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Article

The Impact of *Tri Pramana*-based Hypothetic Deductive Learning Cycle Model on Character Forming and Creativity Development in Early Childhood

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Abstract

In their personality development, children have not been able to achieve unique according to their goals and ambitions, as teachers and students become more and more morally degraded. The study aimed to analyze the impact of a hypothetical deductive learning cycle model based on *Tri Pramana* on personality formation and creative ability development of students in their early childhood. The study utilized a semi-empirical form of a post-trial control design. The experiment was conducted in kindergarten classes, with two each from Kindergarten A and Kindergarten B grades, with a total of 80 students participating. A test and a questionnaire were used to collect data, where the test was used to measure creativity and the questionnaire for character variables. A descriptive and inferential statistical analysis method was used for data analysis, using MANOVA. The results show that there is an impact of learning a hypothetical deductive learning cycle model based on *Tri Pramana* on personality and creativity partially or simultaneously. It can be seen from Sig. value < 0.05. The study concludes that the application of a hypothetical deductive learning cycle model based on *Tri Pramana* has a significant effect on students' personality, creativity as well as creative thinking ability. This learning model can thus be recommended as an alternative to personality development and creativity in childhood.

Keywords

character, creativity, hypothetical deductive learning cycle, *Tri Pramana*

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Current developments in science and technology require people who can compete in the global world. A person needs to be mature in character in addition to being able to compete in the global marketplace. Someone with a strong character is can only adapt to all future changes (Blotnicky et al., 2018; Chang & Hall, 2022; Farrell & Brunton, 2020; Kurdi et al., 2020; Pedro et al., 2018; Tunkkari et al., 2022). Consequently, it is very important to collaborate between characters with insight into the realities of the world in future as an era of digital transformation (Dumont & Ready, 2020; Hu et al., 2022; Kraus et al., 2021). An attitude defines the character that someone should have (Torimtubun et al., 2020). Personality refers to basic moral values such as compassion, honesty, fairness, responsibility, and respect for oneself and others (Birhan et al., 2021). Your personality development can begin through continuous interaction with each other, sharing information about the situation, making contacts, and interacting within your family, community, school, and environment (Bustami et al., 2017; Groenewoudt et al., 2019). Character is often seen as the basis for perspective, thinking, acting, and behavior (Adibatin, 2016), and a prerequisite in the cognitive and psychomotor development of learners for enhancing their capability (Blayone et al., 2017; Burford et al., 2013; Kintu et al., 2017; Shernoff et al., 2017; Tomas et al., 2019; Zhou & Li, 2021). It is important that character should be formed in early childhood. In other words, a person's primary character is determined by forming characters at an early age, and that it develops according to the environmental conditions (Tanto et al., 2019). This illustrates that the good character of students provides an overview of their personality and will have an impact on the personality of a nation.

Creativity is another skill needed to deal with the development of science, technology, and the 21st-century era. Creativity is defined as a mental process for generating new ideas (Hairiyah & Mukhlis, 2019; Piotrowski & Meester, 2018), the ability to see what others may not see (Sanz-Hernández & Covaleda, 2021). Students' learning experiences will contribute to the development of their creativity (Beghetto, 2021). Developing creativity at early age should use methods that can encourage children to explore, imagine, seek and find their answers, make questions, help solve problems, rethink, rebuild and find new ideas (Hidayat et al., 2021). Students' creativity does not just grow but is influenced by several factors. These factors include genetic, personality, cognitive and environmental factors (Gong et al., 2020), where these factors interact synergistically (Lebuda et al., 2021). The creativity of students increases their confidence in what they are doing (Yates & Twigg, 2017), and gives young learners fun and personal satisfaction (Rukiyah et al., 2022). Due to the value given to student creativity, teachers should develop their creative skills by creating instructional materials (Rohmatun et al., 2021; Yates & Twigg, 2017), and develop creativity as early as possible. Creativity needs to be developed from an early age because unless it is nurtured from an early age, this potential will not be able to develop. In other words, creativity is a hidden potential and it cannot be realized later in life (Murdianti & Kaloeti, 2019).

