

The Relationship between Deep Learning Approach, Scientific Approach, and Teacher Creativity in Grade IV Indonesian Language Lesson Planning

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ABSTRACT

Teacher creativity is essential for developing meaningful and student-centered lesson plans, particularly within Indonesia's emerging deep learning framework. However, empirical evidence comparing the relationships of teachers' mastery of the deep learning and scientific approaches with their creativity in developing *Rencana Pembelajaran Mendalam* (RPM) remains limited. This study examined these relationships among Grade IV elementary school teachers. A quantitative correlational design with an ex-post facto framework was employed. Twelve Grade IV teachers from six elementary schools in Majasari District, Pandeglang, were selected through purposive sampling. Data were collected using three validated self-report questionnaires measuring deep learning mastery, scientific approach mastery, and teacher creativity in RPM development, supplemented by RPM document analysis. Data were analyzed using Pearson correlation and multiple correlation analyses. Deep learning mastery was very strongly and significantly associated with teacher creativity, $r = .899$, 95% CI [.672, .972], $p < .001$. Scientific approach mastery showed a moderate significant association with teacher creativity, $r = .585$, 95% CI [.017, .868], $p = .042$. Collectively, both approaches were strongly associated with teacher creativity, $R = .903$, $p = .001$. The findings provide preliminary evidence that mastery of deep learning is more strongly associated with creative RPM development than mastery of the scientific approach. Given the small purposively selected sample and reliance primarily on self-report measures, larger multi-site studies using independent document-based creativity assessments are needed to confirm these findings.

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1. INTRODUCTION

Teacher creativity in designing lesson plans is a decisive factor in the quality of Indonesian Language learning at the elementary level. A creatively designed lesson plan does more than arrange a sequence of activities; it shapes whether students genuinely engage in comprehending, analyzing, and

communicating ideas rather than merely reproducing information (Majid, 2020; Munandar, 2014). This is especially important in Grade IV, a stage at which students are transitioning from basic literacy toward more complex literacy skills (Jayadi & Isro'iyah, 2025). The Merdeka Curriculum currently implemented in Indonesia reinforces this need by emphasizing student-centered, flexible, and contextual learning, which in turn requires teachers to plan lessons that are not only technically sound but also creative and meaningful (Che Mat & Jamaludin, 2024).

Within this curriculum, teachers are required to develop what is termed Rencana Pembelajaran Mendalam (RPM), or a deep lesson plan. Lesson planning in general can be understood as a systematic process of deciding on learning materials, media, approaches, methods, and assessment within a given time allocation in order to achieve predetermined objectives (Majid, 2020; Sanjaya, 2021). An RPM extends this general definition: rather than simply listing activities and materials, it is expected to demonstrate significance for students, relevance to their needs, sufficient depth and continuity of content, learnability, and the capacity to generate genuine interest and motivation (Suparman, 2021). Compared with a conventional lesson plan, which typically follows a fixed procedural template, an RPM asks teachers to design a more holistic, student-centered learning experience that documents how students' prior knowledge, interests, and diverse learning needs are addressed, how learning is connected across disciplines, and how assessment is designed to be diagnostic, formative, and summative within a single coherent document (Dick & Carey, 2022; Reigeluth, 2024). Producing such a plan places considerably greater creative demands on teachers than completing a standard lesson-plan template.

In practice, however, developing a genuinely creative RPM remains challenging for many teachers. Preliminary observations and interviews conducted by the researchers in Majasari District, Pandeglang, found that of the 26 elementary schools in the district, only about 6 schools (23.1%) had teachers who had received training in both the deep learning and scientific approaches. Teachers in the district reported that heavy administrative workloads left them with little time to plan creatively, that their understanding of the new RPM format was still limited, and that constrained technological resources and digital literacy further narrowed the scope for innovative lesson design. These field conditions suggest that, beyond conceptual understanding of pedagogical approaches, teachers' capacity to translate that understanding into creative planning documents cannot be assumed and needs to be examined empirically.

