Scientific Learning Training by School Principals to Improve Teacher Competence

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Guru SMA yang berlatar belakang pendidikan hanya D-III yang kemudian diangkat menjadi PNS memberikan tantangan bagi pengawas dalam mengembangkan kompetensinya dalam berbagai aspek pembelajaran. Salah satu tindakan adalah dengan meningkatkan keterampilan guru dalam melaksanakan pembelajaran saintifik melalui pelatihan yang diselenggarakan oleh kepala sekolah. Penelitian ini ingin mengkaji lebih jauh bagaimana pelatihan pembelajaran saintifik oleh Kepala Sekolah. Jenis penelitian ini adalah penelitian tindakan kelas. Subjek dalam penelitian ini adalah guru di SMA Negeri 1 Janapria. Penelitian ini menggunakan perancangan tiga siklus yang didalamnya terdapat empat tahap yakni perencanaan, tindakan, observasi, dan refleksi. Hasil penelitian yang terdiri dari tiga siklus terbukti bahwa tindakan yang dilakukan berhasil meningkatkan kompetensi guru sesuai standar yang diharapkan. Persentase kompetensi guru meningkat dari 58,13% pada siklus I menjadi 70,13% pada siklus II, kemudian meningkat lagi menjadi 81,88% pada siklus III. Dengan demikian, hasil penelitian menunjukkan bahwa pelatihan yang diselenggarakan oleh kepala sekolah efektif meningkatkan kompetensi guru, dengan tingkat ketuntasan mencapai 100%, dan mendapat respon positif dari para guru. Pelatihan pembelajaran saintifik yang dilakukan kepala sekolah telah berhasil meningkatkan kompetensi guru, memperoleh respon positif dari mereka, meningkatkan mutu pembelajaran, dan berpotensi meningkatkan kinerja sekolah secara keseluruhan.

I. INTRODUCTION

Becoming a professional teacher is a journey full of challenges, with various obstacles that must be overcome (Li et al., 2022). One of the main obstacles is the more bureaucratic and administrative relationship between fellow teachers and school principals, which does not encourage creating an environment that supports a professional academic culture among teaching staff (Lithoxoidou & Papadopoulou, 2024). This causes teachers to increasingly move away from activities that support professionalism, such as reading, discussion, writing and research (Talebizadeh et al., 2021). Therefore, there is a need for continuous improvement and improvement in the quality of teachers throughout their careers.

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Even though conceptually, changing the paradigm of high school teachers to become professional and effective teachers looks easy, this is often faced with various obstacles (Rojas & Abenavoli, 2023).

Educating professional high school teachers is a challenge that requires time and a significant investment (Wang & An, 2023). The panel discussion emphasized that teacher professionalism cannot be achieved in one moment but is a continuous process (Huang et al., 2024). Professional teacher education and development requires a long and constant period (Chaula, 2024). Especially for high school teachers with an educational background of only D-III, to become civil servants, they need continuous guidance and coaching from the school principal in various aspects, from planning to implementing learning (Masumoto et al., 2021). This effort is essential for schools so that the teachers they train can carry out their duties professionally, which will improve the quality of education, especially at the secondary education level (Donkoh et al., 2023).

Teacher development by the school principal is an essential aspect in the context of learning activities at school, especially in the scientific learning approach which emphasizes the value of the learning process (Muhayat, 2020). This approach considers seeking knowledge a valuable element, not just the final learning outcome (Conner & Bohan, 2021). Principals can interact with teachers in coaching, including sharing successful experiences with them (Swanson et al., 2023). However, bureaucratic and administrative factors can hinder teacher development at the high school level (Arifian, 2019). Therefore, principals are expected to provide examples of performance in the classroom and act as colleagues who share experiences (Krammer et al., 2023). Through open partnerships, teachers feel more comfortable revealing their weaknesses and receiving guidance to improve their performance.

According to the theory of teacher professional development proposed by Michael Fullan, there are two main aspects: educational theory and the theory of change. Educational theory discusses the changes needed in the academic context, while change theory discusses implementing these changes. Fullan emphasized the critical role of principal leadership in implementing five

fundamental principles, including orientation towards achieving goals and leadership practices that encourage creativity and innovation among teachers. Apart from that, fostering teacher professionalism and effective leadership is also emphasized to improve the quality of education, especially when there are changes to the learning curriculum (Juliastuti et al., 2024). Meanwhile, according to the instructional leadership theory developed by Edward Seashore, the principal's instructional leadership focuses on supervising, guiding, and supporting effective learning practices by teachers to improve student achievement and school learning quality (Groenewald et al., 2023).

