

Application of the React Model Containing Ethnomathematics of Javanese Scripture to Develop the Character of Love of Homeland and Student Learning Outcomes

Dio Eriawandi¹, Sigit Saptono², Yuli Kurniawati Sugiyo Pranoto³

¹Master Program, Student of Primary Education, ^{2,3}Master Program, of Primary Education, Semarang State University, Semarang City, Indonesia

Corresponding Author: Dio Eriawandi

DOI: <https://doi.org/10.52403/ijrr.20231134>

ABSTRACT

This research was conducted at SDN Sangiang 3 Tangerang and SDN Gandasari 2 Tangerang on class IV students. This research focused on mathematics subjects using the REACT model containing Javanese ethnomathematics to develop the character of love for the country and student learning outcomes because students' knowledge of local wisdom is still low, which can be connected to mathematics lessons. The method used in the research is quasi-experimental with a quantitative approach. The experimental design used in this research is a simple experimental design (Pretest-Posttest Control Group Design). The population in this study were all fourth grade students at SDN Sangiang 3 Tangerang and SDN Gandasari 2 Tangerang. The samples in this study were the experimental class at SDN Sangiang III and the control class at SDN Gandasari II, with a total of 60 students. The data collection techniques and instruments in this research are observation, questionnaire instruments, and test instruments. The data analysis technique in this research uses the N-Gaian test and a related sample t-test (polled variance). Based on the analysis results from the N-gain test with a result of 0.732, it shows that the application of the REACT model assisted by Javanese ethnomathematics can improve student learning outcomes. Likewise, the results of the descriptive analysis show that the average calculation of students' love of their homeland character before and after being given the REACT learning model with the help of ethnomathematics Javanese script experienced

an average increase of 2.43 points, and the results of the Pillai's Trace, Wilks' Lambda, Hotelling's Trace, or Roy's Largest Root tests were all the same, namely a value of 0.000, meaning this is less than the set significance of 5%, therefore H_0 is rejected. In other words, the application of the REACT learning model assisted by Javanese ethnomathematics can influence the character of love for one's country and the results of learning mathematics curve material simultaneously.

Keywords: React Model, Ethnomathematics, Javanese Script, Love Of Homeland Characters, Learning Outcomes

INTRODUCTION

Education in a broad sense plays a very strategic role for every society and culture; in fact, the quality of a nation can be measured by the extent of education implemented. Education is not only a process of transferring knowledge, theory, facts, and examination activities; determining graduation criteria and diplomas; but it is also interpreted as a process of a nation preparing human resources that are complete, independent, responsible, love for the nation, and contribute to society and the nation (Fajarini, 2014).

The quality of human resources to meet international standards is needed to increase the nation's competitiveness. A nation that has superior competitiveness at the global level will determine the welfare of the

country. For the period 2010–2035, the Indonesian nation has a demographic bonus in the form of potential human resources (HR) of productive age. Education is an important instrument for preparing quality human resources to face the ASEAN Economic Community (AEC) through improving quality and competitiveness. Education is required to always update learning concepts so that they are relevant to the needs of society in the MEA era and the 21st century. Therefore, education should teach skills that support careers in the 21st century, which can be done through learning concepts in schools. A student's success depends on 21st-century skills, so students must learn to have them. "Partnership for 21st Century Skills identifies 21st century skills including critical thinking, problem solving, communication, and collaboration". (Boyaci, 2016)

Chunwijitra (2017) stated that a survey conducted by the Organization for Economic Cooperation and Development (OECD) in 2015 using the Program for International Student Assessment (PISA) test stated that Indonesia's achievements were ranked 64th out of 72 countries that took part in PISA. This has proven that education in Indonesia is still low. The low level of student learning outcomes is due, in part, to the fact that creativity in the learning process is still low. Therefore, there needs to be a new breakthrough in learning, namely by learning and cultivating character based on local or cultural wisdom.

Discussing culture, in a broad sense, it is said by Rosmalah et al. (2020) that culture is not only revealed through the form and expression of a sense of beauty through art alone but includes all forms and ways of behaving, acting, and thought patterns that are far behind what is known. looks like that. The spread of foreign culture packaged with communication media means that the existence of local wisdom is easily forgotten by the younger generation in Indonesia (Alfiyani et al., 2020). One effort to preserve local culture is through learning resources in the field of education, which is hoped to

provide students with an understanding of local cultural results.

Culture-based learning methods and contextual or daily life-based learning models are learning strategies that are oriented towards integrating the cultural values of a society in the student's environment into learning materials (Nurdiansyah & Haryani, 2021). Local cultural wisdom is very appropriate for building students' character values, which has an accompanying effect on learning at school (Rosmalah et al., 2020). Learning based on local wisdom and contextual or daily life-based learning models can provide a bridge for students to rediscover their culture (Susanto et al., 2021). A teacher must try to connect mathematics subject matter with regional culture. Because of this, students can understand mathematical material and experience mathematics in real life.

