Erika (Local Wisdom E-module) Dhadak Merak Dance on Newton's Material

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Abstract: The development research carried out aims to produce Erika (e-module based on local wisdom) which is declared feasible. The difference between previous research is that the local wisdom used is the Dhadak Merak Reog Ponorogo Dance. Feasibility is reviewed based on validity, practicality and effectiveness. Research using the Hannafin and Peck model has three stages, namely needs assessment, design and development and implementation. Erika was designed by adapting the independent curriculum which is reviewed with independent learning facilities. The approach using Erika gets a good response to the process and learning outcomes of students. Validity was obtained on average 93.45% with a very valid category. The practical results obtained from the implementation and learning constraints using Erika are stated to be practical. Implementation of learning obtained 91.67% in the very good category. The results of process-based activities obtained an average of 75.71 in the good category. The effectiveness of student learning outcomes has increased with an average n-gain score of 0.3 in the medium category. The results of student responses to learning using Erika obtained an average of 87.59% in the very good category. Thus, Erika was declared suitable for use in learning. The results of this research also provide very good implications in introducing the dhadak merak reog ponorogo dance and being able to teach students physics concepts with an approach to applying the concept of Newton's law in traditional dance.

Keywords: Erika, validity, practicality, effectiveness

INTRODUCTION

The digital revolution made the initial analog mechanical and electronic technology change into digital technology. According to (Dewantara, Misbah, & Wati, 2022) technology is able to influence the teaching and learning process, namely getting good improvements. With this, the digital world will lead to the delivery of the latest and most innovative education, knowledge and skills (Sitepu, 2021). One of them is integrating technology into teaching materials packaged in digital form using computers or laptops or smartphones. The teaching materials referred to are e-modules (Ramadayanty, Sutarno, & Risdianto, 2021). Many e-module developments have been carried out, but the development of local wisdom-based e-modules is still not widely found. Erika stands for e-module based on local wisdom. The purpose of this research is to develop Erika as a media and physics teaching material. Learning in physics subjects is a learning process that implements everyday life with physics principles (Yoshua, Fauzan, Kristiani, & Astuti, 2019). The application of related material can of course be observed by students, for example with the local wisdom approach. In the current era of globalization, causing adverse effects that occur. Among them are the eroding of national values, where students are very proud of the culture of foreign countries compared to the culture of their own country (Rosiadi, Rapi, & Yasa, 2019). E-modules are suitable when integrated with local wisdom (Sari, Kurniawan, & Basuki, 2021). Local wisdom is a cultural identification mark that the younger generation needs to know, so that in the future they are able to maintain it (Bakhtiar, 2021). Therefore, in achieving the objectives of the physics subject, it is necessary to develop e-modules as interesting teaching materials. For example by associating local wisdom in it.

Indonesia is a country rich in local wisdom. The local wisdom used as an approach in this study is the Dhadak Merak Reog Ponorogo Dance, this is because this dance is one of the local wisdoms that is still developing in Java. However, it is very unfortunate that only a few are integrated into the realm of education (Wulansari & Admoko, 2021). In the movements during the Dhadak Merak Reog Ponorogo Dance performance, there is a physics concept, namely Newton's Law. Newton's First Law is found in the dancer's standing position with his mask raised. If the total force acting is equal to zero ($\Sigma F = 0$) (Young & Freedman, 2002). The force in question is the weight of the dancer and the weight of the mask is proportional to the normal force ($N–W_{dancer} + W_{mask} = 0$) (Wulansari & Admoko, 2021). The next movement is wrapped in a mask, the dancer bends his body backwards and the dhadak merak is pulled back for a certain time. The dhadak merak initially stood still, then was given a force to quickly retreat, the dhadak merak maintained its position (Rahmawati, et al., 2020). Newton's Second Law appears when a dancer moves according to the tempo of the music, causing deceleration and acceleration, which affects the total force acting ($\Sigma F=m.a$) (Serway & Jawett, 2014). When a dancer is climbed by another dancer, this causes their mass to increase, resulting in a slowdown in movement due to the greater force required. Newton's Third Law appears when the dancer waits for his turn to show his action, the dancer's position is upright with the mask lifted. There are action and reaction forces at work, the action force given by Dhadak Merak presses the penbarong towards the center of the earth and the reaction force acts on the dancer (Wulansari & Admoko, 2021). The position of the circular movement is shown by the dancer's feet pressing the ground in the opposite direction to the movement of the mask, the action is

located on the dancer's right foot and the reaction is the result of the opposite movement (Rahmawati, et al., 2020). In accordance with Newton's Third Law, namely (Faction= -Freaction) (Serway & Jawett, 2014).

