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Critical Determinants of Teacher Agency: A Cluster Analysis Study of Indonesian Teachers

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Abstract. Teacher agency is defined as the ability to deal with complex situations to improve learning. The existing literature has shown that teacher agency is influenced by various aspects. In the Indonesian context, these aspects are discussed according to a one-sided approach, such as the socio-cognitive, sociocultural or ecological. This may possibly yield a partial understanding. The present study identified the critical aspects or determinants of teacher agency, and the characteristics associated with varying levels of teacher agency related to the three approaches. The data was obtained through a multi-response questionnaire completed by 724 teachers from 37 schools in Indonesia. Two-step cluster analysis was used to analyze the data. The findings of this study indicate that 10 out of 23 aspects significantly contribute to teacher agency. These were interpreted as reflection, idea development and supportive involvement, which were critical in determining the variations in teacher agency, ranging from low to very good. It was also observed that only 33.3% of teachers exhibited the anticipated agency at good or very good levels. The remainder required enhancement through appropriate professional development.

Keywords: cluster analysis; reflection; socio-cognitive approach; teacher agency, teacher professional development

1. Introduction

Teacher agency demonstrates the willingness and capacity to critically respond to complex situations and can be seen when teachers perform their professional roles and then make positive changes to facilitate learning (Priestley, Biesta, & Robinson, 2015). It is attributed to the professionalism of teachers and is imperative for transforming teachers into agents of change (Cong-Lem, 2021). In the rapidly changing world of learning and innovation in the post-pandemic era, teacher agency is crucial. Innovations such as online and distance learning (Sato et al., 2024) and artificial intelligence (Şeren & Özcan, 2021) are just some

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examples. This ensures educators can swiftly adapt to these changes, given the challenges using ICT and digital skills (UNESCO, 2022). Research on teacher agency in Asia, including Indonesia is underrepresented in comparison to research in developed Western countries, which account for approximately 23% and 45% respectively (Cong-Lem, 2021). Within the Indonesian context, studies on teacher agency have employed diverse approaches, encompassing the sociocultural (Agustin & Lengkanawati, 2023), ecological (Wulansari & Lestari, 2024), or socio-cognitive approaches (Hidayati, 2024). Studying a single approach separately can lead to only partial understandings, hindering the development of educational policies and interventions (AlAjmi & Alsaleh, 2023).

In order to address this gap, this research employs all dimensions of agency formation based on the three approaches. The sociocultural approach involves the chordal triad of agency (iterative, projective, and practical evaluative dimensions) with scaffolding and internalization processes (Emirbayer & Mische, 1998). The ecological view, on the other hand, breaks it down into three distinct components: iterative (teachers' lives and professional histories), projective (short- and long-term opinions), and practical evaluative (teachers' regular activities in their work environment as educators) (Priestley, Biesta, & Robinson, 2015). According to socio-cognitive, they refer to these as personal determinants, behavioral determinants, and environmental determinants (Bandura, 2018).

As previously outlined in the extant research, teacher agency is manifested in various ways based on the aforementioned approaches. Firstly, it has been established as a teacher's response to and involvement in change, their personal identity (Chaaban et al., 2021; Jenkins, 2020), professional identity (Green & Pappa, 2021), and the negotiation of their identity (Vähäsantanen, 2015). The manifestation of agency in terms of identity pertains to the actions and involvement of teachers in making changes based on contextual conditions.

Secondly, the development of competencies (Nolan & Molla, 2017) is limited to a single aspect of agency formation, specifically professional histories, while other contributing factors to agency are not sufficiently explored. Thirdly, interactions with others constitute an integral component of the iterative and practical evaluative dimensions (Green & Pappa, 2021; Hökkä et al., 2012; Wei & Chen, 2019). However, it is only a fraction of the comprehensive factors influencing agency development. Fourthly, the consideration of learning practices (Wei & Chen, 2019) falls short in adequately capturing the dynamic nature of projective agency realization. Finally, responses to education policy (Dhammarungruang & Wudthayagorn, 2021) offer a limited depiction of the broader scope of the influence on agency.

As previously explained, the manifestations of teacher agency are discussed separately, while teacher agency based on the three approaches is comprehensive (Toom et al., 2015). This study involves all aspects of teacher agency from the three approaches. The identification of the pivotal determinants that influence teacher agency will facilitate a more comprehensive understanding of the approaches that are suitable for the Indonesian context. Furthermore, this study will uncover the

characteristics of teacher agency based on these critical determinants. The objective of this study is to provide answers to the following two research questions.

1. What are the aspects that significantly contribute to teacher agency in the Indonesian context?
2. What are the characteristics of teaching agency in different levels of manifestation?

2. Literature Review

2.1. Theoretical approaches of teacher agency

Teacher agency is approached from a variety of perspectives, including the sociocultural and socio-cognitive approaches, the most popular of which is the ecological approach. Figure 1 illustrates that the three approaches mentioned share some aspects, specifically iterative, projective, and practical evaluations. The difference lies in the focus on agency formation, the role of the individual and how the social environment affects the individual.

