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Challenges in preparing and implementing project-based learning - teachers' experiences[2]

Extended summary

The essence of project-based learning is based on the assumption that exploring real-life problems, genuine situations, questions and dilemmas is a sure way to engage students. In this way, the focus of learning shifts from receptive learning to active knowledge building. As an innovative model, project-based learning requires many changes in established teaching practices, which raises numerous questions, doubts, and difficulties. Therefore, the intention of this qualitative study was to collect and analyze teachers' experience with the challenges they face during the preparation and implementation of the project-based learning.

The research was conducted during the 2023/2024 school year, within the project *Project-based learning in the function of identifying students with exceptional abilities*, which was implemented with the support of the Ministry of Education of the Republic of Serbia. After the implementation of project-based learning in schools, a survey was conducted with the aim of

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examining the impressions of teachers who had gone through the experience of project-based learning. Fifty teachers participated in the project, while nine of them participated in the final research. The structure of this group consisted of four teachers from primary schools, two from secondary vocational schools and three from high schools. The data were collected using the focus group interview technique, and then transcribed and processed using the qualitative method of inductive thematic analysis, based on which the key difficulties that teachers had in project-based learning were identified.

In the preparation phase of project-based learning, formulating a project topic that would have an interdisciplinary character was identified as one of the first problems that teachers encountered. They had difficulty finding meaningful topics that would connect their subjects. They often planned activities first and only later linked them to goals and outcomes, which indicates a lack of focus on outcomes in educational practice.

The teams of teachers who participated in project-based learning were formed mainly on the basis of personal motivation, enthusiasm, and previous cooperation, while pedagogical criteria were absent. Although such an approach contributed to good cooperation, it made it difficult to harmonize project topics with teaching subjects.

The selection of students involved in the project was varied and often pedagogically unsupported. In some schools, entire classes were involved, while in others only individual students or groups participated, raising questions of equity and consistency.

In the project implementation phase, the biggest difficulty is the lack of time. The poor balance between the number of activities and the duration of the project led to implementation outside of regular classes: extra-curricular activities, in additional classes, and even at weekends. Disruptive factors also included the established organization of the school day, an inflexible schedule, and other school events, such as excursions.

In terms of creating learning opportunities, teachers provided a wealth of activities. However, it was noted that more demanding tasks were most often assigned to students with higher achievements and that mechanisms were not created to include students with lower motivation or achievement. Despite the fact that, during the training preceding the project, the potential of the project-based learning was particularly emphasized in terms of differentiation, in practice these opportunities were not used.

The lack of confidence in this model and insufficient experience in its application is evident in the unwillingness of teachers to leave the initiative to students, as well as in the parallel implementation of traditional teaching, so that the teacher can confidently provide students with the knowledge they deem necessary.

The attitude of colleagues, principals and parents towards project-based learning varied. Most often, support was present, but in some schools it was absent, mainly due to insufficient understanding of the nature of project-based learning. Cases were recorded where the school administration considered this type of work to be inconsistent with the annual plan, as well as resistance from parents who considered project-based learning to be an additional burden for students.

The literature mentions the described obstacles as common in other education systems. The difficulties are the result of both objective and subjective factors – from rigid systemic solutions, through organizational constraints, to teachers' personal beliefs. This research should not be used as a criticism, but as a call for professional development. The establishment of professional learning communities, which could provide support, mentoring, a repository of digital materials, and the formation of resource centers, is particularly recommended. At the same time, more extensive research is needed, focusing on topics not covered by this research, such as student and parent perspectives, assessment, and the role of technology. Although this research was conducted within the framework of a project with a limited number of participants, it offers useful insights and guidelines for further research and improvement of practice.