It is hoped that the development of e-modules based on the local wisdom of the Dhadak Merak Dance will introduce local wisdom to students and make physics lessons easier to learn independently. Electronic modules or e-modules based on local wisdom as teaching materials for physics learning are one of the applications of local wisdom-based contextual materials that can help students understand them. This is because the knowledge gained is not through memorization, but based on one's own experience (Yusnidar & Epinur, 2021). E-modules are teaching materials that are arranged to include material content, methods, and evaluation in a systematic and interesting way (Agustin, Wahyuni, & Bachtiar, 2018). Physics learning can be more meaningful if there is a relationship between subject matter and activities in everyday life. That way, students are not only focused on theory, but are able to find out the form of its implementation in the surrounding environment (Bakhtiar, 2021).

According to Rahmawati, Jamalludin, Sholihah, Safitri, Handayani & Putra (2021) in their research it shows the concept of Newton's Law in the Dhadak Merak Reog Ponorogo Dance. Research that has been carried out by (Wati, Apriani, Misbah, Miriam, & Mahtari, 2021) shows that by developing the Temperature and Heat e-modules Loaded with Local Wisdom Through the Sigil Application it is declared suitable for use in learning. The development of e-modules carried out by Rindaryati (2021) was declared suitable for use because it was able to help students understand the material well. As a differentiator from previous research, the e-module developed is based on the local wisdom of the Dhadak Merak Reog Ponorogo Dance. Based on the information obtained that when performing the Dadhak Merak Dance, it requires a lot of strength to be able to lift the mask and the peacock feather accessories which are arranged in such a way and when performing the Dadhak Merak Dance maneuvers, so it can be approached using Newton's Law to analyze it. The e-module development was designed with the help of Flipbook PDF Professional. Based on this explanation, research on the development of e-module physics based on local wisdom of the Dhadak Merak Reog Ponorogo dance was carried out on Newton's law material. The e-module was created with the aim of producing appropriate e-module learning media by integrating technology and local wisdom in learning media so that it is hoped that the learning process for physics subjects will be more interesting, varied and can improve students' understanding.

METHOD

This research is a type of development research that produces Erika (local wisdom e-module) Dhadak Merak Reog Ponorogo Dance. The development was carried out using the Hannafin and Peck (1987) development model, which consisted of 3 stages. To explain it can be seen in Figure 1.
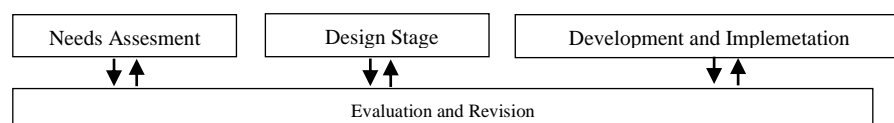

Figure 1 Hannafin and Peck Model.

(Tegeh, Jampel, & Pudjawan, 2014)

Research Design & Procedures

Library Studies and Needs Assessment. At this stage it was carried out by reviewing the literature on matters relating to the development carried out, namely the development of Erika. At the needs assessment stage, it will produce learning products that are in accordance with the appropriate characteristics and meet the needs.

Conceptual and Instructional Design, Graphic and Interface Design and Development and implementation Stage. At the conceptual and instructional design stage it is necessary to determine the concept and goals of Erika's development. The graphic and interface design stage was carried out by making a visual design for Erika's development. The Design stage it is also carried out by combining it with graphic design and interfaces at the previous stage, namely related to the material and questions to be used.

Development (Review, Revision, Erika Validation) and Implementation Erika. At the review stage, it is carried out by the validator by providing input or suggestions that can be used to build and shape a better product. The revision stage is where the results of the review provided by the validator are analysed and applied. Validation was carried out by the main validator, namely two expert lecturers from the Department of Physics. Implementation is the stage of applying Erika's product (local wisdom e-module) in schools with limited research. At each stage an evaluation is carried out to determine the results that have been implemented, whether these results require revision or not.

Population and Sample

The population of this study were students of class X SMA NU 1 Gresik. The sample used was class X-5 with a limited test of 20 students. This class is a class suggested by the physics teacher at SMA NU 1 Gresik. Because this class is an exploratory class so that it can participate actively in the learning process.

Data Collection and Instrument

The data obtained includes data from Erika's validation results (local wisdom e-module), learning outcomes data obtained from the results of the pre-test and post-test, data on the results of student responses and observations of the implementation of Erika's use.

Data Analysis

a) Validity Analysis

Validity analysis was carried out to analyze the overall validity of Erika which refers to learning, material, language, and media. Then analyzed based on the percentage of the questionnaire data obtained using a Likert scale in Table 1.

