

Teacher Challenges in Implementing the Independent Curriculum: Strengthening HOTS in Religious Learning

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Abstract:

This research aims to identify the challenges teachers face in implementing the Independent Curriculum, especially in strengthening higher-order thinking Skills (HOTS) in religious learning at school. The research uses a qualitative research method with the type of case study research. Data is collected through direct observation, in-depth interviews with Islamic boarding school caregivers, principals, and teachers, and analysis of related documents. The study results show that the readiness of teachers and school staff, the change in mindset from teacher-centric to student-centric, and the application of varied learning methods are the main challenges in implementing the Independent Curriculum. However, there has been an increase in students' critical thinking skills since the implementation of this curriculum. This research emphasizes the importance of ongoing support and intensive training for teachers to ensure the successful implementation of a more interactive and student-centered curriculum. The implications of this research are the need to develop educational policies that are more adaptive and responsive to the needs in the field, as well as the importance of continuous assistance to improve the quality of religious education in Indonesia.

Key Words: Challenges, Independent Curriculum, HOTS, Religious Learning

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INTRODUCTION

The global education landscape has undergone significant transformations in recent years, driven by the need to equip students with essential skills to navigate an increasingly complex world (Abulibdeh et al., 2024; Debowski, 2022; Sato et al., 2024). One key aspect of this transformation is emphasizing higher-order thinking skills (HOTS), which include critical thinking, problem-solving, and creativity (Affandy et al., 2024; Hamzah et al., 2022; Kwangmuang et al., 2021).

The shift from rote memorization to active, student-centered learning has become a focal point of many educational reforms worldwide (Abdigapbarova & Zhiyenbayeva, 2023; Martin-Alguacil et al., 2024; Yang et al., 2024). In Indonesia, the introduction of the Independent Curriculum, or Kurikulum Merdeka, represents a bold attempt to foster these cognitive skills in students, particularly in religious education (Martzoukou et al., 2024; Pan et al., 2023; Tapalova & Zhiyenbayeva, 2022). However, despite its potential, this curriculum has posed substantial challenges for teachers, especially in religious learning contexts (Gearon et al., 2021; Kolb, 2023; Unstad & Fjørtoft, 2021). Adapting teaching methods and developing an appropriate mindset remain significant barriers to successfully implementing HOTS-oriented approaches in Islamic education (Gimenez-Fernandez et al., 2021; Leasa et al., 2023).

Previous studies have explored various aspects of HOTS integration in education systems, focusing on both the theoretical framework and practical challenges. Previous research found that targeted teacher training on HOTS significantly improved teachers' ability to apply these skills in classroom settings (Hamzah et al., 2022; Romijn et al., 2021; Strat et al., 2024). Other research also provides references that integrating character education with HOTS is a promising approach for enhancing student engagement and learning outcomes in religious education (Bond, 2020; González-pérez & Ramírez-montoya, 2022; Wahono et al., 2020). The research emphasized the importance of scientific approaches in Islamic education to improve students' analytical skills (Bonilla-Jurado et al., 2024; Weng et al., 2024; Zidny et al., 2020). While these studies provide valuable insights, few have explicitly focused on teachers' challenges in implementing the Independent Curriculum to strengthen HOTS in religious learning. This research aims to fill this gap by identifying key obstacles and exploring the ways educators can better foster HOTS in the context of Islamic education.

This study aims to identify the challenges teachers face in implementing the Independent Curriculum to strengthen HOTS in religious learning. The research aims to provide a comprehensive analysis of the factors that hinder the effective adoption of this curriculum, including teacher readiness, mindset shifts, and the application of varied teaching methods. By focusing on Ar-Rofi'iyah Semampir Middle School in Probolinggo, this research will provide an in-depth look at teachers' specific challenges and strategies to overcome them. The problem statement centers around the difficulty of transitioning from a traditional, teacher-centered approach to a student-centered one and how this shift affects the development of critical thinking and other higher-order cognitive skills in students.

This study suggests that the successful implementation of the Independent Curriculum in religious learning depends on a combination of teacher preparedness, effective training programs, and the willingness to adopt innovative teaching methods.

The research also expects that while the curriculum has shown promise in improving students' critical thinking skills, there are still considerable challenges related to teacher mindset and the application of varied teaching strategies. It assumes that the obstacles teachers face are not solely due to the curriculum but also external factors such as inadequate support systems and limited resources. The findings of this research are expected to provide practical recommendations for enhancing teacher readiness and developing more effective strategies for fostering HOTS in religious education within the framework of the Independent Curriculum.

