Literasi Nusantara
vol.2 no. 3, July- October 2022
https://journal.citradharma.org/index.php/literasinusantara/index

ISSN 2746-8208 (Online)
ISSN 2746-3575 (Print)

Implementation of Computational Thinking - Based Active Learning in Presenting Environmental Friendly Simple Technology Products at MTsN 1 Tanah Datar

Azizah Rahmy *
* MTsN 1 Tanah Datar, Tanah Datar, West Sumatra, Indonesia

* *rahmyazizah125@gmail.com*

DOI : *https://doi.org/10.56480/jln.v2i3.694*

Received: July 28, 2022
Revised: August 17, 2022
Accepted: September 02, 2022

Abstract

Active learning thinking based on computational thinking is a learning approach that is needed by students in facing the 21st century. This research aims to find out how the process of applying active learning thinking based on computational thinking to environmentally friendly technology processes and products at MTsN (Islamic Junior High school) 1 Tanah Datar and its effect on activities and the learning outcomes of ix students at MTsN (Islamic Junior High school) 1 Tanah Datar . This research is the best practice from the author whose data are qualitative and quantitative. The result of this research is the application of active thinking learning based on computational thinking is very well applied to environmentally friendly technology processes and products. It can be seen from the increase of students' activity with an average of 4.24 (four point twenty-four) by good category and an increase of student learning outcomes with an average 95 (ninety-five) in the daily assessment of these basic competencies

Keywords– *MIKiR; Computational Thinking; Based Active Learning*

1. Introduction

In the middle progress fast technology and developments . Indonesia as a sufficient country open for accept development the feel ready compete with major countries in the world. However thereby a number of notes important could made consideration for give description readiness Indonesian people today this . Required skills _ somebody for face the digital age no want to must quick prepared now . No profession easy , however must started now or participant educate who will become a victim of the modern era because no capable face fast development technology communication added the more difficult and complex problems that will he faced . Rhedana W (2019) states for welcome 21st century , someone must have ability create values new through think creative , development innovation products and services , types and methods new work , way _ think new , changing individual mentality to collaborative and communicative , as well as thinking open .

One of the learning strategies active used when _ _ this called with MIKiR . Revitasari , (2020) stated that MIKIR is one _ element learning written active _ in SMART module themed " Good Practices _ in Management Based on School " results from team Tanoto Foundation. PINTAR own program is a program designed for repair ability participant educate in field literacy , numeracy , and science knowledge . The method is with increase quality learning . Thinking is abbreviation from observing , interaction communication and reflection . Approach this attempted answer challenge 21st century and practical existing 5M elements in kurtilas (Curriculum 13). Approach this expected enable participant educate for more creative , capable collaborate in team , and critical During learning take place . Besides Thinking design supportive learning _ in mensi 21st century is Computational Thinking

Computational Thinking seen many expert is one _ many abilities _ support dimensions education the 21st century . In Computational thinking participant educate directed for have Skills think critical , creative , communicative as well as Skills for collaborate in complete problem . Not only that , Computational Thinking also sharpens knowledge logical , mathematical ,

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

mechanical combined _ with modern knowledge of technology , digitization , and computerization and even shape character believe self , think open , tolerant as well as sensitive to environment . Wing JM (2006)

Based on above display _ should all teachers can create condition able learning _ hone knowledge participant combined education _ with modern knowledge of technology and digitization capable of direct participant educate for think critical , creative, communication and collaborating (4C) which are characteristic from learning 21st century . However in fact , at MTsN 1 Tanah Datar specifically based on results reflection the author 's learning and observation do , look low ability participant educate in apply Skills 21st century 4 C. This proven many from participant educate when learning in progress just listening what is conveyed by the teacher, without there is desire for knowing more carry on information submitted by teachers, participants educate seldom ask and answer question from the teacher, so interaction learning walk unidirectional . Involvement participant educate in communicate and collaborate between participant learn and teacher with participant educate not enough in learning , because learning teacher centered , management learning tend classic and less varied more Theory about processes and products technology friendly environment only presented by the teacher with method lecture , even though the teacher is there showing examples picture problem environment happened , and that still centered on the teacher explaining , and because Theory this is the last KD in class IX most teachers only tend ordered participant educate read Theory just the house you are looking for with various literacy because limitations allocation time in learning even though his KD-3 demands are Analyze processes and products technology friendly environment for continuity live and KD-4 presents process and product works technology friendly simple _ environment .