Teacher creativity in lesson planning is, therefore, a critical professional competency rather than an optional add-on. Uno (2016) defines teacher creativity as the ability to create, discover, and apply new ideas, methods, and models that are useful for improving the quality of learning. In the Merdeka Curriculum context, which grants teachers greater flexibility and autonomy, this creativity becomes indispensable for producing an RPM that meaningfully integrates student-centered pedagogy, deep learning experiences, and innovative instructional strategies (Che Mat & Jamaludin, 2024). Cortez and Chua (2023) further note that teachers' instructional creativity, innovation practices, and digital literacy are interrelated and jointly shape the effectiveness of the classroom ecosystem, which helps explain why the limited digital literacy observed among several teachers in Majasari District may also constrain their creativity in lesson planning.

The deep learning approach, as conceptualized by Fullan et al. (2018), is defined as the process of developing six global competencies (6C: character, citizenship, collaboration, communication, creativity, and critical thinking) and moving students from a surface understanding of content toward a deep understanding that can be applied to new and unpredictable situations. It is not merely a set of teaching techniques but a pedagogical process that reorients planning and instruction around meaningful, mindful, and joyful learning experiences (Mehta & Fine, 2019; Schneider & Preckel, 2017). In Indonesia's Merdeka Curriculum, this approach is operationalized through what is commonly referred to as the 8334 framework, comprising 8 graduate-profile dimensions, 3 principles of deep learning (meaningful, mindful, joyful), 3 deep learning experiences (understanding, applying, reflecting), and 4 deep learning framework components (pedagogical practices, learning environment, digital utilization, and learning partnerships).

The scientific approach, by contrast, has been the cornerstone of Indonesia's Kurikulum 2013 (K-13). It requires teachers to design learning activities through five systematic steps known as 5M: *mengamati* (observing), *menanya* (questioning), *mengumpulkan informasi* (collecting information), *menalar* (reasoning/associating), and *mengomunikasikan* (communicating) (Hosnan, 2014). While the two approaches differ in their theoretical foundations and origin, both share a commitment to active student learning and the development of higher-order thinking skills.

Despite the relevance of both approaches to teacher creativity in lesson planning, empirical research that examines this relationship directly remains limited, particularly for Indonesian Language learning at the Grade IV elementary level. Three gaps can be identified from the existing literature. First, most prior studies have examined the relationship between these approaches and student learning outcomes (Utami et al., 2019) or their implementation at the classroom level (Sari & Khair, 2022), rather than their relationship with teachers' own creativity in the planning stage. Second, the small number of studies that do touch on teacher creativity in relation to these approaches tend to be qualitative or descriptive, such as Taufik's (2025) exploration of deep learning and students' literate character development, leaving the strength of these relationships largely unquantified. Third, no study to date has provided quantitative evidence comparing the deep learning approach and the scientific approach as simultaneous correlates of teacher creativity in lesson-plan development, which limits the field's understanding of which approach is more strongly associated with creative planning.

This study addresses these gaps by empirically examining: (1) the relationship between the deep learning approach and teacher creativity in RPM development; (2) the relationship between the scientific approach and teacher creativity in RPM development; and (3) whether there is a significant difference between the correlational strength of the two approaches with teacher creativity. As a correlational study involving a limited and purposively selected sample, the findings are intended as preliminary empirical evidence to inform teacher professional development programs and curriculum implementation strategies in Majasari District and in districts with similar characteristics, rather than as generalizable conclusions for Indonesian elementary teachers as a whole.

2. METHODS

2.1 Research Design

This study used a quantitative correlational design with an ex-post facto framework. The correlational design was chosen because the aim was to measure the strength and direction of the relationship between variables without manipulating them; the natural variation in teachers' mastery of the two approaches served as the basis for the correlational analysis (Fraenkel et al., 2019). The ex-post facto framework was appropriate because the independent variables, teachers' mastery of the deep learning and scientific approaches, reflect naturally occurring professional conditions that had already developed before the study rather than conditions induced by the researchers.