The descriptions above relate to the character and the creativity of students, which are two variables that must be taught in early childhood. Early childhood has a different component of abilities from the age of 4-6 years (Ngo et al., 2018). Early childhood shows equal performance in identification but cannot distinguish between new objects (Canada et al., 2019; Geng et al., 2018). However, one of the issues in early childhood is that children cannot create something original from the beginning using their imaginations consistently, as the teacher exemplifies (Wandi & Mayar, 2019), parents lack of sensitivity in developing intelligence and creativity in children (Rezieka et al., 2021), Often, parents and teachers are impatient or do not have time to answer children's questions (Anshori & Lestari, 2020). The occurrence of the moral degradation in students who are increasingly developing (Unjunan & Budiartati, 2020). If this condition is left unchecked, of course, it will affect how well children develop, especially in early childhood as a child who has the best stage of development.

Overcoming this problem requires an appropriate solution. One solution that can be used is any innovative learning model combined with local wisdom. One of the learning models that can be used is the hypothetical deductive learning cycle. The hypothetical deductive learning cycle model is a series of activity phases organized to allow students to acquire the abilities achieved in learning through active roles (Mustaqiem et al., 2020). The deductive hypothesis learning cycle learning model emphasizes expertise in applying scientific methods based on a scientific attitude. Second, students must be able to engage in independent discovery, meaningful learning, and learning by doing (Asfitria, 2021). The hypothetical deductive learning cycle model has several benefits: it can train students to think critically (Mustaqiem et al., 2020); provide students with opportunities to develop scientific process skills (Sari et al., 2019); provide opportunities to develop skills in the scientific process (Saputra, 2019; Sudana, 2020); develop students' knowledge, train and develop concepts and their thinking skills (Nina et al., 2019). Moreover, the existence of a learning cycle model by deductive hypothesis has a positive impact on the learning process. In this study, the model will collaborate with a local Balinese intellectual style of learning, *Tri Pramana*.

Tri Pramana literally means three ways of learning in order to find knowledge/truth (Prasedari et al., 2019). The three methods are *Pratyaksa Pramana* (seeing directly), *Anumana Pramana* (drawing conclusions from the analysis process or analyzing to get a conclusion), and *Agama Pramana* (believing in notifications or the words of holy people (Seken & Badra, 2019). This concept is often referred to as a scientific approach in the concept of Hinduism. The *Tri Pramana* approach is considered effective in improving learning skills and sensitivity and improving student learning outcomes at the elementary school level. Several studies have stated that using a scientific approach using the *Tri Pramana* concept can improve student learning outcomes significantly and simultaneously with critical thinking skills (Yunita et al., 2019;Chresty, 2015). Research states that the Students Team Achievement Division (STAD) model is assisted by the *Tri Pramana* Approach as an alternative to improve the quality of learning Natural Sciences (Pendem, 2021), Research states that there is a significant difference in critical thinking skills between the *Tri Pramana* SPA Model and the Conventional Learning Model (Arjaya & Puspadewi, 2017). Another research added that the *Tri Prama*-oriented Auditory, Intellectually, Repetition (AIR) learning model, which affects learning motivation and learning outcomes (N. Dewi & Rati, 2020). Hence, the existence of the *Tri Pramana* concept will have a positive influence on the thinking ability of students.

These descriptions provide an overview of the use of the learning cycle model, the Hypothetical Deductive Type Learning Cycle Model and the *Tri Pramana* Balinese Hindu Cultured Local Wisdom. These two variables influence the learning process, especially students' thinking ability and learning outcomes. Based on this description, this research aimed to analyze the impact of the *Tri Pramana*-based hypothetical deductive learning cycle model on character building and early childhood creativity development. This research is different from previous research, where the research to be carried out combines a hypothetical deductive learning cycle model and *Tri Pramana*, where this collaboration is expected to impact students' character and creativity. In addition, the difference is in the research subject where the subject of this research is early childhood, where children must be accustomed to developing their character and creativity.

Method

- *Research design*

A quasi-experimental study design utilizing a purely post-test control design was used for this study (Rogers & Revesz, 2019). The research implementation process was divided into experimental and control classes. The experimental group was treated with a virtual deductive learning cycle model based on *Tri Pramana,* while the control group was taught without this model. Both groups underwent post-testing to determine personality and creative differences between the control and experimental groups. The data obtained in this study included: (1) Experimental class character (Y1). (2) control class character (Y1). (3) Experimental class creativity (Y2). (4) Creativity (Y2) control class.

