modes. *Japan Journal of Educational Technology*, 48(1), 169-178.
- Vetrivel, S., & Thangamuthu, M. (2024). Beyond the blackboard: Embracing hybrid learning spaces. In: K. Omona & M. Kayi O'dama (Eds.), *Global perspectives on micro-learning and micro-credentials in higher education* (pp. 10-28). Hershey: IGI Global.
- Wong, B. T. M., Li, K., Chan, H. T., & Cheung, S. K. S. (2023). HyFlex learning research and practice: A longitudinal analysis. *Sustainability*, 15(12), 9699.
- Wróblewski, Ł. (2025). Phygital consumption of cultural services: segmenting consumers by purchase channel preferences. *Cultural Management: Science and Education*, 9 (1), 31-48.