The correlational design was preferred over an experimental or quasi-experimental alternative for three reasons. First, on ethical grounds, the researchers had no basis to manipulate teachers' professional approach mastery, since this falls within their domain of professional competence. Second, in terms of purpose, the research questions were inherently correlational, concerned with the degree and direction of relationships rather than causal proof. Third, in terms of field conditions, the naturally occurring variation in approach mastery among teachers in Majasari District provided suitable conditions for correlational analysis (Creswell, 2016).

2.2 Research Site and Participants

The study was conducted in Grade IV elementary schools in Majasari District, Pandeglang Regency, Banten Province, from November 2024 to April 2025. Majasari District was selected because, as a semi-urban area undergoing the transition from Kurikulum 2013 to the Merdeka Curriculum, it represents a setting in which both the deep learning and scientific approaches are simultaneously relevant to practice.

The population comprised all 52 Grade IV elementary school teachers across 26 schools in the district. Using purposive sampling, teachers were included if they (a) had received formal training in both the deep learning and scientific approaches, and (b) had begun implementing RPM. These criteria were applied because only teachers with both forms of training and hands-on RPM experience could provide a meaningful self-assessment of their approach mastery. Applying these criteria yielded a final sample of 12 teachers from 6 schools, all of whom met both requirements.

Cohen et al. (2018) suggest that correlational studies at a 95% confidence level with a 5% margin of error require a minimum of about 11 respondents; the achieved sample of 12 meets this general guideline. This benchmark, however, describes a lower bound for feasibility rather than a guarantee of statistical power, and a sample of this size still produces wide confidence intervals around the resulting correlation coefficients — a limitation that is addressed further in the Discussion and Conclusion. Table 1 summarizes the profile of the participating teachers and schools.

Table 1. Participant and School Profile

Characteristic	Description
Total participating teachers	12
Total participating schools	6 (drawn from 26 schools in the district)
Sampling ratio	12 of 52 Grade IV teachers in the district (23.1%)
Selection criteria	Formal training in both deep learning and scientific approaches; active experience implementing RPM
Minimum teaching experience	≥ 1 year (population inclusion criterion)
School status	All 6 schools serve as designated model schools (sekolah inti) for dissemination to 20 other schools
Data sources per teacher	Three self-report questionnaires (X1, X2, Y) and one RPM document

Because this study focused on teachers' professional mastery of pedagogical approaches rather than on demographic correlates of creativity, individual-level demographic information such as age and gender was not the primary focus of data collection and is not reported here; this is noted as a boundary of the present study's scope rather than an oversight. The strategic role of the six participating schools as dissemination hubs (sekolah inti) for curriculum implementation means that, while the findings are not generalizable to all elementary teachers in Indonesia, they carry direct practical relevance for the broader curriculum-dissemination process within Majasari District.

2.3 Research Variables

The study involved three variables: two independent variables and one dependent variable.

- Independent Variable 1 – Deep Learning Mastery (X1): defined operationally as the degree to which teachers master the concepts, principles, and implementation steps of the deep learning approach in RPM development, specifically measured through the 8334 framework, 6C competencies, and the three deep learning experiences (understanding, applying, reflecting).
- Independent Variable 2 – Scientific Approach Mastery (X2): defined operationally as the degree to which teachers master the concepts, characteristics, and implementation of the five-stage scientific approach (5M: observing, questioning, collecting information, reasoning, communicating) in RPM development.
- Dependent Variable – Teacher Creativity in RPM Development (Y): defined operationally as the degree of teacher creativity in designing and producing deep lesson plans for Grade IV Indonesian Language learning, measured across four key creativity dimensions theorized by Munandar (2014): fluency, flexibility, originality, and elaboration, extended to eleven sub-dimensions related to specific RPM components such as goal formulation, material organization, strategy selection, media development, and evaluation design.

