



## **Evaluating Guru Penggerak Training Program's Impact Using Kirkpatrick Level 4 Model: A Data-Driven Analysis with Python Visualization**

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**Abstract:** This study aims to evaluate the outcomes (Level 4) of the Kirkpatrick Model in the implementation of the Guru Penggerak Program in Bogor City State High School/Vocational School. Using a qualitative approach with an evaluative method, data were obtained through documentation studies and interviews with 14 school principals selected via purposive sampling. Data analysis followed Miles and Huberman's interactive model, consisting of three stages: data reduction, data presentation, and conclusion drawing. Theme frequencies were analyzed and visualized using Python and pandas. This study shows that the Guru Penggerak Program has a varied impact on schools, with the most dominant impact seen on improving student learning outcomes, although the effect is not even at the institutional level. Based on correlation analysis and documentation studies, the impact of programs on schools shows a complex relationship. The correlation of -0.65 between the learning community and the role of the principal and -0.41 between the role of the principal and the learning outcome indicated a lack of managerial support. A correlation of 0.00 between community learning and learning outcomes and 0.11 between community learning and positive impact on school indicates that the impact of the program is limited without structural support. A correlation of -0.54 between student learning outcomes and positive impacts on schools shows an unequal impact, while a correlation of 0.47 between the role of principals and positive impacts on schools confirms the importance of the role of leadership in creating a climate that supports change.

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## **Introduction**

The development of the quality of teachers in Indonesia is crucial in improving the quality of education. An effective teacher education program must be based on improving pedagogic and professional competence, as qualified teachers will have a direct impact on student learning outcomes (Sodikin et al., 2022). Efforts to improve the quality of teachers include continuous training, effective supervision, and support from principals and policy makers (Nugroho et al., 2022; Rochimat, 2024). Guru Penggerak Program aims to create competent and characterful teachers according to the Pancasila Student Profile (Ministry of Education and Culture, 2024), as well as improve the ability to manage innovative and collaborative learning that has a positive impact on students.

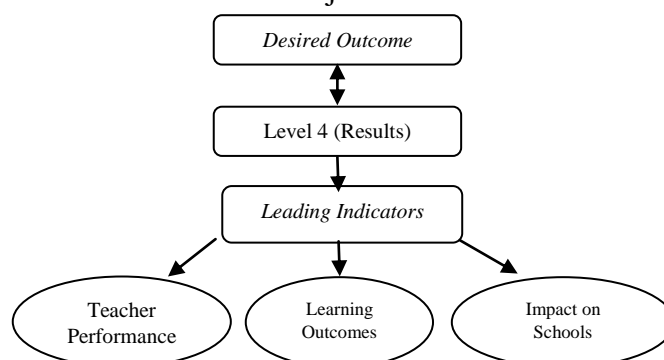
Evaluation of the impact of the Guru Penggerak Program is very important. Previous research used various evaluation models, such as CIPP by (Nurhasanah et al., 2022) which found that some schools excelled, but still needed improvements in budgets and curriculum. (Rohman et al., 2023) used the Kirkpatrick Level 4 model in North Lombok and showed a positive impact with a score of 89.9%. Hayati et al. (2023) found that programs are effective in improving the quality of teaching, although innovation is still needed. Muthiah (2021) also uses CIPP and finds an improvement in teacher competence, despite the challenges of

facilities and support. Program Guru Penggerak launched to produce learning leaders still raises pros and cons regarding its effectiveness, so an evaluation is needed to see the extent to which the program's goals are achieved; Post-training evaluation is important to ensure that the Guru Penggerak is truly “be inspired, take action, and inspire others to act” becomes crucial, the Kirkpatrick model Level 4 used to evaluate the training outcomes. The findings of this study are expected to have practical implications in the form of inputs and recommendations for policy makers, as well as academic significance in contributing to improving the quality of education in Indonesia, especially in the realm of teacher development

The study focuses on the Kirkpatrick Level 4 Model which measures the long-term impact on student learning outcomes and school achievement. This model was more often applied at Levels 1 to 3, which focus on reactions, learning, and behavior, while long-term impact evaluations at Level 4 are still rare, especially in Bogor City. This study aims to evaluate the long-term impact of the Guru Penggerak Program on student learning outcomes and school achievement.