Destination from study this is for know the implementation process application learning Active Thinking Computational Thinking based on process and product materials technology friendly environment at MTsN 1 Tanah Datar ; for know the process of activity and motivation study participant educate after apply learning Active Thinking Computational Thinking based on process and

product materials technology friendly environment at MTsN 1 Tanah Datar ; for know the upgrade process results study participant educate after apply learning Active Thinking Computational Thinking based on process and product materials technology friendly environment at MTsN 1 Tanah Datar.

Approach Thinking

Thinking is one _ element learning written active _ in SMART module themed " Good Practices _ in Management Based on School " results from team Tanoto Foundation. PINTAR own program is a program designed for repair ability participant educate in field literacy , numeracy , and science knowledge . The method is with increase quality learning . Thinking is abbreviation from observing , interaction communication and reflection . Approach this attempted answer challenge 21st century and practical existing 5M elements in kurtilas (Curriculum 13).

Thinking is steps learning that makes participant educate active follow the learning process , with steps as following :

a. Experiencing (M), i.e. something activity To do activities (doing) and/ or observing (observing) during the learning process in progress for example To do observation , experiment , interview .
b. Interaction (I), namely the exchange process idea between two people or more for example exchange thoughts / ideas / ideas , discussing , responding to other people's ideas / opinions .
c. Communication (Ki), which is the process of conveying ideas / thoughts or feelings by someone to others, communication this can shaped oral and writing, for example convey ideas, results work , results experiment , or result discussion group .
d. Reflection (R), i.e. activity see return experience learn and take lessons learned to learn more good in the future (Purnamawati , 2021)

Computational Thinking (CT)

Computational thinking (thinking) computing) is a method solving problem with apply / involve techniques used by software engineers in write programs (Wing, 2006, 2008). Think computing no means think like computer ,

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

but think where somebody sued for formulate problem in form problem computing and compiling solution good computing (in _ form algorithm) or explain why no found suitable solution (Febrina _ Calysta Kirei , 2019; Zaharin , Sharif, & Mariappan , 2018).

First CT term kalai introduced by Seymour Papert 1980 and 1996 (Gunawan , 2019). In 2004 the government English enter Theory programming to in curriculum school elementary and intermediate , the goal no for produce software developer programs but for embed ability think computation so that each participant educate could think objective and systematic when find problem in his daily life . By general CT has 4 methods think as following . (1) Decomposition means ability break down data, processes or problem (complex) becomes more parts _ small you know easy task _ managed . (2) Pattern recognition means ability for see equality or even difference patterns , trends and regularities in later data will used in make prediction and presentation of data. (3) Abstraction means To do generalize and identify principles general that produces patterns , trends and regularities that . (4) Algorithm design means develop instruction solving same problem _ step- by -step, so that others can use steps / information the for complete the same problem (Brennan & Resnick, 2012; Lu & Fletcher, 2009; Wing, 2008).

Characteristics think computing include , (1) able give solving problem use computer or device others , (2) Able to organize and analyze data, (3) Able to perform data representation via abstraction with a model or simulation . (4) Able to do automation solution through method think algorithm . (5) Able to do identification , analysis and implementation solution with various combination steps / methods and sources efficient and effective power . _ (6) Able to do generalization solution for various different problem _ Gunawan , 2019; Zaharin et al., 2018).

2. Method

Research Design

Study this use method approach best practice (experience best) conducted by researchers alone through series activity with using interactive multimedia in the learning process . According to The Director General of PMTK for National Education (2007:26) stated that Best Practice is experience best about success somebody in solve problem when doing task . For teachers especially is learning at his school . Best Practice have characteristic features or indicator as following . (1), develop method new and innovative in development as well as solve problem in education specifically learning (2), bring a change / difference so that often said result outside ordinary (outstanding result) (3), able resolve problem certain by sustainable (success) sustainable) or impact and benefits sustainable (3) able be a model, give inspiration in make policies (officials), and other teacher inspiration , including participant students and (4), the methods and methods used and / or used character economical and efficient .

