



# Implementation Of Digital Technology As An Effort To Create Differentiated Learning In Achieving IKM (Independent Curriculum Implementation) In Schools

Riska Imanda<sup>1\*</sup>, Sri Setiawaty<sup>2</sup>, Fakhrah<sup>3</sup>, Karismayani<sup>4</sup>, Wandira Kinanti<sup>5</sup>

<sup>1,2,3,4,5</sup> Malikussaleh University, Jln. Cot Teungku Nie, Aceh Utara, 24351, Indonesia

\*Correspondence e-mail: riska.imanda07@unimal.ac.id

**Abstract.** The basic principle of integrating digital media (technology) in learning aims to improve students' conceptual understanding and develop students' ability to communicate in carrying out their roles both in the world of education and in society. This research aims to determine the effect of implementing digital technology to create differentiated learning in achieving IKM (Independent Curriculum Implementation) in schools, focusing on students' critical thinking abilities. The technique for determining school research locations uses random sampling techniques. The research used a quasi-experiment with a non-equivalent control group research design, where the experimental class was treated with the implementation of digital media using the Read, Answer, Discussion, Explain, and Create (RADEC) model. In contrast, the control class used an expository learning model. Tests to measure students' critical thinking competencies are given in the form of pretest and posttest. The results of students' critical thinking results showed that the average pretest scores for the experimental and control classes were 28.18 and 25.76, while the posttests for the experimental and control classes were 84.47 and 69.92. This shows that after being given treatment there was an improvement compared to before being given treatment. Test the Critical Thinking hypothesis using the Maan-Whitney test, if the Asymp Sig value is  $< 0.05$ , then the Hypothesis is accepted, and if the Asymp Sig value is  $> 0.05$  then the Hypothesis is rejected. It can be concluded that there is an influence of the implementation of digital technology on students' critical thinking abilities using the Read, Answer, Discussion, Explain, and Create (RADEC) model.

**Keywords:** RADEC, Critical Thinking, digital media and learning

## 1. Introduction

The increasingly rapid development of technology is becoming a new challenge in the world of education. The paradigm shift in learning practices from just presenting information has shifted to equipping students with the ability to find out and solve problems, digital literacy, and creativity. Changes in curriculum policy also result in changes to new learning models, strategies, methods, and media. The increasingly rapid development of technology has also become a new challenge in the world of education. A paradigm shift in learning practices, which initially only presented information has now shifted to equipping students with the ability to find out and solve problems, digital literacy, and creativity. Apart from that, technological developments have resulted in changes to new learning models, strategies, methods, and media. It is possible that in the 5.0 era society will have to get used to living side by side with technology, mastering and

utilizing technology. For learning to take place effectively and efficiently, it is necessary to use technology in education.

Education is a process that involves educators and students through an interaction process that can develop students' potential. Education can also be interpreted as a conscious effort made by a person to form a personality with character and develop skills through enrichment, thereby creating fundamental knowledge. The development of science and technology (IPTEK) in the era of Industrial Revolution 4.0 is increasingly rapid, everyone is required to have more knowledge and skills, while one of the factors that supports knowledge is literacy. The Covid-19 pandemic has caused significant literacy and numeracy learning loss. Learning loss is defined as the absence of optimal learning processes at school [1]. The rapid development of science and technology today requires education to participate in the use of technology as a form of innovation in learning [1]. Apart from that, there is a Ministry of Education and Culture, Research and Technology policy regarding "Freedom to Learn" and "Independent Campus". In the current era of digitalization, almost all access to information and material can be found in cyberspace, whether accessing a page or an application. The Ministry of Education and Culture is very aware that the current need for learning is the use of technology, because by utilizing technology it can reach and distribute learning more widely, and can optimize the implementation of the independent curriculum through the learning process, namely differentiated learning (Permendikbud, 2022).

In the era of globalization and internationalization, especially in the fields of science and technology development, the government through the Minister of Education and Culture Nadiem Anwar Makarim said in his speech at the 2019 National Teacher's Day (HGN) event that he initiated the concept of "Free Learning Education". This concept is part of educational institutions in improving the quality of education and must be flexible towards freedom and openness as educational institutions that can play a role and make real contributions for the benefit of the people, especially in the era of Industrial Revolution 4.0 and society 5.0. [2] [3]. The Merdeka Curriculum is a program that is expected to be able to restore learning, which offers 3 characteristics, including project-based learning, soft skill, and character development by the Pancasila student profile, learning on essential material and a more flexible curriculum structure that follows developments in technology and communication science. The Merdeka Curriculum emphasizes the urgency of integrating learning with assessment. This indicates the importance of developing learning strategies that are appropriate to the stages of student learning outcomes, namely differentiated learning which aims to ensure that each student can achieve the expected competencies. Thus, differentiated learning requires varied and periodic assessments. During differentiated learning, there must be a supportive classroom environment where everyone in the class is welcomed and feels welcome, everyone respects each other, and students feel as safe as possible in their class. Teaching to achieve student success. There is equality felt in real form by students, teachers, and students working together to succeed. The use of technology can be a teacher's choice to implement differentiated learning in the classroom.