### Research Method

This research was conducted in several high schools/vocational schools in Bogor City that had Guru Penggerak 4, 7, 8, and 9, for 10 months (October 2024 - July 2025), involving 15 Guru Penggerak and 14 School Principals. The selection of subjects used purposive sampling with the following criteria: civil servant, former deputy principal, and active in the Learning Community. This study evaluated the long-term impact of the Guru Penggerak Program on learners' learning outcomes and school achievement, focusing on the Level 4 Kirkpatrick Evaluation Model. The following conceptual framework is used to illustrate the relationship between Level 4 and the research objectives:

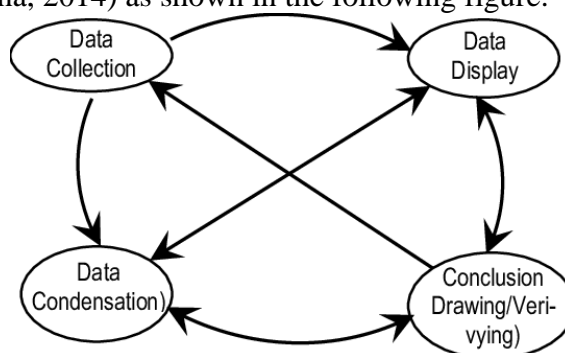


**Figure 1. Conceptual Framework**

This framework visualizes desired training outcomes, including changes in teacher performance, their impact on student learning outcomes, and improved school performance. The figure also shows the relationship between desired outcomes and key indicators, reflecting early signs of the positive impact of training on teacher behavior change and outcomes achieved in schools. To understand the meaning behind the data obtained in the field, this study uses a qualitative approach (Smith & Firth, 2011; White, Oelke, & Friesen, 2012) with the Kirkpatrick Evaluation Model Level 4 – Results (Smidt et al., 2009; Nisa, Sutarsih, & Sudarsyah, 2023). Data collection was carried out through interviews and documentation studies, to ensure the validity of the data.

The instruments used in this study included interview guidelines and documentation study guidelines. Each instrument was compiled based on relevant Kirkpatrick evaluation indicators and adjusted to the context of the Guru Penggerak Program being evaluated.

Qualitative data obtained from interviews and documentation studies would be analyzed using thematic analysis to identify emerging patterns and themes related to the impact of training programs on changes in teacher behavior and student learning outcomes. This analysis process followed the stages of Miles and Huberman's interactive analysis model (Miles, Huberman, & Saldana, 2014) as shown in the following figure:



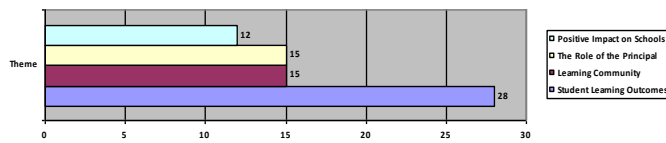
**Figure 2. Miles and Huberman's Analytical Model**

Miles and Huberman's interactive analysis model includes three main stages: data reduction, data presentation, and conclusion drawn. In the reduction stage, researchers filtered raw data from interviews and documents based on relevance to the research objectives, then encoded them to identify important information and build a structured narrative (Aldila & Rini, 2023; Smith & Firth, 2011). The reduced data was then presented in a visual or narrative format that facilitates understanding (Cree et al., 2015). The final stage involved drawing conclusions and recommendations based on the relationships between themes as well as relevant literature (White et al., 2012). This approach allows for a deeper understanding of social phenomena and improves the overall quality of analysis (Grundy et al., 2016; Smith & Firth, 2011). Next, the results of the theme coding would be calculated in the frequency of being analyzed and visualized using Python and pandas. Data presentation serves to organize information that has been reduced in an easy-to-understand format. Finally, drawing conclusions or verifications was carried out to ensure that the results of the analysis are trustworthy and reflect the reality being researched.