Time and Place Study

Study held on 05 to _ with October 23 , 2021 class IX MTsN 1 Tanah Datar 3 times meeting

Procedure Study

Stages Preparation

Before held activity learning , especially formerly researcher provide preparation for the learning process namely :

a. RPP with design learning use approach Thinking based Computational Thinking
b. Observation Sheet Activity participant educate
c. Sheet question Quiz with using Kahoot
d. LKPD with use liveworksheet
e. Questions and Keys Answer for test
f. Distribution group Participant educate

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

Implementation

Activity learning held 3 times (8 hours of lessons) with apply learning active Thinking based Compuational Thinking with design the lesson (attached) trace as following :

a.Meeting I (RPP. 1) Stages Decomposition

Teacher explains problem limited energy through TV news captured from you tube . Limitations energy caused because act human is one with use ingredient burn Oil on vehicle motorized , so result in layer ozone dwindling and the supply of fuel on earth is also running low , so that participant educate challenged for find source alternative energy for solve problem the

b. Meeting II (RPP. 2) Stages Pattern recognition and Abstraction

Teacher gives example of one make technology friendly simple environment _ that is with use principle pyrolysis _ work same with distillation process like ever _ practiced in class VII. Then the teacher invites participant educate for see the distillation process oil from the existing citronella _ environment Public around . After that participant educate designing and designing picture producer source energy alternative simple

c.Meeting III (RPP.3) Stages Algorithm

Participant educate make miniature production tools product technology friendly environment as alternative energy sources , with utilise tools and materials the existing one environment around , communicate step work from tool producer the alternative energy source . Every stages of learning Computational thinking participant educate will To do activity experience , interaction , communication and reflection in accordance with approach (MIKiR)

Observation

Observing or observation conducted During action take place . Observation done by the teacher himself for see activity study participant educate During

activity learning take place . Observation guided with sheet observation activity participant students who have prepared .

Technique Data Collection

Technique Data Collection

a.Observation

Method observation is method observation direct to activities carried out by participants educate typing carry out the learning process with apply learning with approach Thinking based Computational Thinking

b. Learning Outcomes Participant educate

Study results participant educate is gathering results score obtained test _ participant educate after doing learning active Thinking based Computational thinking held

c.Documentation

Documentation is gathering documents and photos moment apply learning Thinking based Computational Thinking

Data Analysis Techniques

Research Data this are qualitative and quantitative data . Research data qualitative analyzed by descriptive for describe the learning process . Quantitative data analyzed with using descriptive statistics which include :

a. Result data study participant educate analyzed with :

1) find the average value by classic every meeting including the average score on implementation Evaluation The KD Daily
2) Media and Mode for see score middle
3) Maximum Value and Minimum Value obtained participant educate
4)vStandard deviation from results evaluation

b. Activity and Motivation Data Analysis study Participant educate with use scoring sheet observation participant educate like Table

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

Table 1. Conversion score activity participant educate.

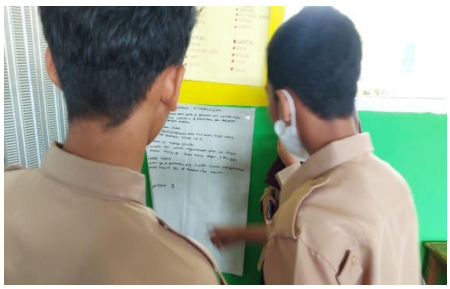
Score Range	Score	Category
4.2 X 5	A	Very Good
3.4 X 4.2	B	Well
2.6 X 3.4	C	Enough Well
1.8 X 2.6	D	Not good
1 X < 1.8	E	Very Not Good

3. Result and Discussion

Description Implementation Application Learning Thinking CT -based

Activity learning Process materials and products technology friendly environment held three meetings _ with use approach learning Thinking based Computational Thinking (CT), as in Figure 1

Participant educate do LKPD with live worksheet



Participant educate visit group knowing results group

Participant educate watching the video shown by the teacher

Figure 1. Learning Process decomposition

Meeting 1 is held Tuesday 06 October 2021 which was attended by 24 participants educate . Stages this is Decomposition on CT , where participant educate solve problem Becomes more trouble _ small so that could resolved . In

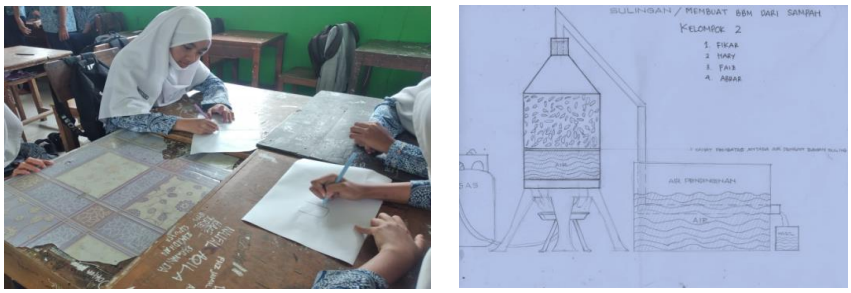
the implementation activity learning there is component Thinking with the implementation process the learning are :