Table 1. Likert scale Criteria Score Validity Sheet

Score	Criteria
4	Very Good
3	Good
2	Pretty Good
1	Not Good

(Riduwan, 2010)

Based on the scoring, a validity analysis was then carried out to determine Erika's validity using the score interpretation criteria in Table 2 as follows:

Table 1 Interpretation Criteria Score Validity

Percentage	Criteria
0% < x ≤ 20%	Very Invalid
21% < x ≤ 40%	Less Valid
41% < x ≤ 60%	Quite Valid
61% < x ≤ 80%	Valid
81% < x ≤ 100%	Very Valid

(Riduwan, 2010)

Based on Table 2, Erika will be declared valid if the percentage obtained is ≥61%.

b) Practicality Analysis

The practicality analysis is reviewed based on implementation and constraints during the learning process. The practicality analysis of the questionnaire given was then assessed based on the Likert scale in Table 1. The practicality analysis used the score interpretation criteria in Table 2. Erika was declared practical if the score obtained was ≥61%.

c) Effectiveness Analysis

1. Analysis of Student Learning Outcomes

In the analysis of students' ability tests based on the scores obtained from the questions distributed to students at the beginning (pretest) and end (posttest) of learning. Comparison is obtained through an assessment using the n-gain score. The increase assessment is analyzed with reference to the n-gain interpretation as follows:

Table 2 N-Gain Interpretation

N-gain Score	Criteria
N-gain ≥ 0,7	High
0,7 > N-gain ≥ 0,3	Medium
N-gain < 0,3	Low

(Hake, 1998)

2. Analysis of Student Responses

Analysis of student responses was determined based on the questionnaire responses that were distributed which were then analyzed. The scoring criteria used in the student response analysis used the Likert scale in Table 1. The effectiveness analysis used the score interpretation criteria in Table 2. Erika was declared effective if the score obtained was ≥61%.

RESULT AND DISCUSSION

The following are the results of research obtained at each stage of the development of Erika (local wisdom e-module) Dhadak Merak Reog Ponorogo Dance on Newton's Law material:

1. Needs Assessment Stage

At the needs assessment stage, there are two aspects that are carried out, namely literature study and needs assessment. Following are the results of the data obtained based on each aspect:

a. Literature review

In the 21st century the development of science and technology is becoming increasingly rapid. This is indicated by the influence in various fields of life, for example in the field of education. Integrating technology in the field of education is an effort that needs to be done to support better learning and provide meaningful learning experiences for students. The technological approach can be carried out by applying the learning resources used by teachers and students. In line with that, the newest curriculum in Indonesia today is the independent curriculum.

In learning activities that implement the Independent Curriculum, it is required to pay attention to the principles contained in Keputusan Menteri Pendidikan, Riset, dan Teknologi Nomor 56/M/2022 concerning Guidelines for Implementing Curriculum in the context of learning recovery. The written principle contains five principles, including the fourth principle, namely "Pembelajaran yang relevan adalah pembelajaran yang dirancang sesuai konteks, lingkungan, dan budaya peserta didik, serta melibatkan orang tua dan komunitas sebagai mitra". In the independent curriculum, teachers have the flexibility to choose or determine various teaching tools that are intended to suit the learning needs and interests of students. The independent curriculum is a curriculum with a variety of intracurricular learning where the content presented is more optimal, so that students have sufficient time to explore concepts and strengthen competence (Kemendikbud, 2022).

Adapting the characteristics of 21st century learning that integrates technology with an independent curriculum can be transferred by utilizing e-modules as a source and learning media for students. e-modules are independent teaching materials that can be accessed anywhere and anytime by teachers or students which are packaged systematically in electronic form using language that is easy to understand. The e-module is made with the aim of inviting students to be more interactive, so that it is equipped with animation, audio and video in the material presented. In making e-modules it can be supported by using several applications including those used in this study, namely Flip PDF Professional.

b. Needs Assessment

Based on the results of observations made at SMA Nahdlatul Ulama 1 Gresik, it was found that this school is one of the schools in Gresik City which is a driving school. In the 2020/2021 academic year, the independent curriculum will be implemented for the first time. The existence of the novelty of the curriculum, makes the availability of teaching media in renewal to adapt to the independent curriculum. The media that are often used include Physics Books for SMA. Then one of the physics teachers often uses video in the learning process. Based on a questionnaire given in class X-5 SMA Nahdlatul Ulama 1 Gresik, 58.8% stated that learning physics was considered less fun, so many of them did not like physics.