Ethnomathematics is mathematics that has an influence on or is based on culture. So far, ethnomathematics-based mathematics teaching materials are needed that connect mathematics with real conditions and culture in society (Imswatama & Lukman, 2018). Education and culture are things that cannot be avoided in everyday life because culture is a unity that is implemented in society. One thing that can be a bridge between culture and education is ethnomathematics. In implementing ethnomathematics learning, an appropriate learning model is also needed to be able to make the learning process in the classroom that is linked to culture or students' daily lives more meaningful. One learning model that can be applied to the learning process in the classroom so that the learning process based on students' daily lives can be more meaningful is the REACT (Relating, Experiencing, Applying, Cooperating, Transferring) model.

The REACT model is a learning model that involves students as a whole to connect learning material with real-life contexts so that the knowledge students gain is more meaningful. According to Musyadad (2020), REACT is a series of student activities

relating material to everyday life, experiencing, applying, collaborating, and transferring the knowledge they have acquired to solve problems in real-world life. The existence of a learning process that uses culture and is based on students' daily lives will result in the cultivation or development of national character related to students' love of their homeland for their culture. The definition of the learning process itself is the act of learning carried out by students as a reaction or result of teaching and learning activities carried out by the teacher. Learning is an activity or a process to gain knowledge, improve skills, improve behavior and attitudes, and strengthen character. So that children at elementary school age are also at a critical age for the process of cultivating character based on developing national character regarding love of the country, Cultural learning and the character of patriotism of a nation need to be instilled in the younger generation as an effort to maintain, preserve, and improve the quality of the nation in the future. So cultural values and contextual learning processes have meaning as the basis of national character, and thus cultural values and national character need to be instilled from an early age in all generations so that each individual is able to understand, interpret, and appreciate them, which will later grow and develop the character of love. students' homeland regarding their culture. (Wahyuni et al., 2013).

Regarding regional culture, one of the cultures in the Java region is the Javanese script. Javanese script is used in various Javanese texts and several other languages around the area where it is spoken. This script is better known as Hanacaraka or Carakan. The Javanese script has 20 basic letters, 20 paired letters that function to cover vowel sounds, 8 "main" letters (some are unpaired), 8 main letter pairs, five swara scripts (front vowel letters), five partner scripts and five of its partners, several sandhangan as vowel regulators, several special letters, several punctuation marks, and several signs that regulate writing order

(Faqihani et al., 2011). These forms of Javanese script will later be integrated with students' mathematics learning material, namely the concept of curves. This aims to civilize the Javanese script. The meaning of civilizing here is so that the Javanese script can be integrated into every school activity, make the Javanese script known, and at the same time be a continuous learning program for students. By integrating Javanese script with the mathematical concept of curves, indirectly, students will gain more concrete experiences that are in accordance with the concept of learning based on students' daily lives and foster the character of students' love for their homeland towards their culture. So far, studies on ethnomathematics have only been in the realm of integrating local culture with subject matter and have not been linked to contextual models or the formation of student character, as in the research of Supriadi et al. (2018). Which discusses students' ability to understand mathematics in curve material using Sundanese ethnomathematics learning, the results of which are better in Sundanese script ethnomathematics than conventional learning. Apart from that, Syahbarina's research (2017) stated that ethnographic learning assisted by Javanese script monopoly media can overcome students' difficulties in understanding Javanese letters. So as a result of the literature study from these two studies, the researcher found a phenomenon that had not been researched by the two researchers, namely that the use of ethnomathematics learning had not been integrated with contextual-based learning models and student character that grew from integrating culture-based learning in students. The contextual model in this research is the REACT model, and the character that will be studied is the character of Love for the Homeland.

Therefore, it is necessary to carry out comprehensive research on ethnomathematics learning or culture-based learning in integrating character education and student learning outcomes in learning the local cultural wisdom of the Javanese script.

The research is based on character development, which can help make it easier for other schools to implement learning based on local Javanese script culture in order to develop students' character of love for their homeland so that the golden generation in 2045 will not forget their own culture. If learning is not implemented that is linked to local culture as well as efforts to develop the character of love for the country in students or a sense of pride in their culture, in the future it could result in the erosion of the Javanese script, which is the culture of Java in the younger generation. This is because the concept of culture-based learning or ethnomathematics in Javanese script is used not only to have an impact on student learning outcomes but also to have an impact on the character of students' love for their homeland, which in the end will make students feel proud of their culture and at the same time start to protect and preserve their culture.

LITERATURE REVIEW

REACT model (relating, experiencing, applying, cooperating, transferring)

The contextual learning process is a process that stimulates the brain to create patterns that can create meaning in learning. Contextual learning is a system that matches the brain to produce meaning and links academic content to students' daily lives (Utami, 2019). The REACT model is a learning model developed from a contextual learning approach. This means that the learning approach is an activity that involves students as a whole or a learning process that is student-centered by linking learning material with the context of students' daily lives so that the learning process becomes more meaningful. The contextual approach is a philosophy in the learning process that is focused on students' interests and daily experiences (Satriani et al., 2012). According to Musyadad (2020), the REACT model is a series carried out by students to be able to relate learning material to everyday life, experience, apply, collaborate, and transfer

the knowledge they already have to be able to solve problems in real life.

According to Luqman Hakim (2017), there are five concepts of subordinate explanation, abbreviated as REACT, namely Relating, Experiencing, Applying, Cooperating, and Transferring.