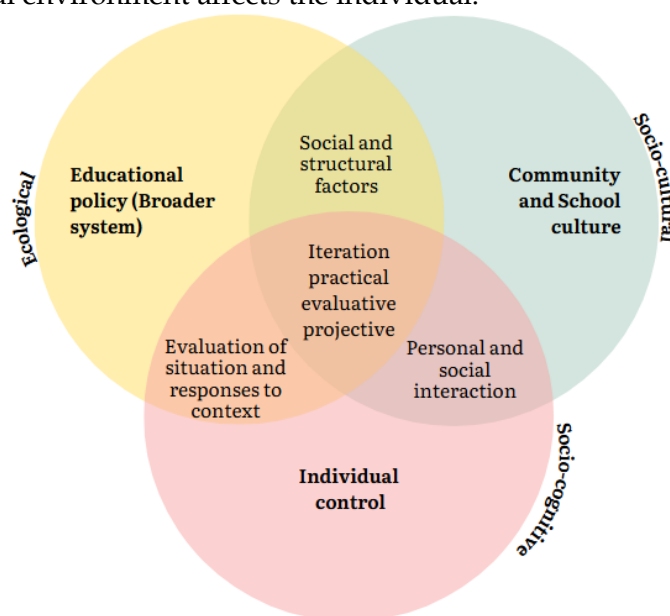


Figure 1: Socio-cognitive, socio-cultural, and ecological approaches

How a teachers' agency is shaped by culture and community is the focus of the sociocultural approach (Lasky, 2005). Emirbayer and Mische (1998), using a sociocultural approach, define agency as the actors' temporally constructed engagement through the interaction of habit, imagination and judgement based on past, present and future visions. Teacher performance is influenced by social interactions in the form of collaboration or support, which is referred to as the zone of proximal development (Muhayimana, 2017).

In the context of socio-cognitive approach, the development of teacher agency is emphasized through personal reflection and experience (Li & Ruppard, 2021). According to Bandura (2018), there are three aspects involved in the formation of agency: the individual, behavior and the environment. Although agency is influenced by the environment, the involvement of the environment is only as a

stimulus. Additionally, agency has four main characteristics: intentionality, forethought, self-reactivity, and self-reflection

The ecological approach examines how agency is influenced by the wider social system, from the family to the political arena (Leijen et al., 2020; Priestley & Drew, 2019). The microsystem is the direct contact environment (e.g. family, school, peers); the mesosystem is related to the interaction of various microsystems; the ecosystem is external factors (e.g. policies in education); the macrosystem is the culture and social structure that enables the interaction of the previous three levels; and the chronosystem is how change occurs over time (Crawford, 2020).

2.2 How Teacher Agency is Manifested

Teacher agency is evident in a variety of manifestations as presented in Figure 2. In the context of personal and professional identity, teacher agency is demonstrated by the teachers' self-assessment in terms of their competence and readiness to carry out tasks on their own or their need to request the involvement of others (Green & Pappa, 2021). Another manifestation of teacher agency based on identity negotiation is the decision to adjust their actions to match expectations or to follow their personal beliefs (Vähäsantanen, 2015). The decisions made by teachers as a result of these interactions are influenced by a complex interplay between values, beliefs, discourses, and the physical environment (Alifia et al., 2022).

Aside from the issue of teacher identity, the development of teacher competence has also been identified as an indicator of how agency is demonstrated in the teaching profession. Teacher competence can be developed through various avenues, including formal means such as continuing education or training, as well as non-formal activities such as community discussion (Priestley et al., 2012) and independent learning through digital (Morris & Rohs, 2021) or non-digital resources (Morris et al., 2025). However, it should be noted that the development of such competencies is influenced by a variety of factors including motivation, beliefs and values (Utami & Kuswandono, 2023), goals, policies and the school culture (Royaei et al., 2023).

The relationships between teachers and students, colleagues and the environment are also an important part of teacher engagement in change (Erdem, 2020). Discourse with colleagues in the school, teacher communities, resource persons, and principals can provide motivation, feedback, and ideas (Cong-Lem, 2024). It is further posited that a school culture facilitates teacher interactions and collaboration with various stakeholders (Imants & Van der Wal, 2020), incorporating responses, support and exemplars provided by the principal (Bellibaş et al., 2020). Teacher agency includes reflection on learning practices, as well as analyzing positive and negative past experiences to overcome difficulties (Vu, 2020). In order to facilitate the understanding of teachers regarding the transformative potential of their actions and interactions, it is recommended that they engage in reflection on not only personal but also professional challenges, including personal abilities, contextual situations (Royaei et al., 2023), facilities (Cai & Zheng, 2022) and resources (Pantic, 2015).

The actions of educational professionals are also influenced by their responses to various factors, including the curriculum, challenges related to the curriculum, and other external factors (Dhammarungruang & Wudthayagorn, 2021; Lasky, 2005). This is particularly salient in the post-pandemic era, wherein the utilization of digital tools and online learning has proven to be a significant challenge in the execution of curriculum implementation (Tan et al., 2025). A subset of these educators responds by attempting to adapt to any policy changes, while others opt to remain in a state of comfort, resulting in a lack of response that is favorable (Amin et al., 2022).