- *Sampling*

The experiment was conducted at four Kindergarten classes, comprising four groups (2 TKA and 2 TKB) with a total of 80 students participating. In this experiment, the TKB class was selected as the experiment group; however, prior to its selection an equivalence test was conducted, using one-way ANOVA and utilizing the SPSS 26.0 application for Windows. The equivalence test was performed on all 80 early childhood students, using a random sampling procedure, in order to determine the sampled class. Each class consisted of 20 students in the control group and 20 students in the experimental group. In this study, the data collection methods used were tests and questionnaires.

- *Research instrument and procedure*

The research instruments comprised a test and a questionnaire. The test, which measured students' creativity, was developed and adapted from the given material. It was a descriptive test consisting of 10 project questions tailored to the child's development. The developed questions were given in each learning process, both in control and in experimental lessons. The procedure was as follows: 1) Create a test equipment grid. 2) Ask questions in the form of explanations. 3) Talk to an expert about the developed grid and questions. The developed test equipment was then tested for equipment item effectiveness, equipment content effectiveness, test reliability,

test item difficulty, and test equipment difficulty. The validity of the creativity test equipment items was tested using the CVR formula. The calculated CVR for each tool item was 1 and the total CVR for all tool items in the creative thinking test was 10, which can be tested against the validation rules for each item. tool element in a CVR formula. The content validation of the creativity tester was done using the CVI formula, and therefore the CVI score was 1, and the content test rule of the whole CVI device type indicated that the test device was valid. The reliability of the creativity test was also of a high standard. Of the 10 questions asked, the creativity test item difficulty was found to be 6 medium levels and 4 test equipment levels of moderate difficulty.

The questionnaire comprised d-ended questions and measured personality traits at early childhood stage. While using the Likert model rating scale, each item was rated as Very Appropriate (SS), Appropriate (S), Inappropriate (TS), Very Inappropriate (TS). The questionnaire items were created from such aspects of personality like religion, honesty, discipline, democracy, compassion, curiosity, and responsibility. These 7 dimensions were developed into 25 indicators which were developed into 30 statements. A complete character grid is described in Table 1. When checking the validity of the character questionnaire tool, it was necessary to check the validity of the tool's elements, the validity of the tool's content. instrumentation and overall reliability.

The validity of the content of the question device was checked by the CVR formula. The calculated CVR result for each tool item was 1 and the total CVR for all character tool items was 30, which can be checked against the verification rules for each tool item. tool in the CVR formula. The result of the questionnaire's content validity test using SPPS was 0.87, which can be classified as very strong. As a result of testing the reliability of the questionnaire by SPSS, we obtained the results of the analysis with an Alpha value of 0.97 for the returned results. This means that the developed questionnaire was very reliable.

Table 1. *Character Instrument Indicator*

No	Dimension		Indicator
1	Curiosity	1)	Enthusiastic in seeking answers
		2)	Attention to the observed object
		3)	Enthusiastic about science projects and ask each step of the activity
2	Social skills	1)	The ability to take turns or shape
		2)	The ability to appreciate or respect
		3)	Ability to help
		4)	Controlling emotions
3	Integrity	1)	Honest
		2)	Consistent
		3)	Objective to the problem
4	Problem solving	1)	Check all the information and calculation involved
		2)	Consider whether the solution is logical
		3)	See other alternative solutions
		4)	Reread the question
5	Empathy	1)	Feel free to
		2)	Built on self-awareness
		3)	Sensitive to non-verbal language
6	Lowliness	1)	Respect to other people’s opinions
		2)	Capable listener
		3)	Accepting feedback, judgement, and suggestions from others
		4)	Treat each individual fairly
		5)	Avoid becoming envois of other’s pleasures
7	Responsible	1)	Performing duties and homework well
		2)	Accepting responsibility for every action
		3)	Finishing assignments on time

- *Data analysis*

The data analysis methods for this study were descriptive, statistical and inferential. The descriptive analysis performed in this study was processed using SPSS 26.0 for Windows and post-test data were analyzed.