RESEARCH METHOD

This research was conducted using a qualitative approach with the type of case study research. The qualitative approach was chosen because it allows researchers to deeply understand the phenomenon being researched, namely the implementation of the Independent Curriculum in strengthening higher-order thinking Skills (HOTS) in religious learning (Borgstede & Scholz, 2021; Poucher et al., 2020; Wilhelmy & Köhler, 2022). The case study was chosen because it allows the exploration of specific details at Ar-Rofi'iyah Semampir Middle School, Kraksaan, Probolinggo. This approach allows researchers to obtain rich and in-depth data through various sources of information (Braun & Clarke, 2023; Lim, 2024; Rogers et al., 2020).

The data collection technique in this study involves direct observation at school, in-depth interviews with Islamic boarding school caregivers, principals, and junior high school teachers, and analysis of related documents. Observations were made to see firsthand how the Independent Curriculum is implemented in the school. The interview was conducted with three key speakers, namely the caretaker of the Islamic boarding school (F1), the principal (F2), and a teacher (F3). The research location is Ar-Rofi'iyah Semampir Middle School, located at Kraksaan, Probolinggo, East Java, Indonesia. In addition, data is also obtained from documents that support and strengthen the research results.

The data analysis technique uses an interactive analysis model, including data reduction, presentation, and conclusion drawing. The validity of the data is checked through triangulation of sources and methods, ensuring that the data obtained is consistent and reliable. The data that has been collected are classified, taxonomized, and reduced as needed by the research. The analysis results are presented systematically to provide a clear picture of the implementation of the independent curriculum and the challenges faced in strengthening HOTS in religious learning in the school.

RESULT AND DISCUSSION

Result

The findings of this study are based on interviews with teachers, principals, and caregivers of Islamic boarding schools that are directly related to the implementation of this curriculum.

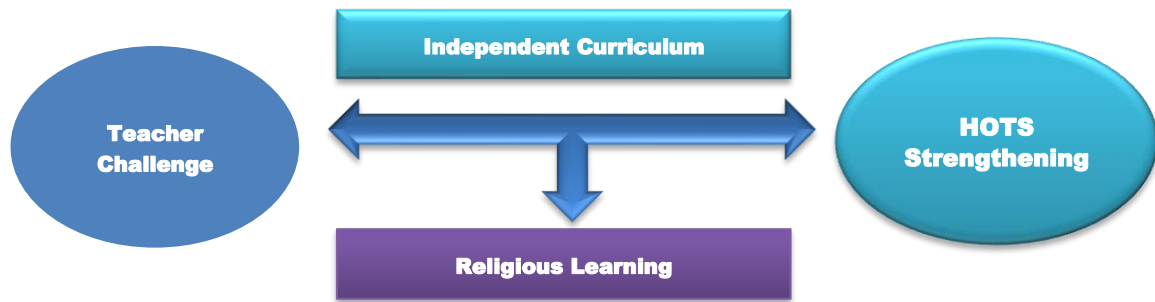


Figure 1. Merdeka curriculum, teacher challenges, strengthening HOTS, and religious learning.

Readiness of Teachers and School Staff

One of the main findings of this study is the readiness of teachers and school staff, which is still a significant obstacle to implementing the independent curriculum. Many teachers admit that they are not fully ready for the change in the learning paradigm brought by this curriculum. Several speakers conveyed some of the findings related to the research in the following interview activities. A teacher from the school stated, "We still have a lot to learn to adapt to this new curriculum, especially in terms of administration and preparation of lesson plans" (F3). The principal also added, "We face a big challenge in ensuring that all teachers understand and are able to implement the Independent Curriculum well. Many of them still have difficulties in compiling learning modules that are in accordance with the principles of HOTS" (F2). This is in line with the opinion of the caretaker of the Islamic boarding school, who said, "The teachers here still need a lot of training and assistance to really be able to carry out this curriculum effectively" (F1).

Several interviews conducted above found that the Independent Curriculum faces various significant challenges, especially related to the readiness of teachers and school staff. Teachers are still learning to adapt to this new curriculum, especially in the administrative aspects and preparation of lesson plans. The biggest challenge lies in ensuring that all teachers understand and can implement the Independent Curriculum well, with many still struggling to develop learning modules that follow the principles of higher-order thinking Skills (HOTS). In addition, a lot of training and mentoring are still needed to help teachers implement this curriculum effectively. These findings highlight the importance of continuous support and intensive training to improve teachers' readiness and competence in implementing the Independent Curriculum optimally to develop students' critical and creative thinking skills to the demands of the new curriculum.