Keywords: project-based learning, teachers, challenges in teaching, interdisciplinarity, teacher's perception, qualitative study

References

- Aksela, M., & Haatainen, O. (2019). Project-based learning (PBL) in practise: active teachers' views of its' advantages and challenges. In *Integrated Education for the Real World: 5th International STEM in Education Conference Post-Conference Proceedings* (pp. 9–16). International STEM in Education Conference, 21. 11. 2018. Queensland University of Technology. http://hdl.handle.net/10138/304045

- Aldabbus, S. (2018). Project-based learning: implementation and challenges. *International Journal of Education, Learning and Development*, 6(3), 71–79. https://www.eajournals.org/wp-content/uploads/Project-Based-Learning-Implementation-Challenges.pdf

- Barron, B., & Darling-Hammond, L. (2008). Teaching for Meaningful Learning: A Review of Research on Inquiry-Based and Cooperative Learning. https://files.eric.ed.gov/fulltext/ED539399.pdf

- Bender, V. (2020). *Projektno učenje – diferencirana nastava za XXI vek*. Clio – Fakultet pedagoških nauka u Jagodini.

- Braun, V., Clarke, V., Terry, G., & Hayfield, N. (2019). Thematic Analysis. In P. Liamputtong (Ed). *Handbook of Research Methods in Health and Social Sciences* (pp. 843–860). Springer. https://doi.org/10.1007/978-981-10-5251-4_103

- Damaiyanti, M., Yulastri, D., Martini, Kemal, E., & Song, D. (2024). The Key of Project-Based Learning Implementasion on Higher Education: A Discourse Analysis Point of View. *Jurnal Gramatika: Jurnal Penelitian Pendidikan Bahasa dan Sastra Indonesia*, 10(1), 1–19. https://doi.org/10.22202/jg.2024.v10i1.7931

- Džinović, V. (2017). Uverenja nastavnika matematike i prirodnih nauka o inovacijama u nastavi – kvalitativna studija. *Zbornik Instituta za pedagoška istraživanja*, 49(1), 31–54. https://doi.org/10.2298/ZIPI1701031D

- Đerić, I., Malinić, D., & Đević, R. (2021). Project-based learning: challenges and implementation support. In N. Gutvajn, J. Stanišić & V. Radović (Eds). *Problems and perspectives of contemporary education* (pp. 52–73). Institute For Educational Research – Faculty of Philology,

Peoples' Friendship University of Russia (Rudn University) – Faculty of Teacher Education, University of Belgrade.

- Fleming, D. (2000). *A Teacher's Guide to Project-Based Learning.* AEL, Inc.

- Garcia-Martin, J., & Perez-Martinez, J. E. (2017). Method to Guide the Design of Project Based Learning Activities Based on Educational Theories. *International Journal of Engineering Education*, *33*(3), 984–999.

- Goldstein, O. (2016) A project-based learning approach to teaching physics for pre-service elementary school teacher education students. *Cogent Education*, *3*(1), 1200833. https://doi.org/10.1080/2331186X.2016.1200833

- Habók, A., & Nagy, J. (2016). In-service teachers' perceptions of project-based learning. S*pringer Plus*, *5*. https://doi.org/10.1186/s40064-016-1725-4

- He, P., Krajcik, J., & Schneider, B. (2023). Transforming standards into classrooms for knowledge-in-use: an effective and coherent project-based-learning system. *Discip Interdscip Sci Educ Res*, *5*, 22. https://doi.org/10.1186/s43031-023-00088-z

- Krajcik, J. S., & Czerniak, C. M. (2008). *Teaching science in elementary and middle school: a project-based approach*. Routledge.

- Ladewski, B., Krajcik, J., & Harvey, C. (1994). A Middle Grade Science Teacher's Emerging Understanding of Project-Based Instruction. *The Elementary School Journal*, *94*(5), 499-515. https://doi.org/10.1086/461780

- Lalić-Vučetić, N., Stevanović, J., & Gundogan, D. (2018). Igra, istraživački rad i kritički dijalog u nastavi: iskustva nastavnika razredne nastave. *Zbornik Instituta za pedagoška istraživanja, 50*(1), 25-49. https://doi.org/10.2298/ZIPI1801025L

- Lev, S., Klark, A., i Starki, E. (2022). *Projektno učenje za predškolski i mlađi školski uzrast.* Clio i Fakultet pedagoških nauka u Jagodini.