2.4 Instruments

Three questionnaire instruments were developed and validated, each consisting of 30 Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree), yielding a total of 90 items across all instruments. The structure of each instrument's dimensions is summarized in Table 2.

Table 2. Overview of Instrument Dimensions and Item Distribution

No.	Instrument (Variable)	No. of Dimensions	No. of Items
1	Deep Learning Mastery (X1) – 8 dimensions	8	30
2	Scientific Approach Mastery (X2) – 9 dimensions	9	30
3	Teacher Creativity in RPM (Y) – 11 dimensions	11	30
Total	3 instruments	28	90

Content validity was established through expert judgment. Because of resource and scheduling constraints in the field, one content validator with relevant subject-matter expertise was assigned to each of the three instruments; each validator assessed all 30 items of the instrument in their area on a 1–5 scale. Items scoring consistently at the highest levels and yielding mean scores above 4.20 were classified as Very Good (Riduwan & Sunarto, 2012). We note that using a single validator per instrument, rather than the two to three validators commonly recommended for stronger inter-rater evidence of content validity, is a limitation of the present validation procedure; future replications of these instruments should employ multiple validators per variable. Table 3 presents the expert validation results.

Table 3. Expert Validation Results for All Instruments

Instrument	Mean Score	Category
Deep Learning (X1)	4.9	Very Good
Scientific (X2)	4.7	Very Good
Teacher Creativity / RPM (Y)	4.8	Very Good

All three instruments received Very Good ratings (mean > 4.20), confirming their content validity and readiness for empirical testing.

2.5 Instrument Validity and Reliability

All three questionnaire instruments were newly developed by the researchers based on the theoretical frameworks underlying each variable – Fullan et al.'s (2018) deep learning framework, Hosnan's (2014) five-stage scientific approach, and Munandar's (2014) four-dimension model of creativity – rather than adapted from a pre-existing published questionnaire.

Empirical validity was assessed using Pearson product-moment correlation on data from a pilot test with 10 respondents outside the main sample but with similar characteristics. The r -table value for $n = 10$ at $\alpha = 5\%$ was .632, and an item was considered valid if its obtained r exceeded this value (Sujarweni, 2021). Item-level r values ranged from .635 to .892 for the deep learning instrument, .633 to .921 for the scientific approach instrument, and .634 to .925 for the teacher creativity instrument; all 90 items across the three instruments met the validity criterion. Because the pilot sample was small ($n = 10$), these item-total correlations should be interpreted cautiously as an initial indication of item quality rather than a definitive validity estimate, and a larger-scale pilot test is recommended for future use of these instruments.

Instrument reliability was then assessed using Cronbach's alpha, applying a threshold of .60 (Sujarweni, 2021). A threshold of .60, rather than the stricter .70 benchmark sometimes applied to established scales, was adopted because all three instruments were newly developed rather than adapted from previously validated measures; for exploratory or early-stage instruments, alpha values

of .60 or above are generally regarded as an acceptable minimum standard of internal consistency (Azwar, 2018; Sujarweni, 2021). Table 4 presents the reliability results.

Table 4. Reliability Test Results for All Instruments

Instrument	Cronbach's Alpha (Obtained)	Threshold	Interpretation
Deep Learning (X1)	0.69	0.60	Reliable
Scientific Approach (X2)	0.82	0.60	Reliable
Teacher Creativity / RPM (Y)	0.75	0.60	Reliable

All instruments exceeded the .60 threshold, confirming adequate internal consistency. The scientific approach instrument demonstrated the highest reliability ($\alpha = .82$), followed by teacher creativity ($\alpha = .75$) and deep learning ($\alpha = .69$).

2.6 Data Collection Procedure

Data collection was conducted through direct visits to each of the six schools. During each visit, researchers explained the purpose of the study, distributed all three self-report questionnaires, and remained on-site for 45–60 minutes to clarify items as needed. To supplement the questionnaire data, researchers also collected the RPM documents produced by each respondent, allowing document analysis to serve as a form of triangulation for interpreting the self-reported creativity scores alongside teachers' actual planning artifacts.