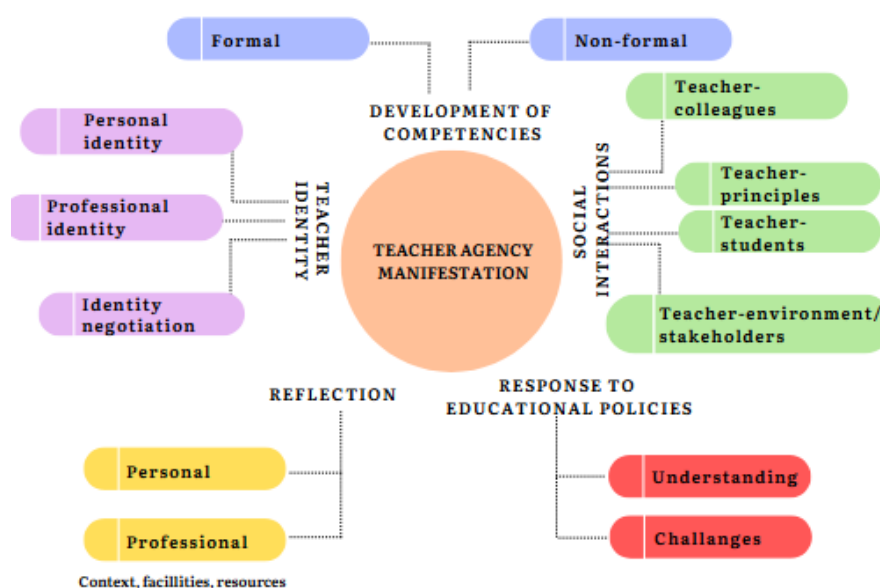


Figure 2: The manifestation of teacher agency within various factors

3. Methodology

The present study investigated teacher agency across all aspects derived from the sub-dimensions and dimensions of teacher agency formation, utilizing a quantitative approach in the form of a survey. Additionally, the teacher responses elucidated the manner in which agency is enacted at various levels.

3.1 Participant

The present study encompassed educators from a diverse array of educational institutions, including primary schools, junior secondary schools, and senior secondary schools. These institutions were selected through a multistage sampling method, ensuring a representative sample of the educational workforce. The sampling procedure was executed in three stages: district, subdistrict, and school. The sampling design incorporated a combination of cluster and stratified sampling techniques (Thompson & Wu, 2020). The final sample was comprised of 27 primary schools, 5 junior secondary schools, and 5 senior secondary schools. A total of 921 teachers were administered the questionnaire, of which 724 completed it, providing a substantial dataset for analysis.

3.2 Research Instrument

The present study employed a multi-response questionnaire, consisting of 23 questions that were later mentioned as the determinants/ aspects used to ascertain teacher agency. The questionnaire was meticulously compiled based on the dimensions, sub-dimensions, and determinants of teacher agency derived from these three approaches. The distribution of the items is presented in Table 1. The instrument's feasibility was assessed through the analysis of percentage agreement, yielding results of 76.5% for the questions and 82.8% for the options. This indicates that the three experts demonstrated a high degree of agreement. The instrument had high reliability, as evidenced by the Cronbach's Alpha value of 0.825.

Table 1: Distribution of the survey questions based on the chordal triad of agency

Dimension	Sub-dimension	Determinant	Aspects
Iteration	The possession of knowledge and skills	Personal	1, 2, 3
	Professional activities	Behavior	4
	Dialogue with peers	Environmental	5, 6, 7
Practical Evaluative	Ideas, values	Personal and behavior	8, 9
	Beliefs, discourses, relationships	Personal and environmental	5, 6, 7, 10
	Role, power/ strength	Personal and behavior	11, 12, 14, 15, 16
	Physical resources and environment	Environmental	5, 6, 13
Projective	Short-term projective	Personal and behavior	17
	Long-term projective	Personal and behavior	18
	Attitudes and actions towards educational change including curriculum change		19, 20, 21, 22, 23

3.3 Data Analysis

The analysis of the data was conducted using the SPSS statistical software to address the two research questions. Two-step cluster analysis was employed to examine the effect of the aspects on the formation and manifestation of teacher agency (Sarstedt & Mooi, 2019). The utilization of this data analysis stems from the nature of the data itself, which is characterized by its nominal characteristic. The analysis enables the identification of predictor importance and the discernment of aspects that exert a substantial influence on teacher agency. Additionally, it facilitates the grouping of the respondents and the identification of characteristic patterns within the resulting groupings (Wendler & Gröttrup, 2016). In the context of this study, the two-step analysis was implemented with a fixed number of clusters of five, adopting a framework of five levels of mastery of teacher competencies in Indonesia (*Peraturan Direktur Jenderal Guru Dan Tenaga Kependidikan Nomor 2626/B/HK.04.01/2023 Tentang Model Kompetensi Guru* [Regulation of the Director General of Teachers and Educational Staff Number 2626/B/HK.04.01/2023 about the Teacher Competency Model], 2023).

The significance of the importance predictors was analyzed based on how important they were, ranging from 0 to 1 meaning not important to most important to the cluster. The predictors were considered to be influential if they could differentiate between the clusters effectively. The cluster analysis for the categorical data employed the most frequent categories and compared them to interpret the nature of each cluster (Sarstedt & Mooi, 2019). We did a sensitivity analysis using a chi-square test and a Cohen kappa value to see how significant the clusters were. We changed the number of clusters to see how that affected the results (Benassi et al., 2020).

4. Result

4.1 The importance aspects of building teacher agency

Table 2 illustrates that 10 out of 23 aspects achieved a score of greater than 0.4, indicating a satisfactory predictive capacity with regard to teacher agency, owing to their capacity to differentiate between the clusters. The remaining 13 aspects exert a lesser degree of influence on the process of clustering.