Based on interviews with physics teachers at SMA Nahdlatul Ulama 1 Gresik, it was found that physics learning rarely uses teaching modules as a learning resource for

students. This is in accordance with the results of the questionnaire which obtained 70.6% stating that they had never used e-modules in physics subjects. In line with this, it was found that 85.3% of the questionnaire results stated that physics learning had been applied by linking it to everyday life. However, Physics Learning has never linked it with local wisdom. Nahdlatul Ulama 1 Gresik High School is a school that provides 42 kinds of extracurriculars, including the Association of Paguyuban Peminat Seni Tradisi (PPST) and Dance (Modern and Traditional) which often perform in collaboration. Appearances that have been shown include when welcoming Native Japanese Teacher Shimizu Miina Sensei. At that time, what was shown was the Dhadak Merak Dance, Reog Ponorogo. Even so, the questionnaire given to students showed that only 64.7% stated with confidence that the Dhadak Merak Reog Ponorogo Dance was one of the cultural wisdoms from Indonesia. Based on this, it is necessary to have a teaching media approach based on local wisdom of the Dhadak Merak Reog Ponorogo Dance.

Referring to the independent curriculum, at the senior high school level, it is divided into 2 phases, namely Phase E and Phase F. Phase E is applied to class X and Phase F is applied to class XI and XII. The material discussed in Phase F was more than that in Phase E. Based on the results of the interviews, it was shown that the material in class XI was considered very dense. In line with this, learning media are needed that students can reach and study independently. The Learning Outcomes (CP) in Phase F include 'Dinamika Gerak'. Based on the CP which is then split into several Learning Objectives (TP). Among others are 'Menganalisis hubungan antara gaya, massa dan gerak benda pada Hukum Newton serta penerapannya'. Based on the needs assessment analysis, a solution was found, namely by developing e-module media based on local wisdom (Erika). It is equipped with practice questions and answer keys that can help students to learn independently.

2. Design Stage
a) Preparation of learning devices

At the stage of preparing learning tools used to develop Learning Objectives 'TP' and Learning Objective Flow 'ATP'. The Learning Objectives used are 'Analyze the relationship between force, mass and object motion in Newton's Law and this application'. Indicators of learning outcomes include students being able to describe the meaning of force, identify types and characteristics of force, distinguish between mass and weight, understand the form of force-free diagrams in daily activities, determine the resultant value on force-free diagrams, relate Newton's Law to the dhadak merak reog dance ponorogo, communicating and determining conclusions from the analysis of Newton's Laws on the dhadak peacock reog ponorogo dance. Erika's characteristics are made to meet learning facilities, including a cover page, foreword, explanation of how to use the e-module, general information, core components, concept map, introduction to local wisdom of the Dhadak Merak Reog Ponorogo Dance, material description, practice activities (exercise questoins with explanations), worksheet on analyzing the concept of Newton's Law in the Dhadak Merak Reog Ponorogo Dance, bibliography, and answer key. Student worksheet this was done after they were introduced to the local wisdom of the Dhadak Merak Reog Ponorogo Dance which was presented in the e-module. The worksheet provided helps students to analyze the concept of Newton's Law in the Dhadak Merak Reog Ponorogo Dance. Each question will be given an image that

students will observe. So we get information about Newton's Law in the Dhadak Merak Reog Ponorogo Dance.

 b) Making e-module designs

At the stage of making the e-module design, what is done is making designs for the e-module front cover, e-module back cover, e-module page layout, e-module cover and e-module logo. The design created is as follows:

Table 3 Erika's design

Cover Depan	Cover Belakang	*Layout* Halaman	Penutup	Logo

3.   Development and Implementation Stage
a.   Development
 1) Study Erika

At the stage of Erika's study that was developed, revisions and input were obtained from the validator. The results of the review contain improvements made based on revisions and input from the validator for better media.

 2) Erika's validation

After the review stage was carried out, it was then followed by the Erika validation stage which was developed. The validation stage was carried out by three expert lecturers from the Physics Study Program, Surabaya State University. The

validator fills in the validation instrument which then recapitulates the scores obtained. The following Table 5 is the result of Erika's validation:

Table 4 Erika's Validation Results

No	Aspect	V1	V2	V3	Validiy Percentage	Criteria
	Learning					
1.	Graduate competncy Standards	4	3	4	91,67%	Very Valid
2.	Content	3	4	4	91,67%	Very Valid
3.	Process Standards	4	3	4	91,67%	Very Valid
4.	Assesment	4	4	4	100%	Very Valid
	Material					
1.	Relevance	4	4	4	100%	Very Valid
2.	Suitability to teaching material needs	4	3	4	91,67%	Very Valid
3.	Comformity with the truth of the subtance	3	4	3	83,33%	Valid
4.	Conformity with the competencies taught	4	4	3	91,67%	Very Valid
5.	Consistency	4	3	4	91,67%	Very Valid
6.	Adequacy	3	4	4	91,67%	Very Valid
	Media					
1.	Language	3	4	4	91,67%	Very Valid
2.	Confomity with learning media priciples	4	4	4	100%	Very Valid
3.	Conformity with the independent curriculum	4	4	4	100%	Very Valid
4.	Conformity with systematic writing and design	3	4	3	91,67%	Very Valid
			Average		**93,45%**	Very Valid