Scores for each variable were computed by summing item scores (range: 30–150 per instrument) and converting them to percentages using the formula $NP = (R/SM) \times 100\%$, then categorized as Very Good ($\geq 86\%$), Good (76–85%), Adequate (60–75%), Poor (55–59%), or Very Poor ($< 54\%$) (Purwanto, 2010).

2.7 Data Analysis

Data analysis was conducted in four stages using IBM SPSS Statistics. The first stage involved descriptive statistics (mean, standard deviation, minimum, and maximum) for all three variables. The second stage comprised three prerequisite tests: the Shapiro-Wilk normality test (appropriate for $n \leq 50$), Levene's test of homogeneity of variance, and a test for linearity, all evaluated at $\alpha = .05$. The third stage tested Hypotheses 1 and 2 using Pearson product-moment correlation, with accompanying 95% confidence intervals computed via the Fisher z transformation to convey the precision of the estimates given the small sample size. Correlation strength was interpreted following Sugiyono (2019): Very Strong (.80–1.00), Strong (.60–.79), Moderate (.40–.59), Weak (.20–.39), and Very Weak (.00–.19). The fourth stage tested Hypothesis 3 using multiple correlation analysis (R), assessing the combined contribution of both approaches to teacher creativity via the F-test for significance.

3. FINDINGS AND DISCUSSION

This section reports the empirical results of the study in the order specified by the analysis plan: descriptive statistics, prerequisite tests, and hypothesis testing. Interpretation of these results is presented separately in the Discussion section.

3.1 Descriptive Statistics

Table 5. Descriptive Statistics for All Variables

Variable	N	M	SD	Min	Max
Deep Learning (X1)	12	113.25	12.59	89	134
Scientific Approach (X2)	12	101.25	9.06	87	116
Teacher Creativity (Y)	12	113.75	16.49	90	141

Table 5 summarizes the descriptive statistics for the three variables. On average, teachers scored higher, and showed greater variability, on the deep learning and teacher creativity variables than on the scientific approach variable, whose scores were both lower in mean and narrower in spread. Individual-level respondent scores are not presented in the main text, to protect participant confidentiality and to keep the focus on aggregate patterns; they are available from the authors upon reasonable request.

3.2 Prerequisite Analysis Results

Table 6. Summary of Prerequisite Analysis Results

Test	Variable / Pair	Statistic	Sig.	Conclusion
Normality	Deep Learning (X1)	Shapiro-Wilk	.821	Normal
Normality	Scientific Approach (X2)	Shapiro-Wilk	.770	Normal
Normality	Teacher Creativity (Y)	Shapiro-Wilk	.288	Normal
Homogeneity	All variables	Levene F = 1.739 (2, 33)	.191	Homogeneous
Linearity	X1 → Y	Test for Linearity	.137	Linear
Linearity	X2 → Y	Test for Linearity	.670	Linear

All three prerequisite conditions for Pearson parametric correlation were satisfied (Table 6). The Shapiro-Wilk test indicated that all three variables were normally distributed (all $p > .05$). Levene's test indicated homogeneous variances across variable groups, $F(2, 33) = 1.74$, $p = .191$. Tests for linearity indicated linear relationships for both X1–Y ($p = .137$) and X2–Y ($p = .670$). With all three assumptions satisfied, Pearson product-moment correlation was confirmed as the appropriate technique for hypothesis testing.