The values obtained by statistical testing included mean, standard deviation, maximum value and minimum value. On the other hand, inferential statistics were used for inferential analysis using MANOVA test on post-test data. Prerequisite tests were run before the MANOVA test. The prerequisite tests were the Kolmogorov-Smirnov Normal test, Levine's statistical homogeneity test and the Variance matrix equivalence box test, where the linearity test had a linear relationship with each sub variable. belonging to be analyzed. The purpose was to determine whether. MANOVA and conditional tests could be performed using SPSS 26.0 for Window.

Findings

Once students have learned according to the implemented learning design, namely the hypothetical deductive learning cycle model based on *Tri Pramana*, the results of the descriptive analysis show a significant influence on the application of using a hypothetical inference model based on *Tri Pramana*. student personality and innovative learning cycle patterns. The full results of the descriptive analysis are presented in Table 2. The results of the descriptive analysis show that there are differences in personality and creativity of students who learn with the learning cycle model inference hypothetical model based on *Tri Pramana,* compared to students who learn without it. This is evident from the difference in character scores of 6.00 where the mean character value of students taught by the *Tri Pramana* hypothesis-based inferential learning cycle model is higher as compared to students who were taught no deductive learning cycle based on the *Tri Pramana* hypothesis model. Meanwhile, creativity showed a difference score of 3.00, where the average creativity score of students who learned with the hypothetical inferential learning cycle model based on *Tri Pramana* was high. than students who learn by learning without the hypothetical deductive learning method. Cyclic model based on *Tri Pramana*. The results also show that the hypothetical deductive learning cycle model based on *Tri Pramana* has more influence on students' personality than creative thinking ability.

Table 2. *Results of descriptive analysis of character and creative thinking skills*

Treatment	Dependent Variable	Mean	Std. Deviation	Min.	Max.	Range
Learning Model deductive hypothetical learning cycle based on *Tri Pramana*	Character	89.50	6.91	71.00	97.00	26.00
	Creativity	86.35	5.60	71.00	93.00	22.00
Learning without a hypothetical deductive learning cycle model based on *Tri Pramana*	Character	83.50	6.60	68.00	95.00	27.00
	Creativity	83.35	5.42	71.00	93.00	22.00

The analytical tests included tests for the normality of data distribution, tests for homogeneity of variance, tests for multivariate homogeneity, and tests for linearity of the variables. The first pre-test was the Kolmogorov-Smirnov standard test. The results of the analysis showed that all data comes from the normally distributed group signal, whose values > 0.05 are shown in Table 3. Once the reference condition is met, the next check step was to check for homogeneity. In this study, we performed the homogeneity test using two analyses. One was the test of variance for homogeneity using Levine's homogeneity test and the other was the test for multivariable homogeneity using Box's covariance matrix equality test.

Table 3. *Results of Normality Analysis*

	Learning_Approach	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
Character	Learning Model deductive hypothetical learning cycle based on *Tri Pramana*	0.17	20	0.13
	Learning without a hypothetical deductive learning cycle model based on *Tri Pramana*	0.10	20	0.20
Creativity	Learning Model deductive hypothetical learning cycle based on *Tri Pramana*	0.10	20	0.20
	Learning without a hypothetical deductive learning cycle model based on *Tri Pramana*	0.12	20	0.20

The results of the homogeneity analysis performed showed equal importance. First, the survey data came from similar data sets. This was confirmed from the sig value. Each test showed a value greater than 0.05. signal. The Levene equivalence check value was 1.00 for the character, but the value of Sig creativity was 0.96. In contrast, the consistency test using the box covariance matrix equivalence test showed sig. value of 0.45, and the F value of 0.84. The next prerequisite test was the linearity test. This was to determine whether each dependent variable analyzed had a linear relationship. The analysis results showed the value of sig. deviation from linear 0.83 > 0.05, which suggested that there was a linear relationship between character data and creativity. Since the tests prior to the MANOVA analysis were satisfied, the outcome study data were normally and uniformly distributed, therefore, MANOVA was used to perform hypothesis testing. The full analysis results are presented in Tables 4 and 5.