The action research aims to identify and overcome challenges in teacher learning practices by implementing scientific learning training. Through a research cycle involving planning, action, observation and reflection, this research aims to increase teacher competence in implementing a scientific learning approach in the classroom. The goal is to create significant change in teachers' instructional practices, hoping to improve student learning outcomes and the overall quality of education (Binti Rahman & Che Noh, 2021).

The research problem in the action research is the need for more understanding and application of the scientific learning approach by teachers, which hinders the effectiveness of learning in the classroom. A lack of training and knowledge of these methods causes limitations in integrating scientific learning principles into teaching practice. Therefore, this research aims to identify and overcome these problems by implementing focused and sustainable training to increase teacher competence in implementing a scientific learning approach.

The action research aims to improve school learning quality by increasing teacher competency through a scientific learning approach. Teachers can use this approach to develop their skills in designing student-centred learning, increase student engagement, and facilitate a better understanding of lesson material. Increasing teacher competence in implementing this approach is expected to improve student learning outcomes and the overall quality of learning and contribute to improving the quality of education in schools (Jumari & Fajrin, 2020).

Previous research shows that the principal's coaching method is successful if a friendly relationship is established between the teacher and the principal, without the feeling of being directly supervised while teaching. Discussions with the principal are considered essential for teachers to improve learning. Still, teacher performance results are generally only known to the homeroom teacher and school principal unless the homeroom teacher wants this information to be conveyed to his colleagues (Niever et al., 2021). Training on learning moral values for early childhood using a scientific approach at IGRA Sidoarjo provided significant benefits to 40 partners, including increased understanding, teaching skills and direct practical abilities in applying this approach, with evaluation results showing significant improvements for the majority of partners (Hariyani et al., 2023). Other research shows that scientific learning coaching and training aims to increase teachers' understanding and skills in implementing this approach, with evaluations showing a significant increase in participants' understanding and recommending continuing training activities with an approach by the curriculum (Fatihah et al., 2022).

Analysis of the gaps between this research and previous research shows that although friendly coaching methods and discussions are considered important in improving teacher performance, there are still limitations in broad knowledge about improving teacher performance. Meanwhile, previous research highlights the success of scientific learning training in improving teacher understanding and skills. However, there is still a need for better integration between training approaches and relevant curriculum needs. Through this action research, scientific learning training by school principals can improve teacher competence. The independent variable in this research is scientific learning training activities carried out by the school principal, while the dependent variable is increasing teacher competence.

II. METHODS

This classroom action research aims to increase teacher competence in implementing a scientific learning approach at SMA Negeri 1 Janapria Central Lombok Regency through training organized by the school principal. Classroom

action research is a structured and sustainable scientific method for understanding and improving social situations through a series of actions planned and evaluated cyclically (Chen, 2022). The subjects in this research were teachers at SMA Negeri 1 Janapria Central Lombok Regency, a target school where the researcher served as principal during the 2021-2022 school year.

In implementing the action, the design is carried out in 3 cycles, which include planning, action, observation, and reflection (Williams et al., 2022). School action research design, according to Kemmis and Mc. Taggar (UU No.14, 2005) is as shown in the following picture:
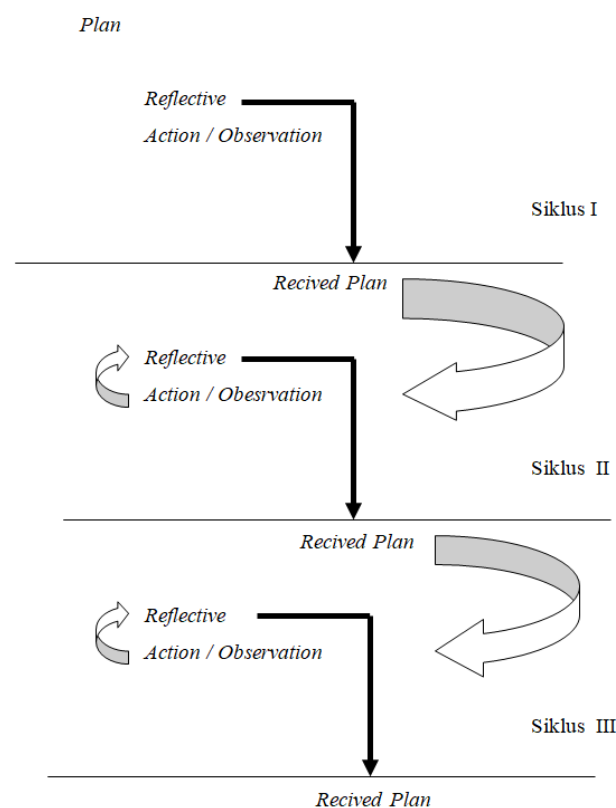
Figure 1. *School action research flow*