3.3 Hypothesis 1: Deep Learning Approach and Teacher Creativity

Table 7. Pearson Correlation Results: Deep Learning (X1) → Teacher Creativity (Y)

Indicator	Value	95% CI	Interpretation
Pearson r	0.899	[0.672, 0.972]	Very strong
p (2-tailed)	< .001	–	Significant
r-table ($n = 12$, $\alpha = .05$)	0.576	–	$r > r\text{-table}$
Decision	Ha accepted	–	Significant positive relationship

The Pearson correlation between the deep learning approach and teacher creativity was very strong and statistically significant, $r(10) = .899$, 95% CI [.672, .972], $p < .001$. Because the obtained r exceeded the critical r -table value for $n = 12$ at $\alpha = .05$ (.576), H_0 was rejected, and H_a accepted. Following Sugiyono's (2019) classification, this correlation falls in the very strong category (.80–1.00). Given the width of the confidence interval, which reflects the small sample size, this estimate should be read as a preliminary indication of a strong association rather than a precise population parameter.

3.4 Hypothesis 2: Scientific Approach and Teacher Creativity

Table 8. Pearson Correlation Results: Scientific Approach (X2) → Teacher Creativity (Y)

Indicator	Value	95% CI	Interpretation
Pearson r	0.585	[0.017, 0.868]	Moderate
p (2-tailed)	.042	–	Significant
r-table ($n = 12$, $\alpha = .05$)	0.576	–	$r > r\text{-table}$
Decision	Ha accepted	–	Significant positive relationship

The Pearson correlation between the scientific approach and teacher creativity was moderate and statistically significant, $r(10) = .585$, 95% CI [.017, .868], $p = .042$. Because the obtained r exceeded the critical r -table value (.576), H_0 was rejected and H_a accepted. Following Sugiyono's (2019) classification,

this correlation falls in the moderate category (.40–.59). The wide confidence interval, whose lower bound is close to zero, indicates considerable imprecision in this estimate given the sample size, so the result should be treated as an initial indication rather than a precise estimate of the population relationship.

3.5 Hypothesis 3: Comparative and Combined Analysis

Multiple correlation analysis indicated that the deep learning and scientific approaches together were significantly related to teacher creativity, $R = .903$ (Sig. F Change = .001). Table 9 summarizes all three hypothesis tests for comparison.

Table 9. Summary of All Hypothesis Testing Results

Variable Pair	r / R	Sig.	Category	Decision
X1 (Deep Learning) → Y	0.899	< .001	Very strong	Ha accepted
X2 (Scientific) → Y	0.585	.042	Moderate	Ha accepted
X1 + X2 → Y (Multiple R)	0.903	.001	Very strong	Ha accepted

The difference in correlational strength between the two approaches was .314 ($r_1 = .899$ for deep learning; $r_2 = .585$ for the scientific approach), which appears substantial within this sample. No dedicated statistical test for the difference between the two correlations (e.g., Steiger's Z) was conducted in this study; this descriptive difference should therefore not be read as a formally tested effect, and future studies with larger samples are encouraged to apply such a test to confirm whether the two correlations differ significantly from one another.

3.6 Deep Learning Approach and Teacher Creativity

The very strong correlation between deep learning mastery and teacher creativity can be explained from several converging theoretical and empirical perspectives, while also warranting some interpretive caution.

First, from a conceptual standpoint, the deep learning approach as framed by Fullan et al. (2018) encompasses the 6C global competencies – character, citizenship, collaboration, communication, creativity, and critical thinking. Creativity is an explicit element of this framework, which may help explain why teachers who report higher mastery of deep learning also report generating new ideas, developing innovative media, and designing authentic learning experiences in their RPM.

Second, the 8334 frame work of the Merdeka Curriculum – comprising 8 graduate-profile dimensions, 3 deep learning principles, 3 deep learning experiences, and 4 learning-framework components – requires teachers to integrate numerous components into a single coherent RPM document. This multi-dimensional integration plausibly calls for a higher level of creative capacity, which is consistent with the higher creativity scores observed among teachers reporting stronger deep learning mastery.