Table 4. *Results of the MANOVA Test Analysis*

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.998	9824.81[b]	2.00	37.00	0.00
	Wilks' Lambda	.002	9824.81[b]	2.00	37.00	0.00
	Hotelling's Trace	531.071	9824.81[b]	2.00	37.00	0.00
	Roy's Largest Root	531.071	9824.81[b]	2.00	37.00	0.00
Treatment	Pillai's Trace	.198	4.56[b]	2.00	37.00	0.02
	Wilks' Lambda	.802	4.56[b]	2.00	37.00	0.02
	Hotelling's Trace	.246	4.56[b]	2.00	37.00	0.02
	Roy's Largest Root	.246	4.56[b]	2.00	37.00	0.02

The analysis revealed some insights. First, based on the Pilae trace, Wilks' Lambda Hoteling trace, and Roy's greater path, we showed that the F-factor was 9824.81b at 1 sig. 0.00 Mean differences in overall personality and student creativity were taught using a fictitious deductive learning cycle model based on *Tri Pramana*. Second, the analysis examining intra-subject effects showed an F score of 7.89 on Sig. 0.00 less than 0.05 shows an effect on learning characteristics using a virtual inferential learning cycle model based on *Tri Pramana*. Finally, the results of the cross-subject effects analysis were an F score of 5.51 and sig. It is 0.00, indicating that it is less than 0.05. This shows that learning with a virtual deductive learning cycle model based on *Tri Pramana* has an impact on creativity.

Tabel 5. *Hasil analisis Tests of Between-Subjects Effects*

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Character	360.000[a]	1	360.00	7.89	0.00
	Creativity	2,135[b]	1	2.14	5.51	0.00
Intercept	Character	299290.000	1	299290.00	6558.84	0.00
	Creativity	281232.900	1	281232.90	9267.93	0.00
Treatment	Character	360.000	1	360.00	7.89	0.00
	Creativity	10.000	1	10.00	0.33	0.00
Error	Character	1734.000	38	45.63		
	Creativity	1153.100	38	30.35		
Total	Character	301384.000	40			
	Creativity	282396.000	40			
Corrected Total	Character	2094.000	39			
	Creativity	1163.100	39			

Discussion

The results showed an effect of learning the hypothetical deductive learning cycle model based on *Tri Pramana* on character and creativity, either partially or simultaneously. The result is inseparable from the learning model used. Applying the hypothetical deductive learning cycle model based on *Tri Pramana* provided a broader space for students to explore various phenomena to propose hypotheses to be tested through experiments. This condition directs children to be able to explore actual and contextual problems and find solutions to the problems found. Learning that prioritizes problem-solving, developing concepts, and constructing solutions and algorithms is better than memorizing procedures and using them to get one correct answer. In the local wisdom learning model, *Tri Pramana* teaches students directly how to find and explore their knowledge. Where the process that students must carry out is to see what they will learn directly (*Pratyaksa Pramana*) where the teacher invites students to observe objects in the environment that can be used as learning resources, this condition will certainly provide direct experience to students.

From those results, it can be seen that students will be able to distinguish, analyze, and make the right decision from a given problem (*Anumana Pramana*). After students can distinguish between demands, they get the purpose of what they are learning (*Agama Pramana*) and get what they need to know. Furthermore, the three stages in the *Tri Pramana* run like a cycle that cannot be separated, and there will be no overlapping or skipping. These three activities experienced by students will certainly provide a life experience to students that student in their lives can later use. It concerns the experience cone of Edgar Dale, which states that the experience with the highest value is direct, purposeful experience, namely the experience obtained from direct contact with the environment, objects, animals, humans, and so on, by doing direct actions. Direct contact with the environment and objects is very likely to be raised in learning by applying a hypothetical deductive learning cycle model.