Table 2: Predictive importance score and most frequent categories of each cluster

Predictor	Aspect	Importance	Cluster Mode				
			1	2	3	4	5
Idea generation	8	1	2	4	22	48	7
Discussion topics	10	0,92	2	3	17	31	11
Short-term improvement	17	0,84	2	0	10	31	10
Social interactions	7	0,72	3	3	12	16	12
Roles expected from others	6	0,68	2	2	10	23	11
Strengths	14	0,62	1	5	5	15	7
Aspects considered in performing tasks	9	0,62	1	1	22	48	7
Attitudes in performing tasks	12	0,61	1	3	1	2	2
Competencies to be improved	2	0,46	1	1	6	16	8
Benefits of training attended	4	0,46	4	2	12	18	4
Long-term improvements	18	0,41	3	3	3	3	15
Role in generating ideas	11	0,41	3	2	3	3	4
Reactions to inadequate facilities	13	0,4	4	4	4	4	4
Others who contributed to the teacher's professional development	5	0,36	1	1	10	30	1
Skills to be improved	3	0,34	3	3	3	34	3
Professional development actions	22	0,27	4	4	4	4	4
Actions in case of dissent	23	0,26	3	4	3	3	3
Opinions about the new curriculum	19	0,2	3	4	3	3	3
Attitudes towards the new curriculum	21	0,19	5	2	5	5	2
Weaknesses	15	0,17	4	4	4	4	4
Challenges	16	0,14	4	4	10	4	4
Readiness to implement the curriculum	20	0,13	4	4	4	4	3
Proficiency in the material	1	0,03	2	2	2	2	2

The aspects that have been identified as good predictors of teacher agency are those that are practical and short-term, while others are structural and long-term. The aspects include the strengths and areas requiring enhancement, particularly with respect to teaching and learning. These factors were discerned through introspective analysis or reflection. Furthermore, the short-term improvements,

including idea generation, discussion topics for enhancement and the benefits from training, are related to the development of ideas. This also requires the support of others to plan and implement improvements in their work. In short, teacher agency comes into being through reflection, idea development and interactions with others, which corresponds with the features of the socio-cognitive approach as presented by Figure 3.

Initially, the reflection aspect is related to self-reflection both on the teachers' strengths and teaching learning needs. The analysis identified professional and pedagogical competencies as well as the students' abilities as a primary concern. Surprisingly, most of teachers don't see themselves as digitally skilled, suggesting that they have difficulty with online teaching (Rahayu et al., 2022). Idea development reflects intentionality, forethought and self-efficacy properties. Forethought in this context refers to the short-term objectives. Pedagogy was found to be the primary focus of the short-term vision, aligning with the competencies that the respondents wish to enhance.

Thereafter, training benefits teachers by increasing their self-efficacy, making the experience and knowledge gained useful for the individual and their colleagues. It was noteworthy that the majority of teachers participated in ICT skill-building training, indicating a need to fortify digital competencies among teachers. Lastly, attitudes when performing tasks, in social interaction, and the roles expected from others are aligned with the features of self- reactivity and environmental determinants. Teachers are responsible not only for establishing objectives and devising implementation strategies but also for executing their duties. The survey respondents anticipated collaboration in professional tasks, predominantly in the form of formal discussions as the external factors.

The aspects that contribute less were more systemic with broader conditions and take a long time to achieve, such as the elements pertaining to policies, including attitudes, opinions, and the implementation of the curriculum, thus exerting a minimal influence on agency. This finding was incongruent with the other findings asserting that governmental policies exert a significant influence on teachers' actions (Nazari et al., 2023). This is a feature of the ecological approach that was less relevant in this study.

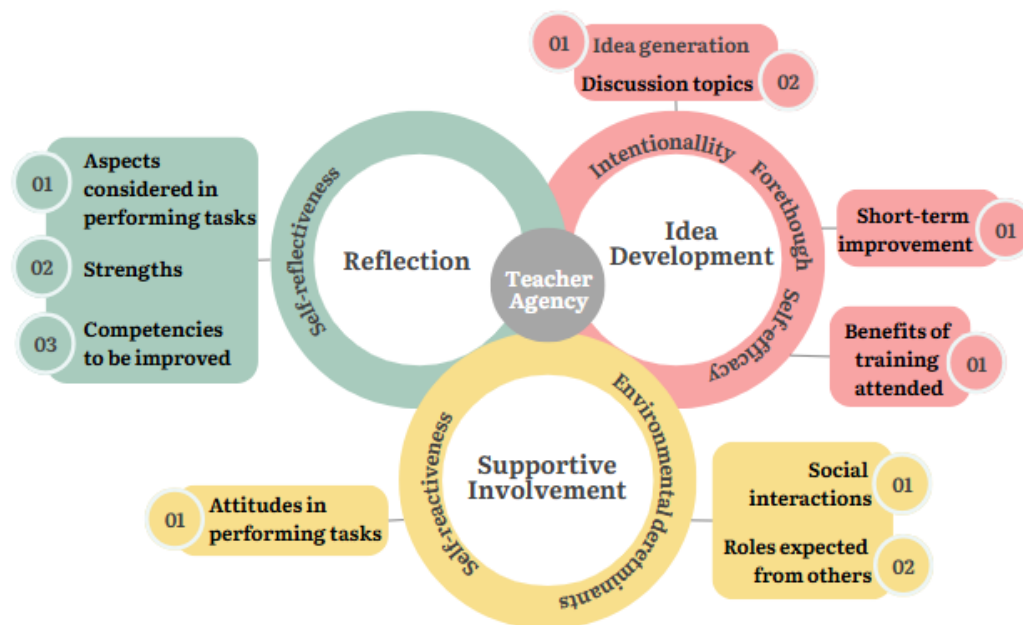


Figure 3: Influential factors of teacher agency manifestation with features of the socio-cognitive approach

Although certain aspects may appear to be practical and short-term in nature, it was evident that they exert a negligible influence on the agency of teachers. Teacher agency was less impacted by skills than it was by competencies because competencies have a broader scope. They influence the teachers' decision-making and actions more than skills do (Bakhru, 2017). Secondly, the role of others influenced teacher agency less than the role of expected others and social interaction. This aspect was an external factor, while the expected role was the desire of the individual.