## Results and Discussion

An analysis of the impact of the Guru Penggerak Program training was conducted by focusing on Level 4 in the Kirkpatrick Evaluation Model, which assesses long-term outcomes on improving the quality of learning and teachers' contribution to achieving school goals. The data was collected through in-depth interviews with school principals who have Guru Penggerak from the 4th, 7th, 8th, or 9th grades in Bogor City. The analysis process follows a thematic approach, complemented by data reduction and visualization in the form of bar graphs and heatmaps to identify the intensity and strength of linkages between themes.

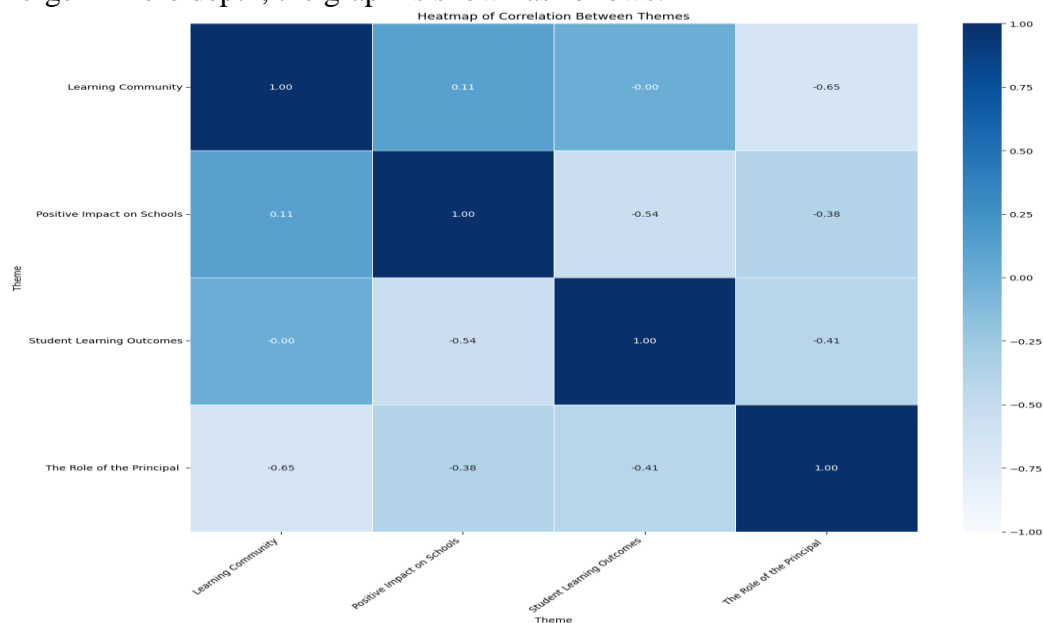
Once the theme coding process is done manually, each theme is classified and calculated in frequency using Python and pandas. The goal is to find out the intensity and distribution of the appearance of the theme in all the speakers' answers. The results of the frequency calculation are shown in the following bar graph:



**Figure 3. Frequency of Themes from Principal's Interview Results**

Figure 3 shows that the theme "Student Learning Outcomes" was the most dominant with 28 appearances, indicating the main focus of the impact of training according to the principal. The themes "Learning Community" and "The Role of Principals" appear 15 times each, highlighting the importance of collaboration and structural support. Meanwhile, "Positive Impact on Schools" appears 12 times, reflecting that change at the institutional level is still evolving. This distribution confirms that training has an impact on the individual, collective, and institutional levels, albeit with different intensities, as well as being the basis for the correlation analysis between aspects visualized in the next heatmap.