Mindset Change from Teacher-Centric to Student-Centric

Another significant finding is the challenge of changing the mindset from teacher-centered learning to student-centered learning. One of the teachers conveyed this, saying it is difficult for us to change the way of thinking oriented towards the delivery of material by teachers to more active and participatory learning for students" (F3). The principal also highlighted this, "There are still many teachers who use traditional methods, such as lectures, which do not provide space for students to think critically and creatively" (F2). The boarding school caregiver's statement reinforces this, "We need to ensure that our teachers really understand the importance of providing space for students to participate actively in the learning process" (F1).

From the interview results above, the implemented Independent Curriculum faces a significant challenge in changing the learning paradigm from one oriented to the delivery of material by teachers to more active and participatory learning for students. One teacher stated that switching from traditional methods to a more dynamic and student-centered approach was difficult for them. The principal also acknowledged that many teachers still use lecture methods that do not provide space for students to think critically and creatively. This was reinforced by the caregivers of Islamic boarding schools, who emphasized the importance of teachers' understanding of the need to provide space for students to participate in the learning process actively. These difficulties show that the transformation towards more interactive and student-centered learning requires substantial support, ongoing training, and a profound mindset change among educators to achieve the Independent Curriculum

Varied Learning Methods

The implementation of varied learning methods is also a big challenge for teachers. Many teachers find it difficult to apply learning methods that are based on the principles of HOTS. A teacher stated, "We are often confused when choosing the right method to teach religious material with the HOTS approach" (F3). The principal added, "We have tried several methods, such as project-based learning, but the results are still not optimal due to time and resource constraints" (F2). This was reinforced by the caretaker of the Islamic boarding school, who said, "A variety of learning methods are indeed needed, but we still need further guidance to be able to implement them" (F1).

Implementing the Independent Curriculum shows that teachers experience confusion in choosing the proper method to teach religious materials with the Higher Order Thinking Skills (HOTS) approach. One teacher revealed that they are often confused when determining an effective method for religious learning. The principal added that although they have tried several methods, such as project-based learning, the results are still not optimal due to time and resource limitations.

This was reinforced by the caregivers of Islamic boarding schools, who emphasized that although varied learning methods are essential, they still need further guidance to implement them properly. These findings highlight that in addition to continuous support, there is a need for intensive training and more in-depth mentoring for teachers to be able to adopt and apply innovative and varied learning methods so that the goals of the Independent Curriculum in improving students' critical and creative thinking skills can be achieved more optimally.

Strengthening HOTS in Religious Learning

The strengthening of HOTS in religious learning showed mixed results. One of the teachers expressed this: "We saw some improvements in students' critical thinking skills, but there is still a lot we need to improve" (F3). The principal added, "There has been an improvement in how students analyze and evaluate information, but there are still many students who lack confidence in expressing their opinions" (F2). The caregiver of the Islamic boarding school added, "We need to continue to encourage and support students to be more active and critical in the learning process" (F1).

The results of the interview above show that the implementation of the Independent Curriculum has brought several improvements in students' critical thinking skills. However, there are still many aspects that need to be improved. A teacher revealed that although there has been an improvement in students' critical thinking skills, there is still much to be further improved. The principal added that there has been progress in how students analyze and evaluate information, but many still lack confidence in expressing their opinions. This is reinforced by the caregivers of Islamic boarding schools who emphasize the need to encourage and support students to be more active and critical in the learning process. This improvement can be seen by comparing students' critical thinking skills using the 2013 and Independent Curriculum, as shown in Table 2.

Table 1. Comparison of Students' Critical Thinking Abilities Between the 2013 Curriculum and the Independent Curriculum

NO	Critical Thinking Ability Score	K-13	KMB
1	The highest score	86	90
2	Lowest Value	80	87
3	Average	84	88

Table 1 above shows that the increase is reflected in the highest score of students, which increased from 86 in the 2013 Curriculum to 90 in the Independent Curriculum, as well as the lowest score, which increased from 80 to 87, and the average score increased from 84 to 88. This data indicates that the implementation of the Independent Curriculum has succeeded in improving students' critical thinking skills, as shown by the findings of interviews that show

an increase in students' analysis, evaluation, and activeness in the learning process.