1. Relating is a form of learning in the context of real life or real experience. Learning must be used to connect everyday situations with new information to understand or problems to solve.
2. Experiencing is learning in the context of exploration, discovery, and creation. This means that students gain knowledge through learning that prioritizes critical thinking processes through the inquiry cycle.
3. Applying is learning in the form of applying learning results to practical use and needs. In practice, students apply concepts and information to the needs of imagined future lives.
4. Cooperating is learning in the form of sharing information and experiences, responding to each other, and communicating with each other. This form of learning not only helps students learn the material but is also consistent with the emphasis on contextual learning in real life. In real life, students will become citizens who live side by side and communicate with other citizens.
5. Transferring is a learning activity in the form of utilizing knowledge and experience based on a new context to gain new knowledge and learning experiences.

Ethnomathematics

According to Hariastuti et al. (2019), "ethnomathematics is a research program process that exists in the history and philosophy of mathematics, with pedagogical implications, by focusing on art (Etno) and technique (tics), which means explaining, understanding, and overcoming (mathematics) in different socio-cultural environments". This statement shows that

ethnomathematics is research that focuses on the application of mathematical philosophy and history, especially in education. Ethnomathematics studies in the realm of education can be used to express ideas in activities in cultures or social groups to be able to develop mathematics curricula for, with, and by groups.

Ethnomathematics itself has its roots in anthropological studies, which describe the mathematics of indigenous peoples. It was also created as a means of recognizing and describing the ideas and practices of a particular cultural group and also the differences between indigenous peoples and communities (Albanese, 2020). The term ethnomathematics itself is defined as mathematics practiced in a cultural group that contains mathematical elements that can be identified within tribal communities, work groups, and children of certain age groups. The identity that emerges from ethnomathematics itself depends on the motivation and focus of interest held in the field of academic mathematics. Ethnomathematics itself is mathematics that can have influences based on culture. Currently, there is a need for mathematics teaching materials that are based on ethnomathematics, which in this case can connect mathematics with real conditions and culture in the local community (Imswatama & Lukman, 2018).

Javanese alphabet

Javanese script is often used in various texts in Javanese and also in several other languages around the area where it is spoken. This Javanese script is better known as hanacaraka or carkan. Hanacara, also known as cacarakan (Sundanese language), is a script that is a derivative of the Brahmi script and is usually used to write several manuscripts in Javanese, Madurese, Sundanese, and Sasak languages. For example, the character Ha represents two letters, namely H and A, which is a complete syllable when compared to the word "hari". Thus, it can be interpreted that there is an abbreviation of whole letters in writing

words when compared to writing Latin script.

The Javanese script itself has 20 basic letters: 20 letters that are called pairs and function to cover vowel sounds; 8 main letters (some are unpaired); 8 pairs of main letters; 5 swara script or front vowel letters; 5 partner characters; and 5 partners. Then there are several words to control vocals, some special letters, some punctuation marks, and also some organizers for writing. In the Javanese script itself, which is usually called standard hanacaraka, there are 20 basic letters (aksara nglegena), which are usually sequenced into a "short story" (Ganiajri et al., 2011).

The development of the Javanese script until it finally found its present form is the result of a very long process of cultural acculturation that occurred in society. This starts with the adaptation process of the Palawa script to local culture, which occurs in several regions. It does not only occur on the island of Java, which produces Javanese script, as is found in the Kawi script. Inscriptions that use Kawi script with a strong Sumatran style are found on the Sriwijaya King, Kedukan Bukit, Talang Tuo, Kota Lime, Karang Berahi, Palas Pasemah, and Jabung inscriptions. Then the Kawi script continued to change shape to become thinner and flatter around the 14th–15th century AD, as found in the Kebantenan inscriptions. But then it changed shape again to become more rounded and enriched with curves throughout the body of the script, which is where this type of script was used until the 16th century AD. And then gradually underwent a change again to become flatter, and the legs of the script had a more drawn-out shape (Fakhruddin et al., 2019).

The changes that occurred in the Palawa script on the island of Java can be described in detail as follows:

1. Early Palawa script, used before the 7th century AD, for example, the Tugu Bogor inscription
2. Late-stage Palawa script, used from the 7th century AD to the mid-8th century

- AD; for example, inscriptions in Canggal, Kedu, and Magelang
3. The early stages of the Kawi or Old Javanese script were used in 750 AD–725 AD, for example, the Balengan inscription in Kalasan, Yogyakarta.
 4. The final stage of the Kawi or Old Javanese script was used in 925 AD–1250 AD, for example, the Airlangga inscription.
 5. Majapahit script and regional/local script were used in 1250 AD–1450 AD, for example, the Singasari inscription and the “Kunjakarna” palm leaf.
 6. New Javanese script, used from 1500 AD until now, for example in the book "Sulah Bonang" and younger books.