Erika's validity was developed based on the results of validation carried out by three expert lecturers from the Physics Education Study Program, Surabaya State University. The validity instrument used is based on several aspects, namely learning, material, language and media. Fill out the instrument using a 1-4 Likert scale, with score information (4) Very good, (3) Good, (2) Fairly good, and (1) Not good. According to (Riduwan, 2010) media can be declared valid if the score obtained is ≥61%. During development, Erika got an average validity percentage score of 93.45% in the very valid category. Based on table 5, there are several aspects that get a score of less than 100%, this shows the need to improve the media before implementation. The aspect that got the lowest score was the material point comfort with the truth of the substance. This is because in the e-module we found examples of applications that were not appropriate to the physics concepts being discussed. So, before implementation, revisions and improvements are made.

b. Implementation

At the implementation stage it is carried out to determine the practicality of the media developed, namely Erika. Erika's practicality in Newton's Law material is obtained from the analysis of implementation and learning constraints as well as an analysis of process-based student abilities. The aspects of implementation and learning constraints are given to observers. The total number of observers in this study was 4 people, namely 2 teachers and 2 peers. The implementation was carried out using a research design, namely an experimental design with the type of one group pretest and posttest design. With the first step, namely by giving a pretest first for students to work on, so that the first value is obtained before the treatment is carried out to find out the students' initial abilities before implementing Erika in learning. Then proceed with the treatment using Erika (local wisdom e-module) to students. After that, it can be continued by giving a posttest to students to find out the changes that occur after being given treatment. The following is data from observations of implementation and learning constraints as well as the abilities of process-based learners:

1) Analysis of implementation and learning constraints

The analysis stage of implementation and learning constraints, a recapitulation of the percentage of the average score given by the observers was obtained. Filling in the instrument using a Likert scale. Assessment is carried out by observers based on the application of learning carried out using Erika as a teaching medium. The following is presented Table 6 implementation results and learning constraints:

Table 5 Implementation Results and Learning Constraints

No	Aspect	V1	V2	V3	V4	Eligibility Percenage	Criteria
1.	Ability to open lessons	4	3	4	4	93,75%	Very Good
2.	Learning process	3	3	4	4	87,50%	Very Good
3.	Mastery of learning materials	3	4	4	4	93,75%	Very Good
4.	Use of learning media	4	4	4	4	100%	Very Good
5.	Evaluation	4	3	3	4	87,59%	Very Good
6.	Ability to close learning	3	4	4	3	87,50%	Very Good
				Average		**91,67%**	Very Good

Based on Table 6 Implementation Results and Learning Constraints obtained an average total score of 91.67%. There are several aspects that get scores below 100%, of which those that get the lowest scores are the learning process, evaluation and ability to close learning aspects. The learning process aspect received this score because during implementation, several supporting devices were not available so it was considered less than optimal. For example, earphones when using Erika at the same time, it is best to use earphones so that her voice can be heard clearly. Then the evaluation aspect was considered inadequate because after presenting the learning results there was no discussion with the class group. So, there were several groups who did not pay attention. And the aspect of the ability to close learning is considered lacking because it does not close learning with a conclusion. This is because the time for data collection coincided with the school's mandatory agenda namely prayers in congregation, so learning had to end.

2) Analysis of process-based knowledge of students

The process-based knowledge analysis stage, students are obtained from the results of the Formative Worksheet applied to Erika. Worksheets are done in groups with each group having 2-3 members. The following Table 7 is a diagram of the recapitulation results of the percentage of process-based student scores.

Table 6 Process-Based Student Value

Indicator	Group1	Group2	Group3	Group4	Group5	Group6	Group7
Reelating Newton's First Law to the Dhadak Merak Dance Reog Ponorogo	25	25	25	20	20	25	25
Reelating Newton's Second Law to the Dhadak Merak Dance Reog Ponorogo	20	15	20	15	10	15	20
Reelating Newton's Third Law to the Dhadak Merak Dance Reog Ponorogo	20	10	15	20	15	10	10
Communicating the results of Newton's Law analysis to Dhadak Merak Dance Reog Ponorogo	20	20	20	20	20	20	20
Total	85	70	80	75	75	70	75
Average				75,71			

Based on Table 7, the process-based value results obtained an average of 75.71 in the good category.

a. Evaluation

The evaluation stage is the stage that is studied based on the analysis of the results of the students' pre-test and post-test as well as the results of the students' responses. At this stage it is used to determine the effectiveness of Erika. The following are the results of the pre-test and post-test data as well as student responses.