Two techniques are used in data analysis. *First*, a quantitative approach is used to measure the increase in teacher competency in implementing scientific learning at SMA Negeri 1 Janapria Central Lombok Regency using percentages (%). *Second*, a qualitative approach provides a comprehensive overview of the research results, including data reduction, descriptive presentation, and concluding (Heredia et al., 2024).

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III.   FINDINGS AND DISCUSSION

Design of Scientific Learning Training Activities

In designing this scientific learning training activity, the school principal has at least several processes that are carried out in stages. These stages include planning, organizing, observing and reflecting.

Planning covers a series of important. *First*, the head school recognises training needs and goals based on the evaluation of beginning teacher competence in learning scientific. *Second*, the head school sets methodology and strategy for suitable training, such as simulation learning and discussion groups. *Third*, the head school designing plan training that includes schedule, materials, methods of teaching, and assessment progress. *Fourth*, the head school ensures the availability of necessary power sources and facilities for implementation training. *Fifth*, the head schools communicate effectively with all related parties, including teachers, staff schools, and other parties, to ensure optimal understanding and participation in training.

Implementation involves several strategies. *First*, the head school organizes session training in an orderly and appropriate way, using a schedule that has been planned previously. *Second*, the head school gives the teacher guidance and support in applying draft learning science in space class. *Third*, the head school monitors and evaluates teacher progress in adopting an approach to learning with bait come back periodically. *Fourth*, the head school compiles progress reports periodically to assess training effectiveness and make adjustments if required. *Fifth*, the head school facilitates meetings and collaborations between teachers to share experiences and successful strategies for applying scientific learning.

Observation involves several essential aspects. *First*, supervision to implementation session training by the head school aims to verify that material is delivered clearly and efficiently to the teachers. *Second*, the head schools observe practice teacher learning in the classroom, focusing on implementing draft learning scientific that has been studied in training. *Third*, the head school observe interaction between teachers and students during the learning process to evaluate students' level of involvement and the effectiveness of the approach. *Fourth*, the

head school observes the teacher's responses and responses to bait feedback given by the head school or team observer, as well as the teacher's efforts to repair practice learning based on bait comeback. This is important for evaluating teacher progress and identifying areas that need repair in the application learning.

Reflection involves several significant aspects. *First*, the head school reflect implementation session training to ensure that material is delivered clearly and effectively to the teacher. *Second*, head schools reflect practice teacher learning in the classroom, especially in application draft learning scientific that has been studied in training. *Third*, the head school reflects interaction between teachers and students during the learning process to evaluate students' level of involvement and the effectiveness of the approach. *Fourth*, the head school reflects teachers' reactions and responses to bait feedback given and teachers' efforts to increase practice learning. Through reflection here, the chief school can evaluate teacher progress and identify areas of need repair in the application learning.

Supervision Head School in Training Learning Scientific

Scientific Learning Training by School Principals is a strategic step in increasing teacher competence in implementing appropriate learning approaches. This activity involves a series of direct classroom training sessions, during which the principal provides guidance and support to teachers. During the training, teachers are given an in-depth understanding of scientific learning concepts and can practice this approach directly in their learning process. The principal not only becomes a facilitator in this process but also provides encouragement and feedback to teachers to help them improve their skills and confidence in implementing scientific learning. Thus, this training is about enhancing theoretical understanding and changing learning practices in the field to achieve better student outcomes.