Third, this pattern is illustrated by document analysis of an RPM developed by a teacher from SDN Saruni 2 (deep learning score of 126, creativity score of 141) on the topic 'Far and Near.' The document showed several markers of creativity: a comprehensive student-identification section covering prior knowledge, individual interests, and diverse learning needs; use of Inquiry and Discovery Learning models to promote active engagement; integration of contextually relevant video media; cross-disciplinary links connecting Indonesian Language, Science-Social Studies (IPAS), and Arts (SBDP); and a multi-stage assessment design spanning diagnostic, formative, and summative phases. This example is illustrative rather than representative of the full sample, but it concretely shows what a highly creative, deep-learning-oriented RPM can look like in practice.

Fourth, item-level analysis of the deep learning instrument showed that the items most strongly correlated with creativity scores concerned connecting learning to real-world contexts ($r = .889$), designing activities for deep understanding ($r = .812$), and designing knowledge-application activities

($r = .828$). These items map onto practical RPM design competencies that plausibly require creativity most directly.

An important caveat concerns possible construct overlap between the two instruments. Several items in the deep learning questionnaire ask about teachers' ability to design creative, contextual, and reflective learning activities – dimensions that are conceptually close to some of the fluency, originality, and elaboration indicators measured by the teacher creativity instrument. This overlap may have inflated the observed correlation to some degree, since the two instruments are not entirely independent in their content. The very strong correlation reported here should therefore be read as reflecting both a genuine pedagogical alignment between deep learning mastery and creative RPM design and, in part, a degree of shared item content between the two measures. Future studies could reduce this risk by using instruments with more clearly differentiated item pools, or by relying more heavily on independently rated RPM documents rather than self-report creativity scores.

These findings are broadly consistent with Zebua (2025), who described the deep learning approach as promoting active student engagement, critical thinking, problem-solving, creativity, and collaboration – qualities that, for teachers, translate into requirements for creative RPM design. Similarly, Alwandi Yanta Krisna et al. (2024) noted that deep learning encourages teachers to integrate character values, technology, and students' sociolinguistic experiences into lesson plans. Taken together, the results suggest that teachers' mastery of the deep learning approach is strongly associated with their creativity in lesson planning, rather than indicating that one directly causes the other.

3.7 Scientific Approach and Teacher Creativity

The significant but moderate correlation between the scientific approach and teacher creativity can also be explained through several complementary lenses.

First, the scientific approach's 5M framework provides a clear, systematic structure for designing learning activities. As Hosnan (2014) explains, this approach requires teachers to organize instruction around five sequential stages. Teachers who report mastering these stages also report a greater ability to design coherent, evidence-based, and structured learning experiences, which may itself be considered a form of creative planning expression, and is consistent with the positive, though moderate, association observed here.

Document analysis of an RPM using the scientific approach, also from SDN Saruni 2 (topic: 'Jauh dan Dekat'), illustrated good creativity in implementing the 5M stages: a contextually appropriate video-viewing activity in the Observing stage, guided prompting for spontaneous student inquiry in the Questioning stage, text reading and direct observation in the Information Collection stage, group discussion to categorize transportation types in the Reasoning stage, and student presentations using creative artifacts (cardboard and bottle-cap vehicle models) in the Communicating stage. This example suggests that the 5M structure can meaningfully scaffold teacher creativity, within a predefined procedural framework.

Second, item-level analysis indicated that the scientific approach items most strongly correlated with creativity concerned facilitating scientific presentations and discussion ($r = .921$), integrating all five 5M stages systematically ($r = .885$), and adapting the scientific approach to specific material characteristics ($r = .852$). These higher-correlating items represent more complex, integrative, and adaptive aspects of scientific approach mastery, whereas more basic conceptual-knowledge items (P1–P6) correlated less strongly with creativity, suggesting that surface-level mastery of the approach is less strongly associated with creativity than deep operational integration.

Third, the moderate correlation strength ($r = .585$, compared with $r = .899$ for deep learning) may be attributable to the scientific approach's more procedural and standardized nature. The mandatory sequential 5M stages provide clear guidance but may also constrain creative exploration to variations within an existing framework rather than innovation of the framework itself. This interpretation is broadly consistent with Eha et al. (2024), who found that the scientific approach supports students'

creativity and critical thinking but is primarily oriented toward systematic scientific-thinking processes rather than holistically enhancing teacher creativity in lesson-planning design.