This rationale suggests that the sociocultural approach may not be optimal for the context of teacher agency development in Indonesia. Thirdly, the role of idea-generation was attributed to the nature of the ideas generated, being merely conceptual and not materialized (Priestley, Biesta, & Robinson, 2015). Fourthly, teacher agency is bolstered by their abilities, offering motivation and confidence, and can be hindered by weaknesses and obstacles. Inadequate facilities also impede agency, although the circumstances can present opportunities for adaptation (Herrera-Seda & Pantić, 2025).

4.2 Characterizing the teacher agency manifestation of each cluster

Figure 4 shows that the respondents were grouped into five clusters, with the lowest percentage of cluster members being 5.7% and the highest being 33.5% in clusters two and one respectively. The result was confirmed by changing the number of clusters from five to four to measure the sensitivity of clustering. Table 3 and Table 4 demonstrate the significant chi-square value was 0.000 and the Kappa value was 0.841. The two clustering were related, meaning that most members of the first cluster were in the same cluster, even though the number of clusters changed. The Kappa value indicates stable clustering, suggesting that changes to the clusters didn't significantly impact the structure.

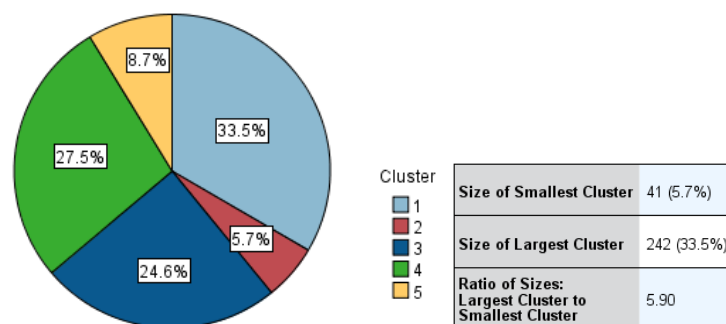


Figure 4: Cluster member distribution

Table 3: Result of the Chi-square analysis

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1999.302 ^a	12	.000
N of Valid Cases	723		

Table 4: Results of Cohen's kappa analysis

	Value	Asymptotic Significance (2-sided)
Pearson Chi-Square	.842	.000
N of Valid Cases	723	

Table 5: Most frequent categories of important predictors in each cluster

Aspects/ Items	C1	C2	C3	C4	C5	Category details
Reflection						
Competencies to be improved	1	1	6	16	2	(1) Professional; (6) Professional and pedagogic; (16) All options; (2) Pedagogic.
Aspects considered when performing tasks	1	1	22	48	7	(1) Student ability; (22) Student ability; teacher ability; facilities; (48) All options; (7) Student ability; teacher ability.
Strengths	1	5	5	15	7	(1) Knowledge of materials; (5) Knowledge of materials; communication; (15) All options; (7) Knowledge of materials; communication; ability to implement non-ICT-based learning.
Idea Development						
Idea generation	2	4	22	48	7	(2) Through the teacher community; (4) Reading textbooks; (22) Informal discussions with peers; Through the teacher community; Digital learning; (48) All options; (7) Informal discussions with peers; Through the teacher community.
Benefits of training attended	4	2	12	18	8	(4) Improving ICT-based teaching skills; (2) Improving 21st century skills; (12) Improving 21st century skills; improving ICT-based teaching skills; (18) Improving subject matter understanding; improving

Aspects/ Items	C1	C2	C3	C4	C5	Category details
						21st century skills; improving ICT-based teaching skills; (8) Improving subject matter understanding; Improving conventional teaching skills.
Discussion topics for self-development	2	3	17	31	11	(2) Methods, media, assessment; (3) Digital learning; (17) Subject matter; methods, media, assessment; lesson plans/ teaching modules/curriculum; (31) All options; (11) Methods, media, assessment; lesson plans/ teaching modules/curriculum.
Short-term improvement	2	0	10	31	10	(2) Method; (0) No answer; (10) Method; media; (31) All options.
Supportive involvement						
Roles expected from others	2	2	10	23	11	(2) Working together to create resources; (10) Working together to create resources, principals facilitating training; (23) All options; (11) Working together to create resources, sharing resources.
Social interactions	3	3	12	16	12	(3) Formal discussion in teacher community; (12) Formal discussion in professional development; Informal discussion in school; Formal discussion in teacher community; (16) All options.
Attitudes when performing a task	1	3	1	2	7	(1) Perform according to school requirements; (3) Perform as much as possible; (2) Be innovative; (7) Perform according to school requirements; Perform according to belief.

The three aspects that broadly influence teacher agency were examined, namely reflection, idea development and supportive involvement to reveal the characteristics of each cluster. Table 6 presents the description of each cluster.