Character of Love for the Motherland

Character is based on the English word "character", the essence of which comes from the Greek word "eharassein," which means to engrave, which means to carve, sculpt, or scratch and paint. Character itself has the meaning of the deliberate use of all dimensions of school life to foster optimal character development, which means deliberate efforts from all aspects of social life to help the formation of optimal character. The character comes from the Greek word "charassein," which means the process of carving, which ultimately forms a pattern. This pattern has noble morals, but noble morals are not immediately formed when a child is born; they require a very long process through nurturing and education (Sulastri, 2019). Character education is important because students are prepared to face these aspects of life (Hidayati et al., 2014).

Character education is something that is currently the most important thing to be given to today's young generation because character education is given as a provision so that they are able to compete in the global market while still upholding high morals and being able to control themselves from the negative impacts of technological developments. what is happening at the moment (Izzati, 2019). Character education

aims to shape students' attitudes or behaviors so that they can have knowledge, skills, attitudes, and noble morals and also have a competitive spirit so they can face global challenges. According to Birhan (2021), the term "character" refers to a basic moral value, for example, caring, honesty, justice, responsibility, and respect for oneself and others. Character itself will not be formed easily or instantly but must be trained continuously, seriously, and proportionally in order to achieve ideal shape and strength (Transinata, 2018). It can be interpreted that a person with character is a person with character who has a certain personality, behavior, nature, character, and disposition within a person and becomes a characteristic of that person that can distinguish him from other people. Education must be interpreted as a process for developing students' basic aspects, namely psychological, moral, emotional, physical, and spiritual (Muhtar, 2020).

The Essence of Love for the Motherland

Love for one's homeland means that by knowing and loving one's national territory, one will always be alert and ready to defend the Indonesian homeland from all forms of threats. There are many challenges, obstacles, and disturbances that have the potential to endanger the sustainability of the nation and state and can come from anywhere and by anyone. Education in Indonesia is encouraged to emphasize character education, which includes morality, religion, and nationalism, which is then expected to influence student learning (Wardhani, 2022). Love for one's country is the behavior and attitude of citizens who show a sense of pride, are always loyal, care, and give the highest appreciation to all aspects and also the wealth of the nation so that they are not easily provoked by offers from other nations, which are considered to be a threat and can be detrimental to the nation itself. According to the Ministry of National Education, love for one's homeland, or what can also be called a sense of nationalism, is a way of looking at, a way of behaving, and also a way of acting for an

individual of a nation that can depict loyalty, care, and also high appreciation for the nation, environment, social, cultural, economic, and also political aspects of a nation. There are three things that become a reference for the success of character education, namely knowing, loving, and acting well (Prasetyo, 2020).

Learning outcomes

Learning outcomes are a form of behavioral change that occurs through a learning process that will take place continuously and dynamically. There are several forms of behavior change that are comprehensive in nature, namely in the realm of attitudes, skills, knowledge, and so on (Slameto, 2012). Learning is a process of changing behavior carried out through experience and training (Ramandha et al., 2020). In the sense of realizing a goal in learning, namely changing behavior related to knowledge, skills, attitudes, and even including everything in a person's personality (Atiaturrahmaniah, 2020), Learning is an outcome that provides related statements about what students should and can know and understand at the end of learning (Bralić, 2018). What ultimately are patterns of behavior, values, understanding, attitudes, appreciation, abilities, and skills? Differences that occur in learning outcomes between students can be influenced by differences or backgrounds among students.

Based on Minister of Education and Culture Regulation Number 54 of 2013 concerning Graduate Competency Standards, learning in the 2013 curriculum directs learning targets at developing the domains of attitudes, knowledge, and skills of students in accordance with those set by the curriculum and is developed simultaneously and continuously in the implementation of learning, as stated in the following image.

MATERIALS & METHODS

The method used in the research is a quasi-experiment with a quantitative approach, wherein the researcher uses groups that already exist as a whole. The experimental

design used in this research is a simple experimental design (Pretest-Posttest Control Group Design). The population in this study were all fourth grade students at SDN Sangiang 3 Tangerang and SDN Gandasari 2 Tangerang. The samples in this study were the experimental class at SDN Sangiang III and the control class at SDN Gandasari II, with a total of 60 students. The data collection techniques and instruments in this research are observation, questionnaire instruments, and test instruments. The data analysis technique in this research uses the N-Gaian test and related sample t-test (polled variance).

RESULT and DISCUSSION

The results and discussion in this research will answer three existing problem formulations, namely, the first problem formulation is the application of the REACT model containing Javanese script ethnomathematics in improving student learning outcomes on curve material and testing the application of the REACT model containing Javanese ethnomathematics on the character of love. students' homeland and tested the application of the REACT model containing Javanese ethnomathematics to the character of students' love for their homeland and learning curve material results in class IV at SD Negeri Gandasari 1 and SD Negeri Sangiang 3. The following are the results and discussion of this research:

Application of the REACT Model Containing Ethnomathematics of Javanese Script in Improving Student Learning Outcomes in Class IV Curve Material

In this research, the results of data acquisition were obtained from the results of the pretest-posttest questions carried out in the experimental class and control class. A pretest is a test carried out to determine the initial abilities of students before being given treatment, while a final test is carried out to determine students' final abilities after being given treatment.

The results of applying the REACT learning model assisted by Javanese ethnomathematics to the learning curve

material outcomes of students from the two schools are presented in Table 1 below.