Fourth, observations and interviews at the research site suggested that several teachers perceived the scientific approach as relatively straightforward to implement, given their familiarity with the sequential 5M steps from years of K-13 implementation. This familiarity may reduce the perceived need for innovation, offering one plausible explanation for why the scientific approach, despite its positive association with creativity, shows a comparatively lower correlation than the more open-ended deep learning approach. As with the deep learning findings above, these patterns describe an association rather than a demonstrated causal mechanism.

3.8 Comparative Analysis of Both Approaches

Multiple correlation analysis indicated that the deep learning and scientific approaches together were significantly and very strongly related to teacher creativity, $R = .903$ (Sig. F Change = .001), a value that exceeds each individual correlation ($r_1 = .899$; $r_2 = .585$). This pattern is consistent with the idea that the scientific approach may add incremental value to teacher creativity when combined with the deep learning approach, although, again, this study's design does not allow this to be interpreted as a causal, additive mechanism.

Several non-exclusive explanations may account for the comparatively stronger association observed for the deep learning approach. Conceptually, deep learning is transformative and holistic, while the scientific approach is more procedural and systematic; teachers working with deep learning may be asked to actively construct new learning architectures, whereas the scientific approach primarily involves sequencing activities within an established structure. In terms of component integration, an RPM built around deep learning tends to require the integration of more numerous and diverse components – comprehensive student identification, cross-disciplinary design, digital-media use, multidimensional assessment, and authentic experiences – within a single document, whereas an RPM built around the scientific approach centers primarily on sequencing five learning stages. In terms of curriculum alignment, deep learning is the newer paradigm within the Merdeka Curriculum, which may call for more creative adaptation, whereas the 5M stages are familiar routines carried over from K-13 implementation. Finally, deep learning's open-ended, learner-centered orientation (Fullan et al., 2018) may create more room for divergent, expansive creativity, while the 5M framework may generate more convergent, within-framework creativity.

These interpretations are broadly consistent with Mehta and Fine (2019), who described deep learning as centered on powerful learning experiences in which learners find deep meaning and develop agency, and with Utami et al. (2019), who established the importance of teacher creativity in educational contexts more generally. The present study extends this line of work to the lesson-planning phase and provides preliminary evidence, specific to Majasari District, that the deep learning approach is more strongly associated with creative lesson planning than the scientific approach, while both approaches appear to be positively associated with teacher creativity when considered together.

4. CONCLUSION

This study found that teachers' mastery of the deep learning approach was very strongly associated with their creativity in developing Indonesian Language RPM ($r = .899$, 95% CI [.672, .972], $p < .001$), while mastery of the scientific approach showed a moderate, significant association with the same outcome ($r = .585$, 95% CI [.017, .868], $p = .042$). The combined relationship of both approaches with teacher creativity was also strong ($R = .903$, $p = .001$), suggesting that the two frameworks may support creative lesson planning in a complementary way when used together.

These findings should be interpreted cautiously, as the study involved only 12 teachers from a single, purposively selected district and relied primarily on self-report questionnaire data supplemented by a small number of RPM document examples. They should therefore be regarded as

preliminary correlational evidence rather than as a basis for broad generalization to all Indonesian elementary teachers. Future research is needed to validate and extend these results, including studies with larger samples across multiple districts, designs that incorporate systematic classroom observation, expert-rated RPM rubrics as an independent measure of creativity, longitudinal designs that track RPM creativity following targeted professional development, and experimental or quasi-experimental studies that directly test whether training in the deep learning approach increases teachers' creativity in RPM development. With these limitations in mind, the present study nonetheless offers an initial empirical indication that strengthening teachers' mastery of the deep learning approach, alongside continued support for the scientific approach as a complementary structure, may be a promising direction for professional development efforts in Majasari District and similar settings.

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