Table 6: Teacher agency categories description

Cluster	Reflection	Idea development	Supportive involvement
1 (average)	Teachers can identify aspects of learning that need improvement but lack reflection or are rigid. They are also not consistent in determining strengths and weaknesses.	Teachers use limited means of idea development with the topics covered being limited/ quite varied in realizing the desired short-term remedial improvements.	Teachers engage in discussions and collaboration in a limited way and contribute to the extent requested by the school.
2 (fair)	Teachers can identify aspects of learning that need improvement but lack reflection or are rigid. They are not consistent in determining some	The teacher uses limited means of idea development with the topics covered being limited/quite varied, not realizing the desired short-term improvements.	Teachers engage in discussions and collaboration to a limited extent, contributing only to the degree that they are able.

Cluster	Reflection	Idea development	Supportive involvement
	strengths and weaknesses.		
3 (good)	Teachers can identify aspects of learning that need to be improved reflectively and flexibly but are not consistent in determining some strengths and weaknesses.	Teachers use different ways of developing ideas and less than half the number of topics covered to realize desired short-term improvements.	Teachers engage in discussions and collaboration in varied ways, and contribute to the extent requested by the school.
4 (low)	Teachers demonstrate an inability to make clear and decisive choices concerning reflection, idea development, and supportive involvement.		
5 (very good)	Teachers can identify aspects of learning that need to be improved reflectively and flexibly, as well as discerning their own pedagogical strengths and weaknesses.	Teachers use different ways of developing ideas and half or a greater number of the topics covered to realize the desired short-term improvements	Teachers engage in discussions and collaboration in varied ways. They are also willing to share their knowledge and expertise to meet the demands of the school and to align their actions with their personal beliefs.

Teacher agency is expected to be at the high level, as evidenced by the teachers in the good and very good categories. Only 33.3% of teachers in clusters three and five met these standards. Cluster five (8.7%) includes remarkable teachers. The rest were commendable but need to elevate their abilities. As illustrated in Table 5, there is a clear necessity to enhance their capacity to evaluate their strengths and identify areas of improvement. The subjects displayed an evident dedication to developing their professional and pedagogical competencies. However, a notable strength of the subjects lay in their extensive subject matter knowledge, which is a fundamental component of professional competency. In addition, the selection of discussion topics in cluster three was found to be pivotal in meeting short-term objectives. Teachers need to have better intentions and understand their duties' implications in terms of quality and relevance. This category of teacher must use their autonomy to act (Basikin, 2019).

The other two categories, designated cluster one and cluster two respectively, are interpreted as average and fair teacher agency. Teachers in cluster one and two were rigid, lacked reflection, and were limited in their ability to develop ideas, generate discussion topics and facilitate social interaction. Cluster two exhibited a slight advantage in its consistency in determining some strengths and areas of improvement while cluster one was, on the whole, inconsistent. This ability is a prerequisite for self-reflection (DeLuca et al., 2023).

Teachers in both groups said that their strength was their knowledge of the material, which is also an area for improvement. Teachers in cluster two need to improve their ability to make short-term improvements by setting goals in idea development activities. Setting appropriate goals will help teachers achieve them

(Brown et al., 2016). Teachers with a fair level of teacher agency only perform their professional duties to the extent that they are able, even if it does not meet the school standards. Teachers with an average level of agency meet the standards but improvements can be made. Vahasantenen (2015) defined them as limited and reserved agency related to fair and average agency respectively.

A notable distinction emerges when juxtaposing cluster four with others. This cluster is comprised of a significant proportion of teachers exhibiting characteristics indicative of low teacher agency. In nearly all aspects, teachers in this cluster provided answers that encompassed all options and, in some cases, presented contradictory responses. The tendency to select all answers suggests a low metacognitive awareness (Kallio et al., 2018). This phenomenon typically manifests within a hierarchical educational system, characterized by a top-down approach to decision-making. The substantial influence wielded by senior officials often results in the submergence of the pivotal role of educators in the decision-making process (Nezhad & Stolz, 2024).

5. Discussion

In the context of Indonesia, the socio-cognitive approach, which is predicated on the 10 most significant aspects operationalized in reflection, idea development, and supportive involvement, is the most relevant when compared to the sociocultural and ecological approaches. Reflection is defined as an activity carried out under the control of the teacher that can be seen as a personal determinant, while idea development is a reform action, and supportive involvement reflects an external factor referred to as an environmental determinant (Bandura, 2018). Although internal motivation and self-regulation or autonomy are the main features of reflection, in the Indonesian context, schools encourage teachers to be active in the community. The discussions held, the resource people bring in and the need to adapt, as sociocultural features (Solari & Martín Ortega, 2022), can provide external motivation for continuous improvement. Furthermore, Indonesia's education system, characterized by a top-down structure, underscores the pivotal role of government policy in aligning with the ecological approach (Priestley, Biesta, Philippou, et al., 2015).

However, autonomy remains a key and defining feature of change action. Autonomy, also known as independence, has been demonstrated to be positively correlated with teacher motivation and engagement in learning activities (Lucia & Mølsted, 2020). The provision of autonomy to teachers has been shown to foster a strong sense of ownership and control over their professional practices. Teachers must be granted full autonomy over the conditions in their classrooms to enable the implementation of innovations that are pertinent to the problems they face (Liu et al., 2020).