a. For Apperception and knowing level beginning understanding student use menti.com alpikasi (experience)
b. Participant educate see a video about thin it out source energy on earth presented by the teacher (experience)
c. Teachers and participants educate To do ask answer about the video presented (Interaction)
d. Participant educate group solve problem look for alternative solution for resolve limited source energy (interaction)
e. Each group communicate results discussion by classical (communication)
f. For knowing level understanding participant educate participant educate working on LKPD through application liveworksheet (Reflection)
g. Teachers and participants educate together take conclusion

Meeting 2 will be held on October 7 , 2021, which will be attended by 24 participants educate . Stages this is Pattern recognition and Abstraction where the teacher shows one product technology friendly environment and mechanism it works . Principle work make product source energy alternative one _ same working process with distillation or refining . Participant educate invited see the distillation process existing citronella oil _ _ environment Public around the madrasa. After that participant educate designing in the form of picture one _ example method make friendly alternative energy source environment group like Figure 2 below .

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

Visit the place refiners in the community



Participant educate make Design Result Design

Figure 2. Learning process pattern recognition and abstraction

As for the stages lessons learned at this meeting is as following .

Pattern recognition

a. Teacher tickles knowledge beginning participant educate about Theory before with use Kahoot app (experience)
b. Participant educate see a video about source energy alternative as effort resolve problem environment
c. Participant educate watch a video about the distillation process or distillery that the pyrolysis process that same with distillation (distillation)

Abstraction

After that participant educate group designing or designing alone tool pyrolysis simple so that generated picture design tool pyrolysis simple

Meeting 3, held on the day Friday , October 22 , 2021 which was attended by 24 participants educate , where at the stage of this is a Computational Thinking Algorithm process where participant educate make product miniatures

technology friendly environment from materials the existing one around , then present in front class mechanism work tool the with the learning process :

a. Participant learn in the group designing tool product technology friendly environment simple in accordance with the design already designed
b. Group will present tools and materials , steps and sequence work tools that have been made
c. Teachers and participants educate make conclusion together
d. As reflection for know level understanding participant teach the teacher to hold a quiz game with Kahoot
e. Stage test via google forms

As for Activities learning at meeting 3 as shown in Figure 3 below

Figure 3. Implementation process learning algorithm

Activity Study Participant Educate

Observation results activity study participant educate during the learning process observed with use guidelines observation . From the results of observations so Activity study participant educate experience enhancement start from meeting 1, meeting 2 and meeting 3 like seen in Table 3 below .

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

Table 3. Activities participant educate

No	Activity Shiva	Activity average participant learn per meeting			Average
		Pert 1	Pert. 2	Pert. 3	
1	Experience	4.33	4.58	4.46	4.45
2	Interaction	3.33	4.38	4.50	4.07
3	Communication	3.33	4.17	4.58	4.02
4	Reflection	4.25	4.13	4.79	4.38
	Average	**3.81**	**4.31**	**4.58**	**4.24**

Study this experience success in develop activity study participant educate . This thing showed with results observation participant educate with learning Thinking CT based , with the average result is good (4.24). At Meeting 1 Activity Experiencing (4.33) and reflection (4.25) are categorized good , but on Interaction (3.33) and Communication (3.33) categorized enough . This thing caused because participant educate not yet used to with activity learning active Thinking CT based , But at the Meeting 2nd and 3rd Activities the experience increase , because for develop activity participant educate the writer apply CT activity with steps Decomposition where participant educate solve big problem _ about damage environment with choice solution the existence of alternative energy, then the teacher gives an example of one alternative form of energy is biofuel. After that teacher exemplifies that biofuel _ mechanism work same with the refining process (pattern recognition), and the teacher invites participant educate direct see tool distillery there is simple environment society . After that participant educate designing alone abstract alone mechanism work tool producer source alternative energy with designing alone the tool with existing things _ environment around , after that participant educate designing themselves and communicate alone mechanism and method work tool the with think by algorithm . Every Stages learning CT experienced _ the there is aspect Thinking where participant educate experience , interaction , communication and reflection . Besides that application learning that integrates digital application systems such as use of Kahoot and liveworksheet add motivation participant educate in activity learning .