Discussion

This study shows that implementing the Independent Curriculum has improved students' critical thinking skills, but various challenges still need to be overcome. The improvements seen in students' highest, lowest, and average scores indicate that this new approach has great potential to improve the quality of education. These findings are consistent with previous research that shows that HOTS training can improve teachers' understanding and ability to develop HOTS-based learning tools (Muhaimin et al., 2024).

However, there are still difficulties in choosing and implementing the proper learning method, as expressed by the principal and caregiver of the Islamic boarding school. Jones et al. (2021) also show that character strengthening and HOTS in religious learning require good integration in learning planning. In addition, research by Muhaimin et al. (2024) confirms that a scientific approach to religious learning can improve students' analytical and evaluation skills. However, its implementation requires continuous support and intensive training. This study confirms that although the Independent Curriculum shows positive results, further efforts are still needed to overcome the challenges teachers face in implementing student-centered and oriented learning methods that are oriented towards strengthening HOTS. Therefore, ongoing support in the form of intensive training and mentoring is essential to ensure the successful implementation of this curriculum and improve the quality of education in Indonesia.

This research's contribution to learning management is significant, especially in implementing the Independent Curriculum in Indonesia. This research provides in-depth insight into teachers' challenges and obstacles in adopting a new learning approach oriented towards higher-order thinking Skills (HOTS). The study emphasizes the importance of adequate managerial support to facilitate the transition to more interactive and student-centered learning by identifying the need for intensive training and ongoing mentoring for teachers. In addition, the results of this study can be the basis for developing education policies that are more adaptive and responsive to the needs in the field, as well as strengthen the capacity of educational institutions to design and implement innovative and effective learning modules. Thus, this research contributes to improving the quality of religious education and developing holistic and sustainable learning management strategies.

CONCLUSION

The most important finding of this study is that implementing the Independent Curriculum, has improved students' critical thinking skills. However, there are still many challenges to be overcome. This study shows that

the readiness of teachers and school staff is crucial in successfully implementing the new curriculum. Ongoing support and intensive training are essential to help teachers adopt more interactive and student-centered learning methods. In addition, changing the mindset from a teacher-centered approach to a student-centered one is crucial and requires special attention. This research provides practical insights into how schools can support teachers in overcoming these barriers and improving students' critical and creative thinking skills.

The scientific contribution of this research is to provide a new perspective on implementing the Independent Curriculum in the context of religious education and underline the importance of strengthening HOTS in learning. This research updates our understanding of practical and relevant teaching methods in a curriculum that develops higher-order thinking skills by identifying the challenges and solutions needed. However, this study has limitations, including the limited number of cases in one specific location and gender and age variations that may not be comprehensively represented. Therefore, further research covering various locations, genders, and ages is needed and using broader survey methods to get a more complete picture. This additional research can provide a more substantial basis for developing more appropriate and targeted education policies and ensure that the Independent Curriculum can be effectively implemented in various educational contexts in Indonesia.

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REFERENCES

- Abdigapbarova, U., & Zhiyenbayeva, N. (2023). Organization of Student-Centered Learning within the Professional Training of a Future Teacher in a Digital Environment. *Education and Information Technologies*, 28(1), 647–661. <https://doi.org/10.1007/s10639-022-11159-5>
- Abulibdeh, A., Zaidan, E., & Abulibdeh, R. (2024). Navigating the Confluence of Artificial Intelligence and Education for Sustainable Development in the Era of Industry 4.0: Challenges, Opportunities, and Ethical Dimensions. *Journal of Cleaner Production*, 437, 140527. <https://doi.org/10.1016/j.jclepro.2023.140527>
- Affandy, H., Sunarno, W., Suryana, R., & Harjana. (2024). Integrating Creative Pedagogy into Problem-Based Learning: The Effects on Higher Order Thinking Skills in Science Education. *Thinking Skills and Creativity*, 53, 101575. <https://doi.org/10.1016/j.tsc.2024.101575>