Table 1: Student Learning Results Before and After Learning Using the React Model Assisted with Javanese Ethnomathematics

	Before Learning	After Learning
Average score	36,867	82,367
Amount of Increase	45,50	

The recapitulation results can be seen in Table 1 in terms of the description or average of the character of love for the country of students who were taught using the REACT learning model assisted by Javanese aksar ethnomathematics, which increased by 45.50. Meanwhile, in the influence test analyzed using the N-Gain test, the increase in students' sense of love for their homeland with the help of Javanese script ethnomathematics is as follows:

$$\begin{aligned}
 \text{N-gain} &= \frac{\text{postet average} - \text{pretest average}}{\text{maximum} - \text{pretest average}} \\
 &= \frac{82,367 - 36,867}{100 - 36,867} = 0,732
 \end{aligned}$$

The N-gain test with a result of 0.732 shows that the application of the REACT model, assisted by Javanese ethnomathematics, can improve student learning outcomes. The application of the REACT learning model, assisted by Javanese ethnomathematics, can improve student learning outcomes on curve material in the experimental class with a high improvement category.

The results of this study show that the REACT learning model assisted by Javanese ethnomathematics has an effect based on the results of the N-Gain test and the average mathematics learning outcomes on curve material, where the results of the N-Gain test state that the application of the REACT learning model assisted by Javanese ethnomathematics can improve results. Student learning on curve material in the experimental class is in the high improvement category, and on average, the application of the REACT model assisted by Javanese ethnomathematics has an effect on mathematics on curve material that exceeds the specified KKM, and the average comparison with conventional classes is

better. This is in line with previous research, namely previous research that is in line with this research conducted by Wicaksono & Prihastari (2023), Sapto et al. (2015), and Dhia (2020), which states that the use of the REACT and ethnomathematics learning models can improve results. student learning. Apart from an interesting introduction to culture, which is integrated between classroom learning and local culture, the learning model also really involves student activity so that learning is student-centered. According to the results of other research conducted by Supriadi et al. (2018) using ethnomathematics learning, students are more open in expressing ideas and more active in learning, so that when given test questions, learning results exceed the KKM limit. Firstly, using the REACT learning model makes students ready to carry out learning in class. This is because if students are not ready, then their friends in one group will reprimand them. Then, by having a discussion and ultimately making a presentation, the students in the group are more serious about preparing it so that the results of learning mathematics on the curve material will be better.

The Influence of Using the REACT Learning Model Assisted by Javanese Ethnomathematics on the Character of Love for the Homeland of Class IV Students

To find out the results of the students' love of country character before implementing the REACT learning model assisted by Javanese ethnomathematics, the researcher gave a self-assessment questionnaire on the character of love of the country. Then the researchers gave a self-assessment questionnaire on the character of love for one's country after being

given the REACT learning model assisted by Javanese ethnomathematics and then compared the results of the two. The researcher presents the results of the

descriptive analysis of the students' love of the country character pretest scores in table 2 below:

Table 2 Results of Descriptive Analysis of Students' Pretest Answers

Statistics		
Pretest		
N	Valid	30
	Missing	0
Mean		6.2000
Std. Deviation		1.80803
Range		6.00
Minimum		3.00
Maximum		9.00

Based on the table above, the average score for students' love of the country character in the pretest is 6.20, with a maximum score of 9 and a minimum score of 3, so that the distance between the maximum and minimum scores is 6 points and the standard deviation is 1.808. Next, the researcher

presents the results of the posttest on the students' love of country character after being given the REACT learning model assisted by Javanese script ethnomathematics. The results are in Table 3 as follows:

Table 3: Results of Descriptive Analysis of Students' Posttest Answers

Statistics		
Posttest		
N	Valid	30
	Missing	0
Mean		8.6333
Std. Deviation		1.84733
Range		5.00
Minimum		5.00
Maximum		10.00

Based on the table above, the average score for students' love of country character in the posttest is 8.63, with a maximum score of 10 and a minimum score of 5, so that the maximum and minimum score are 5 points with a standard deviation of 1.847. Thus, the results of the descriptive analysis show that the calculation of the average character of students' sense of patriotism before and after being given the REACT learning model assisted by Javanese ethnomathematics has increased by an average of 2.43 points. The results of the analysis show that the application of the REACT learning model

assisted by Javanese ethnomathematics can improve the student's character of love for their homeland through a test using a questionnaire about the character of love for their homeland. This is in line with previous research, namely Yoni et al. (2023) The results of this research show that the application of ethnomathematics, which is integrated between culture and concepts in the subject matter, can increase the students' sense of love for their country. The students' love for their country has actually been visible. Apart from that, the results of other research conducted by Taskiyah and

Widyastuti (2021) show that ethnomathematics can foster the character of patriotism, which can be seen prominently in students, namely tolerance. For example, diversity and differences in the classroom make students able to blend well. In this technological era, there is a need for learning innovation to introduce students to their culture so that it does not become extinct.