Scientific learning training activities guided by the school principal involve a series of steps. First, the principal teaches teachers to encourage students to observe and research natural phenomena or particular objects for further understanding. Second, the principal encourages teachers to motivate students to

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ask relevant questions based on observations as a basis for investigation. Next, the principal guides teachers in formulating hypotheses or predictions from student questions and then plans experiments to test these hypotheses. In addition, school principals train teachers to guide students in collecting data and information in various ways, such as observation, experiments, or field research. Principals also teach teachers to help students analyze data using multiple statistical techniques or other methods to draw appropriate conclusions. Furthermore, the principal guides teachers to help students draw conclusions based on their data analysis and share findings in a structured manner through various media. Finally, principals guide teachers in assisting students to reflect on their learning processes, identify strengths and weaknesses in their investigations, and plan to improve scientific skills in the future.

Based on the research results above, the school principal's coaching and supervision efforts have increased teacher competency. At the initial meeting with 20 teachers present, the average score increased from 59.5% to 69.5% in the next cycle and increased again to 81.5% in the third cycle. Analysis of this data confirms that training led by the school principal effectively improves teachers' abilities in implementing scientific learning at SMA Negeri 1 Janapria, Central Lombok Regency. This shows success in the coaching process carried out by the school principal and encourages the need for continued training for teachers so that increased competence can be maintained and improved further.

This is also reflected in the provisions in Ministerial Regulation Number 13 of 2007 concerning the competency of school principals, which expects school principals to plan school work and implement changes towards achieving 85%. Thus, school principal training activities can be effective in achieving these goals.

Meanwhile, in coaching activities, the principal has effectively implemented coaching methods through supervision. This is reflected in teachers' active participation in various activities, including planning school programs, implementing learning, and providing and receiving feedback, evaluations, and questions and answers. The percentage of teacher involvement in these activities shows a significant level of participation (Araúz-Ledezma et al., 2022).

Teacher Activities in Training Learning Scientific

The research results show that training organized by school principals positively impacts teacher competence in implementing a scientific learning approach. This is evident from the consistent increase in understanding from teachers and guidance provided by school principals throughout the research cycle. Teacher competency increased significantly from cycle I to cycle III by 59.5%, 69.5% and 81.5% respectively. At the end of cycle III, increasing teacher competency had reached optimal success, with the entire group of teachers achieving overall competency improvement (100% complete).

Data analysis revealed that teachers' activities in improving their competence increased in each cycle, positively impacting the average score of teacher competence as a whole (Ma'rifatulloh & Yanda, 2022). Apart from that, data analysis also found that the most dominant activities in training by school principals were using tools/media, listening to the principal's explanations, and discussing with the principal, indicating that the teachers were actively involved in the training process (Stahnke & Blömeke, 2021).

In the activity training learning scientific, teachers, as participants, carry out diverse activities to increase their understanding and skills, and they apply the approach to learning. The Activity covers participation in session training, in which teachers are involved in discussion, simulation, and practice directly in designing and implementing learning. They reflect on practising what they learned before and obtain feedback from fellow teachers and facilitators' training. Therefore, teachers also have the opportunity To identify the challenges and obstacles in implementing learning science in class, as well as plan strategies To overcome constraints Thr.ough participation in activity training, teachers can increase their competence in designing interesting, relevant and promotional learning deep understanding as well as Skills scientific student.

Scientific learning competencies include a deep understanding of scientific concepts, skills in designing and implementing learning based on scientific methods, the ability to facilitate students' discovery and exploration processes, and the confidence to apply scientific approaches in daily learning practices.

Teachers must also have skills in selecting and using relevant learning resources, evaluating student learning outcomes effectively, and continuously developing themselves through training and practical experience. By having solid scientific learning competencies, teachers can create a learning environment that encourages exploration, discovery and deep understanding for students.

IV. CONCLUSION

The research underscores the positive impact of coaching by school principals on enhancing teacher competence in implementing scientific learning approaches through consistent training cycles. The findings reveal significant improvement in teacher competency across each training iteration, indicating the effectiveness of principal-led guidance. This underscores the importance of comprehensive planning, coordinated implementation, individual guidance, and continued training in enhancing teacher competency and improving school quality. Recommendations emphasize the need for educational institutions to prioritize these aspects and foster collaboration between school principals, teachers, and stakeholders for successful training implementation and enhanced learning quality. Future research avenues could delve deeper into factors influencing the effectiveness of such training, including teacher motivation, principal support, resource availability, and school environment, while longitudinal studies could provide insights into long-term impacts on learning quality and student achievement. Thus, further research holds promise in offering a comprehensive view to bolster teacher competence and learning quality in schools.

V. BIBLIOGRAPHY

[1] Araúz-Ledezma, A. B., Massar, K., & Kok, G. (2022). Implementation of a school-based Social Emotional Learning Program in Panama: Experiences of adolescents, teachers, and parents. *International Journal of Educational Research*, *115*, 101997. https://doi.org/10.1016/j.ijer.2022.101997

[2] Arifian, F. D. (2019). Peran Lembaga Pencetak Tenaga Kependidikan (LPTK) Dalam Mempersiapkan Generasi Emas Bangsa. *Jurnal Pendidikan Dan Kebudayaan Missio*, *11*(1), 26–38. https://doi.org/10.36928/jpkm.v11i1.133

[3] Binti Rahman, F., & Che Noh, M. A. (2021). Implementation of the Al-Quran and Science Integration Approach at the Asajaya Regional Middle School. *Al-*

Hayat: Journal of Islamic Education, *5*(2), 240. https://doi.org/10.35723/ajie.v5i2.204

[4] Chaula, L. (2024). Measure for clinical supervision practices as factors of predictive indicators of teachers' professional identity development in Tanzania. *Heliyon*, *10*(4), e25768. https://doi.org/10.1016/j.heliyon.2024.e25768

[5] Chen, L. (2022). Facilitating teacher learning in professional learning communities through action research: A qualitative case study in China. *Teaching and Teacher Education*, *119*, 103875. https://doi.org/10.1016/j.tate.2022.103875

[6] Conner, C. J., & Bohan, C. H. (2021). Coaching to Teach: Preservice Social Studies Teachers' Experiences with a Hiring Contingency. *The Journal of Social Studies Research*, *45*(1), 1–13. https://doi.org/10.1016/j.jssr.2020.06.001

[7] Donkoh, R., Lee, W. O., Ahoto, A. T., Donkor, J., Twerefoo, P. O., Akotey, M. K., & Ntim, S. Y. (2023). Effects of educational management on quality education in rural and urban primary schools in Ghana. *Heliyon*, *9*(11), e21325. https://doi.org/10.1016/j.heliyon.2023.e21325

[8] Fatihah, H., Chotimah, U., & El Faisal, E. (2022). Pembinaan dan Pelatihan Implementasi Pembelajaran dengan Menggunakan Pendekatan Saintifik bagi Guru Sekolah Menengah Pertama. *Jurnal Pengabdian Kepada Masyarakat*, *2*(1), 21–27. https://doi.org/10.56393/jpkm.v2i1.1403

[9] Groenewald, E., Kilag, O. K., Cabuenas, M. C., & ... (2023). The Influence of Principals' Instructional Leadership on the Professional Performance of Teachers. *Excellencia: International Multi-Disciplinary Journal of Education*, *1*(6), 433–443. https://doi.org/10.5281/zenodo.10430046

[10] Hariyani, I. T., Prameswari, N. K., & Fitri, N. D. (2023). Pelatihan Pembelajaran Nilai-Nilai Moral Anak Usia Dini Dengan Pendekatan Saintifik di IGRA (Ikatan Guru Raudhatul Athfal) Sidoarjo. *Jurnal Sibermas (Sinergi Pemberdayaan Masyarakat)*, *12*(2), 231–243. https://doi.org/10.37905/sibermas.v12i2.19464

[11] Heredia, M. G., Sánchez, C. S.-G., & González, F. J. N. (2024). Integrating lived experience: Qualitative methods for addressing energy poverty. *Renewable and Sustainable Energy Reviews*, *189*, 113917. https://doi.org/10.1016/j.rser.2023.113917

[12] Huang, L., Zhao, D., & Zhou, S. (2024). Examining principal instructional leadership effects on the rural-urban instructional quality gap in China: The mechanism of teacher professional learning. *Studies in Educational Evaluation*, *81*, 101346. https://doi.org/10.1016/j.stueduc.2024.101346

[13] Juliastuti, A. A., Fachrozi, A. D., Putri, F. E., Sari, R. I. A., & Asvio, N. (2024). Tantangan Guru Dalam Menerapkan Kurikulum Merdeka Pada Tahun

Pertama Di Mis Humaira Kota Bengkulu. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, *10*(1), 21–34. https://doi.org/10.36989/didaktik.v10i1.2451

[14] Jumari, J., & Fajrin, W. I. (2020). The Effect of Digitalization of School Data and Teacher Performance on Student Achievement at SD Muhammadiyah 2 Denpasar. *Al-Hayat: Journal of Islamic Education*, *4*(1), 126–137. https://www.alhayat.or.id/index.php/alhayat/article/view/117

[15] Krammer, I., Schrank, B., Pollak, I., Stiehl, K. A. M., Nater, U. M., & Woodcock, K. A. (2023). Early adolescents' perspectives on factors that facilitate and hinder friendship development with peers at the time of school transition. *Journal of School Psychology*, *98*, 113–132. https://doi.org/10.1016/j.jsp.2023.03.001

[16] Li, B., Li, Z., & Fu, M. (2022). Understanding beginning teachers' professional identity changes through job demands-resources theory. *Acta Psychologica*, *230*(October), 103760. https://doi.org/10.1016/j.actpsy.2022.103760

[17] Lithoxoidou, A., & Papadopoulou, V. (2024). Critical incidents analysis in teacher education: Assessing student-teachers' critical thinking. *Thinking Skills and Creativity*, *51*, 101476. https://doi.org/10.1016/j.tsc.2024.101476

[18] Ma'rifatulloh, S., & Yanda, F. (2022). Book review. *System*, *106*, 102796. https://doi.org/10.1016/j.system.2022.102796

[19] Masumoto, Y., Morinobu, S., Fujimaki, K., & Kasagi, K. (2021). Important factors in the observation dimensions of high school Yogo teachers to detect prodromal symptoms of mental health issues in adolescents. *Journal of Affective Disorders Reports*, *5*, 100173. https://doi.org/10.1016/j.jadr.2021.100173

[20] Muhayat, I. (2020). Discussing the Dialectics of Science on Islamic Education. *Al-Hayat: Journal of Islamic Education*, *4*(1), 1–18. https://doi.org/10.35723/ajie.v4i1.95

[21] Niever, M., Trefz, N., Heimicke, J., Hahn, C., & Albers, A. (2021). Situation- and need-based method recommendation for coaching agile development teams. *Procedia CIRP*, *100*, 512–517. https://doi.org/10.1016/j.procir.2021.05.112

[22] Rojas, N. M., & Abenavoli, R. M. (2023). Problem behaviors at the classroom-level and teacher-child interaction quality in Head Start programs: Moderation by age composition. *Journal of School Psychology*, *99*, 101225. https://doi.org/10.1016/j.jsp.2023.101225

[23] Stahnke, R., & Blömeke, S. (2021). Novice and expert teachers' noticing of classroom management in whole-group and partner work activities: Evidence from teachers' gaze and identification of events. *Learning and Instruction*, *74*, 101464. https://doi.org/10.1016/j.learninstruc.2021.101464

[24] Swanson, K. J., Blanchard, M. R., & Gutierrez, K. S. (2023). "We're all like one big family": How teacher-coaches' after-school PLC's influence STEM

Club success. *Learning, Culture and Social Interaction*, *42*, 100739. https://doi.org/10.1016/j.lcsi.2023.100739

[25] Talebizadeh, S. M., Hosseingholizadeh, R., & Bellibaş, M. Ş. (2021). Analyzing the relationship between principals' learning-centered leadership and teacher professional learning: The mediation role of trust and knowledge sharing behavior. *Studies in Educational Evaluation*, *68*, 100970. https://doi.org/10.1016/j.stueduc.2020.100970

[26] UU No.14. (2005). *Undang-Undang Nomor 14 Tahun 2005 tentang Guru dan Dosen*.

[27] Wang, N., & An, B. G. (2023). Improving teachers' professional development through professional learning community: Voices from secondary school teachers at Malaysian Chinese independent schools. *Heliyon*, *9*(6), e17515. https://doi.org/10.1016/j.heliyon.2023.e17515

[28] Williams, T., Wiles, J., Smith, M., & Ward, K. (2022). Combining action research and grounded theory in health research: A structured narrative review. *SSM - Qualitative Research in Health*, *2*, 100093. https://doi.org/10.1016/j.ssmqr.2022.100093