Student pre-test and post-test results

The results of the pre-test of students were obtained based on the initial test given to students before being treated with the application of Erika. While the post-test results of students were obtained based on the final test after the application of Erika was treated. From the results obtained, then the values are recapitulated to carry out normality tests and homogeneity tests.

1) Normality Test

The normality test is used to determine whether the sample is normally distributed. Then if the sample is declared as a normally distributed sample, it can be continued as a condition for the n-gain analysis statistical test. χ^2_{hitung} the results of the pre-test and post-test were 3.04638 and 8.78655. Meanwhile χ^2_{tabel} it is 11.07050, so that $\chi^2_{hitung} < \chi^2_{tabel}$, it is H_0 accepted and declared as a normally distributed sample.

2) Homogeneity Test

Homogeneity test is a test used to determine whether the population taken is a homogeneous variance or not. The results of the homogeneity test for the pre-test and post-test Fcount were 0.078847 and FTabel were 0.554176. So it shows that $\chi^2_{hitung} < \chi^2_{tabel}$, H_0 accepted and stated as a sample comes from a homogeneous population.

3) Analysis of N-gain Score

The n-gain score analysis is used to determine how much improvement has occurred before and after learning. The data used are students' pre-test and post-test scores. The following Table 8 is the value data obtained and the n-gain score.

Table 7 N-gain Score

Information	Learners																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre-Test	6	9	4	3	15	6	14	5	12	7	11	19	4	6	5	9	10	0	0	7
Post-Test	55	34	24	23	34	32	65	30	44	25	37	65	13	47	25	50	30	19	25	32
N-gain Score	0,5	0,3	0,2	0,2	0,2	0,3	0,6	0,3	0,4	0,2	0,3	0,6	0,1	0,4	0,2	0,5	0,2	0,2	0,3	0,3

Then the results are classified into high, medium and low categories. The following Figure 2 is a percentage diagram of the n-gain score categories obtained.
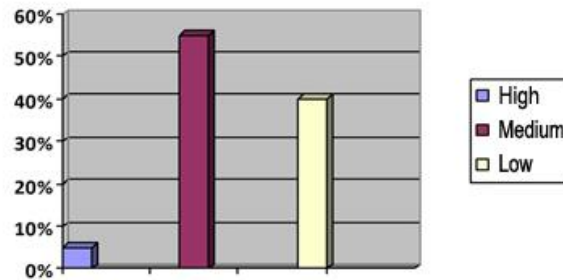
Figure 1. N-gain Score Category Percentage Chart

Based on Figure 2 it shows that the percentage of n-gain score is 5% in the low category. Then 55% in the medium category and 40% in the high category. Based on the calculation of the student's n-gain score, an average score of 0.3 was obtained in the moderate category. In the data presented, there is the lowest n-gain score namely student 13. This is because the student only participated in part of the learning process because there was an association of class representatives who could not be replaced.

1) Student Response Results

The results of student responses were obtained based on the results of filling in the response instruments to students. The following Table 9 is a diagram of the results of the analysis of students' responses to learning using Erika (local wisdom e-module) Dhadak Merak Reog Ponorogo Dance on Newton's Law.

Table 8 Student Response Results

Aspect	SS	S	TS	STS	Percentage	Criteria
Material						
Erika adds motivation to study physics	10	9	1	0	86.25%	Very Practical
I can understand the principles and concepts of Newton's Law in Erika easily	8	11	1	0	83.75%	Practical
Erika menarik is interesting and fun to study	11	7	2	0	86.25%	Very Practical
Erikka presentation is in accordance with the independent curriculum, that it can be studies independently	9	8	3	0	82.50%	Practical
Language						
The language used in Erika is easy to enderstand	13	6	1	0	90.00%	Very Practical
The language used in Erika is effective (concise and clear)	10	8	2	0	85.00%	Very Practical
The terms in Erika are easy to learn	10	8	2	0	85.00%	Very Practical
Media						
Erika is easy to operate	14	5	1	0	91.25%	Very Practical
Erika's facilities are quite complete	10	8	2	0	85.00%	Very Practical
The practice question provided in Erika made me motivation to study	10	10	0	0	87.50%	Very Practical
The material in Erika is easier to underctand with videos and picture	16	4	0	0	95.00%	Very Practical
Learning						
Erika can make the learning process easier	15	5	0	0	93.75%	Very Practical
Erika can raise question releted to Newton's Laws	12	8	0	0	90.00%	Very Practical
Erika can mke it easier to convey nformation releted to Newton's Law to other people	10	8	2	0	85.00%	Very Practical
				Average	**87,59%**	Very Practical

Data collection was carried out by filling out questionnaires given to students. The questionnaire contains aspects given by stating SS (Strongly agree), S (Agree), TS (Disagree) and STS (Strongly Disagree). From the questionnaire, a recapitulation was then carried out in percent values. In accordance with (Riduwan, 2010) it can be stated

as practical if the percentage obtained is ≥61%. Based on Table 9, it shows the average percentage of students' responses to learning using Erika (local wisdom e-module) Dhadak Merak Reog Ponorogo Dance on Newton's Law material of 87.59% in the very good category.