- Malinić, D., Stanišić, J., & Đerić, I. (2021). Iskustva nastavnica u realizaciji projektne nastave zasnovane na interdisciplinarnom pristupu. *Zbornik Instituta za pedagoška istraživanja, 53*(1), 67–120. https://doi.org/10.2298/ZIPI2101067M

- Martinez, C. (2022). Developing 21st century teaching skills: A case study of teaching and learning through project-based curriculum. *Cogent Education*, 9(1), 2024936. https://doi.org/10.1080/2331186X.2021.2024936

- Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., & Soloway, E. (1997). Enacting Project-Based Science: Challenges for Practice and Policy. *Elementary School Journal*, *97*, 341–358. http://dx.doi.org/10.1086/461870

- Meng, N., Dong, Y., Roehrs, D., & Luan, L. (2023). Tackle implementation challenges in project-based learning: a survey study of PBL e-learning platforms. *Education Tech Research Dev, 71*, 1179–1207. https://doi.org/10.1007/s11423-023-10202-7

- Mentzer, G.A., Czerniak, C.M., & Brooks, L. (2017). An Examination of Teacher Understanding of Project Based Science as a Result of Participating in an Extended Professional Development Program: Implications for Implementation. *School Science and Mathematics*, *117*(1–2), 76–86. https://doi.org/10.1111/ssm.12208

- Mergendoller, J.R., & Thomas, J.W. (2003). *Managing Project Based Learning: Principles from the Field*. https://www.dr-hatfield.com/science_rules/articles/Managing%20Project%20Based%20Learning.pdf

- Merije, F. (2016). *Pedagogija: mora se pružiti otpor.* Data Status.

- Perez Torres, M., Couso Lagaron, D., & Marquez Bargallo, C. (2024). Evaluation of STEAM Project-Based Learning (STEAM PBL) Instructional Designs from the STEM Practices Perspective. *Educ. Sci.*, *14*, 53. https://doi.org/10.3390/educsci14010053

- Polman, J. (1998). *Activity structures for project-based teaching & learning: desing and adaptation of cultural tools.* https://files.eric.ed.gov/fulltext/ED425057.pdf

- Popadić, D., Pavlović, Z., i Žeželj, I. (2018). *Alatke istraživača.* Clio.

- Popović, D., i Beara, M. (2022). Projektnom nastavom ka međupredmetnim kompetencijama učenika. *Inovacije u nastavi*, *35*(2), 131–144. https://doi.org/10.5937/inovacije2202131P

- Ristanović, D. (2016). Prepreke u primeni projektnog modela nastave prirode i društva. *Uzdanica*, *13*(2), 7–17.

- Siew, N. M., Amir, N. & Chong, C. L. (2015). The perceptions of pre-service and in-service teachers regarding a project-based STEM approach to teaching science. *SpringerPlus*, *4*(8). https://doi.org/10.1186/2193-1801-4-8

- Tamim, S. R., & Grant, M. M. (2013). Definitions and Uses: Case Study of Teachers Implementing Project-based Learning. Interdisciplinary Journal of Problem-Based Learning, *7*(2). https://doi.org/10.7771/1541-5015.1323

- Terhart, E. (2013). Teacher resistance against school reform: reflecting an inconvenient truth. *School Leadership & Management*, *33*(5), 486–500. https://doi.org/10.1080/13632434.2013.793494

- Thomas, J. W. (2000). *A review of research on project-based learning.* http://www.bobpearlman.org/BestPractices/PBL_Research.pdf

- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Science*, *15*, 398–405.

- Vilig, K. (2016). *Kvalitativna istraživanja u psihologiji.* Clio.

- Wilson, K. (2021). Exploring the Challenges and Enablers of Implementing a STEM Project-Based Learning Programme in a Diverse Junior Secondary Context. *International Journal of Science and Mathematics Education*, *19*, 881–897. https://doi.org/10.1007/s10763-020-10103-8

- Županec, V., Lazarević, T. & Olić Ninković, S. (2024). Effects of Using Project-Based Learning in Biology Teaching. *Teaching Innovations*, *37*(1), 61–74. https://doi.org/10.5937/inovacije2401061Z