Socio-cognitive features, including self-reflection, intentionality, forethought, self-efficacy, self-reactivity, self-reaction, and environmental determinants, have been demonstrated to influence the teachers' decision-making and actions. Self-reflectivity, in this context, is predicated on self-awareness and the metacognitive ability to discern the context for formulating plans and implementing strategies

(Karaoglan-Yilmaz et al., 2023). Intentionality is linked to a commitment made (Code, 2020) to foster professional growth through diverse methods and discussion topics. Forethought drives the actors to act and anticipate circumstances in pursuit of a set vision (Cosnefroy et al., 2018). This process necessitates perseverance and consistency. Hence, explicit goals, influenced by short-term projections, must be established prior to implementation (Brown et al., 2016).

Agency is not confined merely to the cognitive capacity for deliberative decision-making and the formulation of action plans. Rather, it encompasses the capacity to devise suitable courses of action and to inspire and orchestrate their implementation. This notion of agency is known as self-reactiveness (Bandura, 2018). In the realm of pedagogical practice, teachers require external support to develop and implement ideas. School leaders, productive and positive communities, and peer support facilitate the formal and informal exchange of ideas, knowledge, resources, and supportive conversations (Molla & Nolan, 2020). The extent to which educational institutions offer teachers autonomy in decision-making and their actions has been shown to positively influence their self-efficacy. It ensures that their decisions and actions are contextually appropriate (Wilcox & Lawson, 2018).

School leaders must cultivate an environment conducive to innovation among teachers, enabling them to meet and exceed standards. It is imperative for teacher professional development programs to take the significant aspects described here into consideration to improve teacher agency to an expected level of good or very good.

6. Conclusion and Implications

Teacher agency involves 10 significant aspects, including reflecting on their strengths and areas of improvement. Idea generation, the benefits of attending training, and discussion topics are short-term improvements for self-development, while supportive involvement comes from the role of others, social interaction, and attitudes when performing tasks. They were able to distinguish between low, fair, average, good, and very good teacher agency. The very good level demonstrated agents of change characteristics as evidenced by their ability to be reflective, to develop ideas in different ways and from different sources, to demonstrate their persistence and to contribute to a culture of change and progress in the educational environment aligned with their beliefs and beyond the demands of the school.

The good level was a bit different to very good level in term of their consistency in some strengths and area of improvements, the proportion of topics which covered short-term objectives, and the contribution of school demand. Average and fair levels included a lack of reflection and rigidity, while the average level was better at idea development and contributions to their professional duties. The lowest level of teacher agency was defined as those lacking metacognitive awareness.

The implication of this research is that the critical determinants can be used to identify teacher levels of agency, especially for large groups of participants. Relevant parties can take this into account to improve the parts that are still considered lacking by providing support and training. In the context of this study, about 2/3 of the participants need improvement concerning the three main aspects. Therefore, appropriate professional development such as training or courses is needed to improve them effectively, considering the socio-cognitive approach. Other regions with similar characteristics to the context in which this study was conducted may wish to consider its findings when providing treatment.

7. Limitation and Recommendation

Although this research has included all aspects based on the teacher agency model, it uses surveys, which relate to perspectives and responses based on what has been done. The use of surveys can reach a large number of participants for analysis but there is the possibility of a biased conclusion due to the large number of responses. A longitudinal analysis can look at the changing of teacher agency due to the temporal properties of it. It is also necessary to look at teacher agency as a whole by observing the activities and behaviours of teachers as they reflect, develop ideas, and engage in change in themselves and others. Thus, qualitative research such as case study is needed, especially on a deeper level to observe how teachers critically respond to situations that arise in the performance of their duties. In addition, further research is needed to provide teacher professional development programs and to determine their effectiveness in improving teacher agency.

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Appendix

Questionnaire on the factual condition of teacher agency of primary, junior and senior high school teachers in Indonesia

A. Teacher Profile			
1.	Name	:	
2.	School name (*)	:	
3	Employment status (*)	:	a. Civil servant b. Government teacher with employment contract c. Permanent teacher employed by private school foundation d. Honorary teacher e. Non-permanent teacher employed by district government f. Non-permanent teacher employed by provincial government g. Adjunct teacher h. others_____
4	Gender (*)	:	a. Male b. Female
5	Age (*)	:	
6	Education level (*)	:	a. Bachelor b. Master c. Doctor
7	Teaching experience (years) (*)	:	
8	School unit (*)	:	a. Primary school b. Junior secondary school c. Senior secondary school
9	Grades though (*)	:	a. 1 g. 7 b. 2 h. 8 c. 3 i. 9 d. 4 j. 10 e. 5 k. 11 f. 6 l. 12
10	Subject (*)	:	a. Class teacher b. Subject_____
11	Position (*)	:	a. Principal b. Activist teacher c. Teacher