Heatmap visualization is used to see the interconnectedness between the main themes that emerge in more depth, the graph is shown as follows:



**Figure 4. Heatmap visualization**

The correlation analysis between themes based on the results of the principal's interviews showed a variety of relationships that reflect the complexity of the impact of the Guru Penggerak Program in the school environment. By using a thematic approach and correlation visualization in the form of a heatmap, a number of findings were found that deserve critical attention.

#### 1) Weak to Negative Correlation between Learning Communities and Other Themes

The correlation of -0.65 between Learning Community and Principal's Role showed that teachers' initiatives were not adequately supported by school management, hindering the achievement of educational goals (Abidin & Muh. Rahbini, 2022). The very weak correlation with Student Learning Outcomes (0.00) reinforces that without the support of the principal, the learning community has not had a significant impact.

The results of the documentation study confirm that in most schools, the learning community is only contained in the form of a decree without minutes, activity documentation, or follow-up plans, indicating the weak sustainability of implementation at the practice level. School principals need to play a transformational leader role that encourages collaboration and innovation (Megayanti & Asri, 2022; Wasono, 2019). These findings are in line with (Nisa et al., 2023), Nurhasanah et al. (2022), and Yeni et al. (2021) who highlight the weakness of collaboration and the role of school principals as factors supporting the effectiveness of learning communities.

## **2) Weak Positive Correlation between Learning Community and Positive Impact on School**

A correlation of 0.11 between learning community and positive impact on school suggests a weak relationship. Research shows that while learning communities can improve teaching practices, their effectiveness depends on member activeness, collaborative structures, and managerial support. Factors such as school policies, the quality of interactions, and individual commitment also play an important role in the success and positive impact of those communities. In other words, even if there is a learning community, its influence on changes in schools is not strong enough to have a significant impact (Vescio et al., 2008; Hattie, 2012; Timperley et al., 2007).

Documentation studies show that in most schools, the learning community is only recorded in the decree without documentation or follow-up. This hinders effective implementation, so the impact on teaching practices and learning outcomes in schools is very limited. Research by (Rohman et al., 2023) confirms that although teacher development programs can have a positive impact, without structured management, their impact on schools remains limited.

## **3) Moderate Relationship between Student Learning Outcomes and Positive Impact on School**

The correlation of -0.54 indicates that improving learning outcomes has an impact on reputation, collaboration, and a conducive school climate (Miftahusyai'an et al., 2021). A positive learning environment encourages learner engagement and motivation (Sun & Ho, 2023; Kim & Park, 2021), while (Nadav et al., 2024) affirm learning outcomes as an indicator of institutional effectiveness.

Documentation studies show that only a small percentage of schools have complete and systematic academic and non-academic achievement documents, reinforcing the data that the impact of programs on learning outcomes has not been evenly distributed. These findings are reinforced by Rohman et al. (2023) and Nisa et al. (2023) who stated that the Guru Penggerak program supports collaborative learning and school culture change, making learning outcomes a reflection of the success of leadership and teacher development.

## **4) Negative Correlation between the Role of the Principal and Student Learning Outcomes**

The correlation of -0.41 indicates that the principal's leadership has not been optimal in supporting academic achievement, which emphasizes the importance of the principal's active role in learning management (Setiyadi & Rosalina, 2021). Effective leadership can increase teacher motivation and their performance, but the direct influence on student activity has not been proven to be strong (Pratiwi et al., 2021). Nasrun's research (2016) shows that school principals play an important role in creating a supportive environment, encouraging staff to be actively involved in education. Good leadership in schools has the potential to improve student learning outcomes (Qalbi, 2021). Therefore, improving the quality of school principal leadership should be the main concern in school development (Timor, 2018).



From the documentation study, it is known that only a few schools explicitly involve principals in post-training follow-up plans, which reinforces the findings of weak structural support for improved learning outcomes. Nisa et al. (2023) and Yeni et al. (2021) also show that the weak role of school principals is an obstacle to the implementation of teacher training and collaboration results, as reflected in the negative correlation on the heatmap.