The development of information technology and communication science is currently progressing so rapidly that it is impossible to avoid it. The current development of the world of education has entered the realm of Education 4.0 fit for Industry 4.0, where the implementation

of education and learning processes is based on student-centered, learning journey, individual learning path, formative assessment, teacher as mentor, multidisciplinary learning space, inclusive collaboration, and co-creation interconnected. This is expected to support the policies of the Ministry of Education and Culture, Research and Technology. Furthermore, there is a need for 21st century life skills (4C); Creativity, Critical Thinking, Communication, and Collaboration. Furthermore, it is hoped that students will have 6 Basic Literacy abilities (numeracy, science, information, financial, and culture and citizenship literacy), have characters that reflect the Pancasila student profile, be adaptive, have leadership qualities and social and cultural awareness.

Android as an operating system for smartphones is described as a bridge between devices and their users to interact with their devices and run applications available on those devices [4][5]. Thus, students prefer to spend time playing on smartphones rather than using time to study both at school and at home, even though smartphone media can also be used as a medium for learning [6][7]. Therefore, to answer the challenges of the 21st-century revolution (4C); It is very necessary to make efforts for Creativity, Critical Thinking, Communication, and Collaboration to ensure educational innovation in the form of utilizing learning approaches so that students have a complete understanding.

Based on the analysis of these conditions, it is deemed necessary to carry out research, "Implementation of Digital Technology as an Effort to Create Differentiated Learning in Achieving IKM (Independent Curriculum Implementation) in Schools".

## **2. Method**

This research will be carried out at SMA N 2 Peusangan, which will be carried out from June to August 2024. The technique for determining school research locations uses random sampling techniques. The type of research used is quasi-experimental research (quasi-experiment) because not all experimental variables and conditions can be strictly regulated and controlled in research. The research used two sample classes, namely the experimental class and the control class. The research design uses a non-equivalent control group design, where the experimental class is treated with the implementation of digital media using the Read, Answer, Discussion, Explain, and Create (RADEC) model. In contrast, the control class uses an expository learning model.

Tests to measure students' critical thinking competencies are given in the form of pretest and posttest. This instrument was validated first, namely testing questions on students who were used as research samples. The initial and final test results are processed to obtain gain. The gain in this study changed after participating in learning and being given treatment. Next, a hypothesis test is carried out for the results of the research carried out.

## **3. Results And Discussion**

This research aims to determine the effect of implementing digital technology to create differentiated learning in achieving IKM (Independent Curriculum Implementation) in schools, focusing on students' critical thinking abilities. The data obtained was analyzed using Microsoft Excel 2019 software and SPSS version 22 software. The influence of the implementation of digital

technology on the dependent variable, namely Critical Thinking, using test instruments in the form of pretest and posttest Critical Thinking (critical thinking).

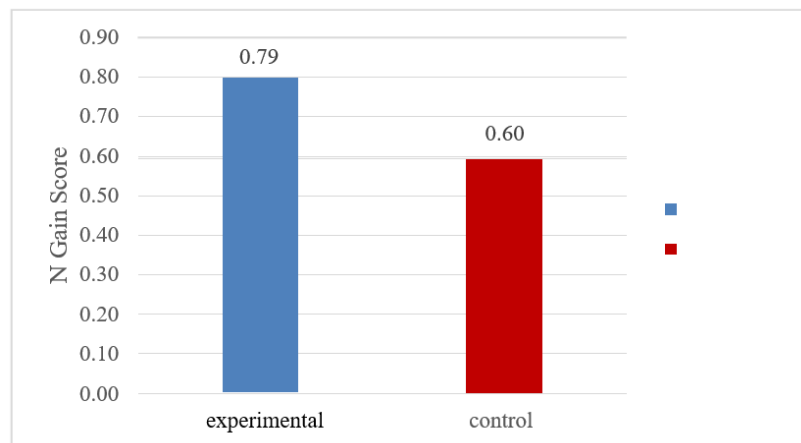
From the results of critical thinking research which was measured using test instruments, pretest and posttest scores were obtained. The following are the average results of the pretest and posttest from the experimental and control classes.