The qualitative data obtained in the instrument of student responses to learning using Erika (local wisdom e-module) is written in the comments and suggestions column. The following are some of the student responses after learning using Erika (local wisdom e-module) Dhadak Merak Reog Ponorogo Dance on Newton's Law.

1. The e-module is good, the colors in the e-module are nice and aesthetic (Learners 7)
2. The e-modul is really cool, it's not difficult to carry books so it's practical. Hopefully the future will get better (Learners 9)
3. The e-module is very useful and easy to operate so that you are enthusiatic about learning physics (Learners 16)

Based on the comments of the students, it was shown that (local wisdom e-module) the Dhadak Merak Reog Ponorogo Dance on Newton's Law material which was developed was interesting. This is shown by the presentation of the contents and physical e-modules that get good comments. Then the ease of operating the e-module makes students enthusiastic about learning physics. In the previous lesson, participants were only presented with material, whereas in Erika, students were directed to analyze the concept of Newton's Law in the Dhadak Merak Reog Ponorogo Dance. Involving students as observers can help them understand physics concepts.

In previous research, analysis of the concept of Newton's Law in the Dhadak Peacock Dance was carried out by (Wulansari & Admoko, 2021) and (Rahmawati, et al., 2020) but it has not been applied in learning. In accordance with research conducted by (Ramdaniyah & Dwiningsih, 2017) states that meaningful learning is a process of linking new information to concepts that are appropriate or relevant to students' cognitive abilities, so that if there is a new problem or phenomenon, students can relate the concept to phenomena that emerge. Then participants can communicate their opinions with the concepts of the available phenomena. Erika was declared valid, effective and practical for use in learning.

In the data collection process, we got a good response from students and teachers, namely that they were helped by Erika. Because the material for class XI is very dense, Erika can be used for independent learning. Then we found several suggestions for learning using Erika's application. Suggestions given by students included that it should be given in the form of a game in the process of analyzing the concept of Newton's Law in the Dhadak Merak Reog Ponorogo Dance. This is for the reason that learning is more enjoyable. Apart from the suggestions given by students, there were also suggestions obtained from validators, namely to be able to further expand the physics concepts in the Dhadak Merak Reog Ponorogo Dance, in this way it is hoped that students will be able to explore more physics concepts in the phenomena presented.

This research has very good implications in introducing the Dhadak Merak Reog Ponorogo dance to students so that the existence of this dance, which is the cultural wealth of the Indonesian nation, is better maintained. And with the results of Erika's development research, apart from introducing the Dhadak Merak Reog Ponorogo dance,

it can also teach students the concept of physics with an approach to applying the concept of Newton's Law in a traditional dance. This is what differentiates the results of Erika's development research from previous studies.

CONCLUSION

Based on the development research conducted, it shows that Erika is declared fit for use. The following is a description of the feasibility aspect validity, practicality and effectiveness. Results of Erika's validity obtained an average percentage of 93.45% with a very valid category. The practical results Erika's developed are declared practical. This is reviewed by two aspects of the implementation of learning using Erika to get a result of 91.67% in the very good category. The results of the process activities using Erika in learning obtained an average percentage of 75.71 in the good category. Effectiveness Results Erika's development was stated to be quite effective. This is seen from the learning outcomes of students who have increased with an average n-gain score of 0.3 in the moderate category. The results of student responses to learning using Erika obtained an average percentage of results of 87.59% in the very good category.

The research carried out was limited to limited trials on students in the SMA NU 1 Gresik class, the main discussion was limited to the concept of Newton's Law and its application and the local wisdom introduced was limited to the study of Newton's Law. Based on the results of the development research that has been carried out, the researcher has several suggestions, namely the form of Erika can be adapted to the availability of tools and needs at school. Researchers should pay more attention to time and manage it properly so that learning can be carried out more efficiently.

REFERENCES

Agustin, P. U. W., Wahyuni, S., & Bachtiar, R. W. (2018). Pengembangan modul fisika berbasis potensi lokal "batik lumbung dan tahu tamanan" untuk siswa sma di kecamatan tamanan bondowoso (materi suhu dan kalor). Jurnal Pembelajaran Fisika, 7(1), 62-69.