The Effect of Implementing the REACT Learning Model Assisted with Javanese

Ethnomathematics on the Character of Love for the Motherland and Mathematics Learning Outcomes for Class IV Students

The results of the influence of the application of the REACT learning model assisted by Javanese ethnomathematics on the character of patriotism and learning outcomes were analyzed using a multivariate test with the help of SPSS, which are presented in Table 4 below.

Table 4: Multivariate Test Results

Multivariate Tests ^a							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0.984	3627.052 ^b	1.000	58.000	0.000	0.984
	Wilks' Lambda	0.016	3627.052 ^b	1.000	58.000	0.000	0.984
	Hotelling's Trace	62.535	3627.052 ^b	1.000	58.000	0.000	0.984
	Roy's Largest Root	62.535	3627.052 ^b	1.000	58.000	0.000	0.984
Pembelajaran	Pillai's Trace	0.253	19.673 ^b	1.000	58.000	0.000	0.253
	Wilks' Lambda	0.747	19.673 ^b	1.000	58.000	0.000	0.253
	Hotelling's Trace	0.339	19.673 ^b	1.000	58.000	0.000	0.253
	Roy's Largest Root	0.339	19.673 ^b	1.000	58.000	0.000	0.253

a. Design: Intercept + Pembelajaran
 b. Exact statistic

As seen in Table 4, it shows that the Sig value in the Pillai's Trace, Wlks'Lambda, Hotelling's Trace, or Roy's Largest Root Learning tests are all the same, namely 0.000, meaning this is less than the specified significance of 5%, so therefore Ho is rejected. Therefore, the application of the REACT learning model assisted by Javanese ethnomathematics can influence the character of love for one's country and the results of learning mathematics curve material simultaneously.

The use of the REACT learning model assisted by Javanese script ethnomathematics has been proven to have an influence on students' character of

patriotism and students' mathematics learning outcomes on curve material. This is in line with previous research, namely Priciliya (2021), Nursinta (2022), and Fajarsari et al. (2022), who argue that ethnomathematics learning influences the character of patriotism and learning outcomes by playing an important role in increasing attitudes of tolerance and an attitude of defending the country because of the growing love for one's own art and culture. Ethnomathematics of Javanese script makes students interested in the learning process in class because studying local culture is something new for students in

class, so it can influence student learning outcomes.

The results of other research conducted by Atma (2019) Based on this research, there are several attitudes that emerge with the implementation of ethnomathematics learning, namely that students, when discussing, can get used to respecting other people's opinions even though other students have different opinions from them, then respecting the various differences that exist between them. In class between one student and another, even though their friends are of different ethnicities, cultures, and religions, they can respect each other's differences more by not choosing their friends.

CONCLUSION

Based on the research results, it can be concluded that the application of the REACT learning model assisted by Javanese ethnomathematics to develop students' mathematics learning outcomes on curve material has an influence, the first being the N-Gain test results between the pretest and posttest, getting a score of 0.732. Based on the criteria $N\text{-Gain} \geq 0.70$, it is categorized as high. Meanwhile, based on the average learning outcomes of the REACT learning model assisted by Javanese ethnomathematics, the mathematics learning outcomes in curve material are 6.014. Therefore, the value of $t_{\text{count}} > t_{\text{table}}$ is $6.014 > 2.045$. This means that the average student learning outcomes in mathematics in curve material using the REACT learning model assisted by Javanese ethnomathematics are more than 70. In addition, the sig value obtained is 0.000, which means less than 5%. So it can be concluded that H_0 is rejected and H_a is accepted. Apart from that, the application of the REACT learning model assisted by Javanese script ethnomathematics on the character of students' sense of love for their homeland has a significant influence, and the application of the REACT learning model assisted by Javanese script ethnomathematics on the character of their sense of homeland love and student learning

outcomes has an influence on Pillai's Trace test learning, Wilks' Lambda, Hotelling's Trace, or Roy's Largest Root are all the same, namely a value of 0.000, meaning it is less than the specified significance of 5%, so therefore H_0 is rejected. Therefore, the application of the REACT learning model assisted by Javanese ethnomathematics can influence the character of love for one's country and the results of learning mathematics curve material simultaneously.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Albanese, V. (2020). Mathematics conceptions by teachers from an ethnomathematical perspective. In *Bolema - Mathematics Education Bulletin* (Vol. 34, Issue 66, pp. 1–21). <https://doi.org/10.1590/1980-4415v34n66a01>
2. Alfiyani, P., Sulistyorini, S., & Subali, B. (2020). The Effectiveness of Guided Inquiry-Based of Interactive Media to Increase Interests and Learning Outcomes. *9(96)*, 398–407.
3. Atiaturrahmaniah. (2020). Using fractional card media and math games to increase students' activities and learning outcomes. In *Journal of Physics: Conference Series* (Vol. 1539, Issue 1). <https://doi.org/10.1088/1742-6596/1539/1/012070>
4. Atma, B. A. (2019). Implementasi pendidikan karakter cinta tanah air di sd negeri gembongan sentolo. *BASIC EDUCATION*. <https://journal.student.uny.ac.id/index.php/pgsd/article/view/15016>
5. Birhan, W. (2021). Exploring the context of teaching character education to children in preprimary and primary schools. *Social Sciences and Humanities Open*, 4(1). <https://doi.org/10.1016/j.ssaho.2021.100171>

6. Boyaci, D. B. (2016). A scale development for 21st Century skills of primary school students: A validity and reliability study. *International Journal of Instruction*, 9(1), 133–135.
<https://doi.org/10.12973/iji.2016.9111a>
7. Bralić, A. (2018). Integrating MOOCs in traditionally taught courses: achieving learning outcomes with blended learning. *International Journal of Educational Technology in Higher Education*, 15(1).
<https://doi.org/10.1186/s41239-017-0085-7>
8. Chunwijitra, S. (2017). Hybrid e-Learning system for basic vocabulary with bulletin board to support the ASEAN economic community (AEC) in the primary school. In *Ubi-Media 2017 - Proceedings of the 10th International Conference on Ubi-Media Computing and Workshops with the 4th International Workshop on Advanced E-Learning and the 1st International Workshop on Multimedia and IoT: Networks, Systems and Applications*.
<https://doi.org/10.1109/UMEDIA.2017.8074117>
9. Dhia, F. (2020). Pengembangan Lks Matematika Berbasis Etnomatematika Guna Meningkatkan Hasil Belajar Siswa. *EKUIVALEN-Pendidikan Matematika*.
<http://ejournal.umpwr.ac.id/index.php/ekuivalen/article/view/6760>
10. Fajarini, U. (2014). Peranan Kearifan Lokal Dalam Pendidikan Karakter. *SOSIO DIDAKTIKA: Social Science Education Journal*, 1(2).
<https://doi.org/10.15408/sd.v1i2.1225>
11. Fajarsari, A. P., Krisdiana, I., & Masfingatin, T. (2022). Pengembangan Modul Ajar Berbasis Etnomatematika Pada Materi Lingkaran Untuk Meningkatkan Hasil Belajar Siswa Kelas VIII SMP *UNEJ E-Proceeding*.
<https://jurnal.unej.ac.id/index.php/prosidin/article/view/33533>
12. Fakhruddin, D., Sachari, A., & Haswanto, N. (2019). Pengembangan Desain Informasi dan Pembelajaran Aksara Jawa melalui Media Website. *ANDHARUPA: Jurnal Desain Komunikasi Visual & Multimedia*, 5(01), 1–23.
<https://doi.org/10.33633/andharupa.v5i01.1990>
13. Ganiajri, F., Romadhoni, A., Fakultas, M., Masyarakat, K., & Diponegoro, U. (2011). Permainan Hanihon Sebagai Media Pembelajaran Aksara Jawa. 1(1), 30–33.
14. Hariastuti, R. M., Budiarto, M. T., & Manuharawati, M. (2019). From Culture to Classroom: Study Ethnomathematics in House of Using Banyuwangi. *International Journal of Trends in Mathematics Education Research*, 2(2), 76.
<https://doi.org/10.33122/ijtmer.v2i2.60>
15. Hidayati, A., Zaim, M., Rukun, K., & ... (2014). The development of character education curriculum for elementary students in West Sumatera. In *International Journal of ... repository.unp.ac.id*.
[http://repository.unp.ac.id/1781/1/International Journal of Education and Research ok.pdf](http://repository.unp.ac.id/1781/1/International%20Journal%20of%20Education%20and%20Research%20ok.pdf)
16. Imswatama, A., & Lukman, H. S. (2018). The Effectiveness of Mathematics Teaching Material Based on Ethnomathematics. *International Journal of Trends in Mathematics Education Research*, 1(1), 35.
<https://doi.org/10.33122/ijtmer.v1i1.11>
17. Izzati, U. A. (2019). Character education: Gender differences in moral knowing, moral feeling, and moral action in elementary schools in Indonesia. *Journal for the Education of Gifted Young Scientists*, 7(3), 547–556.
<https://doi.org/10.17478/jegys.597765>
18. Luqman Hakim, M. (2017). Model Pembelajaran React Untuk Mata Pelajaran Ipa. *Edudeena*, 1(1).
<https://doi.org/10.30762/ed.v1i1.447>
19. Muhtar, T. (2020). Character development-based physical education learning model in primary school. *International Journal of Human Movement and Sports Sciences*, 8(6), 337–354.
<https://doi.org/10.13189/saj.2020.080605>
20. Mulyasari, D. W. (2020). “Permainan Engklek” Terhadap Pemahaman Konsep Geometri Dan Karakter Cinta Tanah Air Efektivitas Pembelajaran Etnomatematika “Permainan Engklek” Terhadap Pemahaman Konsep Geometri Dan

- Karakter Cinta Tanah Air Siswa Kelas 3 Sdn 4 Sepanjang Glenmore.
21. Musyadad, M. A. (2020). Application of react (relating, experiencing, applying, cooperating, transferring) strategy to improve mathematical communication ability of junior high school students. In *Journal of Physics: Conference Series* (Vol. 1521, Issue 3). <https://doi.org/10.1088/1742-6596/1521/3/032048>
 22. Nurdiansyah, I., & Haryani, S. (2021). Ethnomathematics Contained of Guided Inquiry for Elementary School Fourth Grade Student. *10(2)*, 160–165.
 23. Prasetyo, E. (2020). Implementation of character education by establishing a special task force in Muhammadiyah Karangkajen elementary school. *International Journal of Scientific and Technology Research*, *9(3)*, 121–127. https://api.elsevier.com/content/abstract/scopus_id/85082724938
 24. Ramandha, N., Sari, W., & Asikin, M. (2020). Unnes Journal of Mathematics Education Research Imitative and Creative Reasoning Abilities Viewed from Locus of Control on Guided Inquiry Model React Strategy. *9(1)*, 19–25.
 25. Rosmalah, R., Hafid, A., & Asriadi, A. (2020). The Application of Character Education Based on Local Wisdom. *International Conference on Science* <https://ojs.unm.ac.id/icsat/article/view/17757>
 26. Sapto, A. D., Suyitno, H., & Susilo, B. E. (2015). Keefektifan pembelajaran strategi react dengan model sscs terhadap kemampuan komunikasi matematika dan percaya diri siswa kelas VIII. *Unnes Journal of Mathematics* <https://journal.unnes.ac.id/sju/index.php/ujme/article/view/9049>
 27. Satriani, I., Emilia, E., & Gunawan, H. (2012). Contextual Teaching And Learning Approach To Teaching Writing. In *Indonesian Journal of Applied Linguistics* (Vol. 2, Issue 1, p. 10). Universitas Pendidikan Indonesia (UPI). <https://doi.org/10.17509/ijal.v2i1.70>
 28. Siska, Y. (2020). Implementation of character education values in social studies learning of elementary school. *International Journal of Psychosocial Rehabilitation*, *24(1)*, 1954–1967. <https://doi.org/10.37200/IJPR/V24I1/PR200302>
 29. Sulastri. (2019). Development of learning module discipline character based on scouting education at the state elementary school of 12 air kumbang, banyuasin regency. *International Journal of Scientific and Technology Research*, *8(5)*, 115–119. https://api.elsevier.com/content/abstract/scopus_id/85067020485
 30. Supriadi, S. (2023). Didactical design integer operation number of sundanese ethnomathematics online during Covid 19 pandemics with Endog-Endogan games in pre-service elementary school students. In *AIP Conference Proceedings* (Vol. 2614). <https://doi.org/10.1063/5.0125833>
 31. Supriadi, S., Sunda, E., & Kaganga, A. (2018). Pembelajaran Etnomatematika Sunda. *Pedagogia*, 225–304.
 32. Susanto, A., Zaenuri, Z., & Dewi, N. R. (2021). Students Mathematical Critical Thinking Ability with Project Based Learning (PjBL) Model Based on Local Culture. *10(4)*, 485–496.
 33. Syahbarina, M. (2017). Pengembangan Media MONORAJA (Monopoli Aksara Jawa) untuk Siswa Sekolah Dasar. *Mimbar Sekolah Dasar*, *4(3)*, 245. <https://doi.org/10.17509/mimbar-sd.v4i3.7919>
 34. Taskiyah, A. N., & Widyastuti, W. (2021). Etnomatematika dan Menumbuhkan Karakter Cinta Tanah Air pada Permainan Engklek. In *Jurnal Pendidikan Matematika (Kudus)* (Vol. 4, Issue 1, p. 81). State Islamic College of Kudus. <https://doi.org/10.21043/jmtk.v4i1.10342>
 35. Transinata, T. (2018). Integrasi Pendidikan Cinta Tanah Air dalam Kurikulum Tersembunyi Berbasis Karakter Kebangsaan. *PHILANTHROPY: Journal of Psychology*. <http://journals.usm.ac.id/index.php/philanthropy/article/view/679>
 36. Utami, W. B. (2019). Student experience about higher order thinking skill with contextual learning based ethnomathematics using learning media

- and math props. *International Journal of Recent Technology and Engineering*, 8(1), 719–721.
https://api.elsevier.com/content/abstract/scopus_id/85073296399
37. Wahyuni, A., Aji, A., Tias, W., & Sani, B. (2013). Peran Etnomatematika dalam Membangun Karakter Bangsa: Penguatan Peran Matematika Dan Pendidikan Matematika Untuk Indonesia Yang Lebih Baik, 1, 111–118.
38. Wardhani. (2022). Cultivating elementary school students' characters through Neo-Humanistic Education. *Kasetsart Journal of Social Sciences*, 43(2), 323–328. <https://doi.org/10.34044/j.kjss.2022.43.2.08>
39. Wicaksono, A. G., & Prihastari, E. B. (2023). Pemanfaatan Etnomatematika Untuk Meningkatkan Aktivitas Dan Hasil Belajar Siswa Kelas IV SDN 1 Senggrong. *Journal on Education*. <https://www.jonedu.org/index.php/joe/article/view/2090>

How to cite this article: Dio Eriawandi, Sigit Saptono, Yuli Kurniawati Sugiyo Pranoto. Application of the react model containing ethnomathematics of Javanese scripture to develop the character of love of homeland and student learning outcomes. *International Journal of Research and Review*. 2023; 10(11): 293-306. DOI: <https://doi.org/10.52403/ijrr.20231134>