**Table 1.** Average critical thinking scores of students.

No	Class	Pretest	Posttest
1	experimental	28,18	84,47
2	control	25,76	69,92

Based on Table 1, the results of students' critical thinking show that the average pretest score for the experimental and control classes is 28.18 and 25.76, while the posttest for the experimental and control classes is 84.47 and 69.92. This shows that after being given treatment there was an improvement compared to before being given treatment.

The pretest and posttest results are processed to obtain gains. To determine the results of the n-gain test, it is necessary to compare the normal gain of the experimental and control classes. The following is the percentage of n-gain result data:



**Figure 1.** N-Gain diagram

Hypothesis testing uses post-test scores from the experimental and control classes. After all, data has been tested for validity, reliability, and conformity with the prerequisite tests, the researcher carries out a parametric test (T-test) if the data obtained is normally distributed and non-parametric (Mann-Whitney Test) if the data obtained is not normally distributed. Researchers have established the following hypothesis:

H0: There is no influence of the implementation of digital technology on students' critical thinking abilities using the Read, Answer, Discussion, Explain, and Create (RADEC) model.

H1: There is an influence of the implementation of digital technology on students' critical thinking abilities using the Read, Answer, Discussion, Explain, and Create (RADEC) model.

Students The testing criteria are:

If the sig value, (p-value)  $\geq \alpha$  ( $\alpha = 0.05$ ), then the distribution is normal (accepted).

If the sig value, (p-value)  $< \alpha$  ( $\alpha = 0.05$ ), then the distribution is not normal (rejected)

Test the Critical Thinking hypothesis using the Maan-Whitney test, if the Asymp Sig value is  $< 0.05$ , then the Hypothesis is accepted, and if the Asymp Sig value is  $> 0.05$  then the Hypothesis is rejected. Critical Thinking hypothesis testing uses the non-parametric Maan-Whitney test because the data obtained is not normally distributed  $< 0.05$  [8].

**Table 2.** Results of Maan-Whitney Critical Thinking (critical thinking)

	Critical Thinking Results
Mann-Whitney U	1636,500
Wilcoxon W	3847,500
Z	-2,417
Asymp Sig (2-tailed)	0,013

Based on the results of the Maan-Whitney test, the Asymp Sig (2-tailed) value was  $0.013 < 0.05$ . It can be concluded that the "Hypothesis is accepted" or  $H_a$  is accepted and  $H_o$  is rejected. Thus, there is an influence of the RADEC learning model on students' Critical Thinking Competencies.

This research was carried out over 6 meetings for chemical equilibrium material, three experimental class meetings, and three control class meetings. Before learning, students are given a pretest first, and at the end of the lesson they are given posttest questions and to think critically. This research took 90 minutes per meeting or 2 JP in each experimental class and control class.

Critical thinking competency can be seen at the reading stage. Reading activities can encourage students to gain knowledge and develop literacy competencies [9]. Through reading activities, students will gain knowledge and understanding that is built independently and helps students understand basic concepts and information. During the learning process, students will have a provision of understanding that can be explored further, as well as habits to behave. One of the results that is emphasized at the reading stage is the development of critical thinking competencies through reasoning abilities [10]. At this stage, students can independently analyze the information presented. In the Answer stage, students are trained to answer pre-learning questions using the information they got in the reading stage so that students can provide simple explanations (elementary clarification) related to the themes they have read and explained through pre-learning answers. Simple explanations are an indicator of students' critical thinking [9].

At this stage, students practice building independence or character own initiative in searching for answers using available information they get [11]. This is in line with research [12] that someone who has a high interest in reading will not face difficulties in finding accurate information because they are used to sorting information and someone who has critical thinking skills usually does not easily believe the information they receive. Before checking the

information. Explain stage, this stage trains students' critical thinking competencies on indicators of providing further explanation (preliminary clarification). Activities at this stage develop students' character so that they can confidently convey the results of the discussion. Explaining concepts logically and systematically and providing strong reasons to support arguments [9]. The increase in students' critical thinking competence was obtained from a posttest average of 84.47 which can be seen in Figure 1 and the average n-gain test score was 0.79. This is because in the experimental class, when working on the pretest questions, students are very enthusiastic and try to remember the previous material to answer the questions because basically, they have not studied the material on Chemical Equilibrium, as well as when solving post-test questions with students doing the reading stage, Students remember what they get because reading can improve memory and understanding [13] and at the answering stage students are used to answering questions independently.

#### 4. Conclusion

Based on the results of the research and discussion, it can be concluded that there is an influence of the implementation of digital technology on students' critical thinking abilities using the Read, Answer, Discussion, Explain, and Create (RADEC) model.

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