#### **5) Positive Correlation between the Role of the Principal and the Positive Impact on the School**

A correlation of 0.47 indicates that the principal's active and transformative leadership creates a positive school climate. This leadership style increases teacher motivation and performance, supporting professionalism (Riyannie et al., 2024; Solihin et al., 2021), as well as strengthening the strategic direction of schools (Fahma et al., 2024).

Documentation studies show that in one of the schools, all school activities are well documented, many of which are initiated by the Guru Penggerak, which has an impact on improving the school's reputation up to the cross-regional level. (Rohman et al., 2023) and (Nisa et al., 2023) support these findings by showing that effective leadership accelerates the transformation of school culture and the adoption of training outcomes in a participatory manner.

#### **6) Reflection on the Effectiveness of the Guru Penggerak Program**

Overall, this correlation heatmap underscores that the long-term impact of the program has not shown a strong correlation equally between themes. In fact, this diversity of correlations opens up the interpretation that program effectiveness is highly contextual, depending on school culture, leadership style, and the level of teacher participation in the learning community.

The Kirkpatrick Level 4 Evaluation Model emphasizes the importance of *desired outcomes* that impact the organization (school), not just the individual (teacher). In this context, although the Guru Penggerak Program has succeeded in bringing out good practices at the individual level, its integration into the school system is still partial. This is also reflected in documentation studies, which show that although there are learning community decrees available and several teacher self-development certificates, most schools do not fully have a consistent documentation system of activities and achievement reporting. These findings corroborate Kirkpatrick's theory in (Smidt et al., 2009) that level 4 success is highly dependent on organizational support and sustainability of post-training practices.

Conceptually, these findings highlight that teacher training programs must be designed not only to change individual behavior but also to align with organizational structures and cultures that support sustainability. Practically, the results suggest the need for stronger school leadership engagement, systematic documentation, and post-training support mechanisms to ensure that the positive practices of Guru Penggerak are fully integrated into school systems.

### **Conclusion**

This study showed that the Guru Penggerak Program at Level 4 Kirkpatrick Evaluation had a varied impact on schools. The most dominant impact can be seen in improving student learning outcomes as seen in figure 3, although the effect was not completely evenly distributed at the institutional level. Based on correlation analysis and documentation studies, the impact of the Guru Penggerak Program (PGP) on schools showed a complex relationship. The correlation of -0.65 between the learning community and the role of the principal and -0.41 between the role of the principal and the learning outcome showed a lack of adequate managerial support, hindering the achievement of educational objectives.

This negative correlation indicates that excessive managerial dominance can weaken teacher collaboration and limit the transformative potential of the learning community, resulting in the need for empowering leadership that is able to balance professional autonomy with collective improvement of the quality of schools. The correlation of 0.00 between learning community and learning outcomes and 0.11 between learning community and positive impact on school indicates that despite learning community initiatives, their impact is limited without stronger structural support and collaboration. A correlation of -0.54 between student learning outcomes and positive impacts on schools shows an unequal impact, while a correlation of 0.47 between the role of principals and positive impacts on schools confirms the importance of active leadership in creating a climate that supports change. Overall, the success of the program is highly dependent on managerial support and a supportive school culture.

### Recommendation

Based on the findings, it is recommended that the Guru Penggerak Program training be accompanied by continuous mentoring and monitoring at the school level to ensure that principals act as instructional leaders. The urgency of this recommendation in the Indonesian context is that, without systematic follow-up, program outcomes risk remaining temporary and failing to transform schools. Managerial support can be strengthened by integrating program outcomes into school work plans, conducting regular reflective supervision, and rewarding innovative practices, while collaborative culture can be enhanced through structured teacher learning communities linked to concrete instructional improvements. These measures are expected to institutionalize the program's impact and inform broader educational policies on teacher professional development and school leadership.

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