B. Teacher Agency Aspects (*)

1. What is your level of mastery of the learning materials taught?
 - a. Very good
 - b. Good

- c. Moderate
 - d. Poor
 - e. Did not master
2. What competencies need to be improved? (You may select more than one)
 - a. Professional competence
 - b. Pedagogic competence
 - c. Social competence
 - d. Personality competence
 - e. None
 3. What basic teacher skills need to be improved? (You may select more than one)
 - a. Communication skills in learning
 - b. Skills in implementing conventional learning
 - c. Skills in implementing ICT-based learning
 - d. Classroom management skills
 - e. None
 - f. Please specify other_____
 4. What benefits have you gained from training, seminars etc.? (You may select more than one)
 - a. Improved understanding of subject matter
 - b. Improved 21st century skills
 - c. Improved conventional teaching skills
 - d. Improved ICT-based teaching skills
 - e. Improved teacher competence but difficult to implement
 - f. Please specify other_____
 5. Who play roles in supporting the implementation of your duties and achievement of your performance as a teacher? (You may select more than one)
 - a. Colleagues at school
 - b. Lecturers/instructors of training, seminars etc.
 - c. Digital resources (Youtube, GPT Chat etc.)
 - d. None
 - e. Please specify other_____
 6. What roles are expected from others to support your work as a teacher? (You may select more than one)
 - a. Developing learning tools for you
 - b. Collaborate in developing learning tools
 - c. School leaders facilitate teacher training
 - d. Sharing learning tools
 - e. Not necessary because you are independent
 - f. Please specify other_____
 7. What social interactions have a positive effect on your professional duties as a teacher? (You may select more than one)
 - a. Formal discussions in training activities
 - b. Informal discussions at school
 - c. Formal discussions in KKG and MGMP
 - d. Virtual/online interaction
 - e. None

- f. Please specify other_____
8. How do you develop ideas in planning, implementing and evaluating learning?
 - a. Informal discussion with peers
 - b. Through KKG and MGMP activities
 - c. Digital learning (youtube, ChatGPT etc.)
 - d. Reading textbooks
 - e. Through training, seminars etc.
 - f. Please specify other_____
 9. What aspects do you consider in planning, implementing and evaluating learning? (You may select more than one)
 - a. Students' ability
 - b. Your ability as a teacher
 - c. Facilities
 - d. Norms
 - e. Government and school policies
 - f. Please specify other_____
 10. What themes did you discuss in developing your competencies? (You may select more than one)
 - a. Subject matter
 - b. Methods, media, assessment, teaching materials
 - c. Digital learning
 - d. Lesson plan/teaching module/curriculum
 - e. Classroom Action Research
 - f. Please specify other_____
 11. What is your role in coming up with ideas for planning, implementing and evaluating learning?
 - a. Independent without teacher community
 - b. As an idea initiator through professional activities
 - c. As an input provider but not an initiator
 - d. As a teacher who follows other teachers' ideas
 - e. Please specify other_____
 12. What is your attitude in performing your professional duties as a teacher?
 - a. Doing what the school demands
 - b. Innovating (exceeding demand)
 - c. Doing what you can do
 - d. Conducting instructions as believed
 13. What would you do when facilities at school are inadequate?
 - a. Use the facilities that are available
 - b. Appeal to the school to complete the facilities
 - c. Borrowing from other places
 - d. Using alternative facilities
 - e. Please specify other_____
 14. What are your strengths in planning, implementing and evaluating learning? (You may select more than one)
 - a. Knowledge of subject matter
 - b. Communication skills in learning

- c. Skills in implementing non-ICT learning
 - d. Skills in implementing ICT-based learning
 - e. Please specify other_____
15. What are your weaknesses in planning, implementing and evaluating learning? (You may select more than one)
- a. Knowledge of subject matter
 - b. Communication skills in learning
 - c. Skills in implementing non-ICT learning
 - d. Skills in implementing ICT-based learning
 - e. Please specify other_____
16. What challenges do you face in implementing your professional duties as a teacher! (You may select more than one)
- a. Lack of school facilities
 - b. Interaction with other people
 - c. Lack of learning resources
 - d. Challenge of curriculum change
 - e. Please specify other_____
17. What aspects can you address in the near future to improve your performance as a teacher? (You may select more than one)
- a. Mastering the subject matter
 - b. Learning method
 - c. Learning media
 - d. Teaching materials
 - e. Learning assessment
 - f. Please specify other_____
18. What aspects do you need to address for improving your performance as a teacher but cannot be improved in the near future? (You may select more than one)
- a. Mastering the subject matter
 - b. Learning method
 - c. Learning media
 - d. Teaching materials
 - e. Learning assessment
 - f. Please specify other_____

For questions 19-23

Educational changes such as curriculum changes from the previous curriculum to the new curriculum, the use of technology in education (zoom meetings, LMS, google classroom, video, animation, augmented reality, vlog, kahoot etc.) are conditions faced by teachers today.

19. How do you feel about the new curriculum?
- a. The previous curriculum was more applicable
 - b. Some curriculum policies can be implemented
 - c. Need support to implement it
 - d. You will be able to implement the new curriculum
 - e. Please specify other_____
20. What is your level of readiness to implement the new curriculum?
- a. Very less
 - b. Less

- c. Fair
 - d. Good
 - e. Very good
21. What is your attitude towards the current curriculum changes?
- a. Prefer to implement the previous curriculum
 - b. Implementing the new curriculum to the best of your ability
 - c. Implementing the new curriculum with support
 - d. Implementing only the aspects that you are confident in
 - e. Implementing the new curriculum entirely
22. What measures do you take to develop competencies in dealing with educational changes such as curriculum changes, learning media etc.?
- a. Teaching as done usually
 - b. Participate in training if assigned by the school
 - c. Participate in training if supported by the school
 - d. Self-study from various sources
 - e. Please specify other_____
23. What do you do when you have different opinions with others about the new curriculum?
- a. Practice what you believe in
 - b. Implement according to other people's opinions
 - c. Come to an agreement through discussion
 - d. Seeking assistance from experts
 - e. Please specify other_____