Bakhtiar, D. (2016). Bahan ajar berbasis kearifan lokal terintegrasi stm (sains, teknologi, dan masyarakat) pada mata pelajaran fisika. Jurnal Pembelajaran Fisika, 4(5), 650-660. Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-studentsurvey of mechanics test data for introductory physics courses. American Journal of Physics, 65.

Dewantara, D., Misbah, M., & Wati, M. (2022). "The implementation of blended learning in analog electronic learning". Journal of Physics, 1-5. doi:10.1088/1742-6596/1422/1/012002

Epinur, E. (2021). Pengembangan E-Modul Kontekstual Berbasis Kearifan Lokal untuk Siswa SMA pada Materi Pelajaran Sistem Koloid. Journal of The Indonesian Society of Integrated Chemistry, 13(2), 92-97.

Hake, R. R. (1998). "Interactive-engagement versus traditional methods: A six-thousand-studentsurvey of mechanics test data for introductory physics courses". American Journal of Physics, 65.

Kemendikbud. (2022). Buku Saku Tanya Jawab Kurikulum Merdeka. Kemendikbud Republik Indonesia.

Rahmawati, E., Sholihah, L., Safitri, Z. A., Handayani, R. D., & Putra, P. D. A. (2021, March). Analysis of physics concept of newton's laws on the dadhak merak dance in the reogponorogo cultural arts. In Journal of Physics: Conference Series (Vol. 1832, No. 1, p. 012038). IOP Publishing.

Ramadayanty, M., Sutarno, & Risdianto, E. (2021). "Pengembangan E-modul Fisika Berbasis Multiple Representation Untuk Melatihkan Keterampilan Pemecahan Masalah Siswa". Jurnal Kumparan Fisika, 4(1), 17-24. doi:https://doi.org/10.33369/jkf.4.1.17-24

Ramdaniyah, I. F., & Dwiningsih, K. (2017). Penerapan LKS Berbasis Literasi Sains Melalui Model Inkuiri Terbimbing Untuk Meningkatkan Literas Sains Siswa Pada Submateri Faktor-Faktor yang Mempengaruhi Laju Reaksi. Journal of Chemistry Education, 64-65.

Riduwan. (2010). Skala Pengukuran Variabel-Variabel Penelitian. Bandung : Alfabeta.

Rindaryati, N. (2021). E-Modul Counter Berbasis Flip Pdf pada Mata Pelajaran Penerapan Rangkaian Elektronika. Jurnal Imiah Pendidikan Dan Pembelajaran, 5(2), 192-199.

Rosadi, P. R. E., Rapi, N. K., & Yasa, P. (2019). Penerapan Bahan Ajar Sains Berbasis Kearifan Budaya Lokal Untuk Meningkatkan Aktivitas Dan Prestasi Belajar Fisika Siswa Kelas X MIPA 7 Di SMA Negeri. Jurnal Pendidikan Fisika Undiksha, 9(2), 75-84.

Sari, R. I., Jufrida, J., Kurniawan, W., & Basuki, F. (2021). Pengembangan e-modul materi suhu dan kalor sma kelas xi berbasis ethnophysics. Physics and Science Education Journal (PSEJ), 46-59.

Serway, R. A., & Jewett, J. W. 2014. Physics For Scientists And Engineers With Modern Physics (6 Ed.). (Maryati, Ed., & C. Sungkono, Trans.) Jakarta: Salemba.

Sitepu, E. N. 2021. "Media Pembelajaran Berbasis Digital". Journal Mahesa Center, 1(1), 242-248. From https://journal.mahesacenter.org/index.php/ppd/index.

Tegeh, I. M., Jampel, I. N., & Pudjawan, K. (2014). Model Penelitian Pengembangan. Yogyakarta: Graha Ilmu.

Wati, M., Apriani, R., Misbah, M., Miriam, S., & Mahtari, S. (2021). Pengembangan e-modul suhu dan kalor bermuatan kearifan lokal melalui aplikasi sigil. Jurnal Inovasi dan Pembelajaran Fisika, 8(1), 112-121.

Wulansari, N. I., & Admoko, S. (2021). Eksplorasi konsep fisika pada tari dhadak merak reog ponorogo. PENDIPA Journal of Science Education, 5(2), 163-172.

Yosua, R., Fauzan, A., Kistiani, K., & Astuti, I. A. D. (2019). Aplikasi KALFIS (Kalkulator Fisika) berbasis matlab untuk membantu analisis eksperimen fisika. Navigation Physics: Journal of Physics Education, 1(2), 59-62.

Young, H. D., & Freedman, R. A. 2002. Sears and Zemansky's University Physics. (H. W. H, L. Simarmata, & A. Safitri , Eds.) Jakarta: Erlangga.