Purwanti , H, 2021 stated that Application Learning Active with approach MIKiR (Experiencing , Interaction , Communication and Reflection) is very helpful participant educate in learning for develop Skills communication and collaboration . Next Ansori , 2020 states that application Computational Thinking is one _ many abilities _ support dimensions education 21st century . With application CT in the learning process will direct participant educate for have skills think critical , creative , communicative as well as Skills for collaborate in complete problem.

Learning Outcomes Participant educate

Study results participant educate with apply learning active Thinking CT - based experience increase . This thing seen from increase score Quiz participant educate every meeting and results Evaluation daily participant complete education _ entirely .

Table 4. Statistics of Learning Outcomes Participant educate

No	Statistical Data	Pert2	Pert. 1	Pert. 3	PH KD
1	Average	80	89	94	95
2	Max Value	90	100	100	100
3	Min Value	60	75	83	88
4	median	75	90	96	95
5	Mode	75	100	100	100
6	Standard deviation	7.91	8.65	5.41	4.68

From Table 4 it can be seen that the average value of participant educate During application learning Active Thinking CT based on process and product materials technology friendly environment experience enhancement every meeting . this kd KKM is 75. At Meeting 1 there is participant educate those who don't done , see the minimum score is 60, while at meetings 2 and 3 everything is completed and on the KD value in the Assessment Daily all participant also complete . _ Enhancement score participant teach too _ seen from the Mode and Median, where the mode of meeting 1 is 75, while at meetings 2 and 3 and the PH is is 100. Median value at meeting 1 is 75 while at Meeting 2 and 3 is 90 and 96 and the Median at PH is 95.

Literasi Nusantara. vol.2 no. 3, July 2022– October 2022
ISSN 2746-8208 (Online) and ISSN 2746-3575 (Print)

According to Sukandi (2003) in Saiful Sagala (2009) there is four component study active that is experience , interaction , communication and reflection . With experience alone through experience study in the form of investigation , experiment or observing , discussing so information will easy absorbed , remembered and evoked questions curiosity participant educate . Interaction in the learning process is the keyword going to success a learning process . The interaction pattern applied by the teacher in the class is decisive and improves involvement participant educate . In the learning process and is a method for develop Skills collaboration . Various form interaction occur cause error meaning chance corrected , meaning awakened _ the more solid , quality results study improve and skills collaborate the more increase

4. Conclusion

Based on results analysis and discussion about application learning active with approach Thinking based Computational Thinking process materials and products technology friendly environment could taken conclusion as following :

a. Approach Thinking based Computational Thinking is very precise applied to Process materials and products technology friendly environment.
b. Approach Thinking based Computational Thinking in learning could increase activity study participant educate.
c. Approach Thinking based Computational Thinking in learning could increase results study participant educate.

References

Ansori , 2020 *Thoughts Computing (Computational Thinking in solving problem* . Dirasah Journal Vol. 3 Number 1. https://ejournal.laifa.ac.id/index. php / felt

Brennan, K., & Resnick, M. 2012. *New frameworks for studying and assessing the development of computational thinking* . Proceedings of the 2012 Annual Meeting of the American Educational Research Association, Vancouver, Canada, 1, 25.

Febrina Calysta Kirei . 2019. What is meant with computational thinking ? Retrieved December 20, 2019, from https://www.dictio.id/t/apa-yang-diunjukdengan-computational-thinking/12315

Gunawan , BR 2019 What is meant with computational thinking ? Retrieved ecember 20, from https://www.dictio.id/t

Hisham Zaini , Barmawy Munthe , Sekar Ayu Aryani , 2002 Learning Strategies Active university , (Yogyakarta: CTSD State Islamic Institute of Sunan Kalijaga , h. xii

Revitasari , 2019 Become an inspirational teacher with draft Thinking Tonato Foundation smart blog accessed 11 October 2021

Rhedona , W, 2019 Develop 21st Century skills in Chemistry Learning . Journal Innovation Chemistry education Vol. 13 pages 2239-2253

Sagala , Syaiful . 2009. Ability Professional Teachers and Education Personnel . Bandung: Alphabeta

Wing, JM (2006). Computational Thinking . Communications of the ACM. Vol.49(3), p . 33–35

Zaharin , NL, Sharif, S., & Mariappan , M. (2018). Computational thinking : A Strategy for Developing Problem Solving Skills and Higher Order Thinking Skills (HOTS). International Journal Of Academic Research In Business And Social Sciences, 8(10)