Learning like this, in addition to providing experience, will certainly provide a sense of interest so that students will be challenged to learn and try to solve the problems encountered, so that children will remember the knowledge gained because in the learning process, children are actively seeking, finding, and solving problems (Prasedari et al., 2019). From this statement, this model provides opportunities for students to develop several attitudes such as curiosity, integrity, and the ability to solve problems and be responsible for the tasks given. These attitudes are values that children will bring as a learning experience which we know as character. Character is an attitude that must be owned which is its hallmark (Torimtubun et al., 2020). Character refers to basic moral values such as caring, honesty, fairness, responsibility, and respect for oneself and others (Birhan et al., 2021). The formation of character can be initiated by continuous interaction between each other by exchanging information about the situation, socializing, and interacting within the family, community, school, and environment (Bustami et al., 2017; Groenewoudt et al., 2019). Character as the basis for perspective, thinking, acting, and behave (Adibatin, 2016), as well as a basis for cognitive and psychomotor development of children's participants and develop the competence of an individual (Blayone et al., 2017; Burford et al., 2013; Kintu et al., 2017; Shernoff et al., 2017; Tomas et al., 2019; Zhou & Li, 2021). Thus, the character is formed from a learning process that provides opportunities for children to interact directly with the learning environment.

The existence of good values embedded in children will make children have higher-order thinking skills. One of them, of course, is children's creativity in generating different ideas. Creativity in this model grows well because children are accustomed to learning with a clear learning cycle, namely observing, analyzing, and finding new things that follow what the child is doing. Creativity is a mental process for generating new ideas (Hairiyah & Mukhlis, 2019; Piotrowski & Meester, 2018), the ability to see what others may not see (Sanz-Hernández & Covaleda, 2021). The outcomes of children's learning experiences will influence their creativity (Beghetto, 2021). Developing creativity in early childhood should use methods that can encourage children to explore, imagine, seek and find their answers, make questions, help solve problems, rethink, rebuild and find new ideas (Hidayat et al., 2021). In this case, the learning model that can develop creativity is a hypothetical deductive learning cycle based on *Tri Pramana*. This model emphasizes expertise in applying scientific methods based on a scientific attitude, so it is hoped that children can do discovery learning independently, learn meaningfully, and learn by doing (Asfitria, 2021). This learning model makes children learn independently. Independently learning means that children take over the learning process themselves effectively (Haddad, 2016; Lazăr, 2013), belief in the ability to achieve independent learning goals (Henri et al., 2018; Nguyen & Habók, 2021).

Children who participate in learning with a hypothetical deductive learning cycle model get more space and time to learn independently. It is because children's activities dominate learning activities at the exploration, concept introduction, and concept application stages. This condition is very good for building concepts in children independently. Concepts found through independent learning become meaningful. The concepts built will be meaningful if the new information (science) can be applied in real life, intelligent (understandable), plausible (trustworthy), and fruitful (useful) so that it helps children to understand their world (Yanthi et al., 2020; Zulkarnain et al., 2020). Applying the hypothetical deductive learning cycle model provides a broader space for children to think and argue. Thus, the application of the hypothetical deductive learning cycle model can improve and develop students' creativity.

It can be drawn that the application of the hypothetical deductive learning cycle model based on *Tri Pramana* provides a broader space for children to explore various phenomena so that they can propose hypotheses for further testing through experiments. Moreover, learning that prioritizes problem-solving, developing concepts, and constructing solutions and algorithms is better than memorizing procedures and using them to get one correct answer. In the learning model of local wisdom, *Tri Pramana* teaches children directly how to find and explore their own knowledge. The child then has high character and creativity. Considering that, this research is different from other research because it combines two variables that positively impact the learning process. The two variables in question are hypothetical deductive learning cycle models and *Tri Pramana*, where this collaboration impacts children's character and creativity. In addition, the difference is in the research subject where the subject of this research is early childhood, where early childhood must be accustomed to developing their character and creativity.

Conclusion

The results showed a significant effect on applying the hypothetical deductive learning cycle model to the character and creativity of children based on *Tri Pramana*. It is shown from the difference in mean value between children who are taught by learning the hypothetical deductive learning cycle model based on *Tri Pramana* and children who are taught by learning without learning the hypothetical deductive learning cycle model based on *Tri Pramana*. The results also show that the hypothetical deductive learning cycle model based on *Tri Pramana* has more influence on the child's character than the ability to think creatively so that this learning model can be recommended as an alternative to developing the character and creativity of early childhood.

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