- Bond, M. (2020). Facilitating Student Engagement through the Flipped Learning Approach in K-12: A Systematic Review. *Computers and Education*, 151, 103819. <https://doi.org/10.1016/j.compedu.2020.103819>
- Bonilla-Jurado, D., Zumba, E., Lucio-Quintana, A., Yerbabuena-Torres, C., Ramírez-Casco, A., & Guevara, C. (2024). Advancing University Education: Exploring the Benefits of Education for Sustainable Development. *Sustainability*, 16(17), 7847. <https://doi.org/10.3390/su16177847>
- Borgstede, M., & Scholz, M. (2021). Quantitative and Qualitative Approaches to Generalization and Replication—A Representationalist View. *Frontiers in Psychology*, 12, 605191. <https://doi.org/10.3389/fpsyg.2021.605191>
- Braun, V., & Clarke, V. (2023). Toward Good Practice in Thematic Analysis: Avoiding Common Problems and Be(Coming) a Knowing Researcher. *International Journal of Transgender Health*, 24(1), 1–6. <https://doi.org/10.1080/26895269.2022.2129597>
- Debowski, S. (2022). Shifting Sands: Navigating Being Academic in an Evolving Sector. *Higher Education Research and Development*, 41(1), 7–20. <https://doi.org/10.1080/07294360.2021.2008327>
- Gearon, L., Kuusisto, A., Matemba, Y., Benjamin, S., Preez, P. Du, Koirikivi, P., & Simmonds, S. (2021). Decolonising the Religious Education Curriculum. *British Journal of Religious Education*, 43(1), 1–8. <https://doi.org/10.1080/01416200.2020.1819734>
- Gimenez-Fernandez, E., Abril, C., Breuer, H., & Gudiksen, S. (2021). Gamification Approaches for Open Innovation Implementation: A Conceptual Framework. *Creativity and Innovation Management*, 30(3), 455–474. <https://doi.org/10.1111/caim.12452>
- González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st Century Skills Frameworks: Systematic Review. *Sustainability (Switzerland)*, 14(3), 1493. <https://doi.org/10.3390/su14031493>
- Hamzah, H., Hamzah, M. I., & Zulkifli, H. (2022). Systematic Literature Review on the Elements of Metacognition-Based Higher Order Thinking Skills (HOTS) Teaching and Learning Modules. *Sustainability (Switzerland)*, 14(2), 813. <https://doi.org/10.3390/su14020813>
- Jones, K. F., Paal, P., Symons, X., & Best, M. C. (2021). The Content, Teaching Methods and Effectiveness of Spiritual Care Training for Healthcare Professionals: A Mixed-Methods Systematic Review. *Journal of Pain and Symptom Management*, 62(3), e261–e278. <https://doi.org/10.1016/j.jpainsymman.2021.03.013>
- Kolb, J. (2023). Muslim Diversity, Religious Formation and Islamic Religious Education: Everyday Practical Insights into Muslim Parents' Concepts of Religious Education in Austria. *British Journal of Religious Education*, 45(2), 172–185. <https://doi.org/10.1080/01416200.2021.1911787>

- Kwangmuang, P., Jarutkamolpong, S., Sangboonraung, W., & Daungtod, S. (2021). The Development of Learning Innovation to Enhance Higher Order Thinking Skills for Students in Thailand Junior High Schools. *Heliyon*, 7(6). <https://doi.org/10.1016/j.heliyon.2021.e07309>
- Leasa, M., Abednego, A., & Batlolona, J. R. (2023). Problem-Based Learning (PBL) with Reading Questioning and Answering (RQA) of Preservice Elementary School Teachers. *International Journal of Learning, Teaching and Educational Research*, 22(6), 245–261. <https://doi.org/10.26803/ijlter.22.6.14>
- Lim, W. M. (2024). What Is Quantitative Research? An Overview and Guidelines. *Australasian Marketing Journal*, 14413582241264620. <https://doi.org/10.1177/14413582241264622>
- Martin-Alguacil, N., Avedillo, L., Mota-Blanco, R., & Gallego-Agundez, M. (2024). Student-Centered Learning: Some Issues and Recommendations for Its Implementation in a Traditional Curriculum Setting in Health Sciences. *Education Sciences*, 14(11), 1179. <https://doi.org/10.3390/educsci14111179>
- Martzoukou, K., Luders, E. S., Mair, J., Kostagiolas, P., Johnson, N., Work, F., & Fulton, C. (2024). A Cross-Sectional Study of Discipline-Based Self-Perceived Digital Literacy Competencies of Nursing Students. *Journal of Advanced Nursing*, 80(2), 656–672. <https://doi.org/10.1111/jan.15801>
- Muhaimin, L. H., Sholikhakh, R. A., Yulianti, S., Ardani, Hendriyanto, A., & Sahara, S. (2024). Unlocking the Secrets of Students' Mathematical Literacy to Solve Mathematical Problems: A Systematic Literature Review. *Eurasia Journal of Mathematics, Science and Technology Education*, 20(4), em2428. <https://doi.org/10.29333/ejmste/14404>
- Pan, A. J., Lai, C. F., & Kuo, H. C. (2023). Investigating the Impact of a Possibility-Thinking Integrated Project-Based Learning History Course on High School Students' Creativity, Learning Motivation, and History Knowledge. *Thinking Skills and Creativity*, 47, 101214. <https://doi.org/10.1016/j.tsc.2022.101214>
- Poucher, Z. A., Tamminen, K. A., Caron, J. G., & Sweet, S. N. (2020). Thinking Through and Designing Qualitative Research Studies: A Focused Mapping Review of 30 Years of Qualitative Research in Sport Psychology. *International Review of Sport and Exercise Psychology*, 13(1), 163–186. <https://doi.org/10.1080/1750984X.2019.1656276>
- Rogers, L., De Brún, A., & McAuliffe, E. (2020). Defining and Assessing Context in Healthcare Implementation Studies: A Systematic Review. *BMC Health Services Research*, 20(1), 1–24. <https://doi.org/10.1186/s12913-020-05212-7>
- Romijn, B. R., Slot, P. L., & Leseman, P. P. M. (2021). Increasing Teachers' Intercultural Competences in Teacher Preparation Programs and through Professional Development: A Review. *Teaching and Teacher Education*, 98, 103236. <https://doi.org/10.1016/j.tate.2020.103236>

- Sato, S. N., Condes Moreno, E., Rubio-Zarapuz, A., Dalamitros, A. A., Yañez-Sepulveda, R., Tornero-Aguilera, J. F., & Clemente-Suárez, V. J. (2024). Navigating the New Normal: Adapting Online and Distance Learning in the Post-Pandemic Era. *Education Sciences*, 14(1), 19. <https://doi.org/10.3390/educsci14010019>
- Strat, T. T. S., Henriksen, E. K., & Jegstad, K. M. (2024). Inquiry-Based Science Education in Science Teacher Education: A Systematic Review. *Studies in Science Education*, 60(2), 191–249. <https://doi.org/10.1080/03057267.2023.2207148>
- Tapalova, O., & Zhiyenbayeva, N. (2022). Artificial Intelligence in Education: AIED for Personalised Learning Pathways. *Electronic Journal of E-Learning*, 20(5), 639–653. <https://doi.org/10.34190/ejel.20.5.2597>
- Unstad, L., & Fjørtoft, H. (2021). Disciplinary Literacy in Religious Education: The Role and Relevance of Reading. *British Journal of Religious Education*, 43(4), 434–442. <https://doi.org/10.1080/01416200.2020.1754164>
- Wahono, B., Lin, P. L., & Chang, C. Y. (2020). Evidence of STEM Enactment Effectiveness in Asian Student Learning Outcomes. *International Journal of STEM Education*, 7(1), 36. <https://doi.org/10.1186/s40594-020-00236-1>
- Weng, A. K. W., Chang, H. Y., Lai, K. K., & Lin, Y. B. (2024). Topic Modeling on Peer Interaction in Online and Mobile Learning of Higher Education: 1993–2022. *Education Sciences*, 14(8), 867. <https://doi.org/10.3390/educsci14080867>
- Wilhelmy, A., & Köhler, T. (2022). Qualitative Research in Work and Organizational Psychology Journals: Practices and Future Opportunities. *European Journal of Work and Organizational Psychology*, 31(2), 161–185. <https://doi.org/10.1080/1359432X.2021.2009457>
- Yang, W., Zhang, X., Chen, X., Lu, J., & Tian, F. (2024). Based Case-Based Learning and Flipped Classroom as a Means to Improve International Students' Active Learning and Critical Thinking Ability. *BMC Medical Education*, 24(1), 759. <https://doi.org/10.1186/s12909-024-05758-8>
- Zidny, R., Sjöström, J., & Eilks, I. (2020). A Multi-Perspective Reflection on How Indigenous Knowledge and Related Ideas Can Improve Science Education for Sustainability. *Science and Education*, 29(1), 145–185. <https://doi.org/10.1007/s